A Mixed Methods Study of Paradoxical Tensions in Decision-making: Engage or Ignore?

by

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ABSTRACT

This study explores the thinking behind decision-making when paradoxical tensions are present. The decision-making norm consists of ignoring rather than engaging with underlying paradoxical tensions. This study supports the idea that engaging with paradoxical tensions at a cognitive level is influenced by the kind of tensions involved in the decision situation. This study also points to two cognitive dimensions that decision-makers use to distinguish between types of decisions: information use and contextual focus. Finally, this study offers the possibility that a class of decisions with paradoxical tensions requiring information for cognitive exploration and a focus on external context has yet to be identified.
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1.0 INTRODUCTION

Tasked with improving value for money, a small group of senior advisors in a government organization worked with the organization over the course of a year to develop a set of feasible options for finding a budget reduction of 30% or $300M. The sizable reduction target presented a fundamental paradox – a set of irreconcilable tensions: cost-savings cannot be accomplished with no change in delivery of services. Ultimately, they developed a two-page precis (based on a template) as well as lengthy supporting documents setting out the options, including the benefits and drawbacks of each. As required, these were provided to the governing body two weeks ahead of a committee meeting where a decision was to be made. The decision was placed on the committee’s agenda and allotted 15 minutes. On the day of the meeting, the decision was made in a hallway outside the committee room during a two minute discussion between the head of the committee and the lead advisor. All the options were rejected as non-optimal and no budget changes were made. While the organization and the advisors demonstrated engagement with paradoxical tensions by developing possible alternatives, the decision-makers did not. The problem was ultimately not addressed and there were no improvements in value for money.

Paradox describes the dissonance between simultaneous tensions (Mechiche, 2020). Paradoxical situations arise from enduring and irreconcilable tensions (Mechiche, 2020). In the case of decisions involving paradox, making a decision is not only difficult, but no decision will completely resolve these tensions (Gemi & Hauschildt, 1985). To be effective, decisions involving paradox require continued engagement with the unresolvable tensions (Casey, 2019). However, when faced with a decision involving paradox, the norm is for individuals and organizations to ignore rather than engage with the
underlying tensions (Smith, 2014; Gaim & Wåhlin, 2016). Deviation from this norm can even appear irrational to observers (Barberis & Thaler, 2003; Chapardar, 2016; Mechiche, 2020).

Understanding the thinking behind the apparent lack of engagement described in the opening vignette became the motivation for my study. In my professional life, I observed similar decisions unfold on several occasions, although not always with such significant consequences. Whispers within the organization suggested decision-makers willfully ignored the complexities of the decisions they were being asked to make. My focus turned to complex decisions involving paradox, as it seemed that many seemingly poor decisions involved paradox.

Management researchers have been exploring decision-making involving paradox for the past two decades or more. Examples include studies on detrimental and wasteful organizational decisions, poor decision-making actions (e.g., Nutt, 2004; Nutt, 2008; Seo & Barrett, 2007; Duarte, 2020), deviance in decision-making (e.g., Mertens et al., 2016; Warren, 2003; Galperin, 2012; Shukla et al., 2020), the organizational and individual sources and effects of paradox (e.g., Smith, 2014; Keller et al., 2017; Lavine, 2014; Langley, 2020; Manzhynski et al., 2020), and 50 research studies on managing paradox through the Covid-19 pandemic (Bednarek & Smith, 2023). Scholarship in organizational theory suggests that individual decision-making is central to an organization’s success and survival. In large part, this is because the actions of individuals, and in particular decision-making, are thought to determine an organization’s ability to adapt to its external environment (Dutton & Jackson, 1987; Calabretta et al., 2017; Bingham & Eisenhardt, 2011; Fredrickson, 1984; Cammock et al., n.d.). If organizational success relies heavily on individual decision-making and adaptability, as the literature suggests, engaging with paradoxical tensions (i.e., deviant decision-making) may constitute a critical source of organizational adaptation and, ultimately, survival.
The last two decades of research on decision-making involving paradox have established that effective decision-making requires engagement with paradoxical tensions (Smith, 2014; Gaim & Wåhlin, 2016; Chapardar, 2016; Keller et al., 2017; Gaim, 2018; Pang et al., 2021; van Neerijnen et al., 2021). At the same time, management researchers and practitioners have observed that decision-makers would rather ignore or minimize paradoxical tensions rather than deal with them (Nutt, 1984; Harper, 1997; Nutt, 2004; Smith, 2014; Gaim & Wåhlin, 2016; Pederezini, 2017; Chauhan & Sagar, 2020). The decision-making norm, therefore, is to avoid rather than engage with paradoxical tensions. This describes a situation where addressing decisions involving paradox effectively requires deviation from the norm. However, engagement with paradox as a form of deviant decision-making behaviour has not been explored in the literature. This study, therefore, looks at how decision-makers recognize and think about decisions involving paradox from the perspective of engagement with paradoxical tensions as (positive) deviation from the decision-making norm.

The field of medicine provides a ready example of success through engagement with paradox. Consider the situation where surgically implanting a “scaffold” to support nerve growth across a patient’s severed spine offers a cure, but the complexity involved in bioengineering these materials makes them prohibitively expensive. In this cost versus cure paradox, while cost all but rules out a known cure, the benefits are potentially life-changing. Dr. Pelling, a biophysicist at the University of Ottawa, engaged with these tensions - rather than follow the norms of traditional bioengineering to attempt to bring down the cost, Dr. Pelling wondered if there might be cheaper ready-made structures in nature that would be suitable as scaffolds. According to Dr. Pelling, “I was cooking with [asparagus] one day when I sort of noticed how it looked like a spinal cord – to me at least – and that sparked the idea” (Bresnahan, 2020). Engaging with paradox and abstracting led to innovative research on scaffolds,
the formation of a company, and FDA approval for a device to treat patients with recent, paralyzing back injuries (Bresnahan, 2020). Innovations such as Dr. Pelling’s benefit both individuals and organizations.

The need for studying the thinking behind decisions involving paradox is exemplified by an example from the Canadian Armed Forces (CAF). The CAF is struggling to manage recruitment versus deployment paradoxical tensions involving the demands of force generation (i.e., the cost of recruiting new members) and force employment (i.e., the cost of training and deploying existing members) (Anand, 2023). At the organizational level, CAF leadership has given sweeping direction and set out detailed actions to “reconstitute” the organization (an initiative aimed at recruitment, training, deployment and many other tensions), provided dedicated funding and made an eight-year commitment to addressing the recruitment versus deployment paradox (Eyre & Matthews, 2022a; Eyre & Matthews, 2022b; Rehman, 2022). At a departmental level, therefore, the organization appears committed to addressing the recruitment-deployment paradox. Yet, at an individual level, the Chief of the Defence Staff and Deputy Minister state, "One of the major limiting factors to the CAF’s readiness is its mid-level leader capacity, which must be focused in a disciplined manner" (“Situation” chapter, Section 8. “Problem Definition” in Eyre & Matthews, 2022a). In other words, mid-level leaders must focus or must be made to focus on engaging with the recruitment versus deployment paradox. From the standpoint of practice, this study provides insight into decisions involving paradox that should help managers, such as CAF mid-level leaders, engage with paradox and achieve their organization’s goals.

This study’s primary interest is in complex decisions in which the inherent conflict is paradoxical. Complex decisions are ill-defined, have unpredictable consequences, and involve inherent conflict (Gemi & Hauschildt, 1985). In the case of decisions involving paradox, the alternatives to be evaluated are often not comparable (Västfjäll et al., 2016; Basu & Savani, 2017), making this type of complex decision extremely difficult and complicated. Complexity also introduces uncertainty. In complex situations,
variables interact in ways that change their combined character (Howard, 2010; Pedrezini, 2017) (i.e., the complex whole is greater than the sum of its parts). This emergent property of complexity makes the connection between cause and effect uncertain in complex situations (Pedrezini, 2017). Complexity uncouples the rational relationship between actions and their consequences (Howard, 2010; Pedezini, 2018). Paradox, complexity and uncertainty virtually guarantee a changing set of circumstances for which the default of a single or simple solution will not be effective.

Two overarching theories offer valuable lenses through which we can investigate decision-making with paradoxical tensions. First, event theory supports the idea that deviating from the decision-making norm (e.g. engaging fully with paradoxical tensions) is an event with process and contextual features. Events are also seen as disruptions or discontinuities. Accordingly, this study places particular emphasis on the context surrounding individual decision-making as an integral part of the decision-making process. Incorporating context into this study helps to separate the effect of context from the impact of other variables of interest, injects a layer of complexity in the decision situation, and allows for the study of higher-level phenomena on individual decision-making (Johns, 2017). Second, categorization theory provides a bridge between an individual’s thoughts and feelings and their decision-making behaviour. According to categorization theory, an individual’s thoughts and feelings begin to shape their behaviour early in the process of decision-making (Dutton & Jackson, 1987). This study explores the cognitive and affective components of decision-making believed to contribute to observed decision-making behaviour in line with categorization theory.

This study takes a mixed-method exploratory approach, combining surveys and observed decision-making to investigate decision-making that either engages with or suppresses underlying unresolvable tensions. The decision-making behaviour of interest in this study is the deviation, or engagement with paradoxical tensions, that sometimes occurs when a decision-maker faces a complex,
paradoxical decision. In this situation, the decision-making norm is to avoid or ignore paradox and treat decisions involving paradox as conventional trade-offs, compromises, or simple decisions (Harper, 1997; Nutt, 1984; Nutt, 2004; Pederezini, 2017). This kind of decision-making norm has evolved from the reinforcement of rational choices over time (Bendor & Swistak, 2001). The focus of this study, suppressing or engaging with unresolvable tensions in the face of paradox, is, therefore, a question of adhering to or deviating from the decision-making norm. Unlike the norm, divergent or deviant decision-making behaviour in the face of paradox addresses the irresolvable conflicts underlying the situation (Smith, 2014).

1.1 RESEARCH QUESTIONS AND CONTRIBUTIONS

Bearing in mind this study's view of engaging with paradoxical tensions as a type of deviant decision-making, and use of paradox as an example of underlying unresolvable tension, this study addresses three research questions: (1) Which cognitive dimensions do individuals use to differentiate between decisions with and without unresolvable underlying tensions, and how important are these dimensions in their perceptions? (2) To what extent do specific decision-making skills contribute to these cognitive dimensions for differentiating decision types (from those with resolvable to those with unresolvable tensions)? (3) How do decision scenarios differ from a cognitive perspective when paradoxical tensions are different from scenario to scenario?

In addressing these questions, this study contributes to theory by offering a dynamic theoretical framework for deviant and non-deviant decision-making involving paradox (i.e., engaging with or ignoring paradoxical tensions, respectively), with rational and emotional components. In addition, it proposes a spectrum of increasingly paradoxical decision types – filling in gaps in the existing literature. This study also provides an elaboration of the link between thought and action in decision-making, the elucidation of distinctions between simple, complicated and complex decisions, and the derivation of
thematic codes to explore decision-making from a cognitive perspective. It also addresses a call in the literature (Pang et al., 2021; Smith, 2014) for research on paradoxical tensions beyond the often-cited explore versus exploit paradox. This study also contributes methodological insights into the application of the repertory grid technique for exploring management cognition, the use of a think-out-loud procedure to elicit information about cognition, and suggests focusing research on decisions involving paradox on examples from the field of human resources.

Finally, concerning practice, this study contributes to approaches that encourage full engagement with paradoxical tensions during decision-making, and suggests a number of techniques that might improve both individual and organizational performance.

The remainder of this study is presented in five chapters. First, the literature on decision-making, paradox, and engagement is reviewed comprehensively. This begins with an elaboration of an organizing theoretical framework for considering these three topics together. The review is followed by a chapter integrating the literature on decision-making, paradox, and engagement, including a detailed conceptual framework for studying cognition in the face of decisions involving paradox. The next chapter provides a detailed description of the mixed methods approach, including the repertory grid technique, used for studying decision-making involving paradox. This is followed by a chapter describing and interpreting the data gathered, including insights into the meaning of the results and their relation to theory. Finally, the conclusions chapter addresses the research questions posed, sets out this study's contributions and limitations, and provides suggestions for research that could be undertaken in the future.

2.0 LITERATURE REVIEW
This chapter reviews the literature related to a decision-maker's progress through the decision-making process. Figure 1 presents a broad proposed framework that conceptualizes this process, including the
role of context, paradox, and engagement with paradox. Decision-making is embedded in context at the level of the individual, organization and external environment, as well as the decision itself. Context includes such things as governing laws, organizational culture and norms, the thoughts and feelings of the decision-maker, and characteristics of the decision at hand. Context encompasses paradox as well as antecedents to the degree of engagement with paradoxical tensions during decision-making (e.g., having a paradox mindset). Engagement with paradoxical tensions may occur to a greater or lesser degree. The norm in decision-making is to have partial or non-engagement with paradoxical tensions; full engagement reflects a departure from the norm. This is reflected in the divergence in the decision-making process in Figure 1: a "rational" (in the view of a typical observer) stream of decision-making

Figure 1 – Proposed Framework: Decision-making with paradox
behaviour that adheres to organizational norms of non-engagement with paradoxical tensions; and an "irrational" stream representing a deviation from the norm – engagement with paradoxical tensions. Rational and irrational streams may be separate, or decision-making may mix both rational and irrational processes. Figure 1 is used to structure the literature review. The detailed decision framework that follows the literature review is used to structure the study.

The next section describes the literature review process and approach. This is followed by a review of the literature on the major components of the framework shown in Figure 1: decision-making, context, paradox, and engagement.

2.1 APPROACH

This study adopted the literature review method used by Meyer et al. (2010) to select articles for inclusion in the review. The method consists of database searches to identify relevant articles and the examination of references and citations within these articles. First, a Web of Science search was conducted on the keywords “paradox,” “decision,” and “deviance” (anywhere in an article). Search fields were combined with the Boolean AND operator. The timespan of the initial search was from 1900 to 2020. Words with roots the same as, or similar to, keywords were also used as search terms, including paradoxical (for paradox), decision making, decision-maker, decisions (for decision making), and deviation, deviant (for deviance) (Hutzschenreuter & Kleindienst, 2006). Single and multi-word search terms were not parenthesized in the search field. The search yielded fewer than 25 articles regarding decision-making, none of which focused on deviance and paradox simultaneously within the business or public administration field. The search parameters were therefore expanded by using search terms only in pairs (e.g., decision AND paradox, decision AND deviation, etc.). Thousands of articles met these search criteria. Only “highly cited” and “hot papers” (i.e., papers meeting the Web of Science criteria for these designations based on date written, times cited, and field of study) were considered for inclusion.
in the review, reducing the number of articles to about 50 in total. When the content of these papers was examined for relevance to this study, 16 papers remained for review.

Second, where the 16 papers in question contained particularly relevant text with references to other articles, these references were examined for relevance to this study. Additionally, articles citing the 16 papers were examined for relevance using the Web of Science “Times Cited” function. This process doubled the number of papers addressing decision-making, paradox, or deviation included in the review.

Finally, the search for papers for inclusion in this review was expanded to Business Source Complete (to ensure coverage of the management literature) and Google Scholar (to ensure a broad range of articles), following the same steps as for the Web of Science. This process did not have a definitive end point but resulted in approximately 80 articles in total being included for review. Additional documents were included following the Academy of Management Annual Meeting in 2020. Searches were conducted as the study unfolded until 2023 using the method of Meyer et al. (2010) to ensure that the review remained current.

Trends in the literature were reflected in the results of database searches conducted for this review. A trend in decision-making research, for example, has been to move away from studies of individual decision-making and toward the examination of organizational decision-making. This trend reflects a shift in theoretical perspective from a "reductionist" view of behaviour to a more holistic view that incorporates context (Sibony et al., 2017). There is, however, relatively recent interest in the individual-level micro-foundations of management cognition (Helfat & Peteraf, 2015), decision-making (Eisenhardt et al., 2010), and paradox (Miron-Spektor et al., 2018). As a result, database searches identified fewer relevant recent articles on individual decision-making than articles dealing with
decision-making at the team, group, or organizational level. However, these two trends in the literature suggest that the current study’s focus on individual decision-making under paradoxical conditions is topical, particularly as context forms part of the study to provide a balanced, if not entirely holistic, perspective.

The following sections review the literature associated with the decision process diagrammed in Figure 1. First is a discussion of decision-making. Next is a review of some of the contextual elements of decision-making, including paradox. Finally, a review of deviance is provided as a means of understanding engagement with or ignoring paradoxical tensions. The purpose of the detailed review is to establish the link between thought and action since this relationship underpins the interpretation and analysis of this study’s results.

2.2 DECISION-MAKING

Decision-making is a multilevel, information-based process (Adinolfi, 2021) that involves choosing from among a set of alternatives based on a number of criteria for evaluating those alternatives (Nutt, 1998; Elbanna et al., 2020; Eranova & Prashantham, 2014). Researchers have identified two primary decision-making logics or rationales underlying the decision-making process: the logic of consequence (based on the value to the decision-maker of the expected consequences of a decision) and the logic of appropriateness (based on the degree of alignment between expected outcomes and the decision-maker’s role or identity) (Newark, 2018). The decision-making process has both intuitive, emotional components and rational, analytical components (Adinolfi, 2021), although there are different perspectives on their exact role and operation (e.g. Cristofaro, 2019; Hulpke & Fronmueller, 2022; Newark, 2018).
Adinolfi’s (2021) “big picture” of decision-making identifies three fundamental assumptions researchers make regarding the nature of decisions and decision-making; a subjective or objective view of decisions, a view of the decision-maker as either intuitive or rational, and an idea about decision-making as either ordered or disordered.

Following the trajectory of these assumptions in the literature, the subjective and objective aspects of decisions have been brought together in the idea that decision-makers and the decision-making environment interact and coevolve (Adinolfi, 2021). The intuitive and rational components of decision-making have been incorporated into dual theories of cognition as independent processes operating in tandem (Adinolfi, 2021). The interaction between intuitive and rational processes (e.g., Cristofaro, 2019) has been extended to the notion that decision-makers have both cognitive flexibility (i.e. the ability to use both rational and intuitive modes of thinking) and emotional flexibility (the ability to bring a variety of emotions to bear on a decision) (Hulpke & Fronmueller, 2022). Finally, assumptions concerning the orderliness of decision-making produce different kinds of findings. Decision-making seen as a cause-and-effect chain of events (Elbanna et al., 2020), progressing through decision identification, alternative generation, selection, and implementation (Adinolfi, 2021), yields insights into the relationship between inputs, outputs and throughputs. Research into decision-making as a collection of interrelated elements helps explain change over time and the relationship of decisions to organizational performance (Elbanna et al., 2020).

The fact that research into decision-making can be based on different assumptions from one study to the next, along with methodological problems involving definitions and scope of study, may have led to some inconsistent findings. For example, findings are mixed on the relationship between personality and management outcomes (Abatecola et al., 2013), planning and performance (Amoo et al., 2022), and the precise effect of different elements of context on decision-making (Elbanna et al., 2020).
However, there is considerable agreement in many areas. For example, it seems to have been established that context (decision, task, situation, and environmental context; Elbanna et al., 2020; Shepherd & Rudd, 2014) plays a critical role in influencing decision-making and its outcomes (Shepherd & Rudd, 2014). It is also accepted that emotions and mood influence management decisions (Cristofaro, 2019) and that cognitive style (i.e., a preferred way of thinking) influences decision-making outcomes (Shepherd & Rudd, 2014).

More than ever, decision-makers are facing upheaval and experiencing profound decision-making uncertainty and complexity as a result (Alvarez & Porac, 2020). When faced with complex decisions, decision-makers typically do what they’ve always done, relying on routine and the past to predict the future (Alvarez & Porac, 2020). However, the complexity and uncertainty inherent in most decisions today offer decision-makers an opportunity to use their imaginations to create new, innovative decision choices (Alvarez & Porac, 2020). A new decision-making logic has been suggested, the logic of absurdity (Newark, 2018), which may lay the foundation for decision-makers to use their imaginations to create innovative decision choices (Alvarez & Porac, 2020). The logic of absurdity entails willfully choosing an irrational course of action based on a rational analysis of alternatives and the situation (Newark, 2018). The driver behind this kind of logic is thought to be a decision-maker’s need to express free will, agency, and self-determination (Newark, 2018).

This study shares the view in the literature that change and reaction to change pervade organizations (Alvarez & Porac, 2020). In responding to change, this study assumes that decision-makers are both rational and irrational, that decisions are material and constructed as a product of co-evolution (i.e., variation, selection and retention of decision variables; Adinolfi, 2021; Cristofaro, 2019) or enactment (i.e., making sense of the ongoing environment; Alvarez & Porac, 2020; Cristofaro, 2019; Cristofaro, 2022), and that decision-making is not necessarily ordered. The focus of this study is
individual decision-makers within organizations. The decision and decision process of interest is one where the situation involves paradoxical tensions. The mindset required to address these decisions effectively resembles the logic of absurdity in its reliance on creativity and innovation and not being bound by any particular logic or past events. Decision-making, as conceived of in this study is depicted in Figure 1 as the line or path a decision-maker follows as they encounter paradox and choose to engage with or ignore underlying tensions. This section of the chapter begins with a discussion of different types of decisions to add richness to the definition of a decision. The organization of decisions into types also highlights a range of subtleties permeating the decision-making process. The review then discusses two particular types of decisions, rational and irrational, to introduce the idea that decision-making is not a singular process. This discussion also explores why deviant decisions are typically seen as irrational.

2.2.1 Types of Decision-making
Eranova and Prashantham (2014) describe a decision as the act of choosing from among alternative actions. This description aptly describes decisions in common parlance. However, decisions are more than a mere sorting of alternatives (Nutt, 2008). Decisions involve a rich spectrum of features (Nutt, 2008). A consideration of the different types, domains, functions, and dimensions of decisions, for example, reveals the true scope of decision-making.

Robert N. Anthony (1965 in Edwards et al., 2000) suggested three types of decisions: strategic (involving long-range organizational goals), tactical (requiring the setting of targets and criteria to achieve goals), and operational (involving the management of day-to-day activities). Herbert A. Simon (1997 in Edwards et al., 2000) suggested the addition of transactional decisions below the operational decision level to describe fully programmed/structured "non-decisions." The classification of strategic, tactical, operational, and transactional decisions is based on several decision dimensions. These dimensions include the degree of structure (Edwards et al., 2000), complexity, ambiguity, resource
demand (Amason, 1996), creativity, innovation, exploration (Nutt, 1984), analysis required for decision-making (Connolly, 1980), certainty (Starcke & Brand, 2012), comprehensiveness (Hutzschenreuter & Kleindienst, 2006), and the kind of cognitive processing (Alós-Ferrer, 2018; Akinci & Sadler-Smith, 2013), impacts (e.g., internal versus external), and commitment (Edwards et al., 2000) involved. Strategic decisions register high on the degree of ambiguity, complexity, resource demand, creativity, external impact, and analysis required. In contrast, operational and transactional decisions register on the lower end of these dimensions (Edwards et al., 2000; Amason, 1996; Nutt, 1984). Further categorization of decisions is possible: by the domain (e.g., internationalization, product development, acquisitions, and alliances, Bingham & Eisenhardt, 2011), by function (e.g., allocation, investment, and brainstorming, Sibony et al. 2017; Nutt, 2008; Shepherd et al., 2015), and by form (e.g., problems involving multiple issues, opportunities emerging from ideas, and crises involving fewer but more significant issues, Nutt, 1984). Additional dimensions or continua of interest in this study include outcome certainty/uncertainty (Starcke & Brand, 2012), thinking/feeling (Alós-Ferrer, 2018; Akinci & Sadler-Smith, 2013), and rapid/comprehensive (Hutzschenreuter & Kleindienst, 2006).

Of all the aspects of decisions and decision-making, the multi-level nature of the process, from the individual, through the group, to organizational and environmental levels, is one of the most consistently noted features (Sibony et al., 2017; Foss & Saebi, 2017; Kouamé & Langley, 2018; Eranova & Prashantham, 2014; Eisenhardt et al., 2010; Harper, 1997; Hutzschenreuter & Kleindienst, 2006). The levels are linked causally, over time, or as nested activities (Eisenhardt et al., 2010; Kouamé & Langley, 2018). The result is that individual decision-maker’s decisions shape organizational strategy and ultimately affect organizational performance (Eranova & Prashantham, 2014). However, the demonstrated link between individual decisions and organizational performance does not mean that decision-making levels are perfectly aligned. Tensions can arise within and between layers of the
decision-making process (e.g., performance versus learning, stability versus change, control versus flexibility, alignment versus ability, Smith et al., 2010). These tensions can generate paradox if they conflict.

The multi-level nature of decision-making poses challenges for researchers (Ketchen et al., 2008) and managers (Smith et al., 2010). From a research perspective, the study of decision-making at different levels is facilitated by observing that decision processes tend to follow patterns (Sibony et al., 2017). These patterns repeat themselves at different levels of detail (Harper, 1997). This repetition means any patterns of thinking, context, and behaviour identified in the proposed study at the individual level may be candidates for exploration at the group or organizational level. From a managerial and practitioner perspective, decision-making difficulties in a multilayered and paradoxical context call for an approach that accepts, engages, and accommodates multiple perspectives (e.g., multiple criteria decision-making, Kumar et al., 2017).

2.2.2 Rational versus Irrational Decision-making
This study reflects the trend that depicts decision-makers as both rational and irrational thinkers and actors. Historically, mainstream economics influenced the view of decision-makers as rational, self-interested, and self-controlled (Tomer, 2007). In reaction to this "inhuman" view of decision-makers, behavioural economics introduced the idea of decision-makers as capable of rational and irrational behaviour (Hosseini, 2003). While working within the "Carnegie school" of behavioural economics, Herbert Simon proposed "bounded rationality" in the 1950s (Hosseini, 2003) to reflect the limited capacity of decision-makers to process information and to address the influence of social and psychological aspects of decision-making (Tomer, 2007). At about the same time, George Katona of the "Michigan school" began to study the influence of the decision-maker's expectations and intentions
around future events (Hosseini, 2003). Simon and Katona's insights continue to be recognized in the distinction between rational and irrational types of decision-making.

Rational decision-making takes place in an orderly way, in an observable and explicit process involving problem identification and formulation, information analysis, alternative generation, and cost-benefit analysis, ultimately leading to a logical choice (Calabretta et al., 2017). In contrast, irrational decision-making does not follow an orderly process in the sense that it does not accord with an outside observer's view of the decision-maker's expected utility (i.e., the logical outcome of weighing anticipated benefits or gains resulting from a fully informed choice) (Barberis & Thaler, 2003). In the reviewed literature, the disorder of irrational decision-making is focused on the misalignment of decision outcomes with others' expectations (i.e., socially constructed norms, Lugosi, 2019; Bendor & Swistak, 2001) rather than on the orderliness of the decision process itself. From a research perspective, treating decision-makers as rational thinkers makes it easier to predict their decision-making behaviour. It makes it easier to observe any deviation from a normative decision-making model (Newell, 2008). However, decision-making models where decision-makers are capable of a degree of irrationality align better with developments in cognitive psychology (Newell, 2008) and are more reflective of real individual and organizational settings.

Although researchers often distinguish between rationale and irrational decision-making, the boundary between rational and irrational is not altogether clear, given that each type of decision-making is almost entirely dependent on a given context (Brekhus, 2015). Rational and irrational may combine, for example, when rational decision-making occurs well before and after a decision, with irrational decision-making immediately surrounding a decision, or when irrational decision-making occurs within a rational decision-making structure (O'Connor et al., 2002). While it might be easier to identify and explain deviation as any kind of departure from rationality, doing so would virtually
eliminate consideration of the human and contextual elements involved in decision-making (e.g., Simon and Katona’s insights) and force the construction of an arbitrary boundary. On balance, therefore, this study encompasses both rational and irrational types of decision-making.

The next section reviews the relevant contextual aspects of decision-making, beginning with a discussion of context as an all-encompassing feature involving material and human components, as set out in Figure 1. The review then focuses on cognitive context: the cognitive setting and how thoughts and emotions within that setting influence the cognition associated with decision-making. Thoughts, emotions, and context are postulated to contain key antecedents of deviant decision-making behaviour (e.g., Pierce & Aguinis, 2015; Tenzer & Yang, 2019; and Yang & Diefendorff, 2009). The discussion on thoughts, emotions, and context leads to a brief discussion of how motivation drives decision-making from thought to action.

2.3 CONTEXT

Context is the umbrella term encompassing all the stimuli impinging on individual perception and subsequent simplification, representation, and evaluation processes involved in individual decision-making. Perceived context, not objective context, serves as input for decision-making. The perception of context, even of the same context, varies among decision-makers (Shepherd et al., 2015).

Contextual factors affecting cognition may originate at the environmental, organizational, individual, and task levels. At an organizational level, decision-making is embedded in context (e.g., rules and organizational setting such as priorities, culture, and history (Brekhus, 2015; Helfat & Peteraf, 2015; Nutt, 2008; Sibony et al., 2017) shaped by emergent trends, opportunities and constraints (Johns, 2017; Brown, 1992; Healey & Hodgkinson, 2014). Context at the organizational level includes economic conditions and deep-seated societal influences (Morgeson et al., 2015; Nutt, 2008; Eranova &
The elements of organizational context may be static or dynamic. Static factors include priorities, culture, history (Helfat & Peteraf, 2015; Nutt, 2008; Sibony et al., 2017), decision type (Shepherd & Rudd, 2014; Nutt, 2008), incentives (Shepherd et al., 2015; Shepherd & Rudd, 2014), firm size (Fredrickson & Iaquinto, 1989), firm age, and technology (Hutzschenreuter & Kleindienst, 2006). Dynamic factors include organizational tensions and pressures (Shepherd & Rudd, 2014; Nutt, 2008), champions, the management team, resources (Shepherd et al., 2015; Shepherd & Rudd, 2014), team continuity (Fredrickson & Iaquinto, 1989), culture, routines, and values (Hutzschenreuter & Kleindienst, 2006). The difficulty separating static and dynamic organizational context is reflected in some overlap between these two categories in the literature (e.g., organizational culture is categorized as static in Sibony et al., 2017 and dynamic in Hutzschenreuter & Kleindienst, 2006).

At an individual level, the literature has recognized cognitive factors as part of the decision-making context for most of the 20th century (Lerner et al., 2015; Medin & Bazerman, 1999). Context at the individual level includes such factors as tolerance for risk and ambiguity, creativity, decision-making style, intelligence, need for control, experience, skills, education, and values (Morgeson et al., 2015; Brekus, 2015; Nutt, 2008; Eranova & Prashantham, 2014; Shepherd et al., 2015). Task-level context includes task-related issues such as uncertainty, ambiguity, time pressure, and risk level, together with the emotions these engender (Shepherd et al., 2015).

In addition to static and dynamic context, the literature distinguishes between omnibus and distal context. This distinction forges a link between context and event system theory. Omnibus context comprises general context consisting of the who, what, where, when, and why of a situation. Distal context is specific, proximal context related to the task and social and physical aspects of a situation (Johns, 2017). Event system theory incorporates both an omnibus and a distal context. Under event system theory, distal context is associated with discrete, observable, time-bound, context-specific
"events" (Johns, 2017; Morgeson et al., 2015). The impact of an event is determined by its attributes, features, and content (Morgeson et al., 2015). When events occur within a reasonably constant ambient omnibus context, they constitute "phenomena" (Johns, 2017, Morgeson et al., 2015).

The system of events, multi-level influences, and controlled information processing (including individual cognition) lead to organizational change. In turn, change leads to disruption when new behaviours or events (i.e., changed context or features within the system) replace existing behaviours or events (Morgeson et al., 2015). These disruptions or breaks in continuity lead to changes in a decision maker's cognitive structures (e.g., schema, representations), particularly if the emotions associated with a discontinuity are strong (Walsh, 1995). When considered under event system theory, individual deviance in decision-making constitutes a disruption or discontinuity in the decision-making system (i.e., context, cognition, and organizational influences) with the potential to result in organizational change. Event system theory also proposes that decision-making deviance can be understood through the context and features of the decision system or situation in which it takes place (Morgeson et al., 2015). Such understanding is independent of any understanding gained by knowing the decision's content (Morgeson et al., 2015). The ability to understand decision-making deviance based on its context alone (e.g., in different decision scenarios) suggests that this study's findings may be transferable to different contexts.

The literature further classifies context according to three dimensions; strength, space, and time (Morgeson et al., 2015). Contextual strength refers to the novelty, clarity, consistency, constraints, and consequences of a situation (Johns, 2017; Morgeson et al., 2015). Combined with individual differences in cognition (e.g., cognitive style), the strength of situational context can motivate or demotivate a course of action (Meyer et al., 2010; Hodgkinson & Healey, 2008; Akinci & Sadler-Smith, 2013; Kozhevnikov et al., 2014). While strong situations tend to command decision-making attention,
managers may ignore weak situations for several reasons, including unrecognized cues, insufficient attentional resources, or organizational inattention to weak signals (Rerup, 2009). Weak cues, however, can alert an organization to potential threats or opportunities (Rerup, 2009). Space refers to the origins of the situation and its propagation through an organization (Morgeson et al., 2015). Time refers to how a situation evolves (Morgeson et al., 2015). Understanding the sensitivity of variables to contextual strength, space, and time, and relationships between strength, space, and time within a decision-making system, can help determine context's salience (Johns, 2017; Morgeson et al., 2015). Given how context affects cognition and occurs across individual, organizational, and environmental levels, context serves to integrate individual cognition and organizational information processing (Elsbach et al., 2005; Brekhus, 2015; Keller et al., 2017). As context changes, therefore, it produces a force for change at both the individual and group levels (Elsbach et al., 2005).

Naturalistic decision-making theory recognizes that context acts as a mediator and moderator of decision-making behaviour at the individual level within organizations (Brekhus, 2015; Shattuck, 2006), with unpredictable results (Sibony et al., 2017). Naturalistic decision-making theory focuses on how practitioners make decisions in complex situations in real life, recognizing the difficulty of separating decision context (objective or perceived) from decision-making (Shattuck, 2006). Recent extensions of naturalistic decision-making include the explicit recognition of technology as part of the decision context and the incorporation of features of the dynamic model of situated cognition (e.g., individual states, traits, and social factors) to make the decision-making model responsive to momentary context (Shattuck, 2006). Scholarship on practice further underlines the inseparability of human and material context (e.g., decision-support tools and technology) (Dagnino & Cinici, 2016; Kouamé & Langley, 2018).
The following section discusses the cognitive context or setting for decision-making. There is a focus on aspects of cognitive context that may serve as antecedents to engaging with or ignoring paradoxical tensions in a decision situation.

2.3.4 Cognitive Context
Cognition is central to shaping observable individual and organizational decision-making behaviour (Diržytė, 2018). Both external and embodied contextual factors influence decision-making by affecting cognition (Nutt, 2008; Shepherd & Rudd, 2014; Hutzschenreuter & Kleindienst, 2006) and patterns in cognitive processing (e.g., cognitive style or mindset, Akinci & Sadler-Smith, 2013) (Hough & Ogilvie, 2005; Narayanan et al., 2011). Context influences cognition through several means: by defining stimuli (e.g., affecting how decision-makers perceive issues, Hutzschenreuter & Kleindienst, 2006; triggering schema and influencing sense-making, Morgeson et al., 2015), by constraining freedom (e.g., triggering certain kinds of information processing depending on whether a situation is significant or routine, Morgeson et al., 2015; improving individual self-control and decreasing impulsiveness as task and situational uncertainty are reduced, Milkman, 2012), and by establishing values (e.g., rewarding or punishing risk-taking, exerting an influence on subsequent decision-making contexts, Morgeson et al., 2015) (Meyer et al., 2010). Situated cognition theories capture these effects of context on cognition (Healey & Hodgkinson, 2014; Fiske & Taylor, 2016). Context has a particular influence on attention through several processes, including priming, framing, and salience. Priming reflects prior context and determines the accessibility of a category for classifying and interpreting stimuli (Fiske & Taylor, 2016). Framing, triggered by a particular context, influences the selection of mental schema or representations that, in turn, affects action-related emotions (Elsbach et al., 2005; Dunning et al., 2017). Salience involves contextual or situational characteristics of stimuli that make them stand out (Fiske & Taylor, 2016).
The following sections review components of the cognitive setting for decision-making involving paradox. These components include managerial, individual, organizational, emotional, and motivational aspects of context. The review begins with a managerial perspective. The managerial view introduces and leads to a discussion of individual and organizational perspectives on cognitive context. Next, the review considers emotional context, typically inextricable from the individual and organizational context. The review culminates with a discussion of how management, individual, organizational and emotional context motivates decision-making. First, however, is the review from a managerial perspective.

2.3.4.1 Managerial Perspective
In the eighties and nineties, the term "management cognition" comprised any kind of "thinking" taking place in an organization and was seen as a counterpart to organizational action (Grégoire, 2011). A more recent refinement distinguishes intertwined roles for individual cognition alone and individual cognition within a group (i.e., "group" or "organizational" cognition). Individual cognition is embedded in culture, social context, organizational technology, structure, and ecology (Brekhus, 2015; Walsh, 1995). Organizational or group cognition emerges from the interaction of individuals with common innate predispositions and the sharing of templates or strategic frames that guide the interpretation of experience and shape subsequent action within the organization or group (Walsh, 1995; Cammock et al., n.d.; Narayanan et al., 2011; Kozhevnikov et al., 2014). There is evidence to suggest that designing a supportive context for group cognition can condition a desired cognitive style (e.g., by using "cognitive ergonomics," Hodgkinson & Healey, 2008, it might be possible to induce a paradoxical mindset, Smith, 2014). Constructs related to cognitive style include perceptual affordances, dispositions, learning patterns, learning orientations, mindset, and framing (Narayanan et al., 2011; Miron-Spektor et al., 2018; Kozhevnikov et al., 2014; Miron-Spektor et al., 2018). Three main cognitive styles have been
identified: (1) creative, high complexity style, (2) norm-favouring, low complexity style, and (3) a mix of creative and norm-favouring styles (Kozhevnikov et al., 2014). The norm-favouring cognitive style has important implications for this study on adherence to and deviation from decision norms.

The kind of thinking done by managers and other information workers (i.e., "management cognition") involves making sense of complex, ambiguous, and abundant information as they make decisions and solve problems (Walsh, 1995). Helfat and Peteraf (2015) offer a model of management cognition. Their model draws links between management cognition and the actions that ultimately affect organizational performance. Helfat and Peteraf identify three primary dynamic management capabilities: anticipating, interpreting, and responding to a changing external environment. These dynamic capabilities are linked to three cognitive underpinnings: “sensing,” the perception and attention needed to gain awareness of surroundings; “seizing,” the problem-solving and reasoning required to identify and pursue opportunities and; “reconfiguring,” the language, communication, and social reasoning needed for shaping organizational context (Helfat & Peteraf, 2015).

The concept of management cognition comprises an organizational and an individual component. The next two sections review cognitive context from an individual and an organizational perspective, respectively.

2.3.4.2 Individual Perspective

Neurobiological and psychological theories contribute to an understanding of the brain functions involved in decision-making and how cognitive context influences individual decision-makers at the most fundamental levels. The next sections review the literature on theories, processes and structures associated with the individual cognitive context.
2.3.4.2.1 Individual Cognitive Context - Theories

From the perspective of brain function, the concepts of "split-brain" and "dual-processing" or "dual-mode" theories hold a prominent place in the literature on management cognition. Split-brain theory proposes that in an organizational context, brain function is divided between a left brain responsible for intuition, emotion, and management and an analytical and logical right brain responsible for planning (Healey & Hodgkinson, 2014). The split-brain theory proved an oversimplification that ultimately didn't contribute significantly to explanations of management and organizational cognition and behaviour (Healey & Hodgkinson, 2014). However, during the 80s, a parallel line of research, dual-process or dual-mode theory, emerged to explain how the need for detail and efficiency in information processing (i.e., controlled and automatic information processing, respectively) could be met (Akinci & Sadler-Smith, 2013). Dual-process or dual-mode theory proposes that cognition employs pairs of related brain functions traceable to neural pathways distributed across the brain (i.e., not limited to one location – dual-mode, not dual-location, Brekhus, 2015). Dual-process theory continues to be used to explain specific findings from management cognition studies (e.g., Fiske & Taylor, 2016). Examples of dual-process theory applied to management cognition include intuition versus analysis (Akinci & Sadler-Smith, 2013; Hodgkinson & Healey, 2008), top-down (i.e., based on experience) versus theory/data-driven (i.e., based on current context) (Walsh, 1995), and rapid, automatic versus slower controlled and deliberative processing (Fiske & Taylor, 2016; Brekhus, 2015; Helfat & Peteraf, 2015).

Moving from brain function to the level of cognition and possible antecedents to engaging with or ignoring paradoxical tensions, the Theory of Reasoned Action and the Theory of Planned Behaviour focus on how individual cognitions or thoughts mediate the relationship between observable stimuli and individual responses (Godin et al., 2008; Paul et al., 2016). According to the Theory of Reasoned Action, the willingness to perform a contemplated action (i.e., intention) is the most important predictor of
behaviour (Paul et al., 2016). The Theory of Reasoned Action postulates two predictors of intention; an individual's positive or negative attitude toward the contemplated behaviour and a subjective norm based on significant others' attitudes toward the planned action (Paul et al., 2016). According to the Theory of Reasoned Action, individuals use these attitudes and norms rationally (Paul et al., 2016). The Theory of Planned Behaviour is an extension of the Theory of Reasoned Action that considers a decision-maker's perceived lack of control and how this hinders the ability to use intentions to predict behaviour (Paul et al., 2016). The Theory of Planned Behaviour includes a cognitive component for a decision-maker's perceived ease or difficulty of performing a planned action as a moderator of behavioural intention (Paul et al., 2016). If a planned action is perceived as entirely within an individual's control, the ease or difficulty moderator does not influence the formation of intentions (Paul et al., 2016). A further extension of the Theory of Planned Behaviour has been suggested, namely the addition of habit or experience as a mediator of intention, to improve the theory's ability to predict the dynamics underlying intention formation (Godin et al., 2008). In summary, these social cognitive theories point to perception and cognition as key processes linking the stimuli surrounding decision-making to decision behaviour. They also suggest a vital role for social norms, perceived lack of control, and experience in linking thought and action in decision-making.

Building on the importance of habit or experience for predicting decision-making behaviour, Prospect Theory proposes that when decision outcomes are uncertain, decision-makers are prepared to take risks based on their expectations (Kahneman & Tversky, 1979; Barberis, 2013). A key feature of Prospect Theory is the idea that options are evaluated against a status quo (e.g., accumulated experience, habit, or a norm). Prospect Theory also holds that there are two phases in decision-making; a simplification or editing phase that produces a simple representation of options and an evaluation phase that identifies the option with the best prospects (Kahneman & Tversky, 1979). Scholarship on
decision-making-induced stress has brought the Theory of Planned Behaviour and Prospect Theory together. When a decision situation is uncertain (i.e., Prospect Theory applies) and uncontrollable (i.e., Theory of Planned Behaviour applies), decision-makers may experience stress because the demand for their cognitive abilities exceeds their cognitive capacity (Starcke & Brand, 2012).

The more complex the decision-maker's problem, the more likely the demand for information processing will exceed an individual decision-maker's cognitive capacity (Connolly, 1980), producing stress. Humans generally have sufficient long-term storage but lack the necessary short-term memory and rapid storage processing required to tackle complex problems (Connolly, 1980). In addition to limiting the scope of a problem to within their capacity (i.e. "bounded rationality," Hosseini, 2003), decision-makers reduce the cognitive burden associated with decision-making by streamlining cognitive processes (e.g., employing creativity, innovation: Narayanan et al., 2011; Calabretta et al., 2017; adaptation and learning: Hodgkinson & Healey, 2008; Healey & Hodgkinson, 2014; Narayanan et al., 2011; Helfat & Peteraf, 2015) by relying on cognitive structures (e.g., routines, heuristics: Bingham & Eisenhardt, 2011; Shepherd et al., 2015), identity, strategic frames, decision support systems, technology and know-how (Connolly, 1980; Healey & Hodgkinson, 2014; Levinthal & March, 1993), and techniques such as group decision making (Levinthal & March, 1993), and by reducing the decision situation to its essentials (e.g., creating and manipulating simplified cognitive representations of the set of decision stimuli: Shattuck, 2006; Diržytė, 2018; Harper, 1997; Kahneman & Tversky, 1979). These means of reducing cognitive burden through simplification are more prevalent when a decision-maker has developed a body of expertise (Calabretta et al., 2017).

The judicious allocation of attention also helps reduce the cognitive burden of decision-making. Individuals perceive their world in meaningful units separated by breakpoints that reflect intentions and goals (Fiske & Taylor, 2016). Breakpoints alone are sufficient to convey a meaningful and coherent
perception of the environment (Fiske & Taylor, 2016). By focusing on breakpoints, a decision-maker need not attend to all impinging stimuli to gain a picture of a situation (Fiske & Taylor, 2016). This kind of parcelling of attention is at the center of cognition, particularly from a decision-making perspective (Posner & Rothbart, 2007). Three neural networks or functions are involved in attention: alerting (maintaining high sensitivity to incoming stimuli), orienting (improving the selected signal), and executive (monitoring and resolving conflict in thought, feeling, and responses) (Posner & Rothbart, 2007). The net effect of these functions associated with attention is to cause individuals to attend to crucial issues and then allocate remaining attention resources to other problems (Rerup, 2009). Neural networks and breakpoints simplify decision-making by focusing an individual’s attention on a limited number of perceived stimuli (Rerup, 2009; Fiske & Taylor, 2016).

Taken together, the theories of Reasoned Action, Planned Behaviour, and Prospect theory identify simplification, representation, and evaluation as critical processes in deciphering perceived decision stimuli and suggest a close tie between decision-making context, cognition, and individual decision-making action. Also, these theories identify a crucial role for cognitive structures such as cognitive representations and norms.

2.3.4.2.2 Individual Cognitive Context - Structures

Context includes external as well as cognitive artifacts. From the perspective of individual cognitive context, this sub-section reviews cognitive structures that may have an influence on decision-making involving paradox.

In addition to cognitive structures resulting from the process of representation (e.g., schema, maps, representations), decision-makers often resort to heuristics and routines, structures derived from simplification processes (Bingham & Eisenhardt, 2011, Shepherd et al., 2015). More experienced
decision-makers develop fewer but more sophisticated and strategic heuristics through simplification cycling than decision-makers with less expertise (Bingham & Eisenhardt, 2011). Routines tend to build around repeated decision problems (Waldman et al., 2018). Heuristics and routines can produce rational and efficient decision-making given an appropriate context (e.g., willingness to make adjustments according to feedback and a stable environment where the cost of deliberation is high) (Bingham & Eisenhardt, 2011). Much as representations provide a template for automatic cognitive processing, routines provide a template for automatic and even unconscious behaviours (Healey & Hodgkinson, 2014; Brekhus, 2015).

2.3.4.2.3 Individual Cognitive Context - Processes
This sub-section reviews processes that involve the creation, manipulation, and evolution of cognitive structures that are influenced by, and also become part of, the individual cognitive context for decision-making with paradox.

External context, experience, predispositions, emotions, and so on pass through cognitive and technological filters to become incorporated into the decision-maker's internal cognitive representations (Shattuck, 2006). These cognitive representations, based on a simplified perception of external events (Diržytė, 2018; Harper, 1997), are created and manipulated in the process of thinking (Fiske & Taylor, 2016; Calori et al., 1994; Helfat & Peteraf, 2015) and are instrumental in shaping decision-making action (Malmström et al., 2015; Hutzschenreuter & Kleindienst, 2006; O'Connor et al., 2002). The literature on cognition conceptualizes these internal representations in many ways depending on the focus of the research: as schema, mental maps, frames, beliefs (Calori et al.; 1994, Walsh, 1995; Helfat & Peteraf, 2015), knowledge structures (Walsh, 1995), information structures (Helfat & Peteraf, 2015; Fiske & Taylor, 2016), logics, identities (Wry & York, 2017), and adaptive programs (Cosmides & Tooby, 2013). Representations serve to identify a situation or elements within it.
and determine how a situation’s components are related and how they operate (Elsbach et al., 2005). When a representation that addresses the situation at hand is readily accessible, automatic processing is the dominant mode of cognition (Walsh, 1995; Helfat & Peteraf, 2015; Frijda, 2010). However, if there is no representation available to address an aim or goal (e.g., a novel situation, Walsh, 1995), automatic processing is replaced by more deliberate and reflective processing (Frijda, 2010). Deliberate processing leads to new experience and the generation of a new or modified representation (Calori et al., 1994). During either automatic or deliberate formation, a developing representation can be affected by interaction with other emerging or existing representations (Malmström et al., 2015).

Simple representations (i.e., cognitive structures) can grow into complex structures as experience is accumulated and incorporated (Calori et al., 1994). Cognitive complexity refers to two aspects of cognitive representations or structures: comprehensiveness/differentiation (the ability to see several dimensions in a stimulus and the number of sub-maps in a cognitive map), and connectedness/integration (the ability to see connections among differentiated characteristics) (Calori et al., 1994). Cognitive complexity allows managers to generate several interpretations or representations of events (enabling variety in understanding to match the variety within a situation) and increases tolerance towards ambiguity (Calori et al., 1994). The ability to generate complex representations or engage in deliberative thinking may be limited by an individual's cognitive capacity to process information and extract meaning (Hodgkinson & Healey, 2008). For example, in ambiguous situations where cognitive resource demand is significant, individuals most often choose to conserve resources by using available cognitive schema (Walsh, 1995). Although using more automated than controlled or deliberative thinking can be efficient, it can also lead to biased decision-making (Fiske & Taylor, 2016; Helfat & Peteraf, 2015).
Once a decision representation becomes sufficiently formed, the decision-maker evaluates and judges the representation. The simplifications, heuristics, and other shortcuts decision-makers use to conserve cognitive resources (often in the face of organizational norms) can subject the evaluation and judgment processes to cognitive biases (Medin & Bazerman, 1999). Reviews of cognitive bias associated with decision-making (e.g., in Barberis, 2013; Barberis & Thaler, 2003; Kahneman & Tversky, 1979) identify several biases that might influence the decision-making process. A particular context, or the history leading to a decision, or the experience of a decision-maker (i.e., emotional and cognitive contextual factors) may trigger decision-making biases (Medin & Bazerman, 1999; Hutzschenreuter & Kleindienst, 2006; Connolly & Zeelenberg, 2002; Fairhurst et al., 2016). The mechanism giving rise to biases stems from a failure to update beliefs and subsequently form preferences correctly, leading to outwardly irrational decision-making behaviour (Barberis & Thaler, 2003).

Two cognitive biases are of particular interest in this study because they bear on decisions involving paradox. First, decision-makers tend to treat decision situations as separate phenomena within their “mental accounting” process (Barberis & Thaler, 2003). This separation means that a decision-maker may be unaware of a paradoxical relationship between organizational tensions or decisions (tensions being a frequent source of paradox). Further, even if a decision-maker is aware of paradoxical tensions in a decision situation, they may not be open to accepting and engaging with these tensions in a way that is necessary to address paradox effectively (Keller et al., 2017; Gaim, 2018). Second, decision-makers tend to remove common elements from consideration when choosing between alternatives (i.e., the “isolation effect”) (Kahneman & Tversky, 1979). Once again, this means that even if paradoxical tensions form part of the decision representation, the common threads running across these tensions go unnoticed and unused, making it challenging to address paradox effectively (Calabretta et al., 2017; Gaim, 2018; Miron-Spektor et al., 2018). Controlled cognition can override mental accounting and
isolation biases, but the ability to override cognitive biases varies from individual to individual (Helfat & Peteraf, 2015).

The following sub-section reviews elements of organizational context that may become incorporated in an individual decision-maker’s cognitive context. The discussion of organizational stability and agility toward the end of this sub-section reflects consideration of the boxes in Figure 1 labelled “most effective” and “least effective,” where effective decisions help ensure long-term organizational viability.

2.3.4.3 Organizational perspective

Organizational and management theories contribute to understanding the interaction between individual cognition, group or organizational decision-making settings, and organizational performance. Before 2006, the impact of context on organizational behaviour was "unrecognized and underappreciated" (Johns, 2017). Since then, context has been incorporated into many organizational theories to explain what had been up until then counterintuitive research results (Johns, 2017; Fairhurst et al., 2016).

As context was being incorporated into organizational theory, the context for organizations itself changed. Organizations began to experience decreased stability, increased technological change, increased performance accountability, increased complexity, uncertainty, and ambiguity, increased interconnection, and increased globalization (Shepherd et al., 2015; Lewis & Smith, 2014; Cammock et al., n.d.; Gaim & Wåhlin, 2016; Smith & Tracey, 2016). Decision-making in this kind of environment needs to be increasingly creative and innovative (Shepherd et al., 2015) to manage multiple competing demands simultaneously (Smith, 2014). Competing demands and the organizational and individual tensions they give rise to are intensifying and ubiquitous (Gaim & Wåhlin, 2016; Miron-Spektor et al.,
As these trends continue, managers face paradoxical decision-making situations with increasing frequency (Ivory & Brooks, 2018; Fairhurst et al., 2016). Further, change and complexity intensify the experience of paradox, so the threshold at which managers perceive paradox will be exceeded more and more often (Schad et al., 2016).

Including context as part of decision-making seeds the decision-making process with forces of change (Walsh, 1995; Harper, 1997) that ultimately may affect individual and organizational performance (positively or negatively) (Walsh, 1995). Instability caused by significant levels of change favours the development of a decision-making process that is flexible and responsive (e.g., incremental decision-making that is loosely structured and that may or may not be integrated with overall strategy) (Fredrickson, 1984; Davis et al., 2009). In contrast, stability and continuity foster increasingly structured, rational decision-making, providing an opportunity to gain efficiencies (Fredrickson, 1984; Fredrickson & Iaquinto, 1989; Davis et al., 2009). In a stable environment, a manager may suffer the consequences of a poor decision for years, making them less likely to take risks and depart from any organizational norms (Fredrickson, 1984), a particular consideration in this study of deviation from decision norms.

As a whole, the literature suggests that a discontinuity in the decision-making context at an organizational level could result in changes to cognitive structures and the breaking of cognitive norms, ultimately leading to deviant decision-making behaviour. Also, creating a discontinuity in the decision-making context may support or promote deviant decision-making that, if it endures, could facilitate organizational change at the individual level. Finally, the literature suggests that stable conditions may lack the discontinuity that sparks departure from norms, and the rationality associated with stability could suppress the role of emotion in facilitating decision-making deviance.
The next section reviews the literature on emotional context, first laying a foundation by describing different types of emotion. Next, the review outlines the benefits and drawbacks associated with emotion in the context of decision-making. Finally, the review focuses on theories and research findings on how emotions influence decision-making.

2.3.4.4 Emotional Perspective

In the early 2000s, interest emerged in the emotional context of the decision-making process (Lerner et al., 2015). Emotions are a conscious or unconscious feeling of "goodness or badness" (Västfjäll et al., 2016) associated with a specific context (Seo & Barrett, 2007). Emotions may be either "integral" (i.e., directly associated with a decision) or "incidental" (i.e., experienced at the same time as a decision but independent of the decision) (Västfjäll et al., 2016; Lerner et al., 2015; Alós-Ferrer, 2018; Connolly & Zeelenberg, 2002; Starcke & Brand, 2012; Seo & Barrett, 2007). The literature on emotions consistently recognizes four essential families or classifications of emotion (happiness/achievement, sadness/withdrawal, anger/antagonism, and fear/deterrence). It equivocates on a fifth (either disgust or approach) (Frijda, 1998; Elfenbein, 2007). The next sections review the positive and negative impacts of emotions on decision-making and theories on how emotions influence the decision-making process.

2.3.4.4.1 Positive and Negative Impact of Emotions

Emotions serve several beneficial functions (Seo & Barrett, 2007). The benefits of emotion include: focusing attention, driving the allocation of working memory, helping to distinguish relevant from irrelevant stimuli, acting as information, and motivating decision-making and action (Hanselmann & Tanner, 2008; Seo & Barrett, 2007; Västfjäll et al., 2016; Elfenbein, 2007). In particular, for decision-making under paradox, emotions can serve to compare otherwise incomparable information (Västfjäll et al., 2016). More broadly, the experience of intense emotions (Seo & Barrett, 2007) and the use of
"hot cognition" (i.e., consulting a pool of emotions associated with a cognitive representation rather than all available information) can also improve decision-making (Elfenbein, 2007; Västfjäll et al., 2016).

Although emotions have benefits, they can also hamper the decision-making process. In particular, in the context of this study, emotions can interfere with the adoption of appropriate strategies, such as active decision-making, for dealing with paradox. Active decision-making requires a series of small, rapid decisions and adjustments based on consequences. Anticipated or actual regret over making hasty or thinly supported decisions (Connolly & Zeelenberg, 2002) could make this strategy difficult emotionally for a decision-maker to adopt (Lerner et al., 2015).

2.3.4.4.2 Influence of Emotions on Decision-making
Similar to the difficulty separating decision-making from context, it is difficult to define "emotion" concretely enough to separate it from the decision-making process and study it in isolation (Västfjäll et al., 2016). Cognition and emotion are so intertwined that it is not practical and often impossible to separate them (Elfenbein, 2007). The relationship between emotion and cognition is recursive (Hodgkinson & Healey, 2008). For example, in addition to external stimuli triggering an emotion, emotions can be triggered by internal cognitive representations, and these emotions, in turn, can elicit other representations (Västfjäll et al., 2016). Different representations give rise to different emotions (Frijda, 1998; Starcke & Brand, 2012), and different emotions are associated with different cognitive appraisal patterns, thereby influencing the content of thought (Lerner et al., 2015). Embodied cognition theory captures the intertwined and recursive nature of the relationship between emotion and cognition and incorporates emotion as an integral part of cognitive processes (Healey & Hodgkinson, 2014).
Despite the difficulty in separating emotion from the decision-making process, emotion in decision-making is the subject of considerable theorizing. Research on decision-making, neurobiology, and cognition identifies a distinct influencing role for emotion in the decision-making process (e.g., Lerner et al., 2015; Alós-Ferrer, 2018; Connolly & Zeelenberg, 2002; Starcke & Brand, 2012; Seo & Barrett, 2007; Västfjäll et al., 2016). From a neurobiological perspective, the influence of emotions on decision-making appears to stem from the reward or punishment experience generated by uncertainty, which gives rise to an emotion, which in turn becomes tied to a somatic marker (e.g., the release of cortisol) linked to the original uncertain decision situation. A reoccurrence of uncertainty can trigger the somatic marker and its corresponding interpretation as an emotion and act to guide decision-making behaviour (Starcke & Brand, 2012). Once emotional experience reaches a conscious level, higher-order cognitive processes such as judgment and decision-making may be involved in processing the emotion (Schreuder et al., 2016). From registration, through appraisal and classification, to emotional response and expression, emotional processing can be either automatic or partially controlled through emotional regulation (Moors et al., 2013; Elfenbein, 2007). Findings in the literature on dual-mode theory suggest a pattern in the connection between cognition and emotion, where negative emotions (perceived as signalling danger) trigger careful, systematic processing while positive emotions (signalling a safe environment) lead to more automatic or heuristic processing (Lerner et al., 2015).

By influencing cognitive functions, emotions affect how a decision-maker evaluates possible decision outcomes (Lerner et al., 2015; Seo & Barrett, 2007). Three forms of emotion influence decision-making: anticipated emotions as a consequence of decision-making and two kinds of immediate emotions at the time of decision-making (background emotions that are incidental to decision-making and action-related emotions integral to a decision-making option) (Dunning et al., 2017). Integral emotions can be triggered in three ways: innate sensory-motor programs (i.e., reflexes,
Elfenbein, 2007; Lerner et al., 2015), classification of a stimulus into an existing representation associated with specific emotions, and appraisal of the stimulus concerning its effects on well-being (Västfjäll et al., 2016). Research has begun to uncover how all three forms of emotions interact during decision-making (Västfjäll et al., 2016). Where emotion is considered important for decision-making, the effect of congruent integral and incidental emotions will likely be beneficial (Västfjäll et al., 2016). When emotion is less relevant or used as a heuristic (e.g., asking "how do I feel about this," Elfenbein, 2007), incidental affect may be less beneficial for decision-making (Västfjäll et al., 2016).

The Appraisal Tendency Framework links specific emotions to specific decision-making outcomes (Lerner et al., 2015). The Framework postulates that emotional valence (i.e., good or bad) and an emotion’s influence on decision-making are separate functions. For example, fear and anger (i.e., emotions with similar valences) can have different impacts on a decision. In contrast, anger and joy (i.e., emotions with differing valences) can have the same influence on decision-making (Lerner et al., 2015).

Emotions influence decision-making most when the situation is complex and unanticipated (Lerner et al., 2015), taxing the decision-maker’s emotional information processing ability (i.e., the ability to experience strong emotion and to control for emotion-induced biases) (Seo & Barrett, 2007). Decision-making processes can be designed, however, to dampen the effects of emotion (e.g., by imposing a time delay between a decision-maker’s emotional response and the time a decision is made or by modifying the decision architecture to insulate the decision from emotion) (Lerner et al., 2015). The ability to design decision-making processes suggests that it may be possible not just to dampen emotion but to develop decision processes that promote the expression and use of beneficial emotions to improve decision-making performance in demanding complex situations.
Emotion has also been studied from an organizational perspective. The successes and failures of organizations striving to resolve grand challenges (e.g., climate change, poverty, unemployment, and health inequity) inevitably produce an emotional response among organizational members (Sawyer & Clair, 2022). Over time, if organizational members consistently express or repress certain emotions, their responses eventually manifest as emotional culture (i.e., a set of assumptions, beliefs, norms, and practices associated with an emotion) and the expression or repression of a collective emotion (Sawyer & Clair, 2022). The literature establishes that collective emotions (e.g., joy, joviality, anger, and compassionate love) influence an organization’s perseverance as it pursues challenging goals (Sawyer & Clair, 2022). Of interest for this study is the great extent to which decisions involving paradox share many characteristics of grand challenges (e.g., enduring, complex, multilevel, difficult or impossible to solve). Decisions involving paradox, therefore, can be expected to create an emotional response at an organizational level, which in turn may influence an organization’s perseverance in engaging with or avoiding paradoxical tensions. The literature also finds that emotional culture is more likely to be established when organizational members feel they share a common fate (Sawyer & Clair, 2022).

The next section reviews the literature describing how the cognitive context in the form of thoughts, feelings and organizational features motivates decision-makers to engage with or ignore underlying tensions as they move along the decision-making process depicted in Figure 1.

2.3.4.5 Motivation
This section looks at how cognition and emotion drive action. Motivation, cognition, and emotion are closely linked. Motivation involves needs (Fiske & Taylor, 2016; Harper, 1997), post-emotional responses, action tendencies (Elfenbein, 2007), and situational assessments (Fiske & Taylor, 2016). Ultimately, the interaction of individual characteristics (e.g., cognitive style, personality traits), context (e.g., task characteristics, Hodgkinson & Healey, 2008; Elsbach et al., 2005), cognition (e.g.,
representations), emotion, and motivation, establishes the desired course of action (Västfjäll et al., 2016; Elfenbein, 2007; Frijda, 2010; Harquail & Wilcox King, 2010). However, the strength of motivation determines if the desired, and possibly deviant, action will occur (Fiske & Taylor, 2016).

According to the theories of Reasoned Action and Planned Behaviour, an individual may be motivated to deviate, but context in the form of socially constructed norms constrains them (Bennett & Robinson, 2000). Process motivation theories also postulate that although an individual may be motivated to deviate, the perceived likelihood and control over subjective decision consequences influence whether or not deviant behaviour occurs (Paul et al., 2016; Kahneman & Tversky, 1979).

Theories on the control of emotional behaviour (e.g., anxiety and impulsiveness) postulate that the response to a stimulus is conditioned by the interaction of three neurophysiological systems: a system that inhibits behaviour (the behavioural inhibition system or BIS), a general arousal system (the fight or flight system), and a system that activates behaviour (the behavioural activation/approach system or BAS) (Carver & White, 1994). The BIS responds to stimuli associated with punishment, non-reward, and novelty (Gray, 1982, 1987). Activity in the BIS inhibits behaviour that may result in negative outcomes and is believed to be responsible for feelings of sadness, fear, frustration, and anxiousness (Carver & White, 1994; Gray, 1982, 1987). Behaviour in response to cues signalling extremes of punishment and non-reward, is thought to be organized by the fight or flight system (Carver & White, 1994; Gray, 1987). Operation of the fight or flight system produces a state of general arousal and is believed to be associated with feelings of panic and rage (Carver & White, 1994; Fowles, 1980; Gray, 1987). The BAS responds to signals in the environment associated with reward, impending reward, non-punishment, and escape from punishment (Carver & White, 1994; Fowles, 1980). Functioning of the BAS promotes the start of, or increase in goal-oriented behaviours and is thought to produce feelings of hope, elation and happiness (Carver & White, 1994). Depending on individual differences in the
sensitivity of the BIS and BAS systems to relevant environmental stimuli, a person may have an anxious or an impulsive personality respectively (Carver & White, 1994). Of interest to this study is the proposed association between anxiety and the inhibition of behaviour such as engagement with paradoxical tensions, that might have negative outcomes. Also of interest is the proposed relationship between the possibility of reward, as might be expected from engaging with paradoxical tensions, and increased goal-seeking behaviour.

The next section reviews the literature on paradox, a component of context in Figure 1.

2.4 PARADOX
Paradox reflects a contextual aspect of decision-making and implies a situation involving dissonant forces. That is, paradoxical tensions are considered an underlying element of the decision setting. Paradoxical tensions are situated within the shaded portion of Figure 1 labelled “Context.” This section introduces the literature on paradox with a brief discussion of the definitional challenges involved in defining paradox concisely, even though paradox has almost reached the status of a paradigm in the management literature, according to Putnam et al. (2016). This leads to the development of a definition of paradox suitable for use in this study. Next, different types of paradoxical tensions are reviewed. This is followed by a review of paradox theory discussing sources of paradox, and how paradoxical tensions change with time. The review subsequently looks at how paradoxical tensions can be managed from a theoretical perspective and then from a practical viewpoint. The section closes with the development of a spectrum of decisions involving paradox, from least paradoxical to most paradoxical.

2.4.1 Definition of Paradox
Paradox is a polysemic term (Lado et al., 2006) associated with the idea of dualities, dialectics, contradictions, and tensions (Fairhurst et al., 2016; Harbour & Kisfalvi, 2012). Managers often turn to the term "paradox" to describe any situation involving opposing forces in a complex organizational
environment (Putnam et al., 2016). However, not all issues involving multiple tensions are paradoxical (Lüscher & Lewis, 2008). Regardless of the term used, paradox focuses on organizational tensions and their relationship (Schad et al., 2016). As a starting point, paradox consists of an awareness of multiple, interrelated tensions requiring ongoing organizational attention, characterized by a complicated relationship. The literature on paradox describes the relationship between tensions as contradictory, persistent, proximal, multi-level, juxtaposed, oppositional but independent, negatively correlated, simultaneous, or dynamic (Chapardar, 2016; Fairhurst et al., 2016; Miron-Spektor et al., 2018; Waldman et al., 2018; Epstein & Faerman, 2017; Gaim & Wåhlin, 2016; Lewis, 2000; Lado et al., 2006; Schad et al., 2016; Smith, 2014; Eisenhardt, 2000). Truly paradoxical tensions are persistently irresolvable and inescapable (Poole & Van de Ven, 1989; Calabretta et al., 2017; Smith, 2014; Chapardar, 2016). For the purposes of this study, in the context of decision-making involving paradoxical tensions, paradox is defined as “an awareness of multiple, irresolvable, interrelated and simultaneous tensions requiring ongoing organizational attention.” As a result of this definition, genuinely paradoxical situations are not entirely solvable by compromise, trade-off, or adopting two or more viewpoints simultaneously (Poole & Van de Ven, 1989; Calabretta et al., 2017; Smith, 2014; Chapardar, 2016) as opposed to decisions without paradox. A consequence of this definition of paradox, which includes ongoing irreconcilable tensions, is that the norm of simplifying and suppressing tensions cannot produce success in the long run since the underlying tensions would persist essentially unaddressed, and be likely to resurface in the future. This does not mean that decisions involving paradox cannot be addressed successfully even though underlying tensions remain unresolved. The challenge for decision-makers is to find creative solutions that at a minimum allow an individual or organization to cope with irresolvable tensions and at best raise irresolvable tensions to a level of abstraction where the boundary between them disappears and the fact that the tensions persist is less consequential. For example, the concept of striving for quality embodied in the slogan “Quality is job 1” successfully rose above the speed-to-market versus car
quality paradox at the Ford motor company during the 1970s and 1980s. The objective of getting new car designs to market as quickly as possible at the expense of quality was replaced by a new overarching priority focused on product quality (Robert Cox, Ad Man behind Ford’s “Quality Is Job 1” Pitch, Dies, 2016). As successful as the new priority was at holding the paradoxical tensions at bay, they remained unresolved, and recently the quality of Ford vehicles has once again fallen noticeably (How Ford’s Making Sure Quality Is Job 1 Once Again, n.d.).

Increasingly, complex and global organizational environments require managers to address multiple competing demands simultaneously (Smith & Tracey, 2016; Smith, 2014) to the point where paradox is ubiquitous in daily organizational life (Gaim, 2018; Farjoun, 2010). Paradox is so common that multiple paradoxes, nested paradoxes, and meta-paradoxes are possible (Calabretta et al., 2017). Multiple paradoxes consist of interconnected co-occurring paradoxes. Nested paradoxes involve interconnected paradoxes at different levels of the organization. Meta-paradoxes refer to sets of competing objectives that combine aesthetic/experiential versus functional demands (e.g., novelty-usefulness and commercial-symbolic goals). These paradoxes, singly or in combination, become particularly acute when an organization experiences or initiates change (Lüscher & Lewis, 2008).

2.4.2 Types of Paradox
Reviews of the literature (e.g., Lewis, 2000; Lüscher & Lewis, 2008; Wright, 2015; Smith & Lewis, 2011) converge on a framework of four categories or types of paradox: paradoxes of belonging, paradoxes of learning, paradoxes of organizing, and paradoxes of performing. Given the importance of strategy in organizations, Wright (2015) suggests an additional category to capture strategizing paradoxes. The scenarios included in this study touch on as many different types of paradox as possible to make them relevant and representative. Different ways of classifying and categorizing paradox are discussed in some detail to ensure the broadest coverage possible in the construction of scenarios for this study.
Belonging paradoxes stem from complex boundaries between the self and others, giving rise to tensions between the collective position and individual identity, cognitive style (i.e. patterns in cognitive processing) (Akinci & Sadler-Smith, 2013; Hough & Ogilvie, 2005; Narayanan et al., 2011), values, roles, and memberships (Calabretta et al., 2017; Lewis, 2000; Smith & Lewis, 2011). Paradoxes of learning center on the processes of sense-making, innovation, and transformation triggered by organizational change. These include the tension between building and dismantling, routine and novelty, and evolution and revolution (Farjoun, 2010; Lewis, 2000; Smith & Lewis, 2011). Paradoxes of organizing focus on the processes of structuring and leading. These paradoxes include tensions between collaboration and competition, unique competitive advantage and substitutability/observability, quality and cost, empowerment and direction, cohesion and division, and control and flexibility (Lado et al., 2006; Lewis, 2000; Smith & Lewis, 2011). Paradoxes of performing stem from individuals or organizations pursuing goals that diverge (Smith & Lewis, 2011). Performing paradoxes include tensions between exploring and exploiting (Levinthal & March, 1993; Smith, 2014; Smith, 2014), innovation and efficiency (Davis et al., 2009; Eisenhardt, 2000), long-term and short-term perspectives (Miron-Spektor et al., 2018; Chapardar, 2016), and complex cognition to address problems and simplified cognitive structures to improve decision-making (Calori et al., 1994). Paradoxes of strategizing stem from the relationship between multiple means, disagreeing aims (Kumar et al., 2017), and their supporting logic (Wry & York, 2017; Davis et al., 2009). These include tensions between profit maximization and improved social welfare/corporate citizenship (Smith, 2014; Lewis & Smith, 2014; Chapardar, 2016; Li, 2016; Smith & Tracey, 2016; Smith, 2014), cooperation and competition, global and local concerns (Li, 2016), intuition and rationality (Calabretta et al., 2017), and performance knowledge and performance measures (Lado et al., 2006).
Interaction between the four categories of paradox, and their associated organizational elements, produces six sub-categories of paradoxical tensions (Smith & Lewis, 2011). When learning and belonging interact, there is tension between the need to adapt and the need to maintain a stable self-identity. Learning and organizing elements interact to produce tension between the stability, clarity, and efficiency of organizational routines and the need for flexibility and agility within the organizational structure. The interplay between performing and organizing gives rise to tension between means and ends, such as between employee and customer demands. When performing and belonging elements interact, they produce tension between organizational members' identities, and organizational goals and associated social and occupational demands. The relationship between belonging and organizing can produce tensions between individual needs and collective action. Finally, the dynamic between learning and performing creates paradoxical tension between a focus on the future and building capacity and a focus on the present and maintaining or improving productivity (Smith & Lewis, 2011).

In addition to the classification by type, paradoxical tensions can be categorized based on the organizational level at which the tensions occur; organizational or individual (e.g., Calabretta et al., 2017; Li, 2016; Schad et al., 2016; Gaim, 2018). Examples of typical organizational-level paradoxical tensions include global versus local, cooperation versus competition, exploration versus exploitation, profit versus value/purpose, stability versus change (Schad et al., 2016; Li, 2016, Calabretta et al., 2017), creativity versus efficiency/productivity (Calabretta et al., 2017), and aesthetics versus performance (Gaim, 2018). Examples of paradoxical tensions at the individual level include rationality versus intuition (Calabretta et al., 2017), passion versus discipline (Gaim, 2018), learning versus performance, self-focus versus other-focus (Schad et al., 2016), and want-self versus should-self (Milkman, 2012; O’Connor et al., 2002; Bazerman et al., 1998).
As can be seen from the examples of paradoxical tensions, although classification structures may be comprehensive, individual categories can overlap considerably within and between systems. Regardless of any overlap, the categories of paradox and their definition, including illustrative examples, provide telltale clues that identify paradoxical decision situations. In particular, these clues from the literature flag situations where paradoxical tensions are likely to be found. The scenarios constructed for this study include many of these clues or flags to simulate the presence of paradox in a decision situation.

2.4.3 Paradox Theory
One step in bringing together paradox, deviation, and decision-making is to draw from event theory to understand them all as events comprised of contextual and process elements (Morgeson et al., 2015). In the case of paradox, its sources stem from the complexity present within a decision-making context manifesting as tensions. As a process, paradox develops over time from a hidden phenomenon to a full-blown complex decision situation acknowledged by the decision-maker. The idea that paradox emerges and evolves in this way reflects the current view of paradox as inherent in situations ontologically (i.e., a materialist and realist perspective) and socially constructed epistemologically (i.e., paradox is only paradox when it is interpreted as such). The material and social aspects interact in the performance of paradox (e.g., evolution and emergence) drawing from an ever changing context and set of tensions (Berti et al., 2021; Bednarek & Smith, 2023).

The theoretical roots of paradox originate with the ancient philosophers. Aristotle laid the foundation for formal logic and the establishment of “either-or thinking.” Confucius and Lao Tzu contributed to the notion of the dynamic integration of opposites. Early psychologists such as Jung elaborated on these ideas with a holistic view of reality (Schad et al., 2016). In the early 20th century, managerial theorist Mary Parker Follet laid the foundations for modern paradox theory, focusing on
the relationships between elements of paradox including a particular focus on the distribution of organizational power and its effects on the management of paradox (Bednarek & Smith, 2023). Paradox gained a foothold in the management literature in the late 1980s with the emergence of theory. Management theory on paradox focused on three key aspects of paradox: sources of organizational tension, how paradoxes develop within organizations and individuals, and strategies for managing paradox (Lewis & Smith, 2014; Schad et al., 2016; Smith & Lewis, 2011; Ivory & Brooks, 2018). Once paradox was recognized as a management phenomenon in the 1980s, it was first associated with complexity in the 1990s, then seen as an opportunity for spurring innovation and creativity in the 2000’s, and finally it became part of an established paradox theory in the 2010s (Berti et al., 2021).

Conceptually, paradox involves complex interactions (often obscure or ambiguous, Lewis, 2000) between organizational tensions along temporal (short-term versus long-term, and past, present, and future), structural (too little versus too much), and spatial (near versus far) dimensions (Lewis & Smith, 2014, Davis et al., 2007; Putnam et al., 2016). Organizational sense-making and sense-giving on the part of leadership (i.e., the exercise of power) help determine the importance of each paradoxical tension (Fairhurst et al., 2016). The weight given paradoxical tensions shifts as circumstances change (Fairhurst et al., 2016). This theoretical perspective supports the observation that stable structural solutions (e.g., norms, roles, identities, rewards, goals, Rothman et al., 2017) are not likely to provide a lasting or effective response (Smith & Tracey, 2016), given the constant shifting of paradoxical tensions.

2.4.3.1 Sources of Paradoxical Tension
Paradoxical tensions arise from individual, organizational, and social systems. In individuals, cognition is one of the most common sources of paradoxical tension. Cognitive processes give rise to the creation and imposition of boundaries. These boundaries establish arbitrary distinctions and separation between unified phenomena (e.g., stability and change, mutually exclusive goals, multiple selves and associated
norms, values, and logics – actual, ideal, spiritual, social) (Wright, 2015; Lewis, 2000; Farjoun, 2010; Bazerman et al., 1998; Brown, 1992; Wry & York, 2017; Keller et al., 2017). These boundaries then become embedded in cognitive frames, visualizations, and representations (Calabretta et al., 2017). Ultimately, all tensions, whether they arise from organizational action, social interaction, or individual cognition, are experienced through the lens of individual cognition (Putnam et al., 2016).

Another common source of paradox in individuals is emotion, particularly mixed emotions or ambivalence (i.e., the simultaneous experience of polar opposite feelings toward something) about a course of action (Dunning et al., 2017; Rothman et al., 2017). Feelings of ambivalence may lead to tension between flexibility and inflexibility, engagement and disengagement, opportunity and threat, and approach and avoidance (Rothman et al., 2017; Keller et al., 2017). When faced with paradox, ambivalence makes it easier for a decision-maker to remain open to alternative perspectives (Rothman et al., 2017; Amason, 1996). Emotions can prove useful in other ways when facing irreconcilable paradoxical tensions. For example, they can act as a common denominator for comparing fundamentally dissimilar things (Västfjäll et al., 2016).

Sources of paradoxical tensions in organizations are often associated with innovation, change, leadership, and governance processes (Gaim, 2018). Paradoxical tensions can result when circumstances bring these and other processes into proximity (e.g., in an organizational strategy, an organizational project, or a particular task) (Lado et al., 2006; Gaim, 2018; Calori et al., 1994). Paradoxical tensions may also arise when an organization operates in multiple environments, such as when a firm competes in different industries, each operating in a unique set of circumstances (Fredrickson, 1984; Eisenhardt et al., 2010). Finally, paradoxical tensions may originate from within society at large (e.g., forces of competition, demand for consistent performance tempered by the need for flexibility, and corporate
sustainability/social responsibility requirements) (Farjoun, 2010; Fairhurst et al., 2016; Eranova & Prashantham, 2014; Ivory & Brooks, 2018).

The apparent consensus within the literature is that without boundaries, there can be no paradox. Boundaries separating environments or other organizational elements (e.g., goals, processes, practices) that contribute to paradox may be real, constructed, or emergent, whether the source of paradoxical tension lies at the individual or the organizational level (Schad et al., 2016; Farjoun, 2010; Calabretta et al., 2017).

2.4.3.2 Development/Evolution of Paradoxical Tensions

The literature clarifies that a paradox does not exist until an organization or individual becomes aware of the paradoxical tensions underlying the situation (Smith & Lewis, 2011). Paradoxes remain latent until an organization or individual realizes that paradoxical tensions are the source of a problem (i.e., problem awareness alone does not guarantee a paradox, there must be an awareness of paradoxical tensions) (Chapardar, 2016; Gaim, 2018). An organization or individual can extend the latency period by gradually engaging with paradox, moving from imposing a single solution to attempting trade-offs or compromises to resolve the tensions (Chapardar, 2016). However, with the awareness of paradoxical tensions comes the need for simultaneous attention to competing demands, which is a hallmark of paradox (Chapardar, 2016; Gaim & Wåhlin, 2016).

Once paradoxical tensions reach awareness, they may spark emotions (e.g., anxiety, defensiveness, feelings of exposure, vulnerability, and fear) (Gaim, 2018; Harper, 1997; Smith & Tracey, 2016). If sufficiently strong, these emotions may trigger cognitive processes followed by a judgment concerning whether or not the tensions warrant attention (i.e., are salient) (Smith & Tracey, 2016; Ivory & Brooks, 2018; Lewis & Smith, 2014). If the paradoxical tensions are salient, and once they have moved
beyond the level of an individual decision-maker, organizational processes and interactions, such as organizational discourse, support the continued evolution of organizational paradoxes (Putnam et al., 2016; Fairhurst et al., 2016). This development process further supports the notion that static solutions are unlikely to address the reality of a paradoxical situation.

2.4.4 Managing Paradox – Theoretical Foundation

A discussion of engaging with paradoxical tensions during decision-making requires consideration of the best ways to address or manage paradox. Best practices recognize and embrace paradox. A broad discussion of best practices is necessary because the most effective ways of addressing paradox require deviation from the norm, which is to ignore or suppress paradox.

The management of paradox, from a theoretical perspective, involves a combination of static (e.g., context, organizational structure) and dynamic components (e.g., tensions, defences, management, and environmental unpredictability) (Lewis, 2000; Davis et al., 2009). The Dynamic Equilibrium Model of Organizing (Smith & Lewis, 2011) suggests two pathways for managing paradox: organization-wide acceptance (i.e., comfort with tensions) and paradoxical resolution. Paradoxical resolution refers to a “consistently inconsistent” management strategy. According to the Dynamic Equilibrium Model, successful paradox management requires frequent shifts in decision-making based on short-term considerations while recognizing and accepting contradiction in the longer term (Smith & Lewis, 2011). A successful management strategy might include deliberately iterating among different alternatives to ensure simultaneous attention to paradoxical tensions over time (Smith & Lewis, 2011).


Language and dialogue, safe experimentation space, and reward/incentive structures contribute to collective commitment (Ivory & Brooks, 2018). Finally, strategic sensitivity refers to gathering and integrating knowledge to support strategy development, judgments, innovation, and organizational sense-making (Ivory & Brooks, 2018). Strategic analysis, learning, adaptation, and cognitive diversity contribute to strategic sensitivity (Ivory & Brooks, 2018). In combination, strategic sensitivity and collective commitment produce an acceptance of paradox, and collective commitment and resource fluidity provide the basis for a dynamic resolution of paradoxical situations (Ivory & Brooks, 2018).

More recent elaborations on the Dynamic Equilibrium Model include reframing decision-making cognition as a three-stage sequential process in the transparadox model of Pang et al. (2021) and a two-stage sequence in the model of top management team (TMT) paradoxical processes of van Neerijnen et al. (2021). The three stages in Pang et al.’s (2021) transparadox model are information navigation, contextual consideration, and integration. In the information navigation stage, decision-makers acknowledge, exploit and sometimes create oppositional tensions to achieve a strategic goal. In the contextual consideration stage, decision-makers formulate prudent actions (adequate without being excessive or compromising) and adjust to change while staying true to personal principles. In the integration stage, decision-makers maintain their flexibility and adaptability by seeking perspectives that transcend oppositional tendencies. Pang et al. (2021) also propose the addition of “oneness” and “syncretic focus,” a philosophical perspective encompassing the fundamental unity of all things despite
appearances otherwise. The idea of “oneness” as an element that fosters full engagement with paradoxical tensions (Pang et al., 2021) may have first appeared in the management literature in the early 20th century as “holism” within Mary Parker Follet’s management theory (Bednarek & Smith, 2023). Syncretic focus and “prudent precision” (characterized by moderate, considered action) (Pang et al., 2021) replace the strategy of “differentiation and integration” in the Dynamic Equilibrium Model. The two stages in van Neerijnen et al.’s (2021) model of top management team (TMT) paradoxical processes are reflexivity and paradoxical cognitive processing. Reflexivity involves an examination of goals, processes or outcomes with a view to identifying and evaluating information gaps. Reflexivity motivates the next stage, cognitive paradoxical processing. In cognitive paradoxical processing, decision-makers overcome paradoxical tensions through cognitive differentiation and integration. Both the transparadox model and the model of TMT paradoxical processes construe the endpoint of successful engagement with paradoxical tensions as individual and organizational ambidexterity (Pang et al., 2021; van Neerijnen et al., 2021).

The Dynamic Equilibrium Model and associated paradox theory continue to be refined. Bednarek and Smith (2023) and Berti and Simpson (2021) for example, draw attention to the importance of modelling recursive relationships between the various entities involved in paradox. Berti and Simpson in 2021, and Berti and Cunha in 2023, elaborate on the impact of power relationships in organizations and how these dynamics lead to the emergence of pragmatic paradoxes (i.e., an inability to engage with paradoxical tensions due to insufficient agency). Provision has also been made in the Dynamic Equilibrium Model for radical transformation under rapidly changing, chaotic conditions, a process where undecidability (i.e., the inability to provide a logical rationale for a decision) and the need for improvisation (i.e., spontaneous action without preparation while learning and gradually engaging with paradoxical tensions over time) render seeking a dynamic equilibrium among paradoxical tensions
inappropriate (e.g., where reaching an equilibrium might maintain an unfair status quo, or reduce organizational performance) (Lê & Pradies, 2023; Berti & Cunha, 2023). Consideration of organizational power, undecidability, improvisation, and radical transformation refine the concept of the “total situation” (from Mary Parker Follett in Bednarek & Smith, 2023) or context within which paradoxical tensions operate (Lê & Pradies, 2023; Bednarek & Smith, 2023). The decision-making framework in this study incorporates these refinements and the preceding models and capabilities.

2.4.5 Managing Paradox – Practice
Organizational researchers suggest a variety of strategies for addressing paradoxical situations in practice. Strategies range from accepting to using to transcending paradox through new conceptions (Farjoun, 2010) afforded by a paradox-friendly mindset (i.e., reframing from “either/or” to “both/and”) (Ivory & Brooks, 2018; Calabretta et al., 2017; Smith, 2014). Common to all these strategies lies the understanding that the resolution of paradox is not possible and that the goal is to support continued tension (Smith et al., 2010; Calabretta et al., 2017; Miron-Spektor et al., 2018). Effective management responses to paradox employ strategies that themselves appear paradoxical (Lewis & Smith, 2014; Eisenhardt et al., 2010). Effective responses embrace paradoxical tensions and deviate from the norm of choosing to respond to one tension at the expense of all others as a lasting solution (Gaim & Wåhlin, 2016; Smith, 2014; Eranova & Prashantham, 2014; Nutt, 2004; Fredrickson & Mitchell, 1984; Smith, 2014; Miron-Spektor et al., 2018).

Paradox precipitates a range of behavioural responses from denial, repression, regression, and resistance to ambivalence and, finally, engagement (Lewis & Smith, 2014; Gaim, 2018; Putnam et al., 2016; Poole & Van de Ven, 1989; Schad et al., 2016). These behavioural responses create a need for management strategies at the organizational level to address paradox. The strategies implemented in practice vary in their effectiveness (Lewis & Smith, 2014; Eisenhardt et al., 2010; Schad et al., 2016). A
strategy of ignoring tensions is the least effective. Managing all tensions at the same time is more effective. Integrating tensions through novel solutions that address but don’t eliminate paradoxical tensions is most effective (Schad et al., 2016; Poole & Van de Ven, 1989; Calabretta et al., 2017; Wright, 2015; Ivory & Brooks, 2018; Smith, 2014; Smith, 2014).

2.4.5.1 Norms for Managing Paradox

Individual and organizational norms constrain the choice of practical strategies for managing paradox. The established norms tend to produce ineffective behavioural responses at the “ignoring” end of the range of effectiveness. Individuals try to conserve cognitive resources, narrow their attention, limit consideration to what is within their control and boundaries of understanding, and seek consistency (Lewis, 2000; Lewis & Smith, 2014; Nutt, 2004; Pedrezini, 2017; Pederzini, 2018; Smith et al., 2010). Faced with substantial demands on their cognitive capacity to comprehend paradox, decision-makers and managers tend to frame their thinking in simple either/or terms (Lewis, 2000). The norm is to oversimplify the complex relationships between paradoxical tensions to a case of opposites. Decision-makers can then resolve the situation by addressing one tension while suppressing or ignoring the others (at least as a temporary solution that eliminates the paradox and relieves pressure on cognitive resources) (Harper, 1997; Eisenhardt, 2000; Lewis, 2000; Smith, 2014; Wright, 2015). As paradoxical tensions endure and evolve, they continue to drive decision-makers and managers to adhere to existing norms (i.e., employ existing schemata and frames) rather than embrace contradictions (Lüscher & Lewis, 2008; Narayanan et al., 2011).

Cognitive style compounds the constraints imposed by cognitive capacity. A rational-style decision-maker cannot comfortably accommodate intuitive thinking and vice versa, preferring to avoid dealing with paradox rather than switching to an intuitive style of cognition better suited to the complexity and uncertainty of paradox (Calabretta et al., 2017). This compounding effect is particularly
likely where decision-makers must justify their choice and face multiple options simultaneously (i.e., in paradoxical situations) (Bazerman et al., 1998).

The guidance decision-makers and managers receive based on the dominant contingency approach to management research further reinforces their natural tendency to reduce paradox to an either/or choice between alternatives. Advice to managers and decision-makers based on contingency research (which dominated until the emergence of the paradox perspective in the 1980s) follows the structure of research designed to suggest when it might be best to choose one particular alternative over another (Lewis & Smith, 2014). However, advice based on a paradox perspective fosters consideration of two or more demands or tensions simultaneously (Smith et al., 2010). Simultaneous management includes accepting tensions, using a paradoxical lens to clarify and differentiate tensions, and separating tensions temporally or spatially (Chapardar, 2016; Smith, 2014; Schad et al., 2016; Smith & Lewis, 2011). The result, from a practical standpoint, is decisions based on circumstances at a given moment, with the view that any decision is flexible and temporary (i.e., inconsistent over time) (Smith, 2014; Lewis, 2000).

The organizational norm for managing paradox is an extension of individual decision-making norms. The organizational norm requires managers to articulate clear strategies, be consistent and predictable in their behaviour, and choose a single rather than a multi-strategy approach. This norm is driven by the organizational need for external legitimacy, for internal conflict to be kept to a minimum, for value to be leveraged from existing practices, and for maintaining alignment with existing organizational structure (Smith, 2014; Smith & Tracey, 2016; Eisenhardt et al., 2010). This natural tendency to focus on one solution becomes more pronounced if the decision-maker’s organization has established rapid decision-making as an organizational norm (Nutt, 2004). The pressure to act in the presence of a norm for quick decisions makes it hard to maintain a “discovery” decision-making process
(Nutt, 2008; Nutt, 1984) typical of an entrepreneurial mindset (Grégoire, 2011), increasing the likelihood that a decision-maker will consider only a single alternative. For example, this organizational norm may predispose decision-makers to choose ready-made solutions from an organizational repertoire with known consequences rather than seek new solutions. Familiar, ready-made solutions are more straightforward than novel solutions to visualize, communicate, and justify (Nutt, 2008; Nutt, 1984; Narayanan et al., 2011); they address the need for quick action and reduce stress and organizational tension in the short run. Organizational forces build over time, making it ever harder to settle on more than one alternative and deviate from the decision norm (Nutt, 2008). These constraining organizational forces resist changes in personnel (i.e., the organizational behaviour pattern is larger than the people making the decisions) (Fredrickson & Mitchell, 1984). Set against these forces maintaining the current norm and status quo, however, are drivers for change, including organizational goals around “thinking out-of-the-box” and “thinking differently” (Grégoire, 2011; Shepherd et al., 2015; Wry & York, 2017), and “being creative and innovative” (Faßauer, 2018). These forces for and against the current norm for decision-making under paradox are themselves in a paradoxical relationship.

How well organizations address paradox is determined in part by organizational culture, which influences how paradoxes are framed as either single events or an unfolding process (Keller et al., 2017). The relationship between the established norms for managing paradox and effective management of paradox is both recursive and negative, deeply entrenching an ineffective response as the individual and organizational norm within an organization’s culture. Regardless of how well or how poorly paradoxes are managed, complex decisions, and among them, paradoxes, are becoming increasingly frequent. Effectively dealing with paradoxes requires managers to deviate from the decision-making norm by engaging with paradoxical tensions to develop alternatives that synthesize several perspectives or abstract tensions to a higher level (Amason, 1996).
2.4.5.2 Paradoxical Mindset

Deviating from the norm for addressing paradox by synthesizing perspectives and abstracting paradoxical tensions to a level that erases boundaries requires a particular way of thinking referred to as a paradoxical mindset (e.g., Smith, 2014; Lüscher & Lewis, 2008; Miron-Spektor et al., 2018; Schad et al., 2016; Lewis & Smith, 2014). A paradoxical mindset is more than the experience of paradoxical tension (Miron-Spektor et al., 2018; Chapardar, 2016). A paradoxical mindset coordinates emotion, cognition, and behaviour when grappling with paradoxical tensions. Emotional capacities characteristic of a paradoxical mindset include attaching valence to cognitive frames and applying intuition. Cognitive functions contributing to a paradoxical mindset include accepting and engaging inconsistencies, holding multiple perspectives, focusing on relationships among features, integrating past and future time frames, and reframing (Chapardar, 2016; Eisenhardt et al., 2010). Behaviours characteristic of a paradoxical mindset include seeking, choosing, and creating options, adjusting solutions, adopting contradictory behaviours, and maintaining tension (Gaim, 2018; Eranova & Prashantham, 2017; Eranova & Prashantham, 2014; Calabretta et al., 2017; Gaim & Wåhlin, 2016; Schad et al., 2016; Bingham & Eisenhardt, 2011). The emotional, cognitive, and behavioural features of a paradoxical mindset resemble descriptions of an entrepreneurial mindset with the added feature of inconsistency.

2.4.5.3 Tools for managing paradox

The literature describes many tools to help managers foster, promote, and use a paradoxical mindset. A paradoxical mindset preconditions a decision-maker to identify a unifying abstraction or novel solution that rises above and integrates paradoxical tensions (Smith, 2014). These abstractions or solutions address paradox effectively (Smith, 2014). The literature describes two techniques for developing a paradoxical mindset of particular interest to this study. First, Farjoun (2010) sets out a framework for rendering stability-change as a single solution. The framework consists of a matrix of stability-change by
mechanism-outcome. Farjoun's framework aligns well with the Competing Values Framework that similarly accommodates competing elements (e.g., Epstein & Faerman, 2017). The connection to the Competing Values Framework creates a link between managing paradox effectively (i.e., making a deviant decision under paradox) and individual values, beliefs, and organizational context. The connection also suggests a way of determining the baseline for organizational change aimed at creating a paradoxical mindset.

Second, Harper (1997) describes a practice for producing a paradoxical mindset. The method requires decision-makers to identify points in their perception where they choose the focus of their attention (based on perceived needs and solutions available at that time). The heuristic that helps reveal these perceptual breakpoints is to ask questions that expose choices about how a situation is observed and the accuracy and completeness of information supporting those choices (Harper, 1997). Although decision-makers are always scanning for information, this heuristic helps them shift from a closed system perspective to a “holographic experience” (i.e., the simultaneous, multi-dimensional experience of all situational elements and their potential complexity) (Harper, 1997). The concept of holographic experience may be related to the idea of aesthetic experience (i.e., the direct, unmediated experience of stimuli), which is more frequently encountered in the management literature. Harper’s technique is of interest to this study because it identifies breakpoints in cognition. Breakpoints in cognition are associated with the development of representations that underly deviant behaviour (Fiske & Taylor, 2016). This connection between cognitive discontinuity and deviance suggests that the effective management of paradox (which involves deviance) requires a mindset able to summon and reflect on cognitive breakpoints or discontinuities and synthesize these insights into a holistic cognitive representation.
In addition to procedures for fostering a paradoxical mindset, the literature provides some examples of techniques for managing paradox effectively. These include multiple criteria decision-making and inclusive decision-making, practices that help integrate logic and intuition by allowing decision-makers to consider several criteria, perspectives, and objectives simultaneously (Kumar et al., 2017; Calabretta et al., 2017; Harper, 1997). Other techniques for managing paradox include active decision-making and dynamic decision-making. Active decision-making consists of making a series of small decisions rather than one big decision (Connolly, 1980). Dynamic decision-making involves iteratively choosing between options over time (Smith, 2014; Smith & Lewis, 2011). These techniques work well, provided managers can overcome organizational and personal forces driving them to make one final choice (Harper, 1997; Connolly & Zeelenberg, 2002; Lerner et al., 2015). The literature also suggests that organizational supports are critical for success (e.g., commitment to an overarching vision and goals, awareness of relationships between agendas – personal and organizational, a willingness to engage/endure conflict, an openness to diversity, and support for mistake-making) (Smith et al., 2010, Gaim, 2018).

More generally, management practices that foster the exposure and maintenance of paradoxical tensions (rather than suppressing them) play an essential role in the management of paradox (Eisenhardt, 2000; Smith & Tracey, 2016; Mechiche, 2020). Ways of maintaining tensions include: making temporary assignments, prototyping rather than planning, creating alliances rather than constructing internal units (Eisenhardt et al., 2010), rewarding and providing training for the achievement of paradoxical objectives (e.g., short-term performance that also reinforces long-term success), fostering the use of new logics (e.g., both-and, best-of-both, and neither-nor) (Gaim & Wåhlin, 2016; Smith et al., 2010) or positive deviance (Snowden & Boone, 2007), and accepting partial or temporary solutions that allow progress without resolving paradoxical tensions (e.g., aim for a
“workable certainty” or a “negotiated understanding”) (Smith, 2014). Higher-level thinking, such as “design thinking,” brings together a paradoxical mindset and organizational and individual practices for managing paradox by encouraging decision-making mastery, originality, and artfulness to address competing, simultaneous demands (Gaim & Wåhlin, 2016).

Several factors influence the effectiveness of tools designed for managing paradox, including the nature of tensions, external context/environment, organizational culture, and individual cognition and affect. With regards to the nature of tensions, if paradox involves a value protected from trade-offs (i.e., a “sacred” value), the decision is more comfortable than if a choice lies between two sacred values (Hanselmann & Tanner, 2008). Also, as paradoxical tension increases in intensity, the conventional emphasis on control, decision, and a solution may move toward “coping with” and “working through” (Schad et al., 2016). Regarding contextual/environmental factors, environmental change and complexity intensify a decision-maker’s experience of paradox, making it more likely to be perceived under turbulent conditions (e.g., plurality, change, and scarcity) (Schad et al., 2016; Miron-Spektor et al., 2018). Organizational culture, for its part, can be manipulated to provoke a paradoxical mindset (e.g., introducing artifacts such as strategies, systems, structures, and practices that embrace paradox, emphasize friendly competition, or adopt contradictory values) (Keller et al., 2017; Smith, 2014). Finally, from a cognitive perspective, organizational factors that foster cognitive complexity and emotional detachment (i.e., ambivalence) also encourage individual acceptance of and engagement with paradox (Smith & Lewis, 2011; Gaim & Wåhlin, 2016).

2.4.6 Development of a Spectrum of Decisions from Least to Most Paradoxical
Because the term “paradox” is polysemic, it covers a range of decision situations that are not strictly paradoxical or are paradoxical to a degree. Decision-makers, therefore, may interpret the term “paradox” to mean a decision with as few as one or with all the distinguishing characteristics of a
paradox. Further, it is unlikely that any two managers would agree on the meaning of the term paradox, yet each would probably have their own workable definition (Murphy, 2002). This study accommodates this range of interpretations of the term paradox by incorporating a spectrum of decision situations from non-paradoxical to paradoxical. For the purposes of this study, this spectrum is anchored at the most paradoxical end by a precise definition of the term paradox: “an awareness of multiple, interrelated and simultaneous tensions requiring ongoing organizational attention.”

Nine articles in the reviewed literature provide examples of the range of decision situations included under the umbrella term “paradox”: Gaim and Wåhlin, 2016; Lewis, 2000; Putnam et al., 2016; Miron-Spektor et al., 2018; Schad et al., 2016; Smith, 2014; Smith and Tracey, 2016; Wright, 2015, and; Lewis and Smith, 2014. Each range found in these articles presents decision situations in a hierarchical-like order, according to the characteristics of each situation in relation to paradox. However, the articles provide no single agreed-on set of situations or order. A three-step process was followed to obtain a single, literature-based spectrum of decision situations involving one or more elements of paradox. The three-step development process is illustrated in Figure 2 and described in detail below.

In the first step in the development process, the nine reviewed articles were searched for the terms used to describe decision scenarios. These terms were gathered along with their descriptions, order of presentation in the article and the rationale behind any ordering of terms (see Appendix 1, Detailed Tables: Decision Spectrum for Paradox, table i). Next, the order of presentation of terms, the number of mentions of terms in the nine articles, and the number of terms (or groups of terms) in the range of decisions referred to in an article were tabulated (see Appendix 1, Detailed Tables: Decision Spectrum for Paradox, table ii). The ranges of decision situations in the articles consistently place the term paradox at one extreme. The ranking of other terms for decision situations was less consistent.
However, trade-offs and dilemmas are mentioned most frequently after paradox. Paradox, trade-off, and dilemma, therefore, are included in the spectrum as decision situation terms or types.

**Figure 2 - A three-step development process to produce a decision spectrum for paradox**

The second step in the development process sought distinguishing characteristics for each decision situation type by identifying recurring associations of a particular term with a specific feature across the nine articles. Aided by the work of Gemi and Hauschildt (1985) on the nature of top-management decisions, five distinguishing characteristics of decision situations were identified as involving some degree of paradox: the presence of conflicting, interrelated tensions, lack of clarity, challenge, persistence, and resolvability. Resolvability manifested as the inverse of persistence. These distinguishing characteristics were then used to construct an additional “simple” non-paradoxical decision situation with none of the distinguishing characteristics and against which any broadly paradoxical situation might be compared. Categories of entities, including decisions, often gain meaning
through comparison with their opposites (Dagnino & Cinici, 2016; Rogers & Ryals, 2007). The intention of including a contrasting simple decision situation in the spectrum was to provide such a clarifying opposite.

The third step involved ordering the decision scenarios according to the number of distinguishing characteristics each shared with the most paradoxical decision situation. Placing categories of entities in hierarchical order is thought to be both natural and helpful in placing novel entities, such as newly encountered decisions, into categories (Murphy, 2002). Of the terms entered in the spectrum of decision scenarios to this point, paradox and simple decision situations occupied the two extremes, with paradox possessing all the distinguishing characteristics and simple decisions possessing none. After the simple scenario, tradeoff was associated with the least number of distinguishing characteristics (two). Near the opposite end of the spectrum, dilemma was associated with four out of the five distinguishing characteristics. The level of difficulty associated with a dilemma and the relative clarity of a trade-off would place dilemmas closer to paradox and trade-offs closer to simple decisions. At the center of the spectrum, between trade-off and dilemma, the fifth decision situation, compromise, was entered, having three distinguishing characteristics. The position of compromise in the middle of the spectrum fit with the frequency with which it was mentioned in the reviewed articles and on its placement in the middle of a spectrum of decisions when it was referred to by an article. All nine of the articles, with the exception of Smith and Tracey (2016) and Wright (2015), mention compromise specifically as a strategy (rather than a term covered by paradox, per se) that seeks stable ground through balancing tensions and weighing and engaging with alternatives. Importantly, Putnam et al. (2016) and Gaim and Wåhlin (2016) position the strategy of compromise between the extremes of ignoring and engaging with paradoxical tensions, that is, in the middle of a spectrum that treats paradoxical situations as either simple decisions or paradoxes respectively.
The final spectrum of decision scenarios, therefore, consists of two extreme decision situations, simple versus paradoxical, one decision situation close to each extreme, trade-off and dilemma, and a final decision situation at the center, compromise (Lewis, 2000; Miron-Spekt et al., 2018; Smith, 2014; Smith & Tracey, 2016; Wright, 2015; Lewis & Smith, 2014; Putnam et al., 2016; Smith & Lewis, 2011; Gaim & Wåhlin, 2016; Schad et al., 2016). The five decision types on the spectrum from non-paradoxical to paradoxical separate along the five distinguishing characteristics as set out in Table 1. In simple decisions, moving from left to right in Figure 2, competing tensions may be present but are not interrelated (e.g., a simple contradiction, Gaim & Wåhlin, 2016; Smith & Lewis, 2011). A trade-off involves conflicting, interrelated tensions that are relatively unambiguous (Gaim & Wåhlin, 2016). Compromises involve vague or unclear tensions, but the decision situation is not necessarily challenging (Schad et al., 2016). Dilemmas are challenging but not persistent (Smith & Lewis, 2011; Gaim & Wåhlin, 2016). Finally, paradoxes involve challenging and persistent tensions (Schad et al., 2016; Gaim & Wåhlin, 2016; Smith & Lewis, 2011).

This spectrum of decision situations involving characteristics of paradox aims to be comprehensive and straightforward, comparing only the most distinguishable decision situations covered by the term “paradox.” The spectrum makes it possible to explore the kinds of decisions that decision-makers might consider paradoxical, along with the distinguishing characteristics of those decisions.

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<td>Simple</td>
<td>Tensions not interrelated</td>
<td>Tensions are clear</td>
<td>Decision is not challenging</td>
<td>Tensions are not persistent</td>
<td>Tensions are resolvable</td>
<td>Go/No go; tensions clearly resolvable.</td>
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<td>Trade-off</td>
<td>Interrelated tensions present</td>
<td>Tensions are clear</td>
<td>Decision is not challenging</td>
<td>Tensions are not persistent</td>
<td>Tensions are resolvable by favouring one tension</td>
<td>Win/Lose; tensions lean toward being resolvable.</td>
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<tr>
<td>Compromise</td>
<td>Interrelated tensions present</td>
<td>Tensions are clear</td>
<td>Decision is not challenging</td>
<td>Tensions are not persistent</td>
<td>Tensions are resolvable by balancing tensions</td>
<td>Weigh aspects; unclear whether tension is resolvable or not.</td>
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<tr>
<td>Dilemma</td>
<td>Interrelated tensions present</td>
<td>Tensions are clear</td>
<td>Decision is not challenging</td>
<td>Tensions are not persistent</td>
<td>Tensions are resolvable by making an either/or choice</td>
<td>Difficult choice: tensions lean toward being unresolvable.</td>
</tr>
<tr>
<td>Paradox</td>
<td>Interrelated tensions present</td>
<td>Tensions are clear</td>
<td>Decision is challenging</td>
<td>Tensions are persistent</td>
<td>Tensions are not resolvable. Engage with tensions.</td>
<td>Global/Local; tensions clearly unresolvable.</td>
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The two extremes of the spectrum of decisions (i.e., simple decisions and decisions involving paradox in Table 1) align with the Cynefin framework, which was developed from observations of real-world practice at IBM (Snowden & Boone, 2007; Alexander et al., 2018). The Cynefin framework sets out differences between simple and complex decision-making situations along two dimensions: level of abstraction and level of information about the external context (e.g. levels of uncertainty and ambiguity) (Alexander et al., 2018; Snowden, 2002). Simple decision contexts are low in ambiguity/uncertainty and low in abstraction (Snowden 2002). Complex contexts are high in ambiguity/uncertainty and high in abstraction (Snowden 2002). Effective decision-making for simple decisions requires categorization, which triggers an established, routine, or automatic response (Alexander et al., 2018).
Complex decisions, according to the Cynefin framework, involve many interacting elements whose relationships are constantly changing (Snowden, 2002) within a system that is subject to human intelligence and unpredictability (Snowden & Boone, 2007). In complex decisions, cause and effect are intertwined and cannot be separated (Snowden, 2002). Responding appropriately to a complex decision requires analysis, experimentation, innovation and probing (Snowden & Boone, 2007; Alexander et al., 2018). In complex decision situations, the solution is unclear but may emerge from discernible patterns within the decision context (Snowden & Boone, 2007; Snowden, 2002).

In addition, Alexander et al. (2018) draw a parallel between the operational level of an organization and simple decisions and the strategic level and complex decisions. This parallel links the Cynefin framework to the work of Robert N. Anthony (1965 in Edwards et al., 2000) and Herbert A. Simon (1997 in Edwards et al., 2000) identifying strategic decisions (involving long-range organizational goals), tactical decisions (requiring the setting of targets and criteria to achieve goals), and operational decisions (involving the management of day-to-day activities). This connection further helps to establish a link between cognitive effort (level of abstraction) and decisions at the two extremes of the spectrum of decisions (i.e., strategic versus operational; and complex versus simple).

The following section establishes the cognitive and behavioural significance of engagement (or non-engagement) with paradox, the former representing deviance from the norm. The section begins with a review of deviance, its definitions and relevant theory and concludes with a review of antecedents.

2.5 ENGAGEMENT WITH PARADOX
A fundamental characteristic of all decisions involving paradox is, the natural human tendency to ignore underlying paradoxical tensions. Engagement with paradoxical tensions during decision-making is a
deviation from this tendency and is the deviation of interest in this study. This is depicted in Figure 1 as a fork in the decision process where progress either adheres to norms or is different. This section of the chapter introduces deviance literature with a brief discussion of the ways deviance can be viewed. Next, deviance is defined for the purposes of this study, including a discussion of the threshold beyond which decision-making behaviour is considered deviant and how the extent of deviation is measured. A discussion of theories of deviance follows, underscoring deviance as an event involving the erosion of decision-making structures (i.e., process) as well as an imbalance between means and ends (i.e., context) (Morgeson et al., 2015). Viewed this way, deviance, paradox, and decision-making can be brought together under event theory. Finally, there is a discussion of the antecedents of deviance as part of the decision-making context.

2.5.1 Positive, Negative, and Continuum Views of Deviance
Traditionally, the term deviance has had negative connotations (Spreitzer & Sonenshein, 2004; Robinson & Bennet, 1995; Lugosi, 2019; Faßauer, 2018), with research since the 1950s tending to focus on deviant behaviours seen as undesirable (e.g., personal aggression, organizational neglect, Bennett and Robinson, 2000; Galperin, 2012). However, since the 1980s, there has been a parallel stream of research on positive deviation focused on corporate social responsibility, innovation, and creativity (Mertens et al., 2016; Bennett & Robinson, 2000; Galperin & Burke, 2006). Definitions of deviance in the literature reflect the dichotomy between positive and negative conceptions of deviance.

Typically, definitions of negative deviance include the idea that deviance is voluntary but not necessarily intentional, that it violates organizational norms, and that it harms the well-being of an organization, an organizational member, or both (Robinson & Bennet, 1995; Lugosi, 2019; Bennett & Robinson, 2000). Negative or destructive deviance can target organizational processes, property, policies, or individual organization members (Sibony et al., 2017; Galperin & Burke, 2006).
There are many definitions of positive deviant behaviour (Mertens et al., 2016). Literature definitions of positive deviance vary on three key factors or dimensions: the focus of deviance, the positive rationale behind deviance, and the nature of deviance. The focus of definitions swings from the deviant behaviour itself, the outcome of the behaviour, or both. For example, a definition of positive deviance might focus on over-conformance to a norm (i.e., behaviour), subjective well-being, long-term effectiveness, the evolution of norms (i.e., outcomes), innovation, challenging rules, whistle-blowing, or adapting to change (i.e., both behaviour and outcomes) (Spreitzer & Sonenshein, 2004; Galperin & Burke, 2006; Mertens et al., 2016). The rationale for labelling a deviant behaviour “positive” usually calls for positive societal, institutional, organizational, or individual evaluations of the behaviour in question. Finally, a behaviour, outcome, or both may be defined as "deviant" when it deviates from a norm with positive or honourable intent (Spreitzer & Sonenshein, 2004; Galperin, 2012). However, not all definitions of positive deviance require positive or honourable intent (e.g., Lugosi, 2019; Faßauer, 2018). Including a requirement for positive intent in the definition (independent of eventual outcome) limits the scope of positive behaviours to those most relevant and likely to be enduring (Spreitzer & Sonenshein, 2004).

Another way to view deviation is to see it as behaviour taking place along a continuum where activities that depart from accepted norms lie at either extreme (positive at one end, negative at the other), and behaviours that adhere to norms occupy the middle (Mertens et al., 2016, Warren, 2003). The continuum view addresses the call in the literature to integrate research on positive and negative deviation (e.g., Galperin & Burke, 2006; Galperin, 2012; Warren, 2003) by adopting a definition of deviation that includes departures from the norm construed as positive, negative or both (Mertens et al., 2016). The direction of the departure from organizational or societal norms determines the deviation’s valence (Pierce & Aguinis, 2015). The valence of antecedents to deviation, norm departures,
and deviant behaviour consequences can be quite fluid depending on the timing and perspective taken (Lugosi, 2019; Pierce & Aguinis, 2015). For example, antecedents perceived as positive or negative (e.g., management control) can produce behaviour and outcomes perceived as positive or negative depending on timing and perspective (Faßauer, 2018; Pierce & Aguinis, 2015; Tenzer & Yang, 2019). Examples of definitions that don’t consider valence include “…behaviour in, associated with or directed at an organization that is perceived to violate socially accepted norms of organizational stakeholders” (Lugosi, 2019), and “departure from common repertoires of behaviour, which can be perceived as desirable or undesirable” (Faßauer, 2018). A continuum-style definition of deviance is much broader than typical definitions of positive and negative deviance in the literature. From a continuum perspective, deviance can extend beyond immediate organizational boundaries (Lugosi, 2019). Intentionality is not part of the definition to accommodate deviance due to a lack of awareness or inability to conform (Lugosi, 2019). Deviance is not determined by the consequences or outcomes of the behaviour (Lugosi, 2019). Although a continuum-type definition does not distinguish between positive and negative deviance, it still permits further deviance classification. Additional classifications include interpersonal-organizational and minor-serious dimensions, task-relevance, and the type or target of behaviour (e.g., organizational or individual assets, interactions with others, process quality or quantity, and aggression or hostility toward others) (Bennett & Robinson, 2000; Galperin, 2012; Robinson & Bennet, 1995). If a target exists, it need not necessarily be subject to any or all of the deviant behaviour’s impact for the behaviour to be considered deviant (Thau et al., 2009).

2.5.2 Definition of Deviance
This study made use of the flexibility and comprehensiveness of a continuum-type definition of deviance. Under Mertens et al.’s (2016) framework for studying deviance, a necessary step in defining deviance involves describing a norm and establishing a threshold of departure from that norm beyond
which an observed behaviour will be considered deviant. The norm of interest in this study is the 
suppression of one or more competing tensions to achieve a “solution” to a paradox within a decision-
making situation (Smith, 2014; Gaim & Wåhlin, 2016). For the purposes of this study, any departure 
from complete suppression of paradox crosses the threshold and is considered deviant. Therefore, with 
a continuum-type definition of deviance in mind, this study defines deviance as “any observed 
departure from complete suppression of paradox.” This definition reflects Mertens et al.’s (2016) 
framework and the notion that the valence of deviance is not a defining feature. The study distinguishes 
deviant and non-deviant decision-making behaviour according to this definition of deviance.

Referring to the continuum definition of deviance, the degree to which a respondent in this 
study demonstrates comfort with and acceptance of paradoxical organizational tensions determines the 
extent of deviance. Departure from the norm may range on a scale from simply recognizing paradox to 
actively engaging with paradox. This study determined the level of a respondent’s deviance based on 
observed suppression (i.e., no deviation), recognition (i.e., a small deviation), or engagement with 
paradox (i.e., a significant deviation) in response to decision scenarios in the study survey.

2.5.3 Deviance Theory
This sub-section on deviance theory draws on anomie theory and detrimental citizenship theory to 
conceptualize deviance as an event with process and contextual components. When paradox, decision-
making, and deviance are seen as events, they become constituents within a larger framework that 
encompasses all three, as shown in Figure 1.

Models of deviance in the literature incorporate elements from models of cognition, emotion, 
and behaviour. Models of deviance tend to proceed from the antecedents of deviance, through deviant 
behaviour, to the consequences of deviance. One of the most comprehensive deviance models is 
founded on anomie theory and considers the path from antecedents to observed behaviour (Faßauer,
2018). Faßauer (2018) describes anomie as an erosion of values, norms, and rules caused by an imbalance between the organizational emphasis on and member acceptance of organizational goals and the means to attain those goals (including sufficient resources). This means-ends imbalance produces member dissatisfaction leading to deviation from norms (Faßauer, 2018).

A two by two matrix consisting of acceptance or rejection of means on one axis and acceptance or rejection of ends on the other axis yields four possible reactions to means-ends imbalance: “innovation” (goal acceptance, means rejection), “ritualism” (goal rejection, means acceptance), “retreat” (goal rejection, means rejection), and “rebellion” (an alternate vision of goals and means, neither acceptance nor rejection) (Faßauer, 2018). Modifiers of deviant reaction to dissatisfaction include reference groups, the extent of institutional socialization, internalization of institutional values and norms, and personal characteristics (Faßauer, 2018). According to anomie theory, organizational controls designed to manage these reactions should focus on two kinds of entities or objects of control: direct controls over results and action (e.g., results and performance targets), and indirect controls over organizational members (e.g., selection, training, job design, and allocation of resources) and organizational culture (e.g., communicating mission statements, creation of role models) (Faßauer, 2018). Controls can vary in the flexibility they afford. An explicit, specific, detailed, measurable performance target aligned with organizational goals and subject to frequent monitoring and feedback, for example, represents very tight control (Faßauer, 2018). The relationship between anomie, reaction to anomie in the form of deviation, and organizational control is recursive (Faßauer, 2018). Anomie theory explains the observation that the same antecedent (e.g., management control perceived as too tight or too loose depending on the perspective taken) can result in deviation perceived as positive (e.g., innovation) or negative (e.g., rebellion) depending on circumstances (Faßauer, 2018). Chapardar’s (2016) definition of paradox links paradox to deviance and anomie theory by specifying that paradoxical
tensions involve elements of an organization competing for resources or influence over means or ends in time. More generally, the means-ends tensions contemplated in the anomie theory of deviance are also discussed in the context of paradox theory (e.g., Kumar et al., 2017; Wry & York, 2017).

Theories from research on detrimental citizenship behaviour (i.e., destructive deviance or destructive conformity to norms) support anomie theory and extend it further to include the consequences of deviant behaviour. Similar to anomie theory, the model of detrimental citizenship behaviour begins with cognition, identifying an organizationally consequential situation (Pierce & Aguinis, 2015). The model then considers the search for existing or newly generated cognitive representations to match the situation, and the association of emotions and values to those representations (Pierce & Aguinis, 2015). If a representation exists, quick reflexive processing leads to an emotional experience and the formation of behavioural intention followed by behaviour (Pierce & Aguinis, 2015). If no representation matched to the situation exists, deliberative, innovative cognitive processing based on search or recall occurs. This form of processing generates potential representations and responses that are assessed against criteria for success, culminating in selecting and implementing a behaviour (Pierce & Aguinis, 2015). Further, if the chosen behaviour is deviant and detected, the detrimental citizenship behaviour model suggests that stakeholder reaction will lead to propagating consequences at different levels: organizational (e.g., business and legal costs, effects on profitability), societal (e.g., regulation, litigation, and impacts on trust and life complexity), and individual (e.g., legal ramifications and effects on reputation and employability) (Pierce & Aguinis, 2015).

Theories of deviance require a deviation from socially constructed norms (Bennett & Robinson, 2000; Warren, 2003; Mertens et al., 2016; Lugosi, 2019) that, in turn, play a crucial role in predicting behaviour (Paul et al., 2016). Process theories of motivation, such as the Theory of Reasoned Action and the Theory of Planned Behaviour, predict that individuals will act when their planned behaviour aligns
with subjective norms reflective of significant others (i.e., socially constructed norms) (Paul et al., 2016).

In this context, planned behaviour constitutes a “means” in anomie theory or a “cognitive representation” of success in the detrimental citizenship behaviour model.

Given the insights from this study’s review of the literature on deviance theory and motivation, it might be anticipated that antecedents precede deviant decision-making behaviour in the form of an imbalance or tension between objectives and means of attaining those objectives. Further, it appears that the clearer the relationship between means and ends, the more likely any imbalance will be perceived, and the more likely deviation will occur. There is also a suggestion that individual and organizational context (including experience with direct or indirect controls to manage deviation) may modify the perception of any means-ends imbalance.

2.5.4 Antecedents
Research on the antecedents to deviant behaviour accounts for a significant body of research in the literature on deviance. Interest in deviant behaviour’s antecedents stems from the high social and economic costs and benefits associated with deviance (Galperin & Burke, 2006; Spreitzer & Sonenshein, 2004; Mertens et al., 2016). More than one antecedent usually precedes deviant behaviour (Kish-Gephart et al., 2010). Antecedents can emerge from organizational, interpersonal/social, and individual factors (Lugosi, 2019). Organizational antecedents might include devices, systems, and rules that impose controls on behaviour, organizational goals and objectives (Galperin, 2012), job design, organizational culture, and the physical layout of the organization (e.g., hidden spaces, isolation) (Lugosi, 2019). Interpersonal and social antecedents include societal-level culture (e.g., Hofstede’s characteristics, Lugosi, 2019), perceived fairness of organizational processes (Lugosi, 2019; Thau et al., 2009), concern or lack of concern for others (Kish-Gephart et al., 2010), and the values espoused by social institutions (e.g., the economy, polity, family, and schooling emphasize the achievement of economic success,
Antecedents at the individual-level include dispositions, traits, and tendencies (Tenzer & Yang, 2019; Lugosi, 2019), values, beliefs (Lugosi, 2019), and organizational commitment (Tenzer & Yang, 2019).

Several factors moderate how antecedents to deviant behaviour operate: gender (through such influences as the size of the entrepreneurial network, perceptual variables such as alertness to opportunities, fear of failure, and belief in having adequate skills, Shepherd et al., 2015), age (young males are the most likely to deviate, Lugosi, 2019), organizational culture (Spreitzer & Sonenshein, 2004; Kish-Gephart et al., 2010), and organizational context (e.g., sociopolitical support, and access to information and resources, Galperin, 2012). These modifiers and the discussed antecedents to deviant behaviour are incorporated as antecedents and decision-specific context in this study's decision-making framework.

3.0 INTEGRATION OF DECISION-MAKING, PARADOX AND ENGAGEMENT

This chapter integrates the literature on decision-making, paradox, and engagement, describing links between the three topics and discussing how each topic contributes to an understanding of the path from thought to action. The path from thought to action conceptualized in Figure 1 is then elaborated on to produce a detailed conceptual framework for studying cognition in the face of decisions involving paradox.

One of the most important links between the literature on decision-making and the research on paradox in organizational settings is the study of tension. From a decision-making/management perspective, organizational tension brought on by resource scarcity or severe time constraints, for example, can have detrimental effects on individual job performance or beneficial effects on innovation (Miron-Spektor et al., 2018). Within the literature on paradox, organizational tension is one of the most important sources of paradox for decision-makers.
A prominent link between the literature on decision-making and that on deviation is the study of creativity and innovation. From the perspective of this study, which focuses on complex decision-making and paradoxical tensions, the link between the two kinds of literature is most pronounced in the fields of entrepreneurial decision-making and the entrepreneurial mindset. Entrepreneurial cognition and mindset involve considering alternatives outside the norm (Grégoire, 2011) and may include breaking existing cognitive frames (including norms) and changing from one frame to another during decision-making by having access to multiple frames (Narayanan et al., 2011). Simultaneous inertial (i.e., change-dampening forces; Fredrickson & Iaquinto, 1989) and entrepreneurial tensions (i.e., forces promoting change) create a paradox. Effectively addressing simultaneous tensions requires deviating from norms that maintain organizational inertia by embracing entrepreneurial thinking and engaging with paradoxical tensions. The link between entrepreneurial thinking, deviation, and paradox suggests that innovation and creativity may set the stage for deviant decision-making under paradoxical conditions. The links also suggest that an entrepreneurial mindset is related to a paradoxical mindset (i.e., thinking that engages paradoxical tensions). The literature further points to threatening situations instead of opportunities, priming deviant decision-making under conditions of paradox (Foss & Saebi, 2017).

All three bodies of literature help to illuminate the link between what a decision-maker thinks and feels in the course of decision-making and the decision finally taken. Individuals construct their unique understanding of reality through individual cognition and act on this understanding (Harper, 1997; Diržytė, 2018). Theoretical constructs and ideas illuminating the connection between thought and individual action include modelling processes, classification, sense-making, meaning and metaphor, identity, memory, time construction (Brekhus, 2015), limits to cognitive capacity, heuristics and biases, self-efficacy (in the context of organizational activities such as decision-making)(Hodgkinson & Healey, 2008), symbols, artifacts, aesthetics, embeddedness, embodiment (to accommodate social context and
emotions) (Healey & Hodgkinson, 2014; Fiske & Taylor, 2016; Walsh, 1995; Brekhus, 2015), rules, and physical and institutional contexts (for situated, i.e., temporally-bounded cognition) (Elsbach et al., 2005). The link between individual cognition, individual decision-making, and organizational action and performance (Eranova & Prashantham, 2014) may not always be direct. For example, setting organizational strategy requires the integration of several individual decisions (Fredrickson, 1984). However, though the link may not be direct in a group setting, the literature suggests that ultimately one individual makes the final decision and not the team (Calori et al., 1994).

Certain organizing themes emerge from the literature review when considered from the perspective of thought to action, as depicted in Figure 1. These organizing themes consist of perspectives taken by researchers and their foci of interest. Within the literature reviewed for this study, researchers tended to take either a fine-grained neurological/psychological perspective or a more course-grained group/organizational/managerial perspective after such works as Maslow (1943), Brekhus (2015), Walsh (1995), Posner and Rothbart (2007), and Healey and Hodgkinson (2014). Three consistent foci of research also emerged from the literature review: cognition, context, and emotion. The three foci are reminiscent of the classic three-part division of psychology (i.e., cognition, emotion and behaviour, Hilgard, 1980) coupled with Payne et al.’s (1993) model of consumer decision-making (comprising decision and decision-maker characteristics and social context). When these perspectives and foci are used to form a matrix, the resulting overview of the literature on decision-making, paradox, and engagement is shown in Table 2. The cells in this matrix are by no means fixed, absolute, or impermeable (Dagnino & Cinici, 2016; Kouamé & Langley, 2018; Eisenhardt et al., 2010; Västfjäll et al., 2016; Edwards et al., 2000).

Table 2 serves as a lens to help focus the literature reviewed in this study on the path from thought to action. The chosen literature views cognition as the basis of behaviour (Hodgkinson &
and divides cognitive inputs into two broad categories: context and emotion (Västfjäll et al., 2016; Elfenbein, 2007; Lerner et al., 2015; Healey & Hodgkinson, 2014). At a deeper level, the literature views behaviour as a recursive extension of cognitive structures (e.g., identity, strategic frames, routines) and cognitive processes (e.g., perception and attention, problem-solving, reasoning, strategy formulation, adaptation, and learning) into the observable world (Healey & Hodgkinson, 2014; Fiske & Taylor, 2016; Hodgkinson & Healey, 2008; Elsbach et al., 2005; Narayanan et al., 2011; Helfat & Peteraf, 2015).

### Table 2 - Overview of literature on the link between decision-making thought and action

<table>
<thead>
<tr>
<th>Perspective</th>
<th>Neurobiological/ Psychological</th>
<th>Organizational / Managerial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognition</td>
<td>Theory&lt;br&gt;- Brain function: Split-brain, Dual processing, dual-mode&lt;br&gt;- Cognition: Theory of Reasoned Action, Theory of Planned Behaviour, Prospect theory, bounded rationality, cognitive capacity, intuition, creativity, attention, breakpoints&lt;br&gt;&lt;br&gt;<strong>Structures and Processes</strong>&lt;br&gt;- Deciphering perception: simplification, representation, evaluation&lt;br&gt;- Cognitive bias: mental accounting, isolation effect&lt;br&gt;- Cognitive structures: schema, heuristics, routines</td>
<td>Theory&lt;br&gt;- Cognitive style: mindset, framing, norm favouring style&lt;br&gt;&lt;br&gt;<strong>Structures and Processes</strong>&lt;br&gt;- Management cognition: model, dynamic capabilities, cognitive underpinnings</td>
</tr>
<tr>
<td>Perspective</td>
<td>Neurobiological/ Psychological</td>
<td>Organizational / Managerial</td>
</tr>
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<td>-------------</td>
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<td>-----------------------------</td>
</tr>
<tr>
<td>Research Focus</td>
<td><strong>Theory</strong></td>
<td><strong>Theory</strong></td>
</tr>
</tbody>
</table>
| Context | • Theory of Naturalistic decision-making: context, technology, dynamic model of situated cognition  
• Types of context: omnibus, distal, strength, space, time dimensions  
• Event system theory: context, features, events, disruption | • Business environment: trends  

Suspends table:

*Theory*

**Structures and Processes**

- Effects on cognition: functions of context, situated cognition, static and dynamic contextual factors  
- Effects on Attention: priming, framing, salience, motivation

**Emotion**

*Theory*

• Definition; challenges, link to cognition  
• Embodied cognition theory  
• Emotional processing: somatic markers, appraisal, classification, emotional response, Appraisal Tendency Framework

**Structures and Processes**

- Effects of emotion: attention, decision-making  
- Decision design: dampen negative emotions, promote beneficial emotions, hot cognition

The next section sets out a detailed framework for the path from thought to action as first conceptualized in Figure 1.

3.1 FRAMEWORK

The literature review in chapter two aligns paradox, deviance, and decision-making with event theory by presenting them in terms of process features and contextual elements (Morgeson et al., 2015). This section brings paradox, deviation in the form of engagement with paradoxical tensions, and decision-
making together in a conceptual framework, informed by the integrated overview of the literature in Table 2. The diagrams in Figures 3 through 5 represent full engagement (i.e. deviation from the decision-making norm) with paradoxical tensions during decision-making or lack of full engagement as an event. This framework serves two purposes. It addresses an apparent absence of articles dealing with decisions, deviant decision-making behaviour, and paradox simultaneously. It also guided the application of methods used in this study and informed the discussion of results and conclusions.

**Figure 3 - The decision cycle with and without full engagement with paradoxical tensions**

From an ontological perspective, Figures 3 through 5 represent organizational processes and features as material phenomena existing apart from the viewer. From an epistemological perspective,
however, the viewer's knowledge of these processes and features may not necessarily reflect material reality (Healey & Hodgkinson, 2014). This view, known as critical realism, conceives of three levels of so-called reality; the real world (deep structures), the actual world (manifestation of deep structures), and the empirical world (what we know from observation and experience) (Healey & Hodgkinson, 2014).

![Diagram of Individual Decision Process]

**Figure 4 - Individual decision process and decision-specific context details**

This study recorded organizational decision-maker's thinking in their "actual" world while observing their decision-making at an empirical level. By linking actual and empirical levels of reality, this study is able to make inferences about the real underlying structure of decision-making involving paradoxical tensions (Healey & Hodgkinson, 2014). Further, in as much as critical realism recognizes
several ways of understanding the world, it is a form of pragmatism, the philosophy underlying mixed methods techniques used in this study (Azorin & Cameron, 2010).

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The layout of the decision-making framework reflects precedents in the literature regarding the layering and linearity of decision-making. The multilevel nature of decision-making is difficult to illustrate in a framework. Models of decision-making in the literature generally distinguish between individual, organizational, and environmental levels of consideration. The literature also acknowledges the interplay between these levels. The conceptual framework addresses this layering in two ways. First,
the framework is nested, where Figure 3 gives a high-level overview, and subsequent figures drill down with expanded views. Second, layers are presented as interfaces rather than boundaries. This can be seen, for example, in the box labelled “antecedents” in Figure 3 that identifies individual, organizational, and external-level components involved in the decision-making process but does not attempt to order, link, or separate these levels.

Equally challenging is how to depict the path from thought to action when most studies point out that decision-making rarely follows proscribed steps (Connolly, 1980). A large body of literature on decision-making establishes that it is useful to picture decision-making as an orderly process (e.g., Fredrickson, 1984; Hodgkinson & Healey, 2008; Kumar et al., 2017; Nutt, 1984) proceeding from goal setting to choice-making (Eranova & Prashantham, 2014). Figures 3 through 5 reflect this convention and set out decision-making as an orderly process. As with most studies in the literature on decision-making, the framework also follows one linear decision rather than showing several concurrent decisions at different points in the decision-making process. The model does, however, show deviant and non-deviant decisions following separate paths. The model also departs from strictly linear decision-making models to include a path for decision implementation feedback. Finally, the decision-making framework carries the assumption that the decision-maker has a limited perception of reality and doesn’t always choose the best alternative (Eranova & Prashantham, 2014).

Figure 3, depicting a decision-making cycle, captures the elements of Helfat and Peteraf’s (2015) management cognition model but with an added emphasis on context as suggested by Payne et al.’s (1993) consumer decision model (comprised of decision, decision-maker, and social contexts). Figure 3 also features the addition of a feedback loop to reflect the recursive nature of cognition. Figure 3 and subsequent figures set out decision characteristics and decision-maker variables from the literature believed to be linked to deviation from behavioural or organizational norms of decision-making.
Decision characteristics, decision-maker variables, and decision-maker cognition are distributed across the boxes labelled “individual decision process with deviation,” “individual decision process without deviation,” and “decision-specific context” in Figure 4. Examples of decision characteristics identified in the literature include strategic considerations (Shepherd et al., 2015; Shepherd & Rudd, 2014; Schreuder et al., 2016; Nutt, 1984; Hutzschenreuter & Kleindienst, 2006), the degree of decision complexity, and the amount of analysis required for different types of decisions and decision processes (Shepherd et al., 2015; Nutt, 1984; Connolly, 1980). Examples of decision-maker characteristics include emotion (Schreuder et al., 2016), creativity, innovation, and deviation (Grégoire, 2011; Narayanan et al., 2011). Figure 4 also sets out details concerning decision-making process characteristics (Shattuck, 2006; Nutt, 1984; Nutt, 2008; Eranova & Prashantham, 2014; Kouamé & Langley, 2018; Hutzschenreuter & Kleindienst, 2006; Amason, 1996; Schreuder et al., 2016; Shepherd & Rudd, 2014; Sibony et al., 2017; Teece, 2007). The box labelled “Individual Decision Process without Full Engagement” depicts a two-stage sequential cognitive process without full engagement with paradoxical tensions during decision-making (Pang et al., 2021; van Neerijnen et al., 2021). The two-stage cognitive process involves information navigation first, followed by contextual consideration. In contrast, the box labelled “Individual Decision Process with Full Engagement” depicts a three-stage sequential cognitive process to engage fully with paradoxical tensions, reflecting the need for paradoxical cognitive processing in addition to information navigation and contextual consideration (Pang et al., 2021; van Neerijnen et al., 2021). The three stages of cognitive processing depicted in Figure 4 will be referred to in the remainder of this paper as “the cognitive processing model.”

Individual decision processes and decision-specific context in Figure 4 also contain key constructs used in building decision-making models, including “choice” (e.g., explore or exploit), “judgment” (i.e., an assessment of what will occur and an evaluation of that outcome), and
“preferences” for one action over another (e.g., biases and heuristics) (Shepherd et al., 2015). The box
entitled “Micro and Macro-level Links” makes provision for links between individual decision-maker
paradoxical cognitive processing and organizational ambidexterity depending on the degree of
engagement with paradoxical tensions (van Neerijnen et al., 2021).

Figure 5 shows details about the content of “decision outputs” and “implementation” (Shepherd
& Rudd, 2014; Sibony et al., 2017; Amason, 1996; Eranova & Prashantham, 2014; Foss & Saebi, 2017;
Helfat & Peteraf, 2015; Hutzschenreuter & Kleindienst, 2006; Nutt, 1984; Schreuder et al., 2016).

The conceptual framework in Figures 3 through 5 reflects the decision architecture surrounding
individual decision-making in an organizational setting. Decision architecture can be designed to
improve decision-making (Gaim & Wåhlin, 2016), including decision-making involving paradox. Once the
framework is elaborated more fully, beginning with this study's findings, the framework can help guide
the management of paradox through decision design. In particular, the general decision design axiom
maintains that decision architecture should be designed to achieve the level of decision-making risk,
agility, and innovation desired by the organization (Sibony et al., 2017). The tools at a decision designer’s
disposal include information provision and incentives (for agility), debate, participation and incentives
(for innovation), and formality, information, participation, decision closure rules, and decision layering
(for risk-taking) (Sibony et al., 2017; Milkman, 2012). A “design mindset” that seeks to find creative
alternatives to competing demands can be fostered through proper design, provided an organization's
objectives for the degree of risk, agility, and innovation it wishes to achieve are known (Gaim & Wåhlin,
2016). The “apposite” design mindset is of particular interest in this study. The apposite design mindset
seeks the undiscovered within tensions (Gaim & Wåhlin, 2016). This characteristic resembles the
“paradoxical” mindset, which accepts and engages opposing tensions and is the kind of perspective
needed to address paradox effectively (Keller et al., 2017; Gaim, 2018). The close relationship between a
paradox and a design mindset further supports the idea that it may be possible to design conditions to increase the likelihood of sound decision-making in the face of organizational paradox.

In summary, the literature review points to decision-making involving paradox as a broad topic comprised of several intertwined fields of study. To help focus on features of paradox important to this study’s research questions, a spectrum of decisions involving paradox was developed from the literature with five distinguishing features of paradox. The spectrum illustrates how the literature sets paradoxes apart from any other kind of decision situation that begins with simple decisions and ends with paradox. Although the spectrum and features of paradox distilled from the literature are intended to provide clarity, the literature highlights how difficult it is to define and distinguish paradox from other types of decision situations, particularly from a decision-maker’s perspective. Placing paradox within a spectrum of decisions provides a set of references to make the task of distinguishing paradoxical decision situations easier. The development of the spectrum also provides this study with an estimate of the degree of engagement with paradoxical tensions embedded in a decision situation. For example, if a decision involving paradox is construed by a decision-maker as a compromise, the degree of engagement with paradoxical tensions is less than if the decision had been recognized as a paradox.

The framework for decision-making in this study reflects the pervasive influence of context found in the literature, starting from the inception of a decision situation. The importance of context led to its inclusion and consideration throughout this study. The framework also reflects the role of cognition in decision-making. It uses the literature on engagement with and avoidance of paradoxical tensions to model two cognitive pathways, one engaging with and the other ignoring paradox. In addition, the literature on decision-making norms suggested that engaging with paradoxical tensions deviates from so-called normal decision-making. This study, therefore, investigated decision-making
cognition in different contexts to observe examples of deviant decision-making and decision-making adhering to norms.

By drawing together three large domains (paradox, engagement with tensions, and decision-making) and placing this study’s research questions precisely within this context, the literature review lays the theoretical foundation for the design of this study and for the interpretation of its findings.

4.0 METHOD
This chapter sets out the data gathering and analytical methods used in this study of decision-making involving paradoxical tensions. This study took a mixed-method approach, employing both a survey and observation of responses to decision scenarios, through a combination of convenience and snowball sampling.

The initial convenience sample of respondents provided both quantitative and qualitative data: quantitative survey data as they completed the survey and qualitative data as their observations, comments, delivery, etc., were recorded during the administration of the survey. The remaining snowball sample provided purely quantitative data through the completion of the online survey by respondents. The final sample comprised 39 decision-makers, 25 of whom participated in the observational decision-making.

The research unit for the quantitative component of this study is the individual decision-maker. The decision-makers in this study were very senior managers with experience in strategic level decision-making from a range of industries. Quantitative data on decision-maker’s thoughts, feelings, and decision-making behaviour were gathered using an electronic survey. The choice of individuals as a research unit aligns with studies of the micro-foundations of paradoxical tensions in organizations (i.e., at the individual level (Miron-Spektor et al., 2018)) and studies of hard-to-define concepts such as
deviance and paradox (Harbour & Kisfalvi, 2012). The research unit for the qualitative component is the decision scenario. Qualitative data was obtained by meeting with some of the respondents and recording their comments as they completed the survey.

Since decision-making under paradox is a complex situation, and given the richness of qualitative data, a mixed methods research design was deemed appropriate for this study. The combination of qualitative and quantitative procedures yields a better understanding of complex issues than purely qualitative or quantitative investigation (Creswell, 2009; Vaismoradi et al., 2016; Azorin & Cameron, 2010). This benefit of using mixed methods is particularly true if the sample size is too small to provide enough statistical power (Wisdom & Creswell, 2013). Additional benefits of using mixed methods include: complementarity (the clarification of results from one method with results from another method), development (the use of results from one method to guide the use of another method), expansion (by expanding the scope of inquiry using different methods), initiation (discovering inconsistencies and paradoxes leading to the reframing of research questions), and opportunities for theory development (e.g., naturalistic, pattern-based, etc., Creswell, 2009) and the bridging of macro and micro perspectives (Azorin & Cameron, 2010).

The timing of data collection, qualifies as concurrent or convergent (Guetterman et al., 2015), supporting the comparison of qualitative and quantitative data (Azorin & Cameron, 2010). The concurrent design facilitates the comparison of quantitative and qualitative data, which helps assess the validity of the study. Through comparison, the two types of data validate each other, allowing conclusions to be drawn from the study results with reasonable confidence (Wisdom & Creswell, 2013; Azorin & Cameron, 2010).
The quantitative analysis consisted of rendering and interpreting the data from a cognitive perspective (i.e. examining cognitive processes underlying action at individual, group, and organizational levels of analysis; Grégoire et al., 2011) with guidance from the work of Mertens et al. (2016), Pang et al. (2021), and van Neerijnen et al. (2021) and using the multidimensional scaling technique illustrated in Hodgkinson (2005).

The qualitative analysis involved interpreting and analyzing individual responses to decision scenarios. Decision scenarios are a means of illuminating the decision-making process in different contexts (e.g. Fredrickson, 1984; Milkman, 2012; Mathias & Williams, 2017). The technique of evoking and recording responses to different decision scenarios and then subjecting these observations to coding analysis can provide insight into the thinking behind a decision and the effect of different contexts (Mathias & Williams, 2017). Ultimately, it is a decision maker’s thinking across several decisions and how that thinking manifests itself in different decision scenarios, which are of primary interest in this study.

The chapter continues by setting out the theory and application of the Repertory Grid Technique (RGT), used for exploratory quantitative analysis. The next section describes the sampling method and the resulting sample. A section describing the study survey administered to the sample, including the scale, demographic, repertory grid, and scenario items in the survey, follows this. The discussion of scenarios in the survey leads to a section that describes how decision-making was observed. The following section sets out how the data collected using the survey were analyzed: quantitative data first, qualitative data second, and data integration third. The chapter ends with a discussion of the reliability and validity of the proposed method.
4.1 REPERTORY GRID TECHNIQUE (RGT)

This section discusses the RGT employed in this study. Wright’s (2015) research on paradox in organizations demonstrates the effectiveness of using the RGT to gather data on managers’ thought processes when faced with decisions ranging in complexity. Other methods such as structured interviews, and a conventional questionnaire were considered. However, the RGT offers the most direct access to the tensions that capture a manager’s attention and why and how these contribute to developing a cognitive representation (Wright, 2015).

The method used by Kruskal and Wish (1978b) and Hodgkinson (2005) to analyze data collected using the RGT was followed closely, providing several benefits. First, the technique is a credible method for studying the meanings, motivations, and preferences underlying managerial decision-making (Wright, 2004; Ketchen et al., 2008). Second, the RGT has proven particularly well suited to the study of ambiguous topics with multiple meanings in the field of organizational behaviour (Rogers & Ryals, 2007; Harbour & Kisfalvi, 2012), such as deviance and paradox. Third, the RGT’s indirect inquiry method improves the accuracy of self-reporting. For example, in this study, the subject matter may carry a negative connotation for the respondent (Akinci & Sadler-Smith, 2013), calling for discreet inquiry methods. Finally, the RGT may be better at accessing a manager’s underlying reality than a depth interview, owing to the possibility of interviewer bias and subtleties of the thought captured by the technique (Rogers & Ryals, 2007; Ketchen et al., 2008). Finally, RGT is scalable (Kruskal & Wish, 1978b), supporting studies with small samples (Wright, 2004) as well as studies employing large sample sizes (Dagnino & Cinici, 2016; Wright, 2015; Hodgkinson & Healey, 2008; Brown, 1992). Literature provides examples of RGT used with samples as small as five subjects (Malmström et al., 2015), samples from 10 to 50 interviewees (e.g., Rogers & Ryals, 2007; Calori et al., 1994; Bingham & Eisenhardt, 2011), and samples of over 200 respondents (Hodgkinson, 2005).
Theoretical findings stemming from the RGT have the advantage of being easily understood and integrated into management practice. The ease with which theoretical findings can be communicated facilitates the implementation of theory-based interventions to improve decision effectiveness in organizations (Village et al., 2013; Narayanan et al., 2011). More broadly, the type of psychological insight fostered by using RGT contributes to successful organizational change (Village et al., 2013). Cognitive mapping also identifies cognitive attributes that can be studied for change over time, across different situations, or under various influences (Malmström et al., 2015), contributing to an improved understanding of the moderating and mediating roles of specific cognitive attributes through appropriately designed studies.

One of the chief criticisms of RGT is that respondents find it boring and onerous to complete (Brown, 1992; Calori et al., 1994; Hodgkinson et al., 2004). The technique can be made less tedious by providing respondents with feedback in real-time on how their cognitive map is developing (e.g., using a paper and pencil grid elicitation process) (Village et al., 2013). The technique can also be made less onerous by supplying “ready-made” elements and constructs for respondents to use rather than eliciting these as part of the repertory grid process (Rogers & Ryals, 2007). Other techniques for measuring thinking, such as freehand mind mapping, analyzing raw text to produce maps (e.g., Fransella & Bannister, 1977), or prompting respondents to “think out loud” as they connect elements and constructs (e.g., Malmström et al., 2015) may require less effort than RGT. However, these techniques may demand more of a respondent in terms of spatial reasoning and working memory than RGT, and although accurate, could provide less detail about the thought process (Hodgkinson et al., 2004; Brown, 1992). Another ready alternative to the RGT is the use of a standard questionnaire or loosely structured interview. However, in a standard questionnaire, there are drawbacks associated with instrument design
and self-reporting bias (of particular importance to this study since it involves norms of decision-making behaviour and deviance from those norms) (Wright, 2004).

In its favour, the RGT documents a respondent’s thinking rather than any preconceived ideas from a researcher or the literature (Cammock et al., n.d.). The technique is particularly well suited to describing hard-to-articulate thoughts (Harquail & Wilcox King, 2010). RGT focuses on the decision-making process/experience independent of any results of those decisions (i.e., whether or not the decisions worked) (Brown, 1992). Finally, the grid process is transparent, reducing the likelihood that respondents feel their participation is a ruse to make them reveal organizational strategy (Brown, 1992). On balance, the repertory grid scores well as a method on several counts: it taps values, produces reliable data, is amenable to qualitative and quantitative analysis, is not too onerous for respondents, and produces results that are useful on topics that may not be well defined or part of the respondent’s conscious thought process (Brown, 1992; Rogers & Ryals, 2007; Harquail & Wilcox King, 2010).

RGT has been used extensively for studying the thinking involved in decision-making: interpretation of context surrounding strategic management decisions (Dagnino & Cinici, 2016), consideration of decision attributes for opportunity recognition and overall decision-making (Malmström et al., 2015), the underlying logic of decision-making (Fransella & Bannister, 1977), the study of strategic phenomena (Hodgkinson et al., 2004), and perceived influences/context affecting strategic decisions (Brown, 1992). RGT has also been used to study paradox in organizations (Wright, 2015). Given this prior research and the alignment of theory to this study’s aims, the RGT was deemed the most suitable method for this study.

4.1.1 RGT Theory
Kelly’s “Theory of Personal Constructs” was first published in 1955 and grew from his over 20 years of experience counselling students (Rogers & Ryals, 2007). According to Personal Construct Theory (PCT),
as Kelly’s theory became known, individuals use personal constructs to understand “elements” (i.e., stimuli in the world) (Dagnino & Cinici, 2016). People form “personal theories” based on these constructs that they then try to validate (Dagnino & Cinici, 2016). If validated, personal constructs guide action (Dagnino & Cinici, 2016; Rogers & Ryals, 2007). If they are not validated, however, they are revised (Dagnino & Cinici, 2016). In the context of PCT, the term “personal theory” can be used somewhat interchangeably with constructs such as personality, attitudes, habits, information coding systems, concepts, philosophy, and even the central nervous system (Fransella & Bannister, 1977).

Categorization theory provides additional theoretical support for the idea of personal constructs. It postulates that individuals understand their worlds by forming and using lay constructs (e.g., the interpretation and categorization of a strategic issue as a threat or opportunity, Dagnino & Cinici, 2016) (Dutton & Jackson, 1987). Categorization theory also highlights the importance of understanding the attributes associated with the categories used in making sense of various entities, in much the same way that in PCT, it is crucial to understand the meaning of opposing poles for a particular construct (Dutton & Jackson, 1987).

The Repertory Grid Technique (the technique or RGT) was introduced to management science by Axelrod in 1976 (Village et al., 2013). The RGT is a method for integrating an issue under investigation with an individual’s view of the world in a grid or matrix (Dagnino & Cinici, 2016). PCT underpins RGT (Dagnino & Cinici, 2016) by setting out the rules for creating cognitive maps (Eden, 2004). Cognitive maps produced using RGT position a respondent’s thoughts along two dimensions; elements that describe critical aspects of the issue under investigation and constructs that render an individual’s view of the world.

RGT elicits a respondent’s conscious and subconscious (e.g., embodied) thought processes regarding their experience of a situation (Fransella & Bannister, 1977; Malmström et al., 2015; Wright,
The thought process documented in the form of a grid or cognitive map serves as a predictive model of thought patterns, content, structures, and dynamics (Fransella & Bannister, 1977; Dagnino & Cinici, 2016; Malmström et al., 2015; Village et al., 2013; Calori et al., 1994). As a proxy for the decision-maker’s internal thought process, the cognitive representation of a decision situation captures all the stimuli of importance for a particular decision-maker (Shattuck, 2006; Diržytė, 2018; Harper, 1997). Therefore, a comprehensive accounting of each stimulus contributing to the decision-maker’s representation is unnecessary for understanding the thinking taking place. However, to interpret a cognitive map, the literature suggests collecting information about key individual decision inputs (e.g., personal/background information and experience) (Langley, 2007).

4.1.2 RGT Protocol
The protocol for implementing the RGT covers the selection of elements and constructs and guides the design and administration of questionnaires containing grid items. This study applied a standard grid protocol with adaptations to accommodate comparisons between respondents and the possibility of a larger number of respondents than anticipated by the technique’s originators.

Typically, the RGT protocol consists of between five and seven steps, depending on how researchers partition the work involved. The main steps include 1) establishing the domain of the study, 2) identifying elements, 3) identifying constructs, 4) creating a grid or matrix, 5) administering the grid to respondents, 6) interpreting individual’s responses to the grid, and 7) aggregating and analyzing individual’s responses to the grid (e.g., Rogers & Ryals, 2007; Brown, 1992; Malmström et al., 2015; Calori et al., 1994; Wright, 2004; Fransella & Bannister, 1977). As part of the protocol, all responses are collected as long as they are sincere (Brown, 1992). The protocol has been extended beyond the analysis of individual and aggregated responses to cover follow-up work such as longitudinal sampling (e.g.,
Hodgkinson, 2005) and the development of post-RGT questionnaires for exposing “lay theory” (e.g., Cammock et al., n.d.). This extension of the protocol may be useful in conducting research in the future related to this study.

4.1.2.1 Identifying elements and constructs

Elements and constructs may be elicited or supplied, each approach with advantages and disadvantages. Typically, the process of eliciting elements and constructs begins with discussions with individuals in the target population about the topic under investigation (Cammock et al., n.d.; Rogers & Ryals, 2007; Malmström et al., 2015; Brown, 1992; Calori et al., 1994). Recurring terms and themes become candidates for inclusion in the RGT as elements if they are used to describe a situation and as constructs if they are used to understand a situation (Fransella & Bannister, 1977; Cammock et al., n.d.; Malmström et al., 2015). Once a set of elements describing the issue at hand begins to coalesce, it can be used to elicit more constructs or confirm existing constructs using the triadic method. The triadic method involves asking respondents to compare three elements and describe how two are similar but different from a third (Brown, 1992; Cammock et al., n.d.; Dagnino & Cinici, 2016; Rogers & Ryals, 2007; Wright, 2004; Fransella & Bannister, 1977). If necessary, elements and constructs from the literature are used to augment those that have been elicited (Malmström et al., 2015; Wright, 2004; Wright, 2008). Elements and constructs may be aggregated to obtain groups or disaggregated to provide finer detail, depending on the study (Wright, 2004; Rogers & Ryals, 2007; Calori et al., 1994).

Supplying respondents with elements and constructs as part of the RGP process permits the aggregation of results (Rogers & Ryals, 2007) and the comparison of grids across respondents, levels, firms, industries, and time frames (Wright, 2008) (e.g., Dagnino & Cinici, 2016; Wright, 2004). A drawback to using the RGT with supplied constructs is that the wording of the constructs may mean different things to respondents with different experience or context (Rogers & Ryals, 2007). However,
researchers familiar with the RGT provide several ways of reducing the likelihood of multiple interpretations: using interviews to generate an initial set of topical elements and constructs, augmenting them using the literature (Malmström et al., 2015; Calori et al., 1994; Wright, 2004), and soliciting comments on proposed elements and constructs from a small group of potential respondents (Wright, 2004; Rogers & Ryals, 2007; Malmström et al., 2015; Hodgkinson, 2005; Cammock et al., n.d.). A pilot of the elements, constructs, reading tasks, and any forced-choice aspects of the RGT is also highly recommended before the broader use of an RGT survey-type instrument (Dagnino & Cinici, 2016).

In this study, elements and constructs were supplied, allowing grids to be aggregated and compared across the study sample. Supplied elements and constructs also make it possible to transfer findings from this study on individual-level behaviour to group and organizational levels. Finally, supplied elements and constructs make the grid section of the survey less tiring to complete. Since elements and constructs were supplied, the study survey was piloted prior to using it with the initial convenience sample, and minor adjustments were made to improve clarity in accordance with Dagnino and Cinici’s (2016) suggestion.

4.1.2.2 RGT Elements

Selecting elements to be supplied is like surveying and “mapping out a new piece of ground” (i.e., key features on the ground are mapped first, then a series of measurements is taken between these features until the entire map can be drawn) (Wright, 2004). Researchers aim to identify elements that encompass the major domains where construing/sense-making is being studied (Wright, 2004; Fransella & Bannister, 1977). All elements must be in the “range of convenience” (i.e., where constructs have meaning for the individual) (Fransella & Bannister, 1977). Giving respondents a chance to say when a construct applies to an element and asking respondents to define organizational phenomena of interest in their own words helps ensure that elements stay in the range of convenience (Fransella & Bannister,
This study's grid elements consist of decisions at different points along the spectrum of decisions from least to most paradoxical as developed in this paper. Using the spectrum helps to ensure that different degrees of paradox are reflected in the decision-making thinking captured in the grid. Table 3 lists and describes the five elements used in this study.

The literature recommends that studies with large samples use surveys designed to solicit responses to categories of stimuli rather than specific stimuli (Hodgkinson, 2005). In this study, using types of decisions as elements rather than particular decisions allows the respondent to supply their own meaningful, specific example within a category and permits responses to a category to be compared across respondents (Hodgkinson, 2005; Kruskal & Wish, 1978b; Cammock et al., n.d.).

Table 3 - Grid elements

<table>
<thead>
<tr>
<th>Simple decisions</th>
<th>Trade-offs</th>
<th>Compromises</th>
<th>Dilemmas</th>
<th>Paradoxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple decisions do not require the decision-maker to attend to more than one organizational tension at a time (Putnam &amp; Banghart, 2016). An example might be a &quot;go / no go&quot; decision to release or delay funds for a priority depending on the projected need for resources.</td>
<td>Trade-offs require the decision-maker to make a clear choice (Smith, 2014) between competing tensions (Smith, 2014; Chapardar, 2016) (i.e., ultimately favouring one tension, Gaim &amp; Wåhlin, 2016), where more of one means less of the other(s) (Chapardar, 2016). An example might be a win-lose decision where two priorities require funding, but there are only enough resources to meet the needs of one.</td>
<td>Compromises require the decision-maker to balance co-existing tensions (Gaim &amp; Wåhlin, 2016) by weighing different aspects of each (Lewis and Smith, 2014). An example might be a decision regarding a reporting strategy that must provide sufficient detail to identify problems but, at the same time, needs to reveal broad trends.</td>
<td>Dilemmas require the decision-maker to resolve competing tensions, each with advantages and disadvantages, by making challenging either/ or choices to reach one preferred alternative (Lewis &amp; Smith, 2014). An example might be a decision between maintaining or upgrading a computer program.</td>
<td>Paradoxes require the decision-maker to address interrelated, contradictory, simultaneous, and persistent tensions (Smith, 2014). Examples of paradoxes include decisions to explore opportunities versus exploit existing advantages, integrate globally versus adapt locally, and maximize profit versus improving social welfare.</td>
</tr>
</tbody>
</table>

4.1.2.3 RGT Constructs

Grid constructs are dimensions that an individual uses to understand the world. Constructs help the individual differentiate and describe elements of an experience (Wright, 2004). A fundamental principle
of RGT, and a key to the analysis of grids, is that constructs are bipolar. Traditionally, the idea behind construct theory, when applied to RGT, is that individuals understand the outside world by categorizing/construing things as similar to, or different from, existing constructs, giving rise to bipolar constructs that establish what a thing is and is not (Fransella & Bannister, 1977; Dagnino & Cinici, 2016; Rogers & Ryals, 2007; Village et al., 2013). More recently, however, consideration has been given to less arbitrary poles: situations where individuals understand the world using poles that are related to one another across different dimensions (i.e., ambiguous situations, Fransella & Bannister, 1977) and sense-making involving the use of dimensions with poles that are complementary rather than opposites (e.g., when facing paradox, Wright, 2015). This broadening of poles accords with Kelly’s theory of “constructive alternativism,” which draws attention to the fact that the opposite of “A” is not necessarily simply “B,” but instead, it’s many possible “non-A’s” (Wright, 2015). Accordingly, the bipolar nature of constructs does not preclude the possibility of seeing sameness and otherness simultaneously, independently, and harmoniously along the same dimension (Wright, 2015) since sameness and otherness are not necessarily opposites but complementary poles. Seeing the poles as complementary rather than as opposites is an initial cognitive step in establishing a paradoxical mindset (Gaim, 2018; Miron-Spektor et al., 2018). The constructs supplied to respondents in this study provide a means of categorizing the decision elements in the grid according to the decision-making abilities needed to address them. In line with current practice and constructive alternativism theory, the constructs used in this study are written using active language and describe abilities in broad terms that should not inhibit paradoxical thinking.

Recurring terms and themes in the literature describing decision making skills were chosen as constructs used to understand decision-making (Fransella & Bannister, 1977; Cammock et al., n.d.; Malmström et al., 2015). The recurring decision-making skills found in the literature are shown in the
right-hand column of Table 4. The decision-making skills were then aggregated (Wright, 2004; Rogers & Ryals, 2007; Calori et al., 1994) under the three primary roles of a decision-maker identified by Mathias and Williams (2017) as shown in the left-hand column of Table 4. The aggregation was used to confirm an even distribution of decision-making skills across the roles demanded of decision makers. The prompt for rating the applicability of constructs to each element asks each respondent to rate how much of a specific skill or ability is required to address the decision type in question on a seven-point scale from none (1) to a lot (7) (Dagnino & Cinici, 2016).

### Table 4 - Grid constructs

<table>
<thead>
<tr>
<th>Decision-making skill sets</th>
<th>Constructs / Decision-making abilities</th>
</tr>
</thead>
</table>
| Entrepreneurial           | • Initiative: Take the initiative (Sibony et al., 2017; Helfat & Peteraf, 2015)  
                            | • Creativity: Think creatively (Sibony et al., 2017; Ivory & Brooks, 2018; Lavine, 2014)  
                            | • Vision: Create a vision (Sibony et al., 2017; Helfat & Peteraf, 2015; Hodgkinson & Healey, 2011; Wright, 2008; Lavine, 2014) |
| Investment                | • Broad knowledge: Integrate, combine and use knowledge (Cammock et al., n.d.; Nutt, 2004; Ivory & Brooks, 2018)  
                            | • Forecasting ability: Forecast (Sibony et al., 2017)  
                            | • Risk tolerance: Take risk (Sibony et al., 2017) |
| Managerial                | • Time management: Manage time (Hodgkinson, 2008)  
                            | • Delegation ability: Delegate (includes forming relationships) (Wright, 2008; Cammock et al., n.d.; Hodgkinson, 2008; Lavine, 2014)  
                            | • Judgement: Make judgments (includes ethics) (Wright, 2008; Ivory & Brooks, 2018) |

### 4.1.2.4 RGT Rating elements using constructs

The RGT requires respondents to rate how well one or other extreme of a construct describes an element. Rating typically occurs on a five-point Likert-type scale (e.g., Wright, 2008; Cammock et al., n.d.) A respondent’s rating of elements by constructs gives researchers a sense of how constructs and their poles contribute to how a respondent makes sense of elements (Dagnino & Cinici, 2016; Wright,
2004; Rogers & Ryals, 2007) and how cognitive “objects” are configured on a conceptual map (Robinson & Bennet, 1995). Findings in the literature suggest that affect, in addition to cognition, plays a crucial role in how constructs are used and, in particular, in the rating process used in the technique (Västfjäll et al., 2016). The interpretation of grids produced through RGT relies on the assumption that the statistical relationships between an individual’s judgments or ratings in the grid reflect psychological relationships in a person’s theory of reality/personal construct system (Fransella & Bannister, 1977). By extension, if a person doesn’t hold a construct, options for acting on that construct are psychologically non-existent (Fransella & Bannister, 1977). Without a construct that allows for the existence of paradox, for example, there can be no awareness of paradox, no basis for formulating a representation, and no possibility of paradoxical thinking being reflected in a grid. Therefore, a paradoxical mindset is helpful but not required for making use of the constructs supplied in this study. This flexibility means that the survey’s grid section captures deviant (i.e., paradox-minded) and non-deviant (i.e., decision-minded) cognition.

4.1.2.5 RGT Grid design

Constructs and their labels should be meaningful and easy to communicate so that respondents, researchers, and interested readers understand them (Fransella & Bannister, 1977). One way to achieve this is to collect a sample of constructs from the group of interest, and the most often used constructs will likely be meaningful to other individuals in the group (Fransella & Bannister, 1977). Another way to improve clarity is to reduce the number of constructs by categorizing or grouping them to make the number of constructs under consideration more manageable (Cammock et al., n.d.). Researchers with expertise in applying the technique recommend using three times the number of elements compared to the number of constructs to increase reliability (Fransella & Bannister, 1977).

A critical requirement of elements is that they describe the phenomenon of interest (Fransella & Bannister, 1977; Dagnino & Cinici, 2016). The literature suggests that nine elements are sufficient to
specify an issue of interest (Wright, 2004; Rogers & Ryals, 2007). Converting all elements to an action statement format turns heterogeneous elements (e.g., a mix of people, objects, events, and situations) into a set of homogeneous elements (Wright, 2008). Homogeneous elements are preferred according to the traditional grid protocol. However, heterogeneous elements better capture decision-making complexities and, in the form of action statements, are more meaningful for respondents (Wright, 2008).

This study makes use of three groups of constructs to understand five elements. Although not the ideal ratio of constructs to elements, the ratio in this study is a product of defining elements within the range of convenience as suggested by the literature and describing constructs in action language and in a way that minimizes the possibility of misinterpretation.

The rating prompt must ask the respondent about the topic under investigation indirectly (e.g., asking, “how do you make sense of this situation?” rather than “what is your strategy for this situation?”) (Rogers & Ryals, 2007). The following RGT prompts reflect this approach: “how are the business models alike or different on a scale ranging from low technology complexity (1) to high technology complexity (7)?” (the basis of comparison is left up to the respondent) (Malmström et al., 2015) or “in designing a highly effective appraisal system, which side of each of these bipolar constructs do you prefer?” (the respondent states but does not explain their preference, and the prompt covers more than one construct) (Wright, 2004). The prompt used in this study taps into decision-making cognition and deviant decision-making indirectly by asking respondents to reflect on how much of a particular skill is required to make different types of decisions (i.e., the basis of comparative ratings is left up to the respondent).
The most common grid layout presents respondents with elements arrayed horizontally across the top of the grid matrix and constructs listed vertically along the grid matrix's far left. The near left and right of the grid are reserved for labelling the extremes of each construct (e.g., Rogers & Ryals, 2007). This study followed the design format used by Hodgkinson (2005) for larger sample sizes: an RGT survey with supplied elements and constructs asking respondents to rate all elements (i.e., decision types) on one construct scale (i.e., a given decision-maker skill) before moving on to new scales.

4.1.3 RGT with Scenarios
Many studies use the RGT in conjunction with scenarios encapsulating an issue of interest (Davis et al., 2007; Lewis & Smith, 2014). This sub-section of the chapter discusses the design of decision scenarios involving paradox that are included in the study survey. The study survey asks managers to complete repertory grid-based items to access their thinking as they reflect on their experience with different decision types on the spectrum of decisions. However, the literature suggests that although decision-making is closely related to cognition, it is not identical (Eranova & Prashantham, 2014). Therefore, this study's survey includes paradoxical decision scenarios that capture actual decision-making behaviour of each respondent (Davis et al., 2007; Starbuck & Mezias, 1996; Morgeson et al., 2015). Decision scenarios present respondents with a real-time standardized stimulus and allow strategic context to be manipulated systematically as part of this study (Fredrickson, 1984; Smith, 2014). An added benefit is that the inclusion of "realistic" scenarios in the survey may have made it more interesting for respondents, given that repertory grid-based items are somewhat repetitive (Fredrickson, 1984). Finally, making decisions under paradoxical conditions pushes decision-making capacity to the extremes of complexity, making it easier to identify subtle relationships and contrasts in the data (Nutt, 2004; Eranova & Prashantham, 2014).
Decision scenarios are a way of replicating managers' rich, multi-level decision-making experience, capturing changing context (Johns, 2017) and multiple decision-making environments (Eisenhardt et al., 2010). Miron-Spektor et al. (2018) provide a list of the types of tensions experienced by employees. This list is useful for identifying paradoxical tensions and for constructing paradoxical decision-making scenarios. Lüscher and Lewis (2008) set out an underlying structure for building decision-making scenarios involving paradox, along with examples. The structure consists of setting out a typical organizational paradox and then giving a decision-maker/respondent a workable certainty (i.e., the paradox management response) and a solution based on either-or thinking (i.e., an alternative reflecting the decision norm) as the decision options. For purposes of this study, the paradox management response was further broken down into a solution corresponding to partial engagement and a solution that fully engaged with paradoxical tensions. According to the continuum theory of deviance and the definition of deviance used in this study, these three choices (no engagement, partial engagement and full engagement) represented three points along a continuum of deviation from the norm.

The scenarios in this study’s survey were developed with Lüscher and Lewis’s (2008) and Miron-Spektor et al.’s (2018) structures in mind, together with the Competing Values Framework (Lavine, 2014; Mathias & Williams, 2017), the work design questionnaire, the work context inventory (Johns, 2017), and the spectrum of decisions involving paradox suggested in this paper. The scenarios feature different decisions and contexts generated by applying these frameworks to the description of paradoxical decisions in Smith (2014). The different contexts in each scenario describe competing tensions that could give rise to decision-making under paradoxical conditions (Smith, 2014; Wright, 2015), making it possible to observe this kind of decision in real-time.
4.2 SAMPLE

This study used a snowball sampling technique to generate a sample of 39 strategic decision-makers. Snowball sampling involves contacting an initial interviewee, or in the case of this study, a survey respondent, who is referred to as a “seed.” This seed, in turn, identifies a potential interviewee or passes on the survey in the case of this study to at least one more potential respondent. This process continues, from wave to wave of referrals, causing the sample to grow in the manner of a snowball rolling and gathering more and more snow (Kirchherr & Charles, 2018). Seeds were chosen from the author’s list of professional contacts maintained on the social media platform LinkedIn, provided the contacts were strategic decision-makers (i.e., known to make non-routine decisions at a managerial level, Sibony et al., 2017).

Snowball sampling is a non-probability method of sampling (Kirchherr & Charles, 2018). Although it does not support statistical inference (Khoury, 2020), it is well-suited to the exploration of a phenomenon of interest and can yield credible results provided there is sufficient sample diversity (Kirchherr & Charles, 2018) and several waves of referral (Heckathorn & Cameron, 2017). Measures taken in this study to ensure the greatest sample diversity possible included: using known professional contacts in LinkedIn as seed contacts (e.g., Dusek et al., 2015), selecting strategic decision-makers from a variety of organizations and at different organizational levels as seeds, and obtaining more than one respondent wave (i.e., at least one referral from a seed) (Heckathorn & Cameron, 2017; Kirchherr & Charles, 2018; Dusek et al., 2015; Khoury, 2020). Snowball sampling aligns well with the use of the RGT for the analysis of data in that both are exploratory in nature.

On the one hand, a snowball sample produces an element of commonality within the sample since several senior managers may be polled from within a single organization. Additionally, senior managers sampled from different organizations may hold similar positions or have jobs within related
industries. On the other hand, soliciting senior managers as seeds from various organizations to respond to the study survey injects an element of diversity. This approach of trying to ensure a balance between sample diversity and commonality corresponds to the sampling approach used by Calabretta et al. (2017), designed to improve validity and generalizability while allowing for comparison within the data. This balanced approach was adopted in this study.

The Qualtrics web-based survey service was used to design, distribute, and manage the study survey (Snow, 2011). The survey was emailed to the author’s professional contacts on the LinkedIn social media platform. In distributing the survey, to keep track of each wave of data collected, each seed participant was emailed a personalized link to the survey, which can be used multiple times (using the “multiple completes per link” feature of Qualtrics). Each time the link is passed on, a new response is generated in Qualtrics attached to that link. Once it was determined to which data wave a respondent belonged, any possibility of a respondent being identified was removed by converting the personalized link to an anonymized code before the response was saved as data. As an additional privacy safe-guard, the invitation to participate in the study included an option for respondents to contact me using their personal rather than work email.

A total of 55 online survey responses were registered in the Qualtrics database for this study. Of these 55, only 39 qualified as complete, and of these 39, 25 consisted of surveys completed in person while I recorded the respondent’s comments as they worked through the survey. Therefore, the sample for the quantitative component and the sample for the qualitative component overlap. The quantitative sample comprised 39 completed online surveys. The qualitative sample consisted of a smaller subset of 25 respondents, which in addition to a completed online survey, also had a running commentary for each respondent. Each respondent in the qualitative sample was interviewed via a video call lasting just over one hour in most cases. The video call was recorded with the respondent’s permission and
transcribed verbatim with the exception of one call where notes were taken (notes were read back to the respondent and their accuracy was confirmed by the respondent). All 39 completed surveys came from very senior-level managers; heads of organizations, company founders, and successful policy and business entrepreneurs. Most of the respondents included in the samples were decision-makers with more than five years of strategic decision-making experience. The respondents’ backgrounds spanned business consulting, health administration, scientific research, software development, engineering, architecture, banking, law, public administration, and international commerce.

4.3 SURVEY

Data on decision-maker’s thoughts, feelings, and decision-making behaviour were gathered using a three-part electronic survey. The first section focussed on respondent demographics. The second section of the survey consists of items used to gather data for use in the RGT. The items in this section asked respondents to rate different decision making-skills on their importance for addressing the decisions on the decision spectrum. In the third section of the survey, respondents were presented with paradoxical decision-making scenarios and were asked to indicate their preferred course of action. These items serve as a proxy for observing complex decision-making behaviour first-hand. A copy of the complete study survey can be found in Appendix 2, Study Survey.

4.3.1 Survey Part 1 - Respondent Attributes

Study demographics were collected regarding educational background (highest degree obtained, area of specialization), job type or duties, job tenure, job title, employment status (full-time, part-time), and employment basis (salaried employee, contractor). Personal demographics such as age, gender and cultural background were not gathered, in part, to assure respondents of the confidential nature of their answers, particularly given the small sample size and the use of my professional network for the seed sampling. Information on organizational size and type was collected indirectly during in-person surveys.
Survey items on educational background, job functions and tenure provided a sense of the diversity of respondent attitudes, values and organizational context (van Knippenberg & Schippers, 2007).

4.3.2 Survey Part 2 - Decision-making Skills and Decision Types
Decision makers make sense of decision situations and ultimately make decisions using a set of decision-making skills. The data-gathering stage of the RGT involved obtaining respondents’ reactions to and understanding of the stimuli to which they were exposed when asked to complete the RGT grid. Stimuli consisted of different types of decisions ranging in their level of paradoxical tension. Respondents’ understanding was captured in terms of their repertory of cognitive constructs.

In this study, there were five elements representing the decision types in the spectrum of decisions. This set out the extent of the cognitive territory being explored using the RGT. Nine constructs represented the decision-making skills that served as landmarks that determine the topography of the cognitive territory or how decision-makers make sense of the decisions on the spectrum.

Administering the grid items in the study survey requires the respondent to rate the extent to which each construct applies to each element. In this study, this represents the extent to which a type of decision (element) requires a decision-making ability (construct). This process yields a construct by element “respondent rating matrix” for each respondent (a decision type by decision skill matrix). The repertory grid/multi-dimensional scaling analysis is diagrammed in Appendix 4.

For each of the five types of decisions in the decision spectrum, respondents were asked to indicate how much each decision-making skill is needed on a scale from 1 (no skill) to 7 (significant skill). Respondents rated all the decision types on the need for a particular decision-making skill before moving on to the next skill. An example of an item assessing the amount of creativity needed to address paradox asks the respondent to “please indicate how much creativity you feel is needed to tackle each
kind of decision,” then presents all the decision types from simple to paradox with short descriptions (see Table 3 for descriptions). In the case of paradox, the respondent is asked to rate “a paradox requiring you to address clearly unresolvable tensions (e.g. explore/exploit)” on a seven-point scale from 1 (no creativity) to 7 (significant creativity). This question format and 7-point rating scale align with similar examples and guidance in the literature (Rogers & Ryals, 2007; Malmström et al., 2015; Wright, 2004).

4.3.3 Survey Part 3 - Scenarios
This study employed seven scenarios based on decision-making involving paradox. These scenarios were included in the study survey. In each scenario, respondents are presented with text describing a decision-making situation and are asked to choose one of three possible options for addressing the decision (a non-deviant option, a somewhat deviant option, and a fully deviant option). The decision-making context and underlying paradoxical tensions differ in each scenario. The seven contexts in the scenarios describe decision-making situations about strategic planning, budgeting, human resources, performance measurement, marketing, visioning, and organizational change, respectively. The seven decision contexts were developed from Miron-Spektor et al.’s (2018) list of the types of tensions experienced by employees and examples of paradoxical decision situations provided by Lüscher and Lewis (2008). The scenarios were elaborated using concepts from the Competing Values Framework (Lavine, 2014; Mathias & Williams, 2017), the work design questionnaire, the work context inventory (Johns, 2017), and this study’s spectrum of decisions involving paradox. The aim was to make the scenarios as different from one another as possible while touching on a representative sample of decision situations. The format for the scenarios follows Lüscher and Lewis (2008).

The options in each scenario correspond with the given context. In each scenario, the first option is typical of a decision which ignores underlying paradoxical tensions (i.e., the non-deviant
decision-making option). In this option, the respondent’s focus is on a single issue. The respondent makes a clear, easily communicated decision to pick one tension over the other. The second option in each scenario reflects partial engagement with underlying tensions (i.e., somewhat deviant decision-making). In this option, the respondent adopts a consistent pattern of decision-making involving accepting, accommodating, and differentiating/integrating paradox. For example, attempting to address tensions by separating them structurally, functionally, temporally, or spatially. This choice represents a small departure from the norm but does not solve the problem. The third option in each scenario involves full engagement with paradoxical tensions (i.e., deviant decision-making). In this option, the respondent seeks to bring poles together in a way that neutralizes tensions and adopts a pattern of decision-making that is inconsistent over time. This option typifies paradoxical thinking, addressing multiple tensions simultaneously. The scoring for the scenarios consisted of awarding a “1” for choosing the first scenario option, a “2” for the second and a “3” for the third option. The full description of scenarios and examples of non-deviant, somewhat deviant and fully deviant options are listed in Appendix 2, Study Survey.

4.4 OBSERVED DECISION-MAKING

Scholarship on cognition and decision-making under paradox (e.g., Rerup, 2009; Smith, 2014; Gaim, 2018) provides examples of three data collection techniques; semi-structured interviews with managers, reviewing organizational documents such as plans and reports, and observing decision-making behaviour through the use of decision scenarios. The literature also points to combining both etic (i.e., observing decision-making from outside the decision-maker across decision-makers) and emic (i.e., examining decisions from the perspective of the individual decision-maker) approaches (Eranova & Prashantham, 2014). In accordance with these suggestions, this study combines interview questions and observed decision-making. The survey also permits the analysis of individual surveys and comparisons
between groups of respondents. Other strategies, such as grounded theory, were contemplated (Fairhurst et al., 2016). However, mixed methods using a survey and interviews were considered appropriate for an exploratory study.

4.5 DATA ANALYSIS

Data analysis in this study aims to identify patterns in the data from individuals or decision scenarios (e.g., consistencies and inconsistencies) (Harper, 1997; Brekhus, 2015). Patterns are identified with the help of multi-dimensional scaling and thematic coding. Inconsistencies, in particular, indicate the presence of paradoxical tensions manifesting as either deviant or non-deviant cognition or decision-making (Poole & Van de Ven, 1989). From a systems perspective, patterns, commonalities, and differences may be scalable to the group, organizational, or societal level, given the self-repeating properties of systems at different levels (Baum & McKelvey, 2006). This section sets out the parameters for the quantitative and qualitative analyses applied to the data in this study and concludes with a discussion of how the quantitative and qualitative analyses are integrated.

4.5.1 Quantitative Analysis

This section discusses how data gathered from the study survey, specifically the decision-making skills in the repertory grid, were prepared and analyzed. The IBM SPSS Statistics Version: 28.0.1.1 (14) INDSCAL routine was employed.

As described above, the RGT requires the respondents to rate the extent to which a particular construct applies to an element. In this study, this represents the extent to which a type of decision (element) requires a decision-making ability (construct). Repeating this for each of the five decision types and each decision-making skill yields a decision type by decision-making skills matrix for each respondent. This is termed a construct by element “respondent rating matrix.” It is also possible to create a respondent-by-element “construct matrix” for each construct (decision-making ability) by
aggregating each respondent’s rating of elements (type of decision) for each construct. Also, matrices representing respondent groups (e.g., all respondents with a specific attribute in common) can be generated by averaging individual ratings across the group or by statistical analysis of variance within the group (Rogers & Ryals, 2007; Wright, 2004; Kruskal & Wish, 1978b).

Three-way multi-dimensional scaling (MDS) is recommended for the statistical analysis of individual and group repertory grids (Hodgkinson, 2005; Kruskal & Wish, 1978b; Kruskal & Wish, 1978a; Brier, 2019). Three-way MDS aims to find a statistical model, through analysis of variance, that best fits the data and preserves relationships within the data (Hodgkinson, 2005). No assumptions are required about the data (e.g., nonlinear relationships between variables are acceptable). The model of the data produced by MDS is based solely on an analysis of variance (Fransella & Bannister, 1977). On occasion, this results in statistically significant patterns in the data that are difficult to interpret (Fransella & Bannister, 1977). For the sake of computing efficiency as well as the quality of analysis, it is recommended that respondent rating matrices be converted into construct by construct or element by element “respondent proximity matrices,” and construct matrices be converted to “construct proximity matrices” that better show information about the dissimilarity in each rating matrix (Hodgkinson, 2005; Kruskal & Wish, 1978a). Statistical software, such as the IBM SPSS Statistics Version: 28.0.1.1 (14) “Distances” routine, does this conversion. A diagram showing an overview of how the data was analyzed is provided in Appendix 4, Repertory Grid/MDS Analysis.

4.5.1.1 Data Preparation
The data preparation stage begins with the conversion of respondent rating matrices and construct matrices (i.e., raw data) to dissimilarity proximity matrices (Euclidian distance between cases) using an application such as the “distances” routine in SPSS. Once the data is converted, the construct by element respondent proximity matrix is submitted to three-way MDS. From a procedural perspective,
the axes of respondent rating matrices can be “flipped” from construct by element to element by construct. Depending on whether or not the respondent matrix is flipped, submitting a respondent proximity matrix to three-way MDS generates two products: a set of “group coordinates” for configuring constructs or elements in a “group perceptual space” along “group dimensions” that explain the variance in how the constructs or elements were rated by the group, and; a set of “dimension weights” for each respondent indicative of how important a group dimension is for a respondent when construing a particular stimulus (Hodgkinson, 2005; Kruskal & Wish, 1978b; Malmström et al., 2015). When MDS is applied to a construct proximity matrix, the result is a set of dimension weights for each construct, showing the importance of each construct in conceptualizing a given dimension (Epstein & Faerman, 2017; Kruskal & Wish, 1978b; Malmström et al., 2015) and a “configuration of respondents” in “respondent space.”

Construct dimension weights are useful for interpreting the meaning of the dimensions obtained through MDS and can help inform the decision as to how many dimensions are needed to best model the data (Hodgkinson, 2005; Kruskal & Wish, 1978b).

4.5.1.2 Knowledge Representation

The knowledge representation stage of MDS involves plotting group coordinates in group perceptual space. These plots yield a “group configuration” of the constructs or elements in the resulting number of dimensions (i.e., where constructs or elements are represented as points in the space). The group configuration represents how the group construes the constructs or elements (i.e., how constructs or elements are related to each other in the minds of respondents in the group) (Malmström et al., 2015; Eden, 2004).
Multiplying the dimension weights for a respondent by the group coordinates produces an “individual configuration” of the constructs or elements. The individual configuration depicts constructs or elements as points in the group space but from the perspective of an individual. A respondent’s dimension weights effectively stretch or shrink the group dimensions to give a view of how the respondent uses the group dimensions to understand the constructs or elements. (Kruskal & Wish, 1978d).

Finally, plotting dimension weights for each respondent in “respondent space” along the group dimensions produces a “configuration of respondents” (i.e., where respondents are represented as points in the space). A point in the configuration of respondents is interpreted as the endpoint of a vector, beginning at the origin. The direction and length of vectors in the configuration of respondents represent the relative importance of group dimensions for a given respondent and the degree of agreement between the individual and the group configuration of elements, respectively (Hodgkinson, 2005).

From an analytical standpoint, clusters of elements in the group configuration in group perceptual space indicate that the elements in question are closely related in respondents' minds (Malmström et al., 2015; Eden, 2004). Areas of the group perceptual space that are not populated with any elements represent “unoccupied” perceptual space (i.e., areas not forming part of respondents’ perception or cognition) (Hodgkinson, 2005). If all the elements in the group perceptual space are clustered in a small area, this indicates a type of narrowness in perception and cognition (Hodgkinson, 2005).

An indication of the complexity of the cognition modelled by three-way MDS is the number of constructs implicated (by the dimension weights for each construct) in the group dimensions used to
explain variance (more complex cognition requires the use of more constructs to understand the elements) (Malmström et al., 2015). Having an understanding of the level of cognitive complexity has important implications. “Intuitive,” “feeling” managers may have less complex cognitive maps or configurations than so-called thinking (i.e., “rational”) managers (Calori et al., 1994; Calori et al., 1994; Village et al., 2013). Also, less complex cognition indicates the presence of more bounded rationality, greater use of heuristics and routines, a higher likelihood that cognition will be subject to bias, and less integration of information about the elements (Malmström et al., 2015).

The configuration of respondents in the respondent space, as reflected in the ratio of dimension weights for each respondent, can be linked to various respondent attributes to study the relationship between a particular attribute and a pattern in the way group constructs are used to understand elements using correlation analysis (Hodgkinson, 2005).

4.5.2 Qualitative Analysis
This section describes the qualitative analysis conducted as part of the mixed methods approach employed by this study. Specifically, this section describes the application of thematic coding to qualitative data captured during the administration of the study’s survey.

4.5.2.1 Coding
Coding aims to summarize the information within a text by organizing that text into meaningful categories and themes (Vaismoradi & Snelgrove, 2019). From the perspective of this study, the coding process translates a respondent’s commentary into the kind of terminology used to describe decision-making (Vaismoradi & Snelgrove, 2019).

There are two main coding procedures: content and thematic. Content coding focuses on the text, and the number of occurrences of a particular code within the text forms the data (Brough, 2019;
Marks & Yardley, 2004). Content coding yields reliable, objective information about commonalities and differences in data (Vaismoradi & Snelgrove, 2019; Brough, 2019). By comparison, thematic coding views the text itself as the data. Thematic coding data includes how text is communicated (e.g. pauses, repetitions, tone, emotions, etc.) (Vaismoradi et al., 2016; Vaismoradi & Snelgrove, 2019). Thematic analysis reveals the text's observable and implied patterns or themes (Brough, 2019; Vaismoradi et al., 2016). Given the small sample size, this study employed the more suitable thematic coding technique (Marks & Yardley, 2004).

Themes are sometimes distinguished from categories and codes: themes are thought to spring from the interpretation of patterns implicit in the text, and categories and codes are believed to be more explicit and observable (e.g. Vaismoradi & Snelgrove, 2019; Vaismoradi et al., 2016). However, researchers do not always distinguish between themes, categories and codes (e.g., Swain, 2018). Codes in this study consisted of themes drawn from the literature, a procedure suggested by Marks and Yardley (2004), Swain (2018), Brough (2019), and Creswell (2009). This kind of thematic coding helps to connect the logic or thoughts giving rise to commentaries (Vaismoradi & Snelgrove, 2019; Brough, 2019; Marks & Yardley, 2004) with a theoretical model (Vaismoradi et al., 2016; Creswell, 2009). The theoretical model is set out in Figure 4 (i.e., the cognitive processing model). Employing themes from the literature helps ensure that evidence contradictory to assumptions or desired outcomes won't be ignored (Marks & Yardley, 2004). Anomalies in the data (e.g., between quantitative and qualitative data in mixed methods procedures) can often lead to new insights (Marks & Yardley, 2004).

After becoming familiar with the respondent commentaries, portions of text that shared specific characteristics were labelled under specific themes (Marks & Yardley, 2004; Vaismoradi & Snelgrove, 2019; Vaismoradi et al., 2016). The coding of commentary by theme was reviewed several times to help ensure coding accuracy (Brough, 2019; Swain, 2018).
Two papers describing models of decision-making involving paradoxical tensions (Pang et al., 2021; van Neerijnen et al., 2021) were analysed to obtain examples of the kind of observations a respondent might make at different stages of the decision-making process (see Figure 4): stage I represents information navigation (exploiting paradoxical tensions); stage II is contextual consideration (reflecting on paradoxical tensions), and; stage III is paradoxical cognitive processing (overcoming paradoxical tensions). Both models make provision for a decision maker to connect a decision situation to various forms of context. The idea of making connections to various forms of context was extended in my search for themes by screening three additional papers: one on drawing analogies (Schwenk, 1988), a second on making and using heuristics (Cristofaro & Giannetti, 2021), and a third on the interaction of ideas and the cognitive perspective (Grégoire et al., 2011). Appendix 3 sets out themes from the literature and their theoretical underpinnings. Seven themes emerged from the literature: exploit tensions, making distinctions, contextual consideration, oneness (superficial), oneness (profound), making connections, and dynamics. The first theme, exploit tensions, falls into the first stage of the cognitive processing model (figure 4) and represents a rudimentary awareness of paradoxical tensions to the extent they can be used as a means of achieving strategic objectives. The second theme, making distinctions, falls into the second stage of the cognitive processing model and represents the start of engagement with paradoxical tensions by differentiating their features and possibly identifying information gaps in normal operations. Contextual consideration also falls into the second stage of the cognitive processing model and represents prudent adjustment to change while staying true to principles. Oneness straddles the second and third stages of the cognitive processing model. Superficial oneness falls into the second stage and represents a desire for uniformity leading to, but falling short of, the integration of paradoxical tensions. Profound oneness falls into the third stage of the cognitive processing model and represents a shift from desiring uniformity to having an appreciation of the unity of all things, leading to the integration of paradoxical tensions. Although oneness is a foundational
concept originating in Confucianism (Pang et al., 2021), the experience of oneness has likely spread, at least somewhat, to all national backgrounds. Making connections also falls into the third stage of the cognitive processing model and represents finding connections between differentiated elements of the decision situation and between the situation and other cognitions. Finally, dynamics falls into the third stage of the cognitive processing model and represents the modification and expansion of existing principles typical of movement through the stages of the model leading to integration. Appendix 3 also constitutes the coding book (also referred to as a coding frame or coding manual) documenting the coding process used in this study (Marks & Yardley, 2004; Swain, 2018). The observed themes link to the third research question in the qualitative component of this study through the decision-making model set out in Figure 4 (Marks & Yardley, 2004; Vaismoradi et al., 2016).

4.5.3 Integration of Quantitative and Qualitative Analysis
The process of integrating quantitative and qualitative data (Guetterman et al., 2015) occurred during its interpretation (Wisdom & Creswell, 2013; Creswell, 2009). The integration approach adopted in this study involved jointly presenting different types of data as a means of addressing the study’s third research question about differences between decision scenarios (Guetterman et al., 2015). This study extends the joint display arrangement in Dickson et al. (2011 in Guetterman et al., 2015) by comparing quantitative data in the form of cognitive dimensions with qualitative data comprised of differences in coded commentaries from each decision scenario.

4.6 RELIABILITY AND VALIDITY
Both qualitative and quantitative studies concern themselves with issues of validity and reliability (Creswell, 2009; Wisdom & Creswell, 2013; Azorin & Cameron, 2010). In qualitative research, validity refers to the accuracy of the findings and the documentation of useful inferences (Creswell, 2009). Reliability refers to how consistently the research method is applied across researchers and projects.
Mixed methods improve the validity of inferences drawn by the study through triangulation of results (i.e. collecting quantitative and qualitative data concurrently and then comparing the two databases for similarities, differences, and patterns, Creswell, 2009).

In accordance with suggestions for improving the reliability of coding used in this study, the same pieces of commentary were coded and then re-coded about a week apart (Marks & Yardley, 2004; Brough, 2019). In addition, the coding process was documented to improve transparency and makes replication possible (Vaismoradi & Snelgrove, 2019). Documentation included the production of coding manuals setting out derivations and descriptions of codes, and examples of text, in an effort to reveal and mitigate any researcher biases (Vaismoradi & Snelgrove, 2019; Vaismoradi et al., 2016).

Regarding the quantitative component of this study, techniques for enhancing the reliability (i.e., producing the same result on different occasions; Fransella & Bannister, 1977) of the RGT during its implementation included: asking respondents for examples of the issue under investigation to verify their understanding (Malmström et al., 2015; Brown, 1992), and comparing responses across respondents for agreement on any attributes (Cammock et al., n.d.). These measures help ensure that changes over time in a respondent’s grid likely mean a change in the respondent rather than an issue with reliability (Fransella & Bannister, 1977).

Adhering to the RGT protocol helps to ensure its validity (i.e., how well the grid reveals patterns and relationships in the data representing the respondent’s thinking) and its reliability (Malmström et al., 2015; Fransella & Bannister, 1977). This study closely adhered to the protocol for RGT with modifications only where such changes have been proven in the literature (e.g., concerning supplied elements and constructs and large sample size). These measures, combined with a diverse sample,
helped ensure the reliability and validity needed for conclusions to be drawn from the data and analyses in this study.

5.0 RESULTS AND DISCUSSION
This chapter describes the results produced by following the data-gathering and analytical methods set out in the previous section. It begins with a description of the sample demographics. Next, the quantitative data are discussed, followed by a description of the results of analyzing this data, addressing research questions one and two. Then the qualitative data and analysis are described, addressing research question three. A discussion follows the results relevant to each research question. The chapter concludes with a section that presents an integration of the quantitative and qualitative findings.

5.1 RESPONDENT ATTRIBUTES
The demographics details of the sample are presented in Table 5. The majority of respondents in the sample are well-educated senior managers of long-standing. Typically, they work full-time and are salaried. Among the entrepreneurs, two are CEOs of companies they founded, and one is a US patent holder. The sample is roughly evenly split between the private and the public sector. The in-person interview sub-sample consisted of eighteen men and seven women with some variety in their national backgrounds. Their estimated age ranged from the mid-twenties to the mid-seventies, with the majority over the age of 50. They worked in organizations with as few as seven people to organizations with thousands of employees, but most worked in large organizations. Importantly, I had observed all of them, first-hand, making strategic (i.e., complex), high-stakes decisions on many occasions.

The in-person and online sub-samples are set out in Table 5. The in-person sub-sample contains managers whose duties include overseeing medical research, whereas the online sub-sample contains medical doctors in field of health administration.
Table 5 - Sample Demographics

<table>
<thead>
<tr>
<th>Attribute</th>
<th>In-person N=25</th>
<th>Online N=14</th>
<th>Total N=39</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Percent</td>
<td>Count</td>
<td>Percent</td>
</tr>
<tr>
<td>Educational Background</td>
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</tr>
<tr>
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<tr>
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</tr>
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<td>29%</td>
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<tr>
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<td>2</td>
<td>14%</td>
</tr>
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<td>29%</td>
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<tr>
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</tr>
<tr>
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<td>Attribute</td>
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<td>Online N=14</td>
<td>Total N=39</td>
</tr>
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<tr>
<td></td>
<td>Percent</td>
<td>Count</td>
<td>Percent</td>
</tr>
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<td>0</td>
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<td>79%</td>
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<td>7%</td>
</tr>
<tr>
<td>Specialist/Expert</td>
<td>24%</td>
<td>6</td>
<td>14%</td>
</tr>
<tr>
<td>Unknown</td>
<td>8%</td>
<td>2</td>
<td>0%</td>
</tr>
</tbody>
</table>

5.2 QUANTITATIVE DATA

The goal of the quantitative analysis was to respond to research questions one and two. First, which cognitive dimensions do individuals use to differentiate between decisions with and without unresolvable underlying tensions, and how important are these dimensions in their perceptions? Second, to what extent do specific decision-making skills contribute to these cognitive dimensions for differentiating decision types (from those with resolvable to those with unresolvable tensions)?

Table 6 shows the mean and standard deviation of the importance rating (from “1” = low importance to “7” = high importance) for each decision-making skill for each decision type on the decision-making spectrum, and Figure 6 shows the means in graphical format. In general, decision-making skills seemed to become more important as decisions became increasingly paradoxical. Delegation skill shows the least dramatic increase as decisions become more paradoxical.
Figure 6 - Mean score for the importance of each decision-making skill for each decision type

Table 6 - Importance of decision-making skill for each decision type

<table>
<thead>
<tr>
<th>Skill (mean (sd))</th>
<th>Simple</th>
<th>Trade-off</th>
<th>Compromise</th>
<th>Dilemma</th>
<th>Paradox</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiative</td>
<td>2.50 (1.52)</td>
<td>3.86 (1.20)</td>
<td>5.03 (1.06)</td>
<td>5.89 (0.95)</td>
<td>6.11 (1.26)</td>
</tr>
<tr>
<td>Creativity</td>
<td>1.92 (1.08)</td>
<td>3.44 (1.38)</td>
<td>4.81 (1.28)</td>
<td>5.58 (1.16)</td>
<td>5.94 (1.64)</td>
</tr>
<tr>
<td>Vision</td>
<td>2.42 (1.54)</td>
<td>3.47 (1.42)</td>
<td>4.75 (1.46)</td>
<td>5.81 (0.92)</td>
<td>6.33 (1.24)</td>
</tr>
<tr>
<td>Broad Knowledge</td>
<td>2.81 (1.49)</td>
<td>4.25 (1.42)</td>
<td>5.25 (1.25)</td>
<td>6.19 (0.75)</td>
<td>6.47 (0.94)</td>
</tr>
<tr>
<td>Forecasting</td>
<td>2.47 (1.44)</td>
<td>3.69 (1.53)</td>
<td>4.67 (1.35)</td>
<td>5.64 (1.17)</td>
<td>6.19 (1.26)</td>
</tr>
<tr>
<td>Risk Tolerance</td>
<td>2.28 (1.58)</td>
<td>3.47 (1.30)</td>
<td>4.33 (1.31)</td>
<td>5.56 (1.18)</td>
<td>6.17 (1.36)</td>
</tr>
<tr>
<td>Time</td>
<td>1.86 (1.13)</td>
<td>3.06 (1.47)</td>
<td>4.31 (1.26)</td>
<td>5.47 (1.34)</td>
<td>5.94 (1.26)</td>
</tr>
</tbody>
</table>
Cumulative scores for each scenario were calculated by summing the raw scores for each respondent (i.e., 1, 2 or 3) by scenario. The cumulative scores for each decision scenario were as follows: strategic planning 109, organizational development 105, marketing 103, HR planning 102, visioning 100, performance measurement 95, and budgeting 87. Individual scores ranged from 1 to 3, including four instances of a score of 0 where a respondent was unable to make a decision. The higher the cumulative number, the more often the third choice (i.e., full engagement with paradoxical tensions) was chosen.

5.2.1 Determining Dimensionality
This section describes how the dimensionality of the MDS solution was determined and how those dimensions were interpreted. It also sets out the findings related to research question one (the cognitive dimensions decision-makers use when faced with decisions involving paradox and their importance) and question two (the contribution of different decision-making skills to the cognitive dimensions used by decision-makers).

MDS analysis was employed for the nine decision skills and five decision types, as well as for the nine dimension weights, which give a sense of the importance of each decision skill in conceptualizing a given cognitive dimension. The goal of the MDS analysis is to determine the number of dimensions that provide the best fit (or least-worst fit) between the proposed and the actual configuration of the objects under study. S-stress, a measure of badness-of-fit between a proposed configuration and the actual configuration, is considered good between 0.05 and 0.10 and poor when greater than 0.20 (Kruskal & Wish, 1978 IN Giguère, 2006 page 34). The relatively small sample size submitted to multidimensional
scaling (MDS) for analysis yielded results that were useful conceptually but statistically limited (Hodgkinson, 2005). As such, the results of the quantitative analysis are interpreted with caution.

Quantitative data was submitted to the SPSS INDSCAL routine to produce configurations of 2 to 6 dimensions for the configuration of skills and for dimension weights. Configurations of 2 to 3 dimensions were produced for the decision types. The maximum number of dimensions for five objects in SPSS INDSCAL was three, and at five dimensions, the S-stress value is 0 or equivalent to a perfect fit. As the number of dimensions increased, the S-stress value computed by SPSS decreased for the configurations in question. The scree plots in Figures 7, 8 and 9 show the effect of increasing the number of dimensions on the computed S-stress value for different configurations. Figure 7 shows the S-stress values computed by the SPSS ALSCAL procedure for MDS solutions for configurations (i.e. maps or plots) of dimension weights from two to six dimensions. Figure 8 shows the S-stress values computed for configurations of skills with from two to six dimensions. Figure 9 shows the S-stress values computed for configurations of decision types with two or three dimensions and a point at five dimensions where S-stress is zero. Stress values of about 0.08 in Figure 9 may reflect, in part, the relatively small number of decision types compared to the number of dimensions (Kruskal & Wish, 1978c).

The scree plots were produced in an effort to identify an optimum number of dimensions for the MDS configurations in this study according to the method described by Kruskal and Wish (1978c). Typically, where a scree plot shows a clear “elbow” or marked change in slope, the point at which the elbow occurs indicates the appropriate number of dimensions for a configuration (Kruskal & Wish, 1978c; Giguère, 2006). None of the plots contain an obvious or marked change in slope or elbow. The scree plot for the configuration of skills suggests a slight elbow at three dimensions. This slight elbow might suggest the appropriateness of a three-dimensional solution. However, even with a three-
dimensional solution for the configuration of skills, the S-stress value does not fall below 0.20, so the fit is still considered poor.

**Figure 7 - Stress for dimension weights for 2-6 dimensions**

**Figure 8 - Stress for configuration of skills for 2-6 dimensions**
Given the absence of a useful elbow in Figures 7, 8 and 9, two other factors were considered in setting the best number of dimensions for the MDS solution: stability of the dimensions and interpretability (Kruskal & Wish, 1978c). Based on guidance provided by Kruskal and Wish (1978c) on determining dimensionality, the stability of a two-dimensional solution was explored rather than a solution with more dimensions for the following reasons. First, a two-dimensional configuration is easier to interpret and communicate than one in three or more dimensions. Second, the main purpose of generating configurations in this study is to observe the distribution and possible clustering of objects in perceptual space. According to Kruskal and Wish (1978c), a two-dimensional configuration is far more useful for this purpose than a configuration in three or more dimensions. Lastly, the more dimensions that are used in this analysis, the likelier it is that MDS calculations are producing artifacts rather than a meaningful representation of the data.

Following Kruskal and Wish (1978c), the procedure for determining the stability of a two-dimensional solution involved taking three random subsamples of 20 respondents from the full sample.
of 39 respondents and subjecting them to the SPSS INDSCAL routine to produce a configuration of decision types (the solution with the best s-stress value in two dimensions and the most likely to produce a clear outcome). The graphical output of this procedure is shown in Figure 10. The position of the decision types in two dimensions remains relatively constant for the three random subsamples. According to Kruskal and Wish (1978c), “decisions about dimensionality can be based in part on such stability considerations.” The stability of the two-dimensional solution for the configuration of decision types supports a dimensionality of two for this study’s MDS analyses. Further support for a two-dimensional solution comes from an investigation of the interpretability of solutions in two versus three dimensions in the section “Interpreting Configuration Dimensions” below.

Figure 10 - Stability of 2-dimensional space using random sub-samples (n=20)
5.2.1.1 Interpreting Configuration Dimensions

Following the work of Hodgkinson (2005), dimension weights were the first factor considered in attempting to interpret the meaning of two and three-dimensional MDS solutions. Descriptions derived from respondents’ comments helped clarify the meaning of decision-making skills and abilities as well as decision types. The ease of interpretation of the dimensions was also considered as a way of confirming the dimensionality of the solution.

5.2.1.1.1 Dimension Weights

The dimension weights for a two-dimensional solution and for a three-dimensional solution are reproduced in Table 7. When construct matrices are submitted to multi-dimensional scaling, one of the outputs is dimension weights for each construct within each dimension. According to Hodgkinson (2005), the meaning of a particular dimension can be interpreted based on the constructs with the largest dimension weights compared to the other weights in that dimension. A relatively large dimension weight indicates that a construct is important in conceptualizing that dimension (Hodgkinson 2005). In this study, dimension weights indicate how important a particular decision-making skill or ability is to the cognitive process of conceptualizing a particular dimension for respondents as a group. Where a construct is not heavily weighted in one dimension but appears the most heavily weighted in another, perhaps second dimension, Hodgkinson (2005) uses this construct to interpret the meaning of the second dimension. Where constructs are not heavily weighted in any dimension, the constructs may be considered of some importance across dimensions (Hodgkinson 2005). The colour code in Table 7 identifies to which dimension a specific decision-making skill contributes most and instances where a particular skill contributes somewhat to all dimensions. In a two-dimensional solution, “knowledge” and “forecasting” have the largest relative weights in dimension 1 and form the basis of the interpretation of that dimension. “Vision,” “risk tolerance,” “time management,” “delegation,” and “judgement” are
slightly more weighted in dimension 2 than in dimension 1, and therefore form the basis of
interpretation of the second dimension. “Initiative” and “creativity” carry virtually equal weight in
dimension 1 and dimension 2 and therefore contribute somewhat to the conceptualization of both
dimensions. Table 7 shows that adding a third dimension eliminates a virtual tie between weights for
initiative and creativity skills (both contribute weakly to a third dimension) and accentuates the
importance of time management and judgment skills compared to a two-dimensional solution. Although
forecasting skills are most heavily weighted in dimension 1 they are less heavily weighted than “vision,”
“time management,” and “delegation” in the same dimension (this type of situation does not arise in
the two-dimensional solution). The meaning of the third dimension is difficult to determine because no
one skill is much more heavily weighted than the others compared to dimensions 1 and 2. In either
solution, time management skill is more heavily weighted in the second dimension. On balance, the
dimension weights for a two-dimensional solution are easier to interpret than the dimension weights for
a three-dimensional solution, primarily due to the difficulty in interpreting a third dimension.

Table 7 - Dimension weights for two and three-dimensional solutions

<table>
<thead>
<tr>
<th>Construct</th>
<th>Dimension 1</th>
<th>Dimension 2</th>
<th>Dimension 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiative</td>
<td>0.1038</td>
<td>0.1035</td>
<td>0.1113</td>
</tr>
<tr>
<td>Creativity</td>
<td>0.0975</td>
<td>0.0976</td>
<td>0.0862</td>
</tr>
<tr>
<td>Vision</td>
<td>0.189</td>
<td>0.1968</td>
<td>0.1337</td>
</tr>
<tr>
<td>Knowledge</td>
<td>0.7723</td>
<td>0.1485</td>
<td></td>
</tr>
<tr>
<td>Forecasting</td>
<td>0.244</td>
<td>0.2199</td>
<td></td>
</tr>
<tr>
<td>Risk tolerance</td>
<td>0.0977</td>
<td>0.1031</td>
<td></td>
</tr>
<tr>
<td>Time management</td>
<td>0.1804</td>
<td>0.1868</td>
<td></td>
</tr>
<tr>
<td>Delegation</td>
<td>0.1629</td>
<td>0.175</td>
<td></td>
</tr>
<tr>
<td>Judgement</td>
<td>0.139</td>
<td>0.1448</td>
<td></td>
</tr>
<tr>
<td>Construct</td>
<td>Dimension 1</td>
<td>Dimension 2</td>
<td>Dimension 3</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------</td>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Creative</td>
<td>0.0861</td>
<td>0.069</td>
<td>0.0875</td>
</tr>
<tr>
<td>Vision</td>
<td>0.211</td>
<td>0.2518</td>
<td>0.2205</td>
</tr>
<tr>
<td>Knowledge</td>
<td>0.1666</td>
<td>0.1402</td>
<td>0.1765</td>
</tr>
<tr>
<td>Forecasting</td>
<td>0.1817</td>
<td>0.148</td>
<td>0.1639</td>
</tr>
<tr>
<td>Risk Tolerance</td>
<td>0.0892</td>
<td>0.0709</td>
<td>0.1008</td>
</tr>
<tr>
<td>Time Management</td>
<td>0.2039</td>
<td>0.7733</td>
<td>0.1284</td>
</tr>
<tr>
<td>Delegation</td>
<td>0.2057</td>
<td>0.1809</td>
<td>0.2248</td>
</tr>
<tr>
<td>Judgement</td>
<td>0.7062</td>
<td>0.1685</td>
<td>0.1796</td>
</tr>
</tbody>
</table>

Key

- Similar in all dimensions
- Most important in dimension 1
- Most important in dimension 2
- Most important in dimension 3

5.2.2 Interpreting the Two-Dimensional Configuration

With both ease of interpretation and stability suggesting a dimensionality of two, respondent-derived descriptions of the different decision-making skills and abilities were used to help interpret the meaning of dimension 1 and dimension 2 and the weightings in question. Table 8 gives descriptions for each decision-making skill. The descriptions of decision skills (hereinafter referred to as “descriptions”) in Table 8 were derived from respondents’ comments during the in-person administration of surveys. The derivation of these descriptions is set out in detail in Appendix 5.

Table 8 - Description of decision-making skills and abilities

<table>
<thead>
<tr>
<th>Decision-making Skills and Abilities</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiative</td>
<td>The cognitive effort needed to generate and explore new perspectives and overcome obstacles</td>
</tr>
<tr>
<td>Creativity</td>
<td>Imagination, understanding and engagement with the decision</td>
</tr>
<tr>
<td>Decision-making Skills and Abilities</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>situation needed to find new ways</td>
<td></td>
</tr>
<tr>
<td>Vision</td>
<td>The need for an explicit desired outcome to guide operations</td>
</tr>
<tr>
<td>Broad Knowledge</td>
<td>The possession of background information needed for a decision process</td>
</tr>
<tr>
<td>Forecasting</td>
<td>The ability to predict operational consequences of a decision</td>
</tr>
<tr>
<td>Risk Tolerance</td>
<td>The ability to understand and mitigate risks and the probability of their occurrence in a given context</td>
</tr>
<tr>
<td>Time Management</td>
<td>The ability to allocate time as a limited resource for examining options</td>
</tr>
<tr>
<td>Delegation</td>
<td>The ability to match tasks to people</td>
</tr>
<tr>
<td>Judgement</td>
<td>The internal logic/cognition used in the decision process</td>
</tr>
</tbody>
</table>

Based on the decision-making skills that contributed the most to each dimension according to the dimension weights in Table 7, and with insight from the descriptions of decision-making skills in Table 8, dimension 1 was deemed to represent “information use,” and dimension 2 was deemed to represent “contextual focus.” The need for broad knowledge and the ability to forecast decision consequences contributed the most to what is interpreted as the information use dimension. The need for vision, risk tolerance, time management ability, delegation ability, and judgement contributed more to the dimension interpreted as contextual focus. The need for initiative and creativity contributed to both dimensions.

5.2.2.1 Neighbourhood Interpretation

Although dimension weights were the first factor considered in the interpretation of cognitive dimensions, the SPSS INDSCAL s-stress value associated with those weights indicated a poor fit, suggesting the need to consider additional factors. Therefore, an additional quadrant-by-quadrant or...
“neighbourhood” interpretation (as suggested in Kruskal and Wish, 1978 for situations where it is difficult to interpret dimension weights) was conducted using descriptions of decision types and decision-making skills. The descriptions of the different decision types are set out in Table 9. The derivation of these descriptions is set out in detail in Appendix 5.

**Table 9 - Description of Decision Types**

<table>
<thead>
<tr>
<th>Decision Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple</td>
<td>Routine operational decisions supported by organizational structures.</td>
</tr>
<tr>
<td>Trade-off</td>
<td>Operational decisions are constrained by organizational and environmental factors.</td>
</tr>
<tr>
<td>Compromise</td>
<td>Decisions requiring cognitive effort to create balance.</td>
</tr>
<tr>
<td>Dilemma</td>
<td>Taxing decisions involving new options.</td>
</tr>
<tr>
<td>Paradox</td>
<td>Decisions aimed at finding a path forward based on analysis of all available information.</td>
</tr>
</tbody>
</table>

The neighbourhood interpretation of the dimensions consisted of identifying examples of respondents’ commentary that suggested how each decision-making skill and decision type contributed to each dimension (i.e., dimension 1 as information use and dimension 2 as contextual focus) according to the configurations produced by MDS. The tables in Appendix 5 set out the analysis of respondents’ commentaries showing how particular comments relate to each dimension in each quadrant. A summary of the results of the neighbourhood interpretation is shown in Figure 11 for the configuration of decision-making skills and in Figure 12 for the configuration of decision types.

Respondents’ comments suggested that broad knowledge, vision and forecasting ability helped to guide and predict the consequences of actions, leading to incremental improvements in existing ways of doing things. This suggestion is supported by referring to the results of the neighbourhood interpretation of decision-making skills summarized in Figure 11, toward the exploitation side of the
information use dimension. Toward the exploration side of the information use dimension, comments on creativity, initiative and risk tolerance were around contributing to the exploration of new ways of seeing or doing things. Regarding the internal focus side of the contextual focus dimension, respondents’ comments suggested that delegation and judgement require confidence in one’s internal resources; the ability to delegate the right job, to the right person, the right way, at the appropriate time in the case of delegation, and breadth of experience in the case of judgement. Toward the external context side of the contextual focus dimension, broad knowledge and vision require a depth of field well beyond the self and the organization.

Simple decisions tend to be operational and proscribed by external context (placing them in the lower left quadrant at the external context end of the contextual focus dimension and the efficiency end of the information use dimension). This observation is supported by examining the results of the neighbourhood interpretation of decision types summarized in Figure 12. Trade-off decisions tend to require more internal personal resources in the form of cognitive effort than simple decisions but are also proscribed mainly by external context (placing trade-offs at the midpoint of the contextual focus dimension and toward the exploitation end of the information use dimension). Compromise decisions tend to involve significant cognitive effort and creativity as part of finding a liveable and practical balance among different perspectives (positioning compromise decisions at the midpoint of the information use dimension and very high on the internal perspective side of the contextual focus dimension). Dilemmas demand very significant cognitive resources in an effort to learn and find new ways of doing things (placing dilemmas on the internal perspective end of the contextual focus dimension and on the exploration end of the information use dimension). Finally, paradox decisions require harnessing all available internal and external context to guide the exploration of new opportunities (placing decisions involving paradox at the midpoint of the contextual focus dimension
and toward the exploration end of the information use dimension). Comments such as “dilemma and paradox need time management skills so you don’t get sucked into the vortex” also suggest diminishing returns on effort which may contribute to pushing paradox decisions closer to the midpoint on the contextual focus dimension.

The quadrant-by-quadrant alignment of decision-making skills and decision types with respondents’ descriptions and the MDS configurations not only sheds light on the meaning of the information use and contextual focus dimensions but also provides additional justification for choosing an MDS solution with two dimensions rather than three according to Kruskal and Wish (1978c).

![Derived Stimulus Configuration](image)

**Figure 11 - Neighbourhood interpretation of decision-making skills**
The configuration of decision-making skills and the configuration of decision types shown in Figures 11 and 12 are an amalgam of the perceptions of all respondents. Perceptions, and the way in which the information use and contextual focus dimensions were used by each respondent to make sense of a particular decision situation, varied from respondent to respondent (as indicated by the individual dimension weights in Appendix 4).

5.2.2.2 Dimension Importance

Regarding the importance of these dimensions to decision-maker’s perceptions, the overall importance of the information use dimension is greater than the overall importance of the contextual focus dimension. Based on the value of r-squared calculated by the SPSS INDSCAL routine, the overall importance of the information use and the contextual focus dimensions is 74.29% and 21.68%,
respectively, for mapping decision types in perceptual space, 9.14% and 8.81%, for mapping decision-making skills, and 8.89% and 2.52% respectively for determining the importance to respondents of each decision-making skill in conceptualizing the dimensions. The percentages for overall importance also indicate the amount of variance between respondents explained by each dimension in configuring the different perceptual spaces.

5.2.3 Research Question One – Results
With respect to the first research question, “Which cognitive dimensions do individuals use to differentiate between decisions with and without unresolvable underlying tensions, and how important are these dimensions in their perceptions?” the MDS analysis and subsequent decision of dimensionality and interpretation of configuration dimensions suggest that perceived decision-making skills relevant to making different kinds of decisions have two dimensions: information use, and contextual focus. Information use spans a continuum from using information to support exploitation to using information for exploration purposes. Contextual focus spans a continuum from a focus on exterior context to a focus on interior perspective. The importance of these dimensions in distinguishing paradoxes from other types of decisions is discussed in the subsection on dimension importance above.

5.2.4 Discussion – Research Question One
Humans in general, and decision-makers in particular, tend to be “cognitive misers”, simplifying decision situations and conserving their cognitive resources (Chauhan & Sagar, 2020). The two-dimensional MSDS solution found in this study aligns with this tendency to simplify given the difficulty of grappling with more than two dimensions (as is the case when constructing perceptual maps, for example) (Hodgkinson, 2005). While two dimensions might be insufficient to address decisions involving paradoxical tensions (e.g., triangulation would not be possible; Rerup, 2009; Gibson, 2017), this study shows that two dimensions are sufficient for the purposes of distinguishing decisions on the spectrum of
decision situations from non-paradoxical to paradoxical. This study’s two-dimensional solution also aligns with the two-dimensional Cynefin framework used to identify different types of decisions from simple to complex, and based on observations of management practice at IBM (Snowden & Boone, 2007; Alexander et al., 2018). Further, the two dimensions used in the Cynefin framework are similar to the dimensions identified in this study. The Cynefin dimension concerned with level of abstraction (from high to low) parallels this study’s information use dimension (from exploit to explore) in that the level of creativity and innovation needed for exploration of opportunities requires a high degree of abstraction (Calabretta et al., 2017; Eisenhardt et al., 2010). The Cynefin dimension dealing with the level of information about the external decision context (from high to low e.g., levels of uncertainty and ambiguity) resembles this study’s dimension spanning external to internal contextual focus where decision-making skills such as forecasting and risk tolerance are associated with external focus.

To survive and prosper, organizations must reconcile exploitation with exploration (Farjoun, 2010). Balancing the paradoxical tension between exploitation and exploration is therefore a key concern of organizational decision-makers (Farjoun, 2010). This supports this study’s findings that decision-makers use an exploit-explore dimension to identify different kinds of decisions and skills needed to address them, and that this dimension is the more important of two dimensions. Regarding the different uses of information along the dimension (to fuel exploitation or to support exploration), research on Eastern and Western management paradigms identifies two different kinds of cognition (Li, 2014). Creative cognition is used to explore, and critical cognition is used for exploitation and extension (Li, 2014). That exploitation and exploration use information in different ways is also supported by research on cognitive style (i.e., analytical processing used for exploiting, intuitive processing used for exploring) (Hodgkinson & Healey, 2008; Calabretta et al., 2017; Akinci & Sadler-Smith, 2013) and
mindfulness (i.e., routines and habits associated with exploitation, active thinking and mindfulness associated with creativity and exploration) (Walsh, 1995).

The second dimension used by decision-makers to distinguish different kinds of decisions spans a continuum from a focus on exterior context to a focus on interior perspective. The literature points to several reasons that a concern with contextual focus is important for decision-makers. First, context influences cognition through several means as set out in the literature review. Second, regarding the two poles of the dimension, research on situated cognition shows that if a decision-maker regards the context as safe, they are more likely to employ an internal locus to evaluate stimuli, and when the context is uncertain a decision-maker is more likely to be influenced by external stimuli (Meyer et al., 2010). Third, Internal versus external locus of cognitive processing is a distinguishing feature of cognitive style (Kozhevnikov et al., 2014). Forth, and finally, the contextual focus dimension mirrors the ontological debate about whether paradox is a construction of the mind (i.e., internal focus) or stems from an objective reality that can be discovered (i.e., external focus) (Fairhurst et al., 2016), in so far as decisions with paradox lie opposite simple decisions on the spectrum of decisions in this study. Although this ontological consideration might not drive the contextual focus dimension to the top of a decision-makers mind, one survey respondent commented on the dangers of “over-thinking” lest they get “sucked into the vortex” and other respondents made similar comments.

The observation that balancing stability and change in the form of exploration and exploitation is a key concern for decision makers touching on organizational survival (Farjoun, 2010), and that internal versus external contextual focus is related to matters more within a decision-makers control (e.g., evaluating the decision context in terms of safety and identifying the source of paradoxical tensions; Meyer et al., 2010; Fairhurst et al., 2016) lends support to this study’s finding that the information use dimension (explore versus exploit) is more important than the contextual focus
dimension (internal versus external). This accords with the finding that manager’s deal with matters they consider crucial first, and then allocate their attention to less important issues (Rerup, 2009). In addition, research on cognitive style and level of information processing shows that decision makers can employ different cognitive styles depending on the level of information processing taking place (Kozhevnikov et al., 2014). This opens the possibility that the information use dimension and the contextual focus dimension (both of which are related to cognitive style) operate at different levels of information processing, and that operation at one level could precede and or be more important than operation at another level.

The information use and contextual focus dimensions revealed in this study, and their use by decision-makers, shed light on the literature on decisions involving paradox. The literature recognizes the importance of many kinds of context (e.g., environmental, institutional, organizational, individual context, etc.) in the decision-making process. For decisions involving paradox, at the individual level, the findings of this study suggest that decision-makers do not distinguish between context emanating from external sources, such as background knowledge and the experience needed to predict the consequences of actions, and context that is generated internally, such as judgment and confidence in one’s abilities (e.g., the ability to delegate). This suggestion stems from the observation that decisions involving paradox fall very close to the horizontal axis in Figure 12, where decision-makers may need to attend to all types of context given the amount of information managing paradoxical tensions requires and the position of decision-making skills in Figure 11. The position of different types of decisions in Figure 12 goes on to suggest, however, that perceptions around internal versus external contextual focus in decision-making may have a bearing on how decision-makers recognize paradoxes as distinct from other types of decisions. Taken together, from a theoretical perspective, although the literature distinguishes different kinds of context and stresses the important influence of context on decision-
making, when researching decisions involving paradox, rather than categorizing, specifying or labelling context, it may be more important to ensure that the context being considered is all encompassing.

From a practical perspective, if the objective is to persuade a prospective decision-maker that a particular decision involves paradox, the best approach may be to convince them of the salience of both internal and external context. The position of decisions involving paradox at the exploration end of the information use dimension further indicates that internal and external context should be shown to be not only germane, but of use for exploring new opportunities.

5.2.5 Research Question Two – Results
With respect to the second research question, “To what extent do specific decision-making skills contribute to the cognitive dimensions used by decision makers for differentiating decision types (from those with resolvable to those with unresolvable tensions)?” reference is made to the dimension weights for a two-dimensional MDS solution in Table 7. The dimension weights for each decision-making skill indicate the contribution or importance of that skill for how respondents conceptualize the dimension in question. In turn, the dimensions are used to differentiate between non-paradoxical and increasingly paradoxical decisions on the spectrum of decisions, as pictured in Figure 12.

The need for broad knowledge and the ability to forecast decision consequences contribute the most to the information use dimension as indicated by dimension weights. The neighbourhood interpretation of the information use dimension (see Figures 11 and 12) indicates that operational decisions, such as simple, trade-off, and possibly compromise decisions, require knowledge and judgement skills. In contrast, vision, risk tolerance, time management, delegation and judgement contribute to how the less important contextual focus dimension is construed. In this case, the neighbourhood interpretation indicates that the requirement to focus on personal internal resources, such as judgement and delegation ability for all but the simplest decisions, and on vision, risk
management, and time management for simpler decisions, are the predominant considerations in shaping how the contextual focus dimension is construed. For all but simple decisions on the spectrum of decisions, some level of cognitive effort (i.e., internal contextual focus) is needed to address the decision situation effectively. For simple decisions, decision makers can rely more heavily, on external guidance (i.e., vision), the predictability of external consequences (i.e., risk management), and managing external resources such as time (i.e., time management) to address the decision situation effectively.

The MDS configuration of decision types shows that decision makers use the information use and contextual focus dimensions to differentiate decision types as follows: simple decisions are situated squarely in the exploitation/external context quadrant, trade-off decisions at the border of the exploitation/internal perspectives and exploitation/external context quadrants, compromises at the border of the exploitation/internal perspectives and exploration/internal perspectives quadrants, dilemmas in the exploration/internal perspectives quadrant, and decisions with paradox at the border of the exploration/internal perspectives and exploration/external context quadrants.

5.2.6 Discussion – Research Question Two
This study finds that the need for broad knowledge and the ability to forecast decision consequences contribute most to how decision-makers use the information use dimension to distinguish different kinds of decisions. Respondents described broad knowledge as the possession of background information needed for a decision process, and described the ability to forecast as the ability to predict operational consequences of a decision. Comments by survey respondents such as “If you don’t have a broad knowledge your forecasting ability goes out the window” illustrate how, from a practical perspective, the two decision-making abilities are closely linked. Models of naturalistic decision-making in operational settings describe how decision makers use their experience (i.e., broad knowledge) to speed up their decision process (Shattuck, 2006). When a decision-maker recognizes a decision as
familiar, they base their decision on their previous experience rather than conducting in-depth analyses (e.g., cost benefit, utility) (Shattuck, 2006). Regarding the ability to forecast, research on organizational structure, performance and the environment indicates that unpredictable environments require flexibility to cope with opportunities and ambiguity, while predictable environments favour the use of routines and other structures (Davis et al., 2009).

The literature on broad knowledge and the ability to forecast both point to decision-makers evaluating a decision situation for cues as to whether the situation is one of exploitation or exploration based on their experience with the situation (Shattuck, 2006), and the extent to which they can rely on that experience to predict the consequences of their decision (Davis, Eisenhardt, & Bingham, 2009).

Vision, risk tolerance, time management, delegation, and judgement skills contribute in roughly equal measure to how decision-makers use the contextual focus dimension to distinguish different types of decisions from simple decisions to those involving paradox according to this study. Neighbourhood analysis narrows the number of skills contributing to the contextual focus dimension to judgement and delegation skills for all but simple decisions. Regarding judgement skills, Ivory and Brooks (2018) in a study of corporate sustainability in the face of paradox draw a distinction between simply having knowledge (akin to experience, background or broad knowledge; Shattuck, 2006) and of using that knowledge to make judgements. Judgement, not simply knowledge is required for decisions involving matters of corporate sustainability and paradox (Ivory & Brooks, 2018). This aligns with models of paradoxical cognitive processing where cognition must progress from a level that simply manipulates or navigates information to a level where information is integrated or elevated to higher abstractions in order to address paradox (Pang et al., 2021; van Neerijnen et al., 2021). Regarding delegation skills, a study of lay models of manager effectiveness showed that managers regarded delegation as a skill related to facilitating the efforts of others (Cammock, Nilakant, & Dakin, n.d.) along with training,
consultation, feedback, contact, support, personality, and integrity. Survey respondent’s comments provide a richer understanding of the judgement needed to not only facilitate others, but to do so effectively. The need for judgement in exercising the power to delegate is captured in statements such as “delegation skill becomes... a judgement about how much you could afford to delegate”, “If you delegate it to the wrong person, you’re throwing your opportunity out the window”, and “Failure to delegate properly will always kill you.” Literature and practice therefore support this study’s finding that decision-makers distinguish between simple and paradoxical decisions by assessing the level of judgement and delegation skill needed to address a decision situation. A decision-maker’s assessment of the need for judgement (including the judgement of others to facilitate their action) is a key contributor to the contextual focus dimension and the usefulness of this dimension for assessing the nature of a decision situation, from simple to one involving paradox. The literature and practice on the need for judgement (including the judgement needed for delegation) to address decisions involving paradox effectively accord with this study’s finding that judgement and delegation contribute to the contextual focus dimension. This study contributes a further refinement in that its neighbourhood analysis suggests that the assessed need for judgement and delegation is sufficient to distinguish simple decisions from any other type of decision, from trade-offs to decisions involving paradox.

The remaining decision-making skills contributing to the contextual focus dimension can be viewed as operational in nature, where required cognitive effort is low (Nutt, 1984; Akinci & Sadler-Smith, 2013), and where a high assessed need by decision-makers would indicate a simple decision on the contextual focus dimension (according to the neighbourhood interpretation of decision types). The literature considers vision and visioning a highly strategic activity requiring considerable cognitive effort and creativity (e.g., Nutt, 1984; Amason, 1996; Akinci & Sadler-Smith, 2013; Pang et al., 2021; van Neerijnen et al., 2021). However, comments made by this study’s survey respondents such as “The
better your vision, the simpler it becomes [to make a decision]” and “So part of refreshing vision is also refreshing the team. And it’s good to be clear that you’re either joining the new voyage or you are not on the boat” shed a more operational light on the use of vision. These comments reveal a low level of cognition that exploits paradoxical tensions associated with visioning rather than a higher level of cognition which strives to manage them (Pang et al., 2021; van Neerijnen et al., 2021). Smith and Lewis (2011) in their study of paradox perspective associate risk management, rational decision-making, and concern with finding contingencies reflective of lower level cognition and operational decision-making (Nutt, 1984; Pang et al., 2021; van Neerijnen et al., 2021). Finally, time management (i.e., personal organization) is included in a group of abilities viewed by managers as critical for operational management (Cammock, Nilakant, & Dakin, n.d.). The group includes decisiveness, prioritizing, and problem solving (Cammock, Nilakant, & Dakin, n.d.). In conjunction with how respondents interpreted decision-making skills and abilities, these considerations within the literature support the findings of this study regarding the contribution of vision, risk tolerance, and time management skills to the contextual focus dimension. By revealing an operational aspect of vision and visioning, this study suggests an opportunity to conduct research to elaborate the dynamic that makes visioning an operational activity.

The perceptual maps shown in Figures 11 and 12 illustrate how survey respondents used the information use and contextual focus dimensions to make sense of different decision-making skills and decision types respectively. Respondents’ ability to identify and order different kinds of decisions based on the degree to which they contain features of paradox aligns with the literature establishing the link between decision types (i.e., simple, complicated and complex, Alexander et al., 2018; Nutt, 1984; Robert N. Anthony, 1965 in Edwards et al., 2000; Herbert A. Simon, 1997 in Edwards et al., 2000) and level of cognition in the paradoxical cognitive processing model (i.e., information navigation, contextual consideration, and paradoxical cognitive processing, Pang et al., 2021; van Neerijnen et al., 2021).
Together, the respondents’ cognitive dimensions, descriptions of skills in Table 8 and decisions in Table 9, and the literature linking levels of cognition and levels of decision-making provide a tool for classifying simple to complex decisions (i.e., a framework for decision-making) equivalent to the Cynefin framework but derived from theory rather than practice. Future research with a larger and more diverse survey sample could confirm the dimensions and solidify the perceptual maps from this study.

5.3 QUALITATIVE DATA

Qualitative data consisted of recorded comments made by respondents as they completed the survey during an in-person interview. Comments for 25 decision-makers were transcribed and linked to the survey questions that elicited them. Comments of a general nature on the need for a particular decision-making skill were gathered under the survey item introducing the skill in question. Only in one or two instances did respondents who were interviewed express the feeling that a particular survey item might have been outside their range of experience. However, when provided with the appropriate context for the item (e.g. context provided by other respondents in other interviews, such as descriptions of skills or examples of decision types), the survey items were brought into range. As a group, the interviewed respondents gave thoughtful responses and appeared to make every effort to respond to the best of their ability. Finally, the difference in some cases and the similarity in others between respondents’ answers to the same survey items were striking but did not appear to follow any pattern.

5.3.1 Qualitative Analysis

This section of the results chapter describes the results of qualitative analysis and how they address the third research question in this study. Respondents’ comments during in-person administration of the decision scenario portion of the survey were coded according to the coding manual in Appendix 3, Coding Manual. As coding proceeded, certain sub-themes were identified. Accordingly, the “contextual consideration” theme was further broken down into “prudence, practicality and realism” and “conflict
between self and decision context” sub-themes. Similarly, the “making connections” theme was broken down into “relevance,” “new ideas/ new ways,” “heuristics and analogies,” and “integration” sub-themes. The results of the coding procedure are summarized in Table 10 and explained more fully in the following section. Tables setting out the detailed coding results for each decision scenario can be found in Appendix 6.

### Table 10 - Summary of coded decision scenario comments

<table>
<thead>
<tr>
<th>Comments coded toward Contextual Consideration (stage 2)</th>
<th>Comments coded approximately midway between Paradoxical Cognitive Processing (stage 3) and Contextual Consideration (stage 2)</th>
<th>Comments coded at Paradoxical Cognitive Processing (stage 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategic Planning</strong></td>
<td><strong>Visioning</strong> (comments between stage 3 &amp; 2)</td>
<td><strong>Marketing</strong> (comments between stage 3 &amp; 2)</td>
</tr>
<tr>
<td>(most comments below stage 3)</td>
<td><strong>Organizational Change</strong> (comments between stage 3 &amp; 2)</td>
<td><strong>HR Planning</strong> (comments all at stage 3)</td>
</tr>
<tr>
<td>Performance Measures (most comments below stage 3)</td>
<td><strong>Integration</strong> (comments between stage 3 &amp; 2)</td>
<td></td>
</tr>
<tr>
<td>Budgeting (most comments below stage 3)</td>
<td><strong>New Ideas/ New ways</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Integration</strong></td>
<td><strong>Heuristics and analogies</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Relevance</strong></td>
<td><strong>Heuristics and analogies</strong></td>
<td></td>
</tr>
<tr>
<td><strong>New Ideas/ New ways</strong></td>
<td><strong>Oneness</strong> (profound)</td>
<td></td>
</tr>
<tr>
<td><strong>Integration</strong></td>
<td><strong>Heuristics and analogies</strong></td>
<td></td>
</tr>
<tr>
<td><strong>New Ideas</strong> (Staging)</td>
<td><strong>Heuristics and analogies</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Integration</strong></td>
<td><strong>New Ideas/ New ways</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Heuristics and analogies</strong></td>
<td><strong>Self vs context tension</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Self vs context tension</strong></td>
<td><strong>Dynamic</strong></td>
<td><strong>Prudence</strong></td>
</tr>
<tr>
<td><strong>Prudence</strong></td>
<td><strong>Integration</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Self vs context tension</strong></td>
<td><strong>Prudence</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Making distinctions</strong></td>
<td><strong>Self vs context tension</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Exploit tension to achieve strategic goals</strong></td>
<td><strong>Self vs context tension</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Exploit tension to achieve strategic goals</strong></td>
<td><strong>Self vs context tension</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Exploit tension to achieve strategic goals</strong></td>
<td><strong>Self vs context tension</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Exploit tension to achieve strategic goals</strong></td>
<td><strong>Self vs context tension</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Key**
- **Stage 3** – Paradoxical Cognitive Processing
- **Stage 2** – Contextual Consideration
- **Stage 1** – Information Navigation

5.3.2 Research Question Three

This subsection sets out the results of the thematic coding analysis to address the third research question; “How do decision scenarios differ from a cognitive perspective when paradoxical tensions are different from scenario to scenario?” This research question was addressed through the thematic coding
analysis of comments made by respondents during the in-person administration of the study survey and associated with each decision scenario. Following the trans-paradox model (Pang et al., 2021) and the model of top management team paradoxical processes (van Neerijnen et al., 2021) (figure 4 shows how these cognitive models are reflected in the decision-making model for this study), the coding analysis revealed that commentaries associated with different decision scenarios manifest different levels of cognitive processing, from contextual consideration to paradoxical cognitive processing. Table 10 groups the decision scenarios under three headings: comments coded toward contextual consideration (stage 2), comments coded approximately midway between paradoxical cognitive processing (stage 3) and contextual consideration (stage 2), and comments coded at paradoxical cognitive processing (stage 3). The grouping is based on a visual inspection of the number of comments falling into each level of the paradoxical cognitive processing model for each scenario. This visual approach to grouping scenarios was considered appropriate after the example of Pradies et al., (2023). All the comments for the HR planning scenario were deemed to be associated with paradoxical cognitive processing (i.e., full engagement with paradoxical tensions). Comments for the visioning, organizational change, and marketing decision scenarios were deemed to be associated with cognitive processing between paradoxical processing and contextual consideration (i.e., akin to the acknowledgement of paradoxical tensions but just short of full engagement). Comments for strategic planning, performance measurement, and budgeting scenarios were deemed to be associated predominantly with contextual consideration (i.e., akin to recognition of paradoxical tensions with little or no attempt to engage with them). None of the scenarios contained a preponderance of comments suggesting information navigation (i.e., a lack of awareness of paradoxical tensions).
5.3.2.1 Engage with, Acknowledge or Ignore Paradoxical Tensions

The literature review supports the notion that in order to address paradoxical decisions successfully, a deviation from the norm of ignoring underlying paradoxical tensions is required to trigger a cognitive progression from information navigation through contextual consideration to paradoxical cognitive processing involving significant abstraction, integration and a “oneness” perspective. The sample size of 39 respondents proved to be too small to identify any significant pattern between the deviation scales and the level of engagement with paradoxical tensions in the decision scenarios. In addition, correlation analysis did not uncover any patterns between deviation scales, decision scenarios and how respondents used cognitive dimensions (using the ratio of respondents’ dimension weights). The few significant correlations that were found, particularly between decision-making skills, aligned well with descriptions of the skills provided by respondents and the results of multidimensional scaling but did not suggest any predictors of engagement with paradoxical tensions. Thematic coding of the comments associated with the decision scenarios, however, suggested that for certain scenarios at least, the necessary cognitive progression from contextual consideration to cognitive paradoxical processing may not have taken place (i.e., the cognition necessary for engaging with paradoxical tensions). By objective standards, the respondents were all very experienced decision-makers and, in addition, rated their ability to be decisive as high. They were confronted with decision scenarios that were deliberately designed to involve different sets of situation-specific paradoxical tensions. Yet, although underlying paradoxical tensions may have been acknowledged (as indicated by contextual consideration in the thematic analysis), full engagement with paradoxical tensions likely only took place in the HR decision scenario.

Although the interpretation of thematic coding results suggests that from a cognitive perspective, respondents engage fully with the paradoxical tensions in the HR decision scenario, from a
behavioural standpoint, the HR decision scenario did not obtain the highest cumulative score when ranked against the other scenarios (i.e., for the HR scenario, respondents did not select the most effective option, option 3, the most number of times compared to the other scenarios). In other words, their thought did not follow their action.

5.3.2.2 Unequal Paradoxes

The commentary associated with the decision scenarios suggests that respondents perceived each decision scenario differently and consequently employed different levels of cognition depending on the scenario. The HR scenario elicited comments suggesting full engagement with underlying paradoxical tensions and hence the strong likelihood of a successful decision outcome over the long-term. The visioning, organizational change and marketing decision scenarios represented a second, lower tier of engagement with tensions, likely just short of the level needed to address these situations effectively. The strategic planning, performance measurement, and budgeting scenarios represented a third and lowest tier of engagement at a level unlikely to produce an enduring successful outcome.

Multidimensional scaling results also suggest that as engagement declines, there is a shift towards a perception of information being needed for more exploitative and operational purposes (i.e., away from exploration and opportunity seeking) and for the focus on decision context to move towards a more internal perspective (i.e., away from a more balanced marshalling of all available resources both internal and external).

5.3.3 Discussion – Research Question Three

The TMT paradox management model of van Neerijnen et al., (2021) and the transparadox model of Pang et al. (2021) postulate that decision-makers learn from their experience and the experience of others to whom they are exposed. Accordingly, learning results in reframing paradoxical decisions in a way that allows full engagement with underlying paradoxical tensions (Pang et al., 2021; van Neerijnen
et al., 2021). This postulate aligns with the finding in this study that all respondents showed some degree of engagement with the paradoxical tensions presented in the decision scenarios (i.e., deviated from the decision-making norm) given that all respondents were experienced, successful managers.

Further supporting the findings of this study, the BIS/BAS theory of motivation proposes a relationship between anxiety and the inhibition of behaviour such as engagement with paradox (Carver & White, 1994; Fowles, 1980). In Lüscher & Lewis’ (2008) study of sense-making involving paradox, it was determined that familiarity with paradox reduces anxiety. It follows, therefore, that the behaviour of engaging with paradox would be less inhibited for experienced compared to novice decision-makers. Although all respondents demonstrated some degree of engagement with paradoxical tensions, as a group and individually they engaged with some tensions more than others. This confirms the literature establishing that decision context has a profound effect on decision-making (e.g., affecting perception, Hutzschenreuter & Kleindienst, 2006; influencing sense-making, Morgeson et al., 2015; constraining freedom, Morgeson et al., 2015; affecting uncertainty, Milkman, 2012; establishing values, Morgeson et al., 2015; Meyer et al., 2010; influencing attention (Fiske & Taylor, 2016; and triggering emotions, Elsbach et al., 2005; Dunning et al., 2017), not just for individuals but also for groups. The differences found in level of engagement across decision scenarios also accords with the call for research on different kinds of paradox beyond the often studied explore-exploit paradox, with a view to extending existing paradox theory to other kinds of paradox. This call for research acknowledges that responses to other paradoxes may differ.

In setting out their framework for decision-making, Snowden and Boone (2007) provide three illustrations of how humans complicate the decision-making environment based on the literature and practice. First, humans can have multiple identities and can switch between them, so values, beliefs, expectations, etc. involved in decision-making can change and be in conflict. Second, humans assume
the past will predict the future, and as a result their decision-making is illogical and opaque. Third, as a way to avoid addressing underlying problems, humans can change their environment to achieve a stable equilibrium. Fundamentally, human intellect makes them unpredictable. This line of reasoning helps to explain why respondents engaged most with the paradoxical tensions in the HR scenario. Experienced managers would be quick to recognize the HR scenario as paradoxical (compared to other scenarios which do not focus on the management of human resources directly) and would have learned to engage fully with the paradoxical tensions at play to achieve success (Pang et al., 2021; van Neerijnen et al., 2021).

Additionally, from the perspective of event theory (Morgeson et al., 2015), only the HR decision scenario qualifies as a simulated event on the grounds that respondents’ comments indicated a possible discontinuity in decision-making (i.e., full engagement with paradoxical tensions). The explanation for the discontinuity may be that, more than any of the other scenarios, the HR scenario is almost exclusively focused on human relations, emotions, and unpredictable behaviours in line with the examples from Snowden and Boone (2007). The level of complexity and the visceral qualities of the paradoxical tensions involved in the HR decision scenario, therefore, are probably more apparent to respondents than in the other decision scenarios (i.e., more salient) (Morgeson et al., 2015; Fiske & Taylor, 2016; Johns, 2017). From a cognitive perspective, this means that decision-makers could use emotions as a common denominator for comparing fundamentally dissimilar and irreconcilable paradoxical tensions (Västfjäll et al., 2016) in a way that allows them to engage fully with paradoxical tensions, to address them effectively through abstraction or finding new ways of seeing or doing (Smith, 2014). This line of reasoning suggests that an unmediated (i.e., emotional) understanding of paradoxical tensions helps to ensure full engagement and that one way to achieve this is to highlight the human aspects of a decision situation.
The understanding of, and full engagement with, paradoxical tensions in the HR decision scenario also reflects how decision-makers make sense of the decision situation in terms of the information use and contextual focus dimensions. As the decision scenario involving the most recognizable paradoxical tensions, and considering its position on the perceptual map shown in Figure 12, the HR decision scenario represents an end point on the decision spectrum where tensions are recognized as persistent and unresolvable. According to the information use dimension, decision-makers see a need to use information for exploring new opportunities rather than using it to apply what may have worked in the past. On the contextual focus dimension, the HR decision scenario reflects receptiveness to all possible sources of contextual guidance, including internal, personal sources (e.g., judgment and delegation ability) and external organizational sources (e.g., vision, broad knowledge and forecasts). Bounded rationality (Hosseini, 2003; Tomer, 2007) may explain why decision-makers, faced with the high demand for cognitive resources imposed by a paradox, call on external sources of context to support limited internal perspectives (i.e., moving to the midpoint on the contextual focus dimension). The simplified perception of the remaining scenarios as compromises or dilemmas, suggested by thematic coding, could perhaps also be explained as a way for decision-makers to stay within the limits of their bounded cognitive abilities.

The seeming lack of correspondence between the thematic analysis and the ranking of decision scenarios according to their cumulative scores may be explained in part by the presence of respondents who were unable to make a decision because a scenario was out of the range of convenience (Fransella & Bannister, 1977; Robinson & Bennet, 1995) or all choices were equally appealing, and their response was awarded a zero (two zeros in the marketing scenario, and two zeros in the visioning scenario out of 39 respondents). There are, however, several more significant influences that may have obscured the link between thought and action. Some of these factors are included in the decision model (e.g., the
emergent property of complexity within context and cognition, Schad et al., 2016; so-called “paradexity” or the combination of complexity and paradox, Howard, 2010; and the organizational chaos that can accompany paradox, Schad et al., 2016), making it difficult to predict the outcome of a decision process based on the kind of cognition involved. This unpredictability means that while decision-makers may engage with paradoxical tensions on a cognitive level, on a behavioural level, they may make decisions that do not address paradoxical tensions effectively (unlike the HR decision scenario where tensions were addressed fully). The anomie theory of devi- ation suggests the reverse is also possible, although probably unlikely. According to the theory (Faßauer, 2018), the benefits of a “strong” context conducive to engaging with paradox (e.g., the disruption caused by an imbalance between means and ends typical of paradoxes) may outweigh the dis-benefits of unfavourable cognition (e.g., less than full paradoxical cognitive processing, “isolation” and other biases, and faulty “mental accounting”) resulting in a decision that addresses paradox effectively almost by chance. On a more profound level, organizational disruption may shift the decision norm away from ignoring paradoxical tensions to engaging with them and, from a decision-maker’s perspective, may shorten the duration of any negative decision consequences. Given such a shift in the norm, the theory of planned behaviour (Paul et al., 2016) could help explain why a decision-maker might address paradoxical tensions effectively yet make no recourse to paradoxical cognitive processing. The change in norm, coupled with a false perception of control (i.e., a false perception of the paradox as a compromise or a dilemma), could be enough to motivate a good decision for the wrong reason. Finally, from the literature on deviation, as the level of engagement declines, so does the need to depart from organizational norms of decision-making (Harper, 1997; Nutt, 1984; Nutt, 2004; Pederezini, 2017), providing decision-makers with an incentive not to engage with paradoxical tensions, conserving cognitive resources (Smith, 2014).
5.4 INTEGRATION

This section integrates the results of applying multidimensional scaling methods to the quantitative data and results from the application of thematic coding methods to the qualitative data. The integration method uses a joint display arrangement to layer qualitative information about levels of cognition for each decision scenario together with quantitative cognitive dimensions and the configuration of decision types (extending the approach of Dickson et al., 2011 in Guetterman et al., 2015).

5.4.1 Connecting Cognition Types and Decision Types to Scenario Responses

The information provided in Table 11 documents the link between decision types, decision scenarios and level of cognition in the paradoxical cognitive processing model, drawing from the literature and from the findings of this study as indicated in the table. In particular, comments associated with the HR planning scenario indicate an association with complex decisions, and commentary associated with the remaining decision scenarios aligns with complicated decisions. None of the decision scenarios have comments that would indicate an alignment with simple decisions.

**Table 11 - Links between decision type, decision scenarios and levels of cognition**

<table>
<thead>
<tr>
<th>Linkage</th>
<th>Analytical Lens</th>
<th>Decision Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>This type of decision...</td>
<td>Decision type (from the literature)</td>
<td>Simple – low in ambiguity/uncertainty (Snowden, 2002; Alexander et al., 2018)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Complicated – Complicated decisions lie between simple and complex decisions (Snowden, 2002; Alexander et al., 2018).</td>
</tr>
<tr>
<td></td>
<td>Decision spectrum type (from section)</td>
<td>Complex – high in ambiguity/uncertainty (Snowden, 2002; Alexander et al., 2018; Gemi &amp; Hauschildt, 1985).</td>
</tr>
<tr>
<td></td>
<td>Simple – tensions clearly resolvable</td>
<td>Trade-off, compromise and dilemma lie between simple</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Paradox – tensions clearly unresolvable</td>
</tr>
<tr>
<td>Linkage</td>
<td>Analytical Lens</td>
<td>Decision Type</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------</td>
<td>---------------</td>
</tr>
<tr>
<td>2.4.6)</td>
<td>Decision level (from the literature)</td>
<td>and paradox on the spectrum.</td>
</tr>
<tr>
<td></td>
<td>Operational decisions - involving the management of day-to-day activities, simple (Alexander et al., 2018; Edwards et al., 2000; Amason, 1996; Nutt, 1984; Robert N. Anthony, 1965 in Edwards et al., 2000; Herbert A. Simon, 1997 in Edwards et al., 2000) Repeated decisions (Waldman et al., 2018, 2019).</td>
<td>Tactical decisions lie between the strategic and operational level, requiring the setting of targets and criteria to achieve goals.</td>
</tr>
<tr>
<td>Requires this type of cognition...</td>
<td>Type of cognition required (from the literature)</td>
<td>Stage 1 cognition (perceive, analyze, decode) (Pang et al., 2021; van Neerijnen et al., 2021) Not much abstraction, creativity, innovation needed (Snowden, 2002; Alexander et al., 2018; Edwards et al., 2000; Amason, 1996; Nutt, 1984; Alós-Ferrer, 2018; Akinci &amp; Sadler-Smith, 2013)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associated with this kind of commentary...</td>
<td>Type of scenario commentary</td>
<td>No scenario coded to Stage 1 cognition</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linkage</td>
<td>Analytical Lens</td>
<td>Decision Type</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------</td>
<td>---------------</td>
</tr>
<tr>
<td>(from section 5.3.1)</td>
<td>Budgeting (coded toward Stage 2 cognition); Visioning, Organizational change, Marketing (coded between Stage 2 and 3 cognition)</td>
<td><strong>Table 11</strong> links complicated decisions with stage 1 and stage 2 cognition and complex decisions with stage 1, 2 and 3 cognition. Meanwhile, the spectrum of decision-making types places decisions involving paradox as the most complex of decisions. The level of cognition manifested by HR decision scenario comments in <strong>Table 10</strong> suggests, therefore, that this scenario is perceived as the most complex decision scenario and that it requires engaging fully with paradoxical tensions such as those found in decisions with paradox. The level of cognition manifested for the remaining scenarios in <strong>Table 10</strong> is below that of the HR planning scenario, at a level that is appropriate for complicated but not complex decisions, according to <strong>Table 11</strong>. <strong>Table 10</strong> suggests that there are two lower-level groupings of complicated decision scenarios. The level of cognition manifested in comments associated with the...</td>
</tr>
</tbody>
</table>
visioning, organizational change and marketing decision scenarios in Table 10 suggests they correspond to complicated decisions such as dilemmas, where tensions may be acknowledged but are believed to be resolvable (according to the characteristics of dilemmas in the decision spectrum shown in Table 1). The level of cognition manifested in comments associated with the strategic planning, performance measurement and budgeting decision scenarios suggests they also correspond to complicated decisions but at a lower cognition level than that required to address dilemmas, namely compromises (where tensions are acknowledged but characteristically viewed as resolvable and of limited duration). The joint display of quantitative and qualitative results in Figure 13 aligns decision scenarios and highlights from the thematic coding analysis with the position of decisions involving paradox, dilemmas, and compromises in the configuration of decision types.

Figure 13 - Joint display of coded scenario commentary and group configuration of decisions
Compromise, dilemma and paradox are increasingly complex decisions with an increasing number of characteristics of paradox. As decision-making cognition moves from stage 1 through to stage 3 in the model of paradoxical cognitive processing, respondents (i.e., decision-makers) engage more fully and more effectively with unresolvable paradoxical tensions in each decision scenario. Therefore, the HR planning decision scenario, with all its associated commentary coded to stage 3 or paradoxical cognitive processing, is positioned next to paradox in the configuration. Similarly, the decision scenarios with comments coded more or less evenly across stage 2, stage 2 and stage 3 are positioned next to dilemma in the configuration. Finally, the decision scenarios where comments fell more heavily towards stage 2 were placed next to compromise in the configuration.

5.4.2 Dynamics of Paradoxical Decision-making
This section shows the results of mapping the decision scenarios from Figure 13 onto the MDS configuration of decision-making skills (Figure 11) to illustrate a progression from lower to higher levels of cognition and changes in the need for certain decision-making skills associated with increasingly complex scenarios. For the purposes of presenting the joint display of level of cognition and the skills needed for each scenario scenarios seen as trade-offs by respondents are considered to lie in the top left quadrant (internal perspective and exploitation on the cognitive dimensions), and scenarios seen as compromises and paradoxes are considered to lie in the top right quadrant (internal perspective and exploration on the cognitive dimensions) respectively on the basis of their proximity to these quadrants, descriptions of decisions provided by respondents, and results of the thematic analysis of comments related to decision scenarios.

5.4.2.1 The Wheel of Cognition and the Configuration of Decisions
Tracking the progression of cognition from lower to higher levels on the joint display of scenario commentary and group configuration of decisions, as shown in Figure 14, results in a circle or wheel
centred at the origin. Progress through the different levels of cognition in the paradoxical cognitive processing model begins in the lower left quadrant with simple decisions and proceeds clockwise through trade-offs and compromises, ending in the lower right quadrant with paradoxes (see Table 11 for the link between cognition and decision types). As complexity increases, cognition progresses into the top left quadrant (internal perspective and exploitation on the cognitive dimensions). Cognition progresses next to the top right quadrant containing compromises, dilemmas and paradoxes. The slight repositioning of these decisions in the matrix for the purposes of this discussion means that the three groupings of decision scenarios (aligned to these decisions based on the results of thematic coding analysis) are all found in the top right quadrant.

Figure 14 - Wheel of cognition and approach to addressing paradoxical tensions
5.4.3 Discussion – Integration of Qualitative and Quantitative Results

Figure 13 aligns decision scenarios and highlights from the thematic coding analysis with the position of decisions involving paradox, dilemmas, and compromises in the configuration of decision types. According to Personal Construct Theory (PCT), individuals use personal constructs to understand “elements” (i.e., this study’s decision types in the spectrum of decisions) (Dagnino & Cinici, 2016) and position these elements in perceptual space (Hodgkinson, 2005). The perceptual maps shown in Figures 11, 12 and 13 are proxies for the outcome of this cognitive process (Hodgkinson, 2005). How respondents applied the dimensions is also revealed in the groupings of scenarios according to the level of cognition manifested in their comments as set out in Table 10. Accordingly, it is possible to propose a reconstruction of how respondents used the information use and contextual focus dimensions to position each scenario in their minds. Respondents may be construing strategic planning, performance measurement, and budgeting paradoxes to be largely operational (i.e., toward stage 2 cognitive processing in Table 10), not heavily imbued with emotional complexity, but complex enough to require significant judgment (i.e., toward the internal perspective end of the contextual focus dimension on Figure 13). Any failings in the outcomes of these paradoxical decision situations are likely not attributed to a lack of full engagement on the part of decision-makers or the decision-making process. Visioning, organizational change, and marketing scenarios may contain sufficient indirect links to human considerations (e.g., aspirations and motivations in the case of visioning, employee resistance in the case of organizational change, and customer and stakeholder relations in the case of marketing) that paradoxical tensions are more apparent and better understood than in the previous tier (i.e., strategic planning, performance measurement, and budgeting scenarios), but not quite enough to elicit full engagement and paradoxical cognitive processing interpreting from their position on Figure 13. Failings in these decision situations may be particularly hard to diagnose as there may be a sense on the part of decision-makers that they understood the true depths and complexities of what they were confronting.
on the one hand, and on the other, a sense of surprise the outcomes weren’t better. Ironically, a high degree of perplexity may be a good indicator that decision-makers are on the right track when it comes to dealing with decision situations involving paradox (Smith, 2014). In the case of the HR scenario, the paradoxical complexities are immediately understood, there is full engagement and paradoxical cognitive processing (i.e., coded to paradoxical cognitive processing in Table 10), and decision-makers sense the need for both internal, personal context and external organizational context to find new ways to address tensions or rise above them (i.e., from an interpretation of the position of these scenarios in Figure 13). The alignment of paradoxical decision scenarios to less paradoxical decision types (i.e., with fewer distinguishing characteristics of paradox, coded to groups with less than full engagement in Table 10, and situated on Figure 13 in other than the position for decisions with paradox), such as dilemmas and compromises, is not unexpected, as the spectrum of decisions is designed to cover the range of decisions that decision-makers might consider paradoxical (Fairhurst et al., 2016; Harbour & Kisfalvi, 2012).

Applying the line of reasoning used to interpret Figure 13 to the display of levels of cognition in Figure 14, cognition progresses from lower to higher levels of processing to deal with increasingly complex decision-making. This progression is reflected as an orderly movement from quadrant to quadrant within a two-dimensional matrix. This accords with the reinforcing cycle of the trans-paradox model, Pang et al., 2021, and the spiral of knowledge creation in Snowden’s (2002) framework for decision-making. In the lower left quadrant of Figure 14 (external context and exploitation on the cognitive dimensions), information navigation (i.e., the first level of cognition in the paradoxical cognitive processing model) is sufficient for addressing decisions effectively because there are no paradoxical tensions. In the upper left quadrant, trade-offs can be dealt with effectively using information navigation and contextual focus (i.e., the first and second levels of cognition in the
paradoxical cognitive processing model). In upper right quadrant, effective decision-making requires all three levels of cognition in the paradoxical cognitive processing model. In the lower right quadrant, all three levels of cognition in the paradoxical cognitive processing model would be required based on the projected path of the decision types in the spectrum, the interpretation of the cognitive dimensions, and the pattern of cognition found in the literature. If this logic holds, then the top right and bottom right quadrants share the same kinds of cognition. Further, given the way respondents' comments referred to the use of higher-level abstractions and continuous adjustments when talking about the decision scenarios (i.e., the two ways in which the literature suggests paradoxes can be addressed effectively, Smith, 2014; Pang et al., 2021; van Neerijnen et al., 2021), it may be that what distinguishes the top right and bottom right quadrants is which one of the two main approaches to addressing paradox a decision-maker chooses. The configuration of decision-making skills suggests that abstraction may take place in the top right quadrant, and finding new ways, new perspectives, and other adjustments take place in the lower right quadrant (refer to the detailed discussion on the approach to decision-making in each quadrant, below). Finally, if there is a distinction in cognition between the top right and bottom right quadrants, it appears that the bottom right quadrant is largely unexplored cognitive territory. Perhaps this quadrant is reserved for decisions with paradoxes that involve protected or sacred values that are somehow more complex and challenging than what might be considered more standard decisions involving paradox since it has already been suggested in this study that not all decisions involving paradox are equal.

The progression of cognition through the decision spectrum, the positioning of the decision types and decision scenarios on the configuration of decisions, and the configuration of decision-making skills, together lead to speculation regarding how decision-makers might attempt to address decisions in each quadrant of the MDS solution. In the lower-level quadrant, decision-makers might address simple
decisions by implementing routines and using heuristics based on knowledge/ experience and guided by vision and forecasts. Decision-makers would address paradox poorly in this quadrant if they exploit tensions, focusing on external context. In the top left quadrant, decision-makers might use judgement and delegation ability to address compromises and trade-offs effectively. But decision-makers would address decisions involving paradox poorly in this quadrant if they rely solely on making distinctions based on judgement and focusing on internal perceptions. In the top right quadrant, decision-makers might address decisions involving paradox effectively by using initiative and creativity to integrate tensions through abstraction. In this quadrant, a focus on internal perceptions might foster the process of abstraction to find an effective way to deal with paradoxical tensions. In the bottom right quadrant, decision-makers might address decisions involving paradox effectively by using risk tolerance and the ability to manage time effectively to explore new ways of doing things, aided by a focus on external opportunities. For example, risk tolerance and time management in the bottom right quadrant would be critical skills in a chaotic situation requiring improvisation to manage paradoxical tensions. This kind of argument aligns with categorization theory which suggests that the different quadrants of the configuration represent different cognitive categories for grappling with decisions. Further, the dimensions which separate the different quadrants and kinds of cognition may act as perceptual breakpoints, providing decision-makers with a means of simplifying decision situations and remaining within their bounded cognition. Figure 14 summarizes this discussion regarding cognition in each quadrant and the two approaches to addressing paradoxical tensions effectively.

Bearing in mind the discussion and conjecture on how respondents in this study made sense of decisions involving paradox, what could explain the behaviour of the head of the committee (the head) in the vignette, who made a decision involving paradox in two minutes or less? Possible explanations include: the head used the information use and contextual focus dimensions differently than survey
respondents and in a way that caste the decision as a simple decision (i.e., the head was solution-centered and used what worked before; Nutt, 1984); the head used the dimensions to recognize a decision with paradox but rather than engage and risk being overwhelmed, chose to act quickly (i.e., given insufficient cognitive resources, any decision was better than no decision; Fiske & Taylor, 2016); recognizing paradox, the head chose to improvise and engage gradually (i.e., act quickly, learn about the paradox and engage over time; Lê & Pradies, 2023); the head let analysts engage with the paradox but did not engage with the analysts (i.e., an example of the effect of unequal power distribution; Berti & Simpson, 2021); the head was insulated from the consequences of not engaging and therefore not motivated to engage (i.e., temporal separation of tensions, coupled with no fear of punishment, Chapardar, 2016; Carver & White, 1994); the analysts supporting the head failed to consider the whole context (i.e., the all-encompassing context including the head’s human qualities, Bednarek & Smith, 2023; Snowden & Boone, 2007), and; the head engaged with paradoxical tensions underlying the decision but exercised free will to chart their own course (i.e., head was expressing free will, Newark, 2018). Future research may be able to answer the question of how best to support decisions involving paradox. Does presenting paradox to a decision-maker such as the head engender a paradox mindset and engagement with paradoxical tensions? The vignette illustrates where this was not the case. Would a process that led the head to discover paradoxical tensions themselves, in a simulation for example, trigger engagement? Such a process would take time, but it might succeed according to Miron-Spektor, et al., (2018).

6.0 CONCLUSIONS
This study was motivated by the need to understand better why seasoned decision-makers sometimes fail to address complex decisions effectively. In addition, the need to study decision scenarios with a variety of paradoxical tensions has been highlighted in the literature. While many factors help explain
poor decision-making, this study explored decision-maker’s perceptions of different decision types and decision-making skills and how they might apply in decision situations involving different types of paradoxical tensions. This chapter responds to the motivations behind this study, addressing the research questions, setting out contributions and limitations, and finally suggesting research that might be undertaken in the future.

The first research question asks: “Which cognitive dimensions do individuals use to differentiate between decisions with and without unresolvable underlying tensions, and how important are these dimensions in their perceptions?” The interpretation of this study’s multidimensional scaling results suggests that decision-makers perceive skills relevant to making different kinds of decisions in two dimensions: information use and contextual focus. Regarding the importance of these dimensions in their perceptions, the information use dimension is considerably more important than the contextual focus dimension. The information use dimension appears to span a continuum from using information to support exploitation to using information for exploration purposes. The contextual focus dimension appears to span a continuum from a focus on exterior context to a focus on interior perspective. The information use and contextual focus dimensions were used to construct cognitive maps of the relative position of decision types and decision-making skills in group cognitive space. The choice of a two-dimensional interpretation is supported by the fact that the configuration of decision types is a very good fit in two dimensions, and the two dimensions exhibit considerable stability.

The second research question asks: “To what extent do specific decision-making skills contribute to these cognitive dimensions for differentiating decision types (from those with resolvable to those with unresolvable tensions)?” Multidimensional scaling produces dimension weights which indicate the contribution of each decision-making skill to the information use and contextual focus dimensions. The interpretation of these weights suggests that the need for broad knowledge and the ability to forecast
decision consequences contribute the most to the information use dimension. Meanwhile, the need for vision, risk tolerance, time management ability, delegation ability, and judgement contribute more to the contextual focus dimension. The need for initiative and creativity contributes to both dimensions.

The third research question asks: “How do decision scenarios differ from a cognitive perspective when paradoxical tensions are different from scenario to scenario?” This question was addressed through the interpretation of qualitative data produced by thematic coding of respondents’ comments associated with each decision scenario in the study survey. The interpretation suggests that respondents’ commentaries manifest different levels of cognitive processing, from contextual consideration to paradoxical cognitive processing, following the trans-paradox model (Pang et al., 2021) and the model of top management team paradoxical processes (van Neerijnen et al., 2021), depending on the paradoxical tensions embedded in the decision scenario. Decisions with paradox involving strategic planning, performance measurement, and budgeting evoke comments coded toward contextual consideration (stage 2 of the cognitive processing model). Decisions with paradox involving vision, organizational change, and marketing evoke comments coded roughly midway between contextual consideration and paradoxical cognitive processing (i.e. stages 2 and 3 of the cognitive processing model). Decisions with paradox involving HR (human resources) evoke comments coded to paradoxical cognitive processing (stage 3 of the cognitive processing model) exclusively. These findings suggest that not all paradoxical tensions are perceived as equally paradoxical, as only the HR decision scenario evoked comments that consistently manifested the level of cognition needed to address paradoxical tensions effectively. The conjecture is that respondents engaged fully with the paradoxical tensions in the HR decision scenario. A further conjecture based on the level of cognition manifested in the remaining decision scenario comments is that other scenarios were not perceived as purely paradoxical. Finally, there are indications from the joint display of quantitative and qualitative results
that initiative and creativity are used for engaging, abstracting and integrating paradoxical tensions, and risk tolerance and time management are used for exploring new ways of doing things and new opportunities. These two approaches to dealing effectively with paradoxical tensions lie in adjacent quadrants of the joint display but share the same kind of cognitive processing (i.e., all the stages in the paradoxical cognitive processing model). This implies that a distinction yet to be discovered exists in paradoxical cognitive processing associated with abstracting and finding new ways and perspectives.

Although it may be tempting to predict the effectiveness of decision-making involving paradox based solely on the level of cognition involved, engagement with paradoxical tensions on a cognitive level is not the sole predictor of effective decision-making. It is probably fair to say that less than full engagement with paradoxical tensions decreases the likelihood of effective decision-making but doesn’t preclude it. In order to predict decision-making behaviour more precisely, it would be necessary to consider all the variables in the decision-making model.

6.1 CONTRIBUTIONS

From the perspective of theory, this study makes four contributions. First, it offers a theoretical framework of deviant and non-deviant decision-making involving paradox (i.e., engaging with or ignoring paradoxical tensions, respectively), beyond explore-exploit, with rational and emotional components. At the highest level, the framework consists of a decision path comprised of a decision-maker’s cognitive starting point, a decision-making event where deviation may or may not occur, and a decision outcome. As the framework gains detail, it sets out a decision-making cycle focused on individual decision-making processes and structures embedded in a decision-making context. At the lowest level, key variables associated with decision processes, decision-specific context, outputs, and implementation are included. The dynamics of the cognitive components of the model are captured separately in the idea of a cognitive wheel where decisions involving paradox are associated with
different levels of cognition. This kind of framework, including the cognitive wheel, could contribute to the eventual development of a predictive model of full engagement with paradoxical tensions (i.e., deviant decision-making in the face of paradox). Second, this study proposes a spectrum of decisions with an increasing number of characteristics of paradoxical tension. Simple decisions with none of the characteristics of paradoxical tension lie at one extreme of the spectrum, and decisions with all the characteristics of paradoxical tensions lie at the other extreme. The decision types on the spectrum (i.e., simple, trade-off, compromise, dilemma, and paradox) are described in the language used by decision-makers. The even distribution of different decisions across the information use dimension (on the configuration of decision types) lends credence to the names and descriptions of decisions and their placement on the spectrum of decisions. Third, theorists may benefit from the elaboration of the link between thought and action in decision-making, the elucidation of distinctions between simple, complicated and complex decisions, and the derivation of thematic codes to explore decision-making from a cognitive perspective. Fourth and finally, this study addressed a gap in the literature by shedding light on different kinds of paradoxical tensions beyond the often-cited explore versus exploit paradox (Pang et al., 2021; Smith, 2014).

Concerning practice, this study suggests a number of techniques that might improve both individual and organizational performance through better decision-making. First and foremost, clarifying the human relations aspect of a decision situation involving paradox is likely to help trigger the kind of cognition needed to address paradoxical tensions effectively. Next, invoking the concept of controlled cognition, revealing to decision-makers that not all paradoxical tensions may be perceived as paradoxical, and providing concrete examples of this phenomenon, might be expected to raise decision-maker’s overall awareness of all kinds of tensions by improving their attention, “volitional control” and reducing decision-making biases (Harper, 1997; Fiske & Taylor, 2016; Malmström et al., 2015;
Fredrickson, 1984; Eranova & Prashantham, 2014; Eisenhardt et al., 2010). Finally, according to contextual antecedents and implementation components of the decision model, familiarizing decision-makers with the two most common ways of addressing paradox effectively (i.e., finding high-level abstractions and seeking new ways and perspectives) may equip decision-makers with the means and the justification for making better decisions. The Dynamic Equilibrium Model of Organizing (Smith & Lewis, 2011) and Ivory and Brook’s (2018) concept of strategic sensitivity suggest that together, the practices for dealing with paradox supported by this study at the individual level could lead to organization-level acceptance of a “consistently inconsistent” management strategy for dealing effectively with paradoxical tensions. A possible mechanism might be that as individual engagement with paradoxical tensions increases, tailored strategies for recognizing and managing paradox at the organizational level develop through organizational discourse, improving organizational effectiveness, adaptability, and ultimately the chances of long-term survival. The most significant gains would likely be associated with innovation, change, leadership, and governance processes where decisions involving paradox predominate.

Finally, this study makes three methodological contributions. First, it adds to the body of methodological practice on applying the RGT for exploring management cognition. In particular, this study provides an example of using multi-dimensional scaling to produce representations of decision-makers’ cognition based on responses to survey items. When using this technique, however, it is difficult to know which cognitive processes are triggered when a manager responds to a survey item or a decision scenario. This study provides a model of how the description of cognition associated with survey responses can be improved using a modified “think out loud” procedure, where respondents’ comments are recorded during in-person interviews structured around the administration of the survey. Second, this study suggests that explore versus exploit paradoxes, which have almost become a
standard for studies of paradox, are perhaps not the best research subject from the standpoint of clarity. This suggestion is based on the finding that paradoxical tensions in an HR decision scenario may have been more clearly perceived than is the case for paradoxical tensions in an explore versus exploit scenario. Third, regarding research into particular decision types, this study identified a unique opportunity to compare trade-off and paradox decision types because they are similar on the contextual focus dimension yet different on the information use dimension.

6.2 LIMITATIONS

The most impactful limitation of this study is its small sample size. Although the sample size of 39 survey respondents falls within the range of samples subjected to multidimensional scaling cited in the literature, in this case, the sample size proved to be too small and perhaps too uniform to produce statistically significant results or to be generalizable to a broader context. Some characteristics of the sample, in particular those that were not interviewed, are unknown as the study survey did not collect information on age, gender, ethnicity, or cultural background. The effects of a small sample may have been exacerbated by the inherent complexity and subtlety of the decision-making cognition being investigated.

Attempts were made in the course of designing this study to mitigate four additional limitations. First, this study focuses on a single decision. Most managers face several decisions simultaneously. However, asking managers to consider several different decisions simultaneously would make it difficult, if not impossible, to identify the thinking associated with any particular decision. The study survey does not require respondents to reflect on any particulars of co-occurring decisions, maintaining respondents’ focus on the decision in question, but it does not prohibit respondents from thinking about peripheral decisions, particularly during the decision scenario section of the survey.
Second, an established link exists between thought and action. This study depends almost entirely on the efficacy of the RGT to extract, obtain, and represent ongoing thoughts associated with decision-making. A large body of practice indicates the suitability of the technique for this study but also cautions that results are exploratory in nature and need to be interpreted with care. In addition, this study uses scenarios as a proxy for decisions in an organizational setting. The scenarios are informed by the literature on decision theory, case studies, and recommended scenario structures in an effort to be as realistic and understandable as possible. Regardless, this study rests on the ability of managers to imagine details and create a richness equivalent to real decisions.

Third, the idea of creativity and innovation as a kind of positive deviance is gaining acceptance in the academic community. The literature recognizes, however, that deviation and deviance still carry negative connotations. As a result, measures of dysfunctional deviance included in the study survey may be subject to a response bias, with managers hesitating to provide truthful and candid responses. To mitigate this possible bias, scales measuring antecedents of deviance were also included in the survey as they are less likely to produce negative associations.

Fourth and finally, paradox remains latent until a manager becomes aware of at least two contributing paradoxical tensions. From a manager’s perspective, a latent paradox could appear identical to a trade-off, compromise, or dilemma. This study is limited, therefore, in its ability to discern latent paradoxical decisions masquerading as non-paradoxical decisions. However, in line with this study’s epistemological view, critical realism, how a manager classifies a decision within the context of a survey scenario is less important than how that manager thinks about that decision. This aligns with my own behaviourist leanings and work as a practitioner, leaving me more attuned to behavioural contingencies (i.e., context) than to underlying psychological processes. A researcher with a more
constructivist world view, for example, might devise methods to examine the thought processes behind integration of paradoxical tensions and abstraction of tensions to higher levels.

6.3 FUTURE RESEARCH

From a methodological perspective, this study points to two possible avenues of research in the future related to the sample. The first would be to increase the sample size to a point that might produce statistically significant results. The second would be to increase the diversity of the sample by removing the restriction that decision-makers be experienced senior managers. There is a sense gained from this study of senior managers that they are predisposed to engaging fully with paradoxical tensions (i.e., deviating from the decision-making norm of ignoring paradoxical tensions). It would be interesting to investigate whether or not less experienced decision-makers are similarly predisposed.

Also, from a methodological perspective, three particulars of the survey might benefit from a closer examination. First, the comments from respondents to the term “vision” in the repertory grid section of the survey suggest that it might usefully be revised, perhaps to the term “visioning.” Second, and more challenging as a research topic, would be to investigate the possibility that the wording of the decision scenarios produced an artifact rather than a result. Specifically, it would be helpful to establish if there is something in the description of the HR decision scenario that makes its paradoxes clearer to respondents than paradoxes in the other decision scenarios. Finally, the repertory grid section of the survey asked respondents to rate all the decision types against the need for each decision-making skill as part of the same question. In future, respondents may find it easier to rate one decision type against all the decision-making skills, improving the ability of multidimensional scaling techniques to configure decision-making skills and calculate dimension weights.
The study raises four questions regarding cognition theory for further exploration. First, is there a relationship between how decision-makers use the cognitive dimensions in this study and cognitive predispositions (e.g., rational versus intuitive cognitive style and other dual-mode cognition, paradoxical mindset, entrepreneurial mindset, and apposite design mindset)? For example, might rational-style decision-makers be more comfortable in the “exploitation-external context” quadrant of the wheel of cognition, and intuitive-style managers tend to operate in the “exploration-internal perspective” quadrant? If so, how do decision-makers of either style become drawn to the centre of the contextual focus dimension, which this study suggests favours effective decision-making involving paradox? It might be possible to design “cognitive ergonomics” and establish somatic markers which guide this movement toward the centre, building on the appraisal tendency framework. Second, and related to the first question, do decision makers use the cognitive dimensions suggested by this study as perceptual breakpoints, allowing decision situations to be simplified in response to bounded cognition? Third, is there a distinction in the cognitive paradoxical processing required for abstracting paradoxical tensions to a higher level and that needed to address paradoxical tension by finding new ways of doing or seeing things? This is equivalent to asking if there is a difference between the cognition used in the top right compared to the bottom right quadrants of the configurations produced by multidimensional scaling in this study. Fourth, and related to the third question, do decision-makers perceive any types of decisions that might fall within the bottom right quadrant of the configuration of decisions, where information is used for exploration, and the contextual focus is on external perspectives? For the moment, at least, from the perspective of experienced decision-makers, this appears to be unexplored cognitive territory.
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## APPENDIX 1 – DETAILED TABLES: DECISION SPECTRUM FOR PARADOX

### Table i – References by articles to terms associated with paradox

<table>
<thead>
<tr>
<th>Focus of Ordering/ Differentiation of Terms Mentioned (Author(s))</th>
<th>Terms Associated with Paradox in Order of Mention</th>
<th>Term Characteristics/ Description</th>
</tr>
</thead>
</table>
| **1. Conceptualization of competing demands**  
(Gaim & Wåhlin, 2016) | Trade-off | Trade-off: Tensions are mutually exclusive. More of one means less of the other. |
| | Dilemma | Dilemma: Respond to competing demands by choosing one over the other, compromising. |
| | Dialectic | Dialectic: An attempt is made to resolve competing demands (thesis and anti-thesis) by integrating them. However, the integration gives rise to a new thesis and corresponding anti-thesis. |
| | Duality | Duality (listed after dialectic in the original paper): Competing demands are resolved by balancing simultaneous tensions. |
| | Paradox | Paradox: Persistent, simultaneous, contradictory demands co-exist. Respond to competing demands by engaging both, synthesizing. |
| **2. “Cognitively or socially constructed polarities”**  
(Lewis, 2000) | Continua, Dilemma, Trade-off | Continua, dilemmas, trade-offs: Tensions are related but separate. Response may require slight alteration of solutions that worked in the past. |
| | Paradox | Paradox: Tensions appear separate but are one and the same. Response may require rethinking of past solutions. |
| **3 “Definitions of constructs”**  
<p>| | Dualism | Dualism: Mutually exclusive opposites produce stress. |
| | Duality | Duality: Interdependent, overlapping opposites produce stress. |</p>
<table>
<thead>
<tr>
<th>Contradiction</th>
<th>Contradictions: interdependent opposites that can negate each other.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dialectics</td>
<td>Dialectics: the interplay of opposites that implicate each other.</td>
</tr>
<tr>
<td>Paradox</td>
<td>Paradox: persistent, unified opposites that appear mutually exclusive.</td>
</tr>
</tbody>
</table>

**4 How a broad range of tensions is experienced.**
(Miron-Spektor, et al., 2018)

<table>
<thead>
<tr>
<th>Tension, Dilemma, Trade-off</th>
<th>Tension: Tensions are experienced as dilemmas that require trade-offs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paradox</td>
<td>Paradox: Tensions are experienced as competing, interwoven opportunities for learning.</td>
</tr>
</tbody>
</table>

**5 Differences in interdependent contradictions.**
(Schad, et al., 2016)

<table>
<thead>
<tr>
<th>Duality</th>
<th>Duality: Dualities focus on the inseparability of tensions (e.g. defined in relation to one another) and less on contradictions, inconsistencies, and conflicts.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dialectics</td>
<td>Dialectics: Opposing tensions (thesis and anti-thesis) interact to form a synthesis. The synthesis spawns an anti-thesis. The original (i.e., underlying) tension may be resolved through synthesis.</td>
</tr>
<tr>
<td>Paradox</td>
<td>Paradox: Similar to dialectics, but the underlying tension remains even as a synthesis and new anti-thesis form.</td>
</tr>
</tbody>
</table>

**6 Distinguishing between contradictory inter-related tensions.**
(Smith, 2014)

<table>
<thead>
<tr>
<th>Dilemma</th>
<th>Dilemma: Dilemmas involve trade-offs that can be resolved with either/or decisions.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paradox</td>
<td>Paradox: Contradictory, interrelated tensions persist and cannot be resolved.</td>
</tr>
</tbody>
</table>

**7 “Relationships between competing demands”**
(Smith & Tracey, 2016)

<table>
<thead>
<tr>
<th>Dilemma, Trade-off, Dichotomy</th>
<th>Dilemma, Trade-off, dichotomy: Tensions are contradictory but not interdependent. Tensions can be resolved by making a choice.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contradiction</td>
<td>Contradiction: Tensions are oppositional but not inter-related.</td>
</tr>
</tbody>
</table>
Dialectic: Contradictory tensions are interrelated but change with time.

Paradox: Tensions are oppositional and inter-related. Initial tensions persist without changing.

**8 Managing opposing tensions. (Wright, 2015)**

<table>
<thead>
<tr>
<th>Term or strategy associated with paradox</th>
<th>Order in which terms are presented by authors in the discussion of paradoxical situations (numbers indicate the order of mention of a term within an article)</th>
<th>Mention per 9 articles (a mention counts as 1 in this column)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tension</td>
<td>1 1 1 1 1 1 1 1 1</td>
<td>3</td>
</tr>
<tr>
<td>Trade-off</td>
<td>1 1 1 1 1 1 1 1 1</td>
<td>5</td>
</tr>
<tr>
<td>Continua</td>
<td>1 1 1 1 1 1 1 1 1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>-------------</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Dilemma</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Dialectic</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Duality</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Dualism</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Paradox</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Conflict</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Contradiction</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Dichotomy</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Competing Demands</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Number of terms or groups of terms in an article’s range.**

| 5 | 2 | 6 | 2 | 3 | 2 | 4 | 2 | 4 |
APPENDIX 2 – STUDY SURVEY

Letter of Invitation and Consent

Title: Unresolvable Tensions During Decision-making: Engage or Ignore?

(date)

Hello,

You are invited to participate in a study exploring how perceptions of decisions affect decision-making behaviour. The study is being conducted by Paul Hope (pauljhope@cmail.carleton.ca), a Ph.D. student at the Sprott School of Business, Carleton University, under the supervision of Prof. Linda Schweitzer. The objective of this research is to improve organizational and individual decision-making.

Participation in this study will involve two tasks. First, you will be asked to complete an online survey to gather your perceptions of different kinds of decisions. The survey should take no more than 30 minutes to complete. As part of this survey, you will be presented with decision scenarios and asked to make decisions. Second, you will be asked to forward this Letter of Invitation and Consent to up to five of your colleagues and professional contacts.

All aspects of this study are completely voluntary. If you volunteer to be in this study, you may choose to skip any of the survey questions or withdraw completely from the study at any time during the month after your survey is completed by contacting Paul Hope at pauljhope@cmail.carleton.ca. If you choose to withdraw, all the information you have provided will be destroyed. If you choose to participate, your survey responses will be recorded as data along with a code indicating the URL used to access the survey. All data will be treated as confidential and held securely by the principal researcher and will not be accessible to others. Only the researcher will be aware of your participation in this study, and no individual responses will be disclosed to anyone at any time. As a further privacy safeguard, if you prefer, you may contact Paul Hope directly at pauljhope@cmail.carleton.ca using your personal rather than work email to receive a link to the study survey. The data will be used for academic research and information dissemination on decision-making.

The researcher does not foresee any risks or discomforts associated with participating in the survey. This research focuses on perceptions and decisions in various situations. As such, participants will have the
opportunity to contribute to knowledge in this area and help individuals and organizations develop situation-appropriate decision strategies.

This research has been cleared by Carleton University Research Ethics Board (A) Clearance # 115797.

Should you have any ethical concerns with the study, please contact the REB Chair, Carleton University Research Ethics Board-A (by phone: 613-520-2600 ext. 2517 or by email: ethics@carleton.ca). For all other questions about the study, please contact the researcher at pauljhope@cmail.carleton.ca.

sincerely,

Paul Hope

CONSENT OF RESEARCH PARTICIPANT

I am aware that should I have any questions about the study or concerns about my involvement, I can contact the researcher, Paul Hope, at pauljhope@cmail.carleton.ca.

I have read the information provided for the study Unresolvable Tensions During Decision-making: Engage or Ignore? as described herein.

I voluntarily agree to complete the online survey and forward the email invitation to participate in this study to up to five of my colleagues and professional contacts.

Yes

No

Introduction
I very much appreciate that you have agreed to help me explore the decision making process in a variety of organizational situations by completing this survey.

**Three things:**

Although this survey may take between 20 and 25 minutes of your time to complete, please remember that an average organizational decision process is estimated to take 12 months. As you respond to the questions, you are contributing to a powerful set of data that will help improve our collective understanding of decision making. Finally, your response to this survey is anonymous. However, you can have access to the suggestions for improving decision making stemming from this study by sending me an email at pauljhope@cmail.carleton.ca.

**For 24 hours from the time you start the survey, you can leave and come back to the survey as many times as you wish. Your progress will be saved.**

Thank you in advance for your valuable feedback!

**Block 1 – Demographics and Respondent Attributes**

Please help me to understand a little more about you and your organizational background by answering the following the questions.

Q001 Please describe your educational background (e.g. highest certificate, diploma, or degree achieved and area of specialization, if any).

Q002 Please indicate the functions you carry out in your current position.
Q003 Please indicate how long you have held your current position.

One year or less (1)
One to five years (2)
More than five years (3)

Q004 Please indicate your employment status.

Full-time (1)
Part-time (2)

Q005 Please indicate the basis of your employment.

Salary (1)
Contract (2)
Other (3)

Q006 Please indicate the title that comes closest to describing your job.

Manager/Supervisor (1)
Advisor/Analyst (2)
Specialist/Expert (3)

Q007 Please indicate the extent to which you have engaged in the following behaviours in your work.

Departed from rules in order to perform your job. (1)

Departed from organizational policies or procedures to solve a problem. (6)

Departed from rules in order to satisfy a customer's needs. (7)

Reported a wrongdoing to co-workers to bring

▼1 (never) (1) ... 7 (daily) (7)
about a positive organizational change. (8)

Did not follow instructions in order to perform more efficiently. (9)

Disagreed with others in order to improve current work procedures. (10)

Taken an additional or longer break than is acceptable at your workplace. (11)

Put little effort into your work. (12)

Acted rudely toward someone at work. (13)

Pursued innovative activities even against organizational resistance. (14)

Q008 Please indicate the extent to which the following statements describe your organizational life.

I believe that higher risks are worth taking for higher rewards. (15)

I like to take chances, although I may fail. (16)

I like to implement a plan only if it is very certain that the plan will work. (17)

I care about what others think of me. (18)

I talk up my organization to my friends as a great organization to work for. (19)

I would be very happy to spend the rest of my career with my organization. (20)

I could just as well be working for a different
organization as long as the type of work was similar. (21)

I take tough decisions. (22)

I assume responsibility for decisions. (23)

I get to the root of problems quickly. (24)

I am flexible and easy to reason with. (25)

I am comfortable dealing with conflicting demands at the same time. (26)

accurate description) (7)

▼1 (very inaccurate description) (1) ... 7 (very accurate description) (7)

▼1 (very inaccurate description) (1) ... 7 (very accurate description) (7)

▼1 (very inaccurate description) (1) ... 7 (very accurate description) (7)

▼1 (very inaccurate description) (1) ... 7 (very accurate description) (7)

▼1 (very inaccurate description) (1) ... 7 (very accurate description) (7)

Q009 Please indicate the extent to which the following statements describe your organization.

Decisions aimed at exploiting opportunities are more common than decisions aimed at resolving crises. (28)

Long term goals and strategies are emphasized more frequently than the immediate future. (29)

My organization is highly diversified and operates in unrelated industries. (30)

There is very little my company can do in order to change the rules of competition in our industry. (31)

▼1 (very inaccurate description) (1) ... 7 (very accurate description) (7)

▼1 (very inaccurate description) (1) ... 7 (very accurate description) (7)

▼1 (very inaccurate description) (1) ... 7 (very accurate description) (7)

▼1 (very inaccurate description) (1) ... 7 (very accurate description) (7)

Q010 Please indicate the extent to which the following statements describe your work.
In my work, I need to be original while avoiding mistakes. (32)

In my work, I need to gain new skills while relying on my existing skills. (33)

In my work, I need to compete and cooperate with others. (34)

▼ 1 (very inaccurate description) (1) ... 7 (very accurate description) (7)

▼ 1 (very inaccurate description) (1) ... 7 (very accurate description) (7)

▼ 1 (very inaccurate description) (1) ... 7 (very accurate description) (7)

Block 2 – Decision Descriptions
Let's take a moment to consider different kinds of decisions you might typically face in your organization.

**Q011 Simple decisions** do not require you, the decision maker, to address interrelated tensions. An example might be a "go / no go" decision to release or delay funds for a priority depending on the projected need for resources. If you would find it helpful, name a simple decision from your own experience in 5 or 6 words using the space below.

Q012 **Trade-offs** require you to make a choice between competing tensions (i.e. ultimately favouring one tension), where more of one means less of the other(s). By making a clear choice, you appear to resolve the tensions. An example might be a win-lose decision where two priorities require funding but there are only enough resources to meet the needs of one. If you would find it helpful, name a trade-off from your own experience in 5 or 6 words using the space below.

Q013 **Compromises** require you to balance co-existing tensions by weighing different aspects of each. You may be unclear whether or not these tensions can in fact be resolved. An example might be a decision regarding a reporting strategy that must provide sufficient detail to identify problems, but at the same time needs to reveal broad trends. If you would find it helpful, name a compromise from your own experience in 5 or 6 words using the space below.

Q014 **Dilemmas** require you to try to resolve competing tensions, each with advantages and disadvantages, by making challenging either/or choices to reach one preferred alternative. It is possible, however, that the tensions cannot in fact be resolved. An example might be a decision between maintaining and upgrading a computer program. If you would find it helpful, name a dilemma from your own experience in 5 or 6 words using the space below.
Q015 Paradoxes require you to address unresolvable tensions that are interrelated, contradictory, simultaneous, and persistent. Examples of paradoxes include decisions to explore opportunities versus exploit existing advantages, integrate globally versus adapt locally, and maximize profit versus improve social welfare. If you would find it helpful, name a paradox from your own experience in 5 or 6 words using the space below.

Block 3 – Initiative

Let's take a moment to consider the skills and abilities needed to address different kinds of decision situations.

For your reference here is a table summarizing the key characteristics of the kinds of decisions we are considering.

<table>
<thead>
<tr>
<th>Decision</th>
<th>Description of Underlying Tensions</th>
<th>The Example from Your Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple</td>
<td>Clearly resolvable.</td>
<td>Piped text from Q011</td>
</tr>
<tr>
<td>Trade-off</td>
<td>Tending toward resolvable.</td>
<td>Piped text from Q012</td>
</tr>
<tr>
<td>Compromise</td>
<td>May or may not be resolvable.</td>
<td>Piped text from Q013</td>
</tr>
<tr>
<td>Dilemma</td>
<td>Tending toward unresolvable.</td>
<td>Piped text from Q014</td>
</tr>
<tr>
<td>Paradox</td>
<td>Unresolvable.</td>
<td>Piped text from Q015</td>
</tr>
</tbody>
</table>
Q016 Please indicate how much **initiative** you feel is needed to tackle each kind of decision. Please rate the different decisions based on your current experience with decisions, not "what should be."

<table>
<thead>
<tr>
<th>Type of Decision</th>
<th>Initiative Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>A simple decision</td>
<td>▼1 (no initiative) 1 ... 7 (significant initiative) (7)</td>
</tr>
<tr>
<td>A trade-off</td>
<td>▼1 (no initiative) 1 ... 7 (significant initiative) (7)</td>
</tr>
<tr>
<td>A compromise</td>
<td>▼1 (no initiative) 1 ... 7 (significant initiative) (7)</td>
</tr>
<tr>
<td>A dilemma</td>
<td>▼1 (no initiative) 1 ... 7 (significant initiative) (7)</td>
</tr>
<tr>
<td>A paradox</td>
<td>▼1 (no initiative) 1 ... 7 (significant initiative) (7)</td>
</tr>
</tbody>
</table>

Block 4 – Creativity
For your reference here is a table summarizing the key characteristics of the kinds of decisions we are considering.

<table>
<thead>
<tr>
<th>Decision</th>
<th>Description of Underlying Tensions</th>
<th>The Example from Your Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple</td>
<td>Clearly resolvable.</td>
<td>Piped text from Q011</td>
</tr>
<tr>
<td>Trade-off</td>
<td>Tending toward resolvable.</td>
<td>Piped text from Q012</td>
</tr>
<tr>
<td>Compromise</td>
<td>May or may not be resolvable.</td>
<td>Piped text from Q013</td>
</tr>
<tr>
<td>Dilemma</td>
<td>Tending toward unresolvable.</td>
<td>Piped text from Q014</td>
</tr>
<tr>
<td>Paradox</td>
<td>Unresolvable.</td>
<td>Piped text from Q015</td>
</tr>
</tbody>
</table>

Q017 Please indicate how much creativity you feel is needed to tackle each kind of decision. Please rate the different decisions based on your current experience with decisions, not "what should be."

A **simple decision** requiring you to address clearly resolvable tensions (e.g. go/no go funding). (1) ▼1 (no creativity) (1) ... 7 (significant creativity) (7)

A **trade-off** requiring you to address tensions that may be resolvable (e.g. win/lose between priorities). (2) ▼1 (no creativity) (1) ... 7 (significant creativity) (7)

A **compromise** requiring you to address vague or unclear tensions (e.g. balancing aspects of a situation such as detailed versus high-level reporting). (3) ▼1 (no creativity) (1) ... 7 (significant creativity) (7)

A **dilemma** requiring you to address tensions that may be unresolvable (e.g. a difficult choice such as maintain or upgrade equipment). (4) ▼1 (no creativity) (1) ... 7 (significant creativity) (7)

A **paradox** requiring you to address clearly unresolvable tensions (e.g. explore/exploit). (5) ▼1 (no creativity) (1) ... 7 (significant creativity) (7)

Block 5 – Vision
For your reference here is a table summarizing the key characteristics of the kinds of decisions we are considering.

<table>
<thead>
<tr>
<th>Decision</th>
<th>Description of Underlying Tensions</th>
<th>The Example from Your Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple</td>
<td>Clearly resolvable.</td>
<td>Piped text from Q011</td>
</tr>
<tr>
<td>Trade-off</td>
<td>Tending toward resolvable.</td>
<td>Piped text from Q012</td>
</tr>
<tr>
<td>Compromise</td>
<td>May or may not be resolvable.</td>
<td>Piped text from Q013</td>
</tr>
<tr>
<td>Dilemma</td>
<td>Tending toward unresolvable.</td>
<td>Piped text from Q014</td>
</tr>
<tr>
<td>Paradox</td>
<td>Unresolvable.</td>
<td>Piped text from Q015</td>
</tr>
</tbody>
</table>

Q018 Please indicate how much vision you feel is needed to tackle each kind of decision. Please rate the different decisions based on your current experience with decisions, not "what should be."

A **simple decision** requiring you to address clearly resolvable tensions (e.g. go/no go funding). (1) ▼1 (no vision) (1) ... 7 (significant vision) (7)

A **trade-off** requiring you to address tensions that may be resolvable (e.g. win/lose between priorities). (2) ▼1 (no vision) (1) ... 7 (significant vision) (7)

A **compromise** requiring you to address vague or unclear tensions (e.g. balancing aspects of a situation such as detailed versus high-level reporting). (3) ▼1 (no vision) (1) ... 7 (significant vision) (7)

A **dilemma** requiring you to address tensions that may be unresolvable (e.g. a difficult choice such as maintain or upgrade equipment). (4) ▼1 (no vision) (1) ... 7 (significant vision) (7)

A **paradox** requiring you to address clearly unresolvable tensions (e.g. explore/exploit). (5) ▼1 (no vision) (1) ... 7 (significant vision) (7)

Block 6 – Broad Knowledge
For your reference here is a table summarizing the key characteristics of the kinds of decisions we are considering.

<table>
<thead>
<tr>
<th>Decision</th>
<th>Description of Underlying Tensions</th>
<th>The Example from Your Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple</td>
<td>Clearly resolvable.</td>
<td>Piped text from Q011</td>
</tr>
<tr>
<td>Trade-off</td>
<td>Tending toward resolvable.</td>
<td>Piped text from Q012</td>
</tr>
<tr>
<td>Compromise</td>
<td>May or may not be resolvable.</td>
<td>Piped text from Q013</td>
</tr>
<tr>
<td>Dilemma</td>
<td>Tending toward unresolvable.</td>
<td>Piped text from Q014</td>
</tr>
<tr>
<td>Paradox</td>
<td>Unresolvable.</td>
<td>Piped text from Q015</td>
</tr>
</tbody>
</table>

Q019 Please indicate how much **broad knowledge** you feel is needed to tackle each kind of decision. Please rate the different decisions based on your current experience with decisions, not "what should be."

A **simple decision** requiring you to address clearly resolvable tensions (e.g. go/no go funding). (1)

A **trade-off** requiring you to address tensions that may be resolvable (e.g. win/lose between priorities). (2)

A **compromise** requiring you to address vague or unclear tensions (e.g. balancing aspects of a situation such as detailed versus high-level reporting). (3)

A **dilemma** requiring you to address tensions that may be unresolvable (e.g. a difficult choice such as maintain or upgrade equipment). (4)

A **paradox** requiring you to address clearly unresolvable tensions (e.g. explore/exploit). (5)

Block 7 – Forecasting Ability
For your reference here is a table summarizing the key characteristics of the kinds of decisions we are considering.

<table>
<thead>
<tr>
<th>Decision</th>
<th>Description of Underlying Tensions</th>
<th>The Example from Your Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple</td>
<td>Clearly resolvable.</td>
<td>Piped text from Q011</td>
</tr>
<tr>
<td>Trade-off</td>
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<tr>
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</tr>
<tr>
<td>Dilemma</td>
<td>Tending toward unresolvable.</td>
<td>Piped text from Q014</td>
</tr>
<tr>
<td>Paradox</td>
<td>Unresolvable.</td>
<td>Piped text from Q015</td>
</tr>
</tbody>
</table>

Q020 Please indicate how much forecasting ability you feel is needed to tackle each kind of decision. Please rate the different decisions based on your current experience with decisions, not "what should be."

A **simple decision** requiring you to address clearly resolvable tensions (e.g. go/no go funding). (1)

A **trade-off** requiring you to address tensions that may be resolvable (e.g. win/lose between priorities). (2)

A **compromise** requiring you to address vague or unclear tensions (e.g. balancing aspects of a situation such as detailed versus high-level reporting). (3)

A **dilemma** requiring you to address tensions that may be unresolvable (e.g. a difficult choice such as maintain or upgrade equipment). (4)

A **paradox** requiring you to address clearly unresolvable tensions (e.g. explore/exploit). (5)

Block 8 – Risk Tolerance
For your reference here is a table summarizing the key characteristics of the kinds of decisions we are considering.

<table>
<thead>
<tr>
<th>Decision</th>
<th>Description of Underlying Tensions</th>
<th>The Example from Your Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple</td>
<td>Clearly resolvable.</td>
<td>Piped text from Q011</td>
</tr>
<tr>
<td>Trade-off</td>
<td>Tending toward resolvable.</td>
<td>Piped text from Q012</td>
</tr>
<tr>
<td>Compromise</td>
<td>May or may not be resolvable.</td>
<td>Piped text from Q013</td>
</tr>
<tr>
<td>Dilemma</td>
<td>Tending toward unresolvable.</td>
<td>Piped text from Q014</td>
</tr>
<tr>
<td>Paradox</td>
<td>Unresolvable.</td>
<td>Piped text from Q015</td>
</tr>
</tbody>
</table>

Q021 Please indicate how much **risk tolerance** you feel is needed to tackle each kind of decision. Please rate the different decisions based on your current experience with decisions, not "what should be."

A **simple decision** requiring you to address clearly resolvable tensions (e.g. go/no go funding). (1)

- ▼1 (no risk tolerance) (1) ... 7 (significant risk tolerance) (7)

A **trade-off** requiring you to address tensions that may be resolvable (e.g. win/lose between priorities). (2)

- ▼1 (no risk tolerance) (1) ... 7 (significant risk tolerance) (7)

A **compromise** requiring you to address vague or unclear tensions (e.g. balancing aspects of a situation such as detailed versus high-level reporting). (3)

- ▼1 (no risk tolerance) (1) ... 7 (significant risk tolerance) (7)

A **dilemma** requiring you to address tensions that may be unresolvable (e.g. a difficult choice such as maintain or upgrade equipment). (4)

- ▼1 (no risk tolerance) (1) ... 7 (significant risk tolerance) (7)

A **paradox** requiring you to address clearly unresolvable tensions (e.g. explore/exploit). (5)

- ▼1 (no risk tolerance) (1) ... 7 (significant risk tolerance) (7)

Block 9 – Time Management Skill
For your reference here is a table summarizing the key characteristics of the kinds of decisions we are considering.

<table>
<thead>
<tr>
<th>Decision</th>
<th>Description of Underlying Tensions</th>
<th>The Example from Your Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple</td>
<td>Clearly resolvable.</td>
<td>Piped text from Q011</td>
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<tr>
<td>Trade-off</td>
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<tr>
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<tr>
<td>Dilemma</td>
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<td>Piped text from Q014</td>
</tr>
<tr>
<td>Paradox</td>
<td>Unresolvable.</td>
<td>Piped text from Q015</td>
</tr>
</tbody>
</table>

Q022 Please indicate how much time management skill you feel is needed to tackle each kind of decision. Please rate the different decisions based on your current experience with decisions, not "what should be."

A simple decision requiring you to address clearly resolvable tensions (e.g. go/no go funding). (1)

A trade-off requiring you to address tensions that may be resolvable (e.g. win/lose between priorities). (2)

A compromise requiring you to address vague or unclear tensions (e.g. balancing aspects of a situation such as detailed versus high-level reporting). (3)

A dilemma requiring you to address tensions that may be unresolvable (e.g. a difficult choice such as maintain or upgrade equipment). (4)

A paradox requiring you to address clearly unresolvable tensions (e.g. explore/exploit). (5)

Block 10 – Delegation Skill
For your reference here is a table summarizing the key characteristics of the kinds of decisions we are considering.

<table>
<thead>
<tr>
<th>Decision</th>
<th>Description of Underlying Tensions</th>
<th>The Example from Your Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple</td>
<td>Clearly resolvable.</td>
<td>Piped text from Q011</td>
</tr>
<tr>
<td>Trade-off</td>
<td>Tending toward resolvable.</td>
<td>Piped text from Q012</td>
</tr>
<tr>
<td>Compromise</td>
<td>May or may not be resolvable.</td>
<td>Piped text from Q013</td>
</tr>
<tr>
<td>Dilemma</td>
<td>Tending toward unresolvable.</td>
<td>Piped text from Q014</td>
</tr>
<tr>
<td>Paradox</td>
<td>Unresolvable.</td>
<td>Piped text from Q015</td>
</tr>
</tbody>
</table>

Q023 Please indicate how much **delegation skill** you feel is needed to tackle each kind of decision. Please rate the different decisions based on your current experience with decisions, not "what should be."

A **simple decision** requiring you to address clearly resolvable tensions (e.g. go/no go funding). (1) ▼1 (no delegation skill) (1) ... 7 (significant delegation skill) (7)

A **trade-off** requiring you to address tensions that may be resolvable (e.g. win/lose between priorities). (2) ▼1 (no delegation skill) (1) ... 7 (significant delegation skill) (7)

A **compromise** requiring you to address vague or unclear tensions (e.g. balancing aspects of a situation such as detailed versus high-level reporting). (3) ▼1 (no delegation skill) (1) ... 7 (significant delegation skill) (7)

A **dilemma** requiring you to address tensions that may be unresolvable (e.g. a difficult choice such as maintain or upgrade equipment). (4) ▼1 (no delegation skill) (1) ... 7 (significant delegation skill) (7)

A **paradox** requiring you to address clearly unresolvable tensions (e.g. explore/exploit). (5) ▼1 (no delegation skill) (1) ... 7 (significant delegation skill) (7)

Block 11 – Judgement
For your reference here is a table summarizing the key characteristics of the kinds of decisions we are considering.

<table>
<thead>
<tr>
<th>Decision</th>
<th>Description of Underlying Tensions</th>
<th>The Example from Your Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple</td>
<td>Clearly resolvable.</td>
<td>Piped text from Q011</td>
</tr>
<tr>
<td>Trade-off</td>
<td>Tending toward resolvable.</td>
<td>Piped text from Q012</td>
</tr>
<tr>
<td>Compromise</td>
<td>May or may not be resolvable.</td>
<td>Piped text from Q013</td>
</tr>
<tr>
<td>Dilemma</td>
<td>Tending toward unresolvable.</td>
<td>Piped text from Q014</td>
</tr>
<tr>
<td>Paradox</td>
<td>Unresolvable.</td>
<td>Piped text from Q015</td>
</tr>
</tbody>
</table>

Q024 Please indicate how much judgement you feel is needed to tackle each kind of decision. Please rate the different decisions based on your current experience with decisions, not "what should be."

A simple decision requiring you to address clearly resolvable tensions (e.g. go/no go funding). (1) ▼1 (no judgement) (1) ... 7 (significant judgement) (7)

A trade-off requiring you to address tensions that may be resolvable (e.g. win/lose between priorities). (2) ▼1 (no judgement) (1) ... 7 (significant judgement) (7)

A compromise requiring you to address vague or unclear tensions (e.g. balancing aspects of a situation such as detailed versus high-level reporting). (3) ▼1 (no judgement) (1) ... 7 (significant judgement) (7)

A dilemma requiring you to address tensions that may be unresolvable (e.g. a difficult choice such as maintain or upgrade equipment). (4) ▼1 (no judgement) (1) ... 7 (significant judgement) (7)

A paradox requiring you to address clearly unresolvable tensions (e.g. explore/exploit). (5) ▼1 (no judgement) (1) ... 7 (significant judgement) (7)

Block 12 – Scenarios
In the following scenarios, you are the decision maker. Please indicate the course of action that comes closest to what you would most likely do in your current organization.

Q025 As a senior manager, you are committed to achieving long-term organizational goals but doing so depends on short-term successes. Given that investing in innovation often involves short-term costs for long-term benefit, where will you focus your efforts?

Focus on achieving short term successes or alternatively, profile the attainment of long term goals without drawing attention to costs. (1)
Focus on achieving short term successes and long term goals separately (e.g. at different times or different locations). (2)
Focus on realizing benefits from pursuing both short term successes and long term goals. (3)

Q026 As a senior manager, you require the flexibility to shift resources when needed, yet committing to stable funding arrangements fosters the staff confidence needed to make it easier to shift resources. What do you do?

Maintain a guarded flexibility to shift resources or alternatively, boldly commit to stable funding. (1)
Allocate a committed portion of the resource budget first, then allocate the remaining resources as needs arise. (2)
Renew the resource allocation process to enable resource commitment and flexibility on a case-by-case basis. (3)

Q027 As a manager interested in innovation, you want to lever existing knowledge, relationships, and processes but also to develop novel product or service features in response to specific innovation needs. When staffing an innovation team, for example, would you focus on experience or novelty and the skills needed for the future?

Use well-accepted standard criteria or alternatively stress the advantages of differences when selecting team members. (1)
Assemble the team with a predetermined number of “experienced” members and members with “skills needed for the future.” (2)
Assemble the team emphasizing diversity while creating unity by treating members according to their differences. (3)
Q028 As a manager, you understand the need for metrics to be consistent from one reporting period to the next, even though applying existing metrics to new activities may not be reliable, representative or fair. How do you measure progress for an activity grounded in a new business model?

Use proven existing metrics or alternatively create new, easily communicated metrics, for all activities. (1)
Revise existing metrics for new activities and continue using existing metrics for existing activities. (2)
Create a system for assessing past and current contributions of new and existing activities to organizational goals. (3)

Q029 As a manager, you value the freedom to create new products and services, but you also want to align any innovation with existing products and services, which constrains your freedom. For example, you may be able to develop an innovation quickly to gain legitimacy with a client or stakeholder, but doing so may lower product or service quality compared to the past. What do you do?

Focus on superior product quality or alternatively on satisfying unique customer needs. (1)
Pursue innovation only in cases where quality will not be compromised. (2)
Pursue a strategy of developing new products that can be adapted quickly to specific customer needs while maintaining quality. (3)

Q030 As a manager, you accept that innovation is inherently risky. Yet being comfortable with risk during the innovation process requires you to have confidence and certainty. For example you need to communicate a strong vision, but that vision needs to evolve as innovations unfold. How do you achieve this?

Decide to communicate a strong existing vision or an irresistable new vision. (1)
Communicate the existing vision as long as it remains relevant, and then do major revisions to bring it up to date. (2)
Create a higher-level vision statement that incorporates the existing vision and allows for things to evolve. (3)

Q031 As a manager, you understand that the growth provided by innovation and change is desirable for the health of the organization and the well-being of employees. While your organization may benefit from employees responding positively to opportunities for growth, there may be costs to your organization associated with their resistance to changing familiar patterns of activity. Where do you place your focus?

Focus on providing attractive innovation-related opportunities for growth or on dealing with resistance to change respectfully. (1)
Take time to address resistance now, in order to create a more innovative organization over the long run. (2)
Pursue innovation and overcome resistance by giving staff a higher organizational purpose and providing them with opportunities for self-directed activity. (3)

End of Survey Message

Email Invitation

*Please forward the email containing your invitation to participate in this study to up to five of your colleagues or professional contacts. For your ready reference, here is an email you can cut and paste.*

---

**Subject:** Invitation to participate in a research study entitled “Unresolvable Tensions During Decision-making: Engage or Ignore?”

Hello,

You are invited to participate in a study exploring how perceptions of decisions affect decision-making behaviour. The study is being conducted by Paul Hope (pauljhope@cmail.carleton.ca), a Ph.D. student at the Sprott School of Business, Carleton University, under the supervision of Prof. Linda Schweitzer. The objective of this research is to improve organizational and individual decision-making.

Participation in this study involves two tasks. First, you will be asked to complete an online survey to gather your perceptions of different kinds of decisions. The survey should take no more than 30 minutes to complete. As part of this survey, you will be presented with decision scenarios and asked to make decisions. Second, you will be asked to forward this Invitation to up to five of your colleagues and professional contacts.

The formal Letter of Invitation and Consent, available at Decision Survey contains details of the study and your role should you decide to participate.

Thank you for your consideration,

Paul
## APPENDIX 3 – CODING MANUAL

<table>
<thead>
<tr>
<th>Stage in the Cognitive Processing Model</th>
<th>Themes from the Literature</th>
<th>Description of Theme from the Literature</th>
<th>Observed Themes in Commentary</th>
<th>Examples from Commentary</th>
</tr>
</thead>
<tbody>
<tr>
<td>I – Information Navigation</td>
<td>Exploit Tensions</td>
<td>Stems from the notion of “information navigation” in the transparadox model (Pang et al., 2021). Involves deliberately creating and exploiting tensions to achieve strategic objectives (Pang et al., 2021).</td>
<td>Exploit tensions</td>
<td>“you figure out what feeds their [employees] needs and you shovel it to them so if they want to be heroes, they want meaning, intimate team companionship, get a sense of that, and make that the payoff for putting up with the chaos, right?”</td>
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<tr>
<td></td>
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<td></td>
<td>“I think I would do the third one, I think that’s, and it doesn’t necessarily mean a higher level vision or it may not be necessarily different from the middle one, but I think to keep people interested, you have to make it seem like it’s a higher level vision [laughter]”</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>“The other piece of this in organizations is; one of the benefits of not pandering too much to resistance is that people who are wedded to the old ways think you’re an [expletive deleted] and leave. So part of refreshing vision is also refreshing the team. And it’s good to be clear that you’re either joining the new voyage or you are not on the boat.”</td>
</tr>
<tr>
<td>II – Contextual Consideration</td>
<td>Making Distinctions</td>
<td>Stems from the concept of “differentiation” in the model of top management team paradoxical processes (van Neerijnen et al., 2021). Differentiation lays the foundation for “integration” and “paradoxical cognition” (van Neerijnen et al., 2021). This theme is applied only to comments that refer to differentiation in the absence of any reference to integration.</td>
<td>Making Distinctions</td>
<td>“The courses of action are kind of nuanced”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>“It’s [the choices] a bit of a false dichotomy”</td>
</tr>
<tr>
<td>Stage in the Cognitive Processing Model</td>
<td>Themes from the Literature</td>
<td>Description of Theme from the Literature</td>
<td>Observed Themes in Commentary</td>
<td>Examples from Commentary</td>
</tr>
<tr>
<td>----------------------------------------</td>
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</tbody>
</table>
| II – Contextual Consideration          | Contextual Consideration    | Originates from the concept of contextual consideration in the transparadox model (Pang et al., 2021) and “reflexivity” in the model of top management team paradoxical processes (van Neerijnen et al., 2021). Captures the idea of prudence (not being inadequate, excessive or compromising), adjusting to change, and staying true to personal principles amid change (Pang et al., 2021). It also includes reflection on activities and consequences (i.e., consideration of practicality and realism) (van Neerijnen et al., 2021). | Prudence, Practicality & Realism | “Number two is not throwing away what you have, more incremental, that allows you to test things more quickly and not just commit to something that you’re unsure about”  
“you wouldn’t want to let go of all the past stuff.”  
“I don’t agree with the first one, the third one, while attractive, I think is a bit dangerous, because, like if we’re talking about visions, I think it needs to be consistent, like if I was making a vision I wouldn’t want necessarily to have a vision that was easy to evolve, because then it’s like, the vision is going to, it’s going to go anywhere”  
“Putting two systems in place is ridiculous. If you’re changing your changing”  
“I think number two; I like number two, being pragmatically responsive to the situation and adjusting accordingly.”  
“You don’t have stable funding. Committing boldly to that is impractical and unrealistic”  
“the last one would be, too much uncertainty I think for managers to realistically, although I think that’s what the boards would be inclined to do, some boards, but that’s just not realistic, if you are a manager, you need to have a budget” |
<table>
<thead>
<tr>
<th>Stage in the Cognitive Processing Model</th>
<th>Themes from the Literature</th>
<th>Description of Theme from the Literature</th>
<th>Observed Themes in Commentary</th>
<th>Examples from Commentary</th>
</tr>
</thead>
<tbody>
<tr>
<td>II- Contextual Consideration</td>
<td>Oneness (superficial)</td>
<td>Stems from the concept of “oneness” and resulting “syncretic focus” associated with the transparadox model (Pang et al., 2021). Oneness supports all cognitive stages leading to full engagement with paradoxical tensions (Pang et al., 2021). At a superficial level, the idea of oneness translates as comfort with, or desire for, uniformity. However, under oneness (superficial), the recognition of an element of sameness does not lead to “integration.”</td>
<td>Conflict between self and decision context</td>
<td>“I rebel against the notion that there are these constant metrics that provide through time a kind of consistent measure of performance, achievement, and outcomes because that's associated in my mind with a lot of bogus economics and bogus - that whole school of thinking about measuring peoples performance and stuff”</td>
</tr>
<tr>
<td>Stage in the Cognitive Processing Model</td>
<td>Themes from the Literature</td>
<td>Description of Theme from the Literature</td>
<td>Observed Themes in Commentary</td>
<td>Examples from Commentary</td>
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</tbody>
</table>
| III – Paradoxical Cognitive Processing | Oneness (profound)        | Stems from the concept of “oneness” and resulting “syncretic focus” associated with the transparadox model (Pang et al., 2021). At a profound level, the notion of oneness incorporates a sense of the underlying unity of all things. The recognition of unity leads to “integration.” | Oneness (profound) | “[option 3] kind of wishy-washy, but I like that.”
|                                      |                           |                                        |                             | “It’s [vision] really more the values manifestation. It’s almost in the Dharma sense it’s not something to believe in, it’s something to do.” |
| III – Paradoxical Cognitive Processing | Making connections        | Originates from the concepts of “integration” in the transparadox model (Pang et al., 2021), and “paradoxical cognition” and the creation of connections in the model of top management team paradoxical processes (van Neerijnen et al., 2021). “Integration” alone (i.e., without making distinctions or “differentiating,” van Neerijnen et al., 2021) is sufficient for full engagement with paradoxical tensions (Pang et al., 2021). Therefore, where a comment refers to differentiation and integration together, the comment is coded to “integration.” Includes making connections between the decision situation and other cognitions (Grégoire et al., 2011) (e.g. applying heuristics or biases, Cristofaro & Giannetti, 2021; drawing on analogies, or finding parallels with past or current experience that make the decision relevant; Schwenk, 1988), and seeing things from different perspectives (van Neerijnen et al., 2021) or in new ways (Pang et al., 2021). | Relevance | “I think probably number three would be the most accurate. It seems actually close to something we’re doing right now, for our net zero roadmap. Which is really trying to create a new communication framework including a different way of framing some of the things we’ve done in the past.”
|                                      |                           |                                        |                             | “well you know my goal would be three. I mean in practice it probably; you would probably have to stage elements of the other two to get there. Fair enough. But ultimately three.”
|                                      |                           |                                        |                             | “it sounds like you got a problem a deficiency, so I would fix the deficiency, and then move on”
|                                      |                           |                                        |                             | “we didn't have a lot of flexibility. In the time I was there we got a lot of money, but more and more frequently that money came program coded and colour-coded. So, and so for me it was more going back and saying, maybe I don’t need this money here, and asking for permission to reallocate it.”
<p>|                                      |                           |                                        |                             | “at the start there I was kind of going, you're missing an element that I always choose which is passion. You know we are hippies here, so you have to have a partner, a lot of it is driven by passion. So number three. Looking for people who are passionate and a good mix.” |</p>
<table>
<thead>
<tr>
<th>Stage in the Cognitive Processing Model</th>
<th>Themes from the Literature</th>
<th>Description of Theme from the Literature</th>
<th>Observed Themes in Commentary</th>
<th>Examples from Commentary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heuristics &amp; Analogies</td>
<td></td>
<td></td>
<td>“90% of the budget is set because it’s driving big programs. If the board asks us to do something new, what have we got? 10%.“</td>
<td>I’m of the school of thought, dealing in the start-up business, that, I used the ski racers analogy, if you’re always in control you’re probably not going fast enough, and, nothing gets cooked unless it’s hot in the kitchen.</td>
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<tr>
<td></td>
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<td></td>
<td>“very few of the problems that managers face, and politicians for that matter, can be resolvable by one school of thought, one profession, one paradigm. Because if they could have been they would have been years ago using that approach. So I now believe that most of the decisions that decision-makers confront have multifactorial roots. And therefore the only logical response to a problem that has many heads is to bring in people with different skill sets. That’s how I would assemble a team, based on people with different skill sets.”</td>
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<td></td>
<td></td>
<td></td>
<td>“Ok, number 3. It depends on the size of the new activity. If it’s small, I don’t bother. If it’s big I create new metrics.”</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>“What I always [did when I] made decisions, it’s like cost-benefit, it’s my whole mindset. What’s the cost-benefit?”</td>
<td></td>
</tr>
<tr>
<td>Stage in the Cognitive Processing Model</td>
<td>Themes from the Literature</td>
<td>Description of Theme from the Literature</td>
<td>Observed Themes in Commentary</td>
<td>Examples from Commentary</td>
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<tr>
<td>---------------------------------------</td>
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</tr>
<tr>
<td>III – Paradoxical Cognitive Processing</td>
<td>Dynamics</td>
<td>Stems from the ideas of movement through cognitive stages in the model of top management team paradoxical processes (van Neerijnen et al., 2021) and the modification and expansion of existing principles in the transparadox model (Pang et al., 2021).</td>
<td>Integration</td>
<td>“that means long-term goals and short-term successes are not related? I would assume there’s a logic model, short term successes feed into long-term goals”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>“it truly is, it truly is a trade-off been how quickly can you move, and how much are you willing to make compromises on quality, but definitely, the strategy, at least our goal would be number three. You build a platform that you can, you can do a lot with in the future. I think maintaining quality is actually a really good way to say that. Certainly you don’t want to bring down quality, but it doesn’t necessarily need to be perfect.”</td>
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<td></td>
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<td></td>
<td></td>
<td>“You can’t bring sufficient energy to the new vision by throwing out what people had as meaning to begin with. What I want is the new meaning but you get people to the new meaning by validating the old meaning. And giving them a supplement of something wider or stronger or more interesting. So the old does not get rejected it becomes part of the new”</td>
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<td></td>
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<td>“We have a new vision statement, based on this merged partnership we have between the two organizations, we’re using that vision statement, what we’re communicating to staff, that as we go through the strategic planning process, we will re-adjust that vision statement if necessary, you know in other words we’re, we think it’s a good Northstar for us right now , and it’s going to help us in our strategic planning process, but at the end of that strategic planning process, if we feel the need to go back and adjust that new vision statement, we will.”</td>
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<td></td>
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<td></td>
<td>“If your purpose changes your vision evolves with that change and purpose.”</td>
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</tbody>
</table>
APPENDIX 4 – REPERTORY GRID/ MDS ANALYSIS

Knowledge Elicitation

Knowledge Capture

Data Representation And Analyses

Research Questions Addressed

(1) Which cognitive dimensions do individuals use to differentiate between paradoxical and non-paradoxical decisions, and how important are these dimensions in their perceptions?

(2) To what extent do specific decision-making skills contribute to these cognitive dimensions for differentiating decision types (from simple to paradoxical)?

(3) How does a decision-maker’s background, perception of decisions, and assessment of the skills needed to address different kinds of decisions relate to deviant vs. non-deviant decision-making in the face of paradoxes?
### APPENDIX 5 – DEFINITIONS OF DECISION-MAKING SKILLS AND DECISION TYPES

Derivation of definitions for decision-making skills and abilities

**Initiative**

The cognitive effort needed to generate and explore new perspectives and overcome obstacles.

<table>
<thead>
<tr>
<th>Initiative</th>
<th>Dimension 2</th>
<th>Dimension 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Example of Commentary</td>
<td>Explore</td>
</tr>
<tr>
<td><strong>Internal Perspective</strong></td>
<td></td>
<td>Example of Commentary</td>
</tr>
<tr>
<td><strong>Internal cognitive effort</strong></td>
<td>It [addressing a complex decision] takes a really significant amount of initiative to think through that, whatever, so it would just be a gradient up through this list [from simple to paradox decisions] [28:15].</td>
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<tr>
<td></td>
<td>Something that’s simple and doesn’t require my attention doesn’t get it.</td>
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<tr>
<td></td>
<td>And the only time it would require more initiative or effort on my part is if I felt the information ignored some factor.</td>
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<tr>
<td></td>
<td>So, a simple decision or a trade-off is like, you don’t really have to think about it that much, whereas the compromise, suddenly, it’s like okay, you gotta consider a lot more. So that’s why I think it requires a lot more initiative.</td>
<td></td>
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<tr>
<td><strong>New perspectives</strong></td>
<td>The more complex it is the more it requires looking at things from a different perspective...so for all of these [decision types] it’s a scale up for effort. Each one is incrementally higher because the ability to foresee all the aspects that need to be examined is more and more difficult.</td>
<td></td>
</tr>
</tbody>
</table>
Creativity

Imagination, understanding and engagement with the decision situation needed to find new ways.

<table>
<thead>
<tr>
<th>Creativity</th>
<th>Dimension 2</th>
<th>Dimension 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Perspective &amp; External Context</td>
<td>Example of Commentary</td>
<td>Explore</td>
</tr>
<tr>
<td>Cognitive effort and external information, resources</td>
<td>As you get more complicated [on the decision spectrum] you need more creativity to sort of really think through stuff and like be able to get the information for [trails off] yup. Creativity is intelligence...So I would say you’re expending more intelligence and hence energy [on a trade-off than simple], you’re dealing with resources in your organization that are less available than the lower level decisions... But the paradox level you really need someone that understands the situation, that might be several people that understand the situation, who really grasp it, as opposed to an individual.</td>
<td>New ways of doing things</td>
</tr>
<tr>
<td>Seek complexities</td>
<td>As you go down them [decisions on the spectrum]. I kind of see that as failure in creativity. If you see all these things in simple ways.</td>
<td></td>
</tr>
</tbody>
</table>
Vision

The need for an explicit desired outcome to guide operations.

<table>
<thead>
<tr>
<th>Vision</th>
<th>Dimension 2</th>
<th>Dimension 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>External Context</td>
<td>Example of Commentary</td>
</tr>
<tr>
<td>A desired outcome</td>
<td>Vision in my context is something you’re trying to decide, there’s a place, there’s a whole bunch of organizational stuff that comes to my mind, it’s a place where you want the organization to be in the 7 to 10 year horizon.</td>
<td>Links to operations</td>
</tr>
<tr>
<td></td>
<td>[For simple decisions] it’s not about creating vision, it’s about aligning it. To deal with the others [other decisions on the spectrum] you really need to create a place where people can go. You have to be a little bit harsh in your adherence to your vision, because, like, that is your North Star.</td>
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<td>Used as a tool</td>
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</tbody>
</table>
# Broad Knowledge

The possession of background information needed for a decision process.

<table>
<thead>
<tr>
<th>Broad Knowledge</th>
<th>Dimension 2</th>
<th>Dimension 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Context</td>
<td>Example of Commentary</td>
<td>Exploit</td>
</tr>
<tr>
<td>Understanding of external relationships</td>
<td>You need a lot more knowledge if you’re going to try and deal with a dilemma or paradox, you know, compared to [a simple decision], it’s more knowledge, more understanding of relationships, etc.</td>
<td>Knowledge as a requisite tool for any decision process</td>
</tr>
<tr>
<td>Outside-in perspective</td>
<td>The leadership style [in the organization] reflects my leadership style which is to try to see every problem outside its box. Which requires broad knowledge. In order to have a vantage point you need to have context</td>
<td>Link to other tools</td>
</tr>
</tbody>
</table>
Forecasting

The ability to predict operational consequences of a decision.

<table>
<thead>
<tr>
<th>Forecasting Ability</th>
<th>Dimension 2</th>
<th>Dimension 1</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>External Context</td>
<td>Example of Commentary</td>
</tr>
<tr>
<td>Understanding external impacts, consequences</td>
<td>Forecasting, for me what that means is the ability to understand how your solution is going to impact. You know it’s such an uncertain art, predicting the future or attempting to... you know you do two things, you do a kind of rational-based collection of empirical data points that you think..., but then you also have a gut level intuition or hunch about something as you know you’ve seen it in the past so it might play out this way again or it might not but you use both, you know, so... forecasting ability</td>
<td>Link to operations, practicality, other tools</td>
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</table>
Risk Tolerance

The ability to understand and mitigate risks and the probability of their occurrence, in a given context.

<table>
<thead>
<tr>
<th>Risk Tolerance</th>
<th>Dimension 2</th>
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</thead>
<tbody>
<tr>
<td>External Context</td>
<td>Example of Commentary</td>
<td>Explore</td>
</tr>
<tr>
<td>Organizational context, accepting risk</td>
<td>[Senior management] is very risk-averse right now, the senior management that’s in right now, there is zero tolerance, and because of that the senior management has to either comply and be less risk tolerant or take the consequences of being more risk tolerant. So I’m a very high risk tolerance, I have a high risk tolerance, and I have to be very aware of that in a low risk tolerance environment. My risk tolerance has to be higher because of my superiors’ risk tolerance being lower. If you’re not willing to accept risk, odds are you’re not even going to make a decision. They’ll just defer it. You need a certain tolerance for risk if you are leaving something hanging.</td>
<td>Ways to mitigate risk</td>
</tr>
<tr>
<td>Understanding external risks and probabilities</td>
<td>“Is the thing that I’m trying to do [examples of risky projects], whatever, going to have significant probability of causing harm, and/or expenditures, versus the probability of that actually happening. You’ll do your best to get the evidence, have the discussions, like you know, know where there’s going to be different implications across politics, regulations, technologies, partners all that kind of stuff.</td>
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## Time Management

The ability to allocate time as a limited resource for examining options.

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<tr>
<th>Time Management</th>
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<tbody>
<tr>
<td><strong>External Context</strong></td>
<td>Example of Commentary</td>
<td>Explore</td>
</tr>
<tr>
<td>Deadlines, timeline</td>
<td>You have to be aware of what your timeline is in making any type of decision. You only have so much time, and you have to make a decision. I’m sure you could use as much time as possible and never make a decision, but you know, if you got a box, and you need to start to make a decision, then you’re going have to, like, you know really allocate your time to the right types of priorities and discussions, so that you can then make a decision. I couldn’t spend all my time on everything.</td>
<td>Over-thinking ways, untangling ways</td>
</tr>
<tr>
<td>Managing the time needed to explore options</td>
<td>In my mind both the compromise and dilemma you can be creative and find at least quasi-win-win scenarios in those, in a paradox, one of the things that defines a paradox is there’s not going to be a win-win, someone is going to have to lose in that, so, I think the decision can be taken, it can be taken without as much good process, without as much exploration of possibilities, because it’s evident that it’s going to be, that there’s no right choice, you can analyze it more and you’re not going to get to a right choice, so I think in these paradox decisions, a quick decision is actually better, like it’s a “peel off the Band-Aid” situation.</td>
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Delegation

The ability to match tasks to people.

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<th>Delegation</th>
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<tbody>
<tr>
<td>Internal Perspective</td>
<td>Example of Commentary</td>
<td>Exploit</td>
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<tr>
<td>Cognitive ability to match tasks to people correctly</td>
<td>A lot is a reflection of my confidence in the [person being delegated to] and the team behind him, and that they were practicing good risk management decision-making. If you delegate it to the wrong person, you’re throwing your opportunity out the window, likely. So it may be a simple decision for me to take, but if I delegate it to somebody else and it takes them outside of their immediate area of confidence or jurisdiction, then it’s not so much a simple. It may not be so easy for them. So delegation skill becomes, is some judgement about how well you think that other person will be able to satisfactorily deal with that issue. A judgement about how much you could afford to delegate.</td>
<td>Linked to operations, getting things done</td>
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</table>
Judgement

The internal logic/cognition used in the decision process.

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<tr>
<th>Judgement</th>
<th>Dimension 2</th>
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<tr>
<td>Internal Perspective</td>
<td>Example of Commentary</td>
<td>Exploit</td>
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<tr>
<td>Internal resource, skill,</td>
<td>Yeah, I mean a lot, right? As you go through [the decision spectrum].</td>
<td>People have to have judgement for all of the rest [all except simple on the</td>
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<tr>
<td>ability, logic, cognition</td>
<td>Based on skills and experience and all of that stuff, so, and then yeah,</td>
<td>decision spectrum], so I’m going to give all the rest a six [significant</td>
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<td>and knowing when you don’t know things I think is probably one of most</td>
<td>judgment needed]. You will understand that from my perspective it’s not a</td>
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<td>important things as you get more complicated, and then how to figure out</td>
<td>gradation, you need the same amount of really good judgement, to make a</td>
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<td>the people that do, that can answer pieces of the questions, and then you</td>
<td>good decision whether it’s a trade-off, compromise, dilemma or paradox.</td>
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<td>can piece it together into a more strategic decision framework, so, yup.</td>
<td>You will try to reduce the judgement involved by making the decisions as</td>
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<td>You had to explain it [your decision], market it to some extent, but mostly</td>
<td>simple as possible, and you do that by having a good decision-making</td>
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<td></td>
<td>explain it.</td>
<td>process, within itself. So I’m assuming the decision-making process is</td>
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<td>Judgement is all I have, judgement is everything.</td>
<td>part of the organization, I don’t mean that as rigid, because someone may</td>
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<td>need to tweak it for the particular problem or situation that they’re trying</td>
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<td>to address, but again it’s an upward curve [through the decision spectrum].</td>
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Derivation of definitions for different types of decisions on the decision spectrum

**Simple**

Routine operational decisions supported by organizational structures.

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<th>Simple</th>
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<td></td>
<td>External Context</td>
<td>Example of Commentary</td>
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<tr>
<td></td>
<td>Embedded in support structure.</td>
<td>Some [decisions] are straightforward, consistent with international norms, and non-controversial.</td>
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<td>You know the rules, it’s clear.</td>
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**Examples**

Example of simple decisions: Approving briefing note content, approve or refuse vacation leave requests from staff, deploy funds for translation or not, approving expenses for small contracts (e.g. $25,000 or less), purchasing needed supplies, travel schedule.
# Trade-off

Operational decisions constrained by organizational and environmental factors.

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<th>Trade-off</th>
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<tbody>
<tr>
<td>Internal Perspective &amp; External Context</td>
<td>Example of Commentary</td>
<td>Exploit Example of Commentary</td>
</tr>
<tr>
<td>External points of view</td>
<td>When I think about a trade-off, there are vested interests there. People have a point of view, and you need to hear what they have to say.</td>
<td>Operational considerations Applying for a grant, but knowing that the person who has to write the application will not be able to finish the report they’re working on now. The [trade-off] that immediately comes to mind, is that you’re hiring one person, and you have two qualified candidates, and you have to decide between one and the other.</td>
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<tr>
<td>Interaction of cognitive effort and timelines.</td>
<td>While it’s not necessarily easy to know what decision to take, and what is the right trade-off, they are often time bound things.</td>
<td>Accountability You’re going to own this decision. Delegating is a little harder [compared to simple decisions] when you have trade-off, because of the accountability.</td>
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Examples

Examples of trade-offs: Who's project gets priority resources, select which competing projects to fund, identifying one worker as primary on a file, approving budgets for larger contracts (e.g. above $100,000), vendor selection, delaying project growth until more evidence is established, select which media to choose from when both occur at the same time.
Compromise

Decisions requiring cognitive effort to create balance.

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<th>Compromise</th>
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<td></td>
<td>Internal Perspective</td>
<td>Example of Commentary</td>
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<tr>
<td>Cognitive effort, creativity</td>
<td>And again, some situations in terms of compromise are more straightforward than others. But sometimes trying to satisfy a lot of different things at the same time takes a lot of creativity. Some days you compromise more, other days you compromise less. And your red line changes from time to time. I personally find that compromise takes a lot of judgement.</td>
<td>Create balance.</td>
</tr>
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</table>
**New perspectives**

In a compromise you can get people to coalesce around something that’s important to them.

You have to find a path that is in the best interest of [the whole] as opposed to any one interest group.

| Examples | Examples of compromises: collaborate on pooled funding for [projects] with different players, developing a staffing process for new executives, agreeing on project milestones for projects executed by external groups, brand standards that may impact a prospective franchisee, provide a statement on something that is not aligned with organization strategy, strategic planning with inadequate research and environmental scanning, deciding on the level of research needed. |
Dilemma

Taxing decisions involving new options.

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<tr>
<th>Dilemma</th>
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<tbody>
<tr>
<td>Internal Perspective</td>
<td>Example of Commentary</td>
<td>Explore</td>
</tr>
<tr>
<td>Cognitive effort</td>
<td>To me it is going up the scale of complexity and energy required to break it [a dilemma] down and understand it. I think the key for me there is the definition of “tending to be unresolvable”, so then if it’s not [resolvable], then it’s all about heavy lifting.</td>
<td>New perspectives, learning</td>
</tr>
<tr>
<td>Examples</td>
<td>Examples of dilemmas: determining the approach for a move to a new building, evaluating markets / sites for new development, to decide whether or not to weigh in on a [government] policy, recommending alternative governance structures to 100 year old organization's leaders, deciding on the project scope.</td>
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Paradox

Decisions aimed at finding a path forward based on analysis of all available information.

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<th>Paradox</th>
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<td><strong>Paradox</strong></td>
<td><strong>Dimension 2</strong></td>
<td><strong>Dimension 1</strong></td>
</tr>
<tr>
<td><strong>Internal Perspective &amp; External Context</strong></td>
<td><strong>Example of Commentary</strong></td>
<td><strong>Explore</strong></td>
</tr>
<tr>
<td>Harness all available resources internal and external.</td>
<td>But in a paradox where it is not going to get resolved, you can’t ignore it, but you have to be very careful that you don’t spend all your lumber or your energy on something you can’t succeed at.</td>
<td>New ways</td>
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<td>You have to bear in mind where you spend your energy, where it can make a difference.</td>
<td>There’s gotta be a way to break that [paradox] down as well... I’m saying break the paradox, or look at the problem in a way that is not so complex, make it simpler...you rank your musts or needs, and then various solutions available will be scored, if you will, and then multiplied by the weight of that priority... What I’m trying to do is describe a problem-solving environment.</td>
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<td>For a complex decision [like paradox] you need advice.</td>
<td>There [paradoxes] you are really tapping yourself, trying to understand the ramifications of different things and you’re bringing to bear all of your knowledge trying to figure out a way forward.</td>
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<td>Paradox ironically, you can be as creative as you want, but it’s often that you are caught between a rock and a hard spot, so creativity can be futile</td>
<td>The difference between a paradox and everything else, at least in my mind, is that, like, with all the other ones [decisions on the spectrum], there is one direction that you’re trying to go, whereas the paradox, it’s, it’s like there’s different dimensions to it than all the other ones have.</td>
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<td>Paradox requires a depth of understanding, the broader situation.</td>
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<td>[Paradox is] always a struggle as opposed to an outcome that is desired.</td>
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<td>Expressing things simply [based on challenging and questioning experts to gain</td>
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A deep understanding allows experts to be experts at what they do – economists, engineers, scientists.

Examples of paradoxes: Need to make significant decreases in GHG emissions but will impact GDP in [a jurisdiction] related to oil and gas, adopting a hybrid work environment after the pandemic, accepting risk of legal liability to continue program priorities, conflicting policies, positioning for change to [new government] effect on credibility with [current government].
APPENDIX 6 – DETAILED CODING OF COMMENTS ON DECISION SCENARIOS FROM A COGNITIVE PERSPECTIVE

The key to the colour codes in the tables in this appendix is as follows:

**Key**

- Stage 3 – Paradoxical Cognitive Processing
- Stage 2 – Contextual Consideration
- Stage 1 – Information Navigation
Scenario 1 (Q025) Strategic Planning – Long term vs short term focus

As a senior manager, you are committed to achieving long-term organizational goals but doing so depends on short-term successes. Given that investing in innovation often involves short-term costs for long-term benefit, where will you focus your efforts?

- Focus on achieving short term successes or alternatively, profile the attainment of long term goals without drawing attention to costs. (1)
- Focus on achieving short term successes and long term goals separately (e.g. at different times or different locations). (2)
- Focus on realizing benefits from pursuing both short term successes and long term goals. (3)

<table>
<thead>
<tr>
<th>Paradoxical Cognitive Processing Stage</th>
<th>Stage 1 - Information Navigation Commentary</th>
<th>Stage 2 – Contextual Consideration Commentary</th>
<th>Stage 3 – Paradoxical Cognitive Processing Commentary</th>
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<tbody>
<tr>
<td>Integration (Differentiation and integration together)</td>
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<td>&quot;the long-term doesn't matter if you don't survive the short-term, so we gotta do it both ways&quot; (760)(3)</td>
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<tr>
<td>Oneness – Superficial (Merging multiple tensions seen as messy)</td>
<td>&quot;I think you merge them in number three into one, and it gets kind of a hodgepodge&quot; (755)(2)</td>
<td></td>
<td>&quot;that means long-term goals and short-term successes are not related? I would assume there's a logic model, short term successes feed into long-term goals&quot; (746)(3)</td>
</tr>
</tbody>
</table>
| Self vs context tension (Struggle between personal views and decision context) | "it's easy to say three, because that's what you would want. But you're not always in a situation where you can do both. Most of the time you have to... I would say 2." (748)(2) | | "The emphasis on key performance indicators means you don't want to have too many screw-ups. In the short or the long term which I find a very intolerant environment. Because it's not the way things typically work. Because I've adapted to that and lived with that regime, that I find a very hostile regime, I'd have to go with number three, you're looking to achieve both long term successes and short-term goals. Which I don't find very
congenial to be honest but that's the way the world is.” (742)(3)

“In an ideal world, I would want number three to be the one to be the case. Well, I feel it’s the overly optimistic approach, because like, by focusing on both, you may shoot yourself in the foot, I would say that one, but I would be smart about it, by basically, achieve the long term goals through the short-term successes” (754)(3)

“Yes, okay, so I’m trying to see how I do these kind of things, I can eliminate one for sure, but the other two I think I use both, in various, so, the one that I think that is most common in the way I do things, would be the middle one (option 2), like the expression that I hate that everybody uses (99 - something sociological going on here), you know, starting with the low hanging fruit, I hate that expression, but it’s, okay were good” (758)(2)

Making distinctions (Subtle distinction between choices)

“It’s [the choices] a bit of a false dichotomy”(750)(3)

“The courses of action are kind of nuanced” (742)(3)
Scenario 2 (Q026) Budgeting – Predictable versus unpredictable

As a senior manager, you require the flexibility to shift resources when needed, yet committing to stable funding arrangements fosters the staff confidence needed to make it easier to shift resources. What do you do?

- Maintain a guarded flexibility to shift resources or alternatively, boldly commit to stable funding. (1)
- Allocate a committed portion of the resource budget first, then allocate the remaining resources as needs arise. (2)
- Renew the resource allocation process to enable resource commitment and flexibility on a case-by-case basis. (3)

<table>
<thead>
<tr>
<th>Paradoxical Cognitive Processing Stage Commentary Code</th>
<th>Stage 1 - Information Navigation Commentary</th>
<th>Stage 2 – Contextual Consideration Commentary</th>
<th>Stage 3 – Paradoxical Cognitive Processing Commentary</th>
</tr>
</thead>
<tbody>
<tr>
<td>New ideas/New ways (Staged approach to integration; finding work-arounds, other ways of doing things)</td>
<td>&quot;I think it’s 3, you’ve gotta like, get your process organized, and then figured it out, I think you need more money, or you can’t do anything” (779)(3)</td>
<td>&quot;It sounds like you got a problem a deficiency, so I would fix the deficiency, and then move on” (770)(3)</td>
<td>&quot;we didn’t have a lot of flexibility. In the time I was there we got a lot of money, but more and more frequently that money came program coded and colour-coded. So, and so for me it was more going back and saying, maybe I don’t need this money here, and asking for permission to reallocate it.” (771)(3)</td>
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<td>&quot;So, saying we have a certain amount of fee available for a project, that is determined at the beginning. That’s not flexible. We allocate a certain amount of fees per phase of work and sometimes, often, it doesn’t turn out the same way. Often we may use too much in the first phase, which means we have to be more efficient through the other phases. So there’s flexibility within that that we have to be aware of and on top of but, you know, we still have to do the work.” (766)(3)</td>
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<td>Heuristics and analogies (Applied heuristics)</td>
<td>“I never believe in holding resources back because then you don't spend them (01 - rule of thumb). But you need to be agile enough to move resources around” (767)(3)</td>
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<td>“as the organization gets smaller you tend to get more towards three.” (764)(3)</td>
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<td>“90% of the budget is set because it's driving big programs. If the board asks us to do something new, what have we got? 10%.” (765)(1)</td>
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<thead>
<tr>
<th>Self vs context tension (Struggle between personal views and decision context)</th>
<th>“certainly with my organization, the reality is more like the third option, renew the... but ideally I think it's number two” (773)(3)</th>
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<td>“My last job... two. But my personality is towards three (764)(3)</td>
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<tr>
<th>Prudence</th>
<th>“I like retaining some decision flexibility over time” (774)(2)</th>
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<tr>
<td></td>
<td>“you don't have stable funding. Committing boldly to that is impractical and unrealistic” (762)(3)</td>
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<td>“the last one would be, too much uncertainty I think for managers to realistically, although I think that's what the boards would be inclined to do, some boards, but that's just not realistic, if you are a manager, you need to have a budget” (778)(2)</td>
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| Exploit tensions to achieve strategic goals | “you figure out what feeds their [employees] needs and you shovel it to them so if they want to be heroes, they want meaning, intimate team companionship, get a sense of that, and make that the payoff for putting up with the chaos, right?” (769)(3) |


Scenario 3 (Q027) Human Resources – Experience versus novelty

As a manager interested in innovation, you want to lever existing knowledge, relationships, and processes but also to develop novel product or service features in response to specific innovation needs. When staffing an innovation team, for example, would you focus on experience or novelty and the skills needed for the future?

- Use well-accepted standard criteria or alternatively stress the advantages of differences when selecting team members. (1)
- Assemble the team with a predetermined number of “experienced” members and members with “skills needed for the future.” (2)
- Assemble the team emphasizing diversity while creating unity by treating members according to their differences. (3)

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<tr>
<th>Paradoxical Cognitive Processing Stage</th>
<th>Stage 1 - Information Navigation Commentary</th>
<th>Stage 2 – Contextual Consideration Commentary</th>
<th>Stage 3 – Paradoxical Cognitive Processing Commentary</th>
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</thead>
<tbody>
<tr>
<td>Heuristics and analogies (Applied heuristic)</td>
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<td></td>
<td>“very few of the problems that managers face, and politicians for that matter, can be resolvable by one school of thought, one profession, one paradigm. Because if they could have been they would have been years ago using that approach. So I now believe that most of the decisions that decision-makers confront have multifactorial roots. And therefore the only logical response to a problem that has many heads is to bring in people with different skill sets. That’s how I would assemble a team, based on people with different skill sets.” (781)(3)</td>
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<tr>
<td>New ideas/ New ways (Introducing new dimensions)</td>
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<td></td>
<td>“you’re not looking necessarily for diversity, diversity implies ideas and we’ve already got the ideas, it’s usually people that will implement the ideas, so that takes hard work, novelty of how to do that” (799)(2)</td>
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<td>“well, I’m a great believer in something called multidisciplinarity” (781)(3)</td>
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<td>“To me you want a mix, and how much of one versus the other would depend on what my perception of the leadership skills of one versus the other. If you know if you only had one novel person but you knew that novel person had a way of galvanizing a group, you would only need the one” (790)(3)</td>
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<td>“at the start there I was kind of going, you’re missing an element that I always choose which is passion. You know we are hippies here, so you have to have a partner, a lot of it is driven by passion. So number three. Looking for people who are passionate”</td>
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<tr>
<td>Integration</td>
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<td>and a good mix.” (784)(3)</td>
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<td>“you need to find a mechanism that encourages those two groupings to work together. So that one, kind of, it's not that, those who innovate have to understand the context of the past in order to go forward to the future, as well as the people with experience have to understand there are better ways” (787)(3)</td>
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<td>“don't be concerned with differences, treat people as people.” (798)(3)</td>
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Scenario 4 (Q028) Performance Measurement – Consistency vs inconsistency

As a manager, you understand the need for metrics to be consistent from one reporting period to the next, even though applying existing metrics to new activities may not be reliable, representative or fair. How do you measure progress for an activity grounded in a new business model?

- Use proven existing metrics or alternatively create new, easily communicated metrics, for all activities. (1)
- Revise existing metrics for new activities and continue using existing metrics for existing activities. (2)
- Create a system for assessing past and current contributions of new and existing activities to organizational goals. (3)

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<th>Stage 3 – Paradoxical Cognitive Processing Commentary</th>
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<tr>
<td>Relevance</td>
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<td>“I think probably number three would be the most accurate. It seems actually close to something we’re doing right now, for our net zero roadmap. Which is really trying to create a new communication framework including a different way of framing some of the things we’ve done in the past.” (807)(3)</td>
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<td>Heuristics and analogies (Use a heuristic)</td>
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<td>“You needed to be able to see some continuity, some similarity. So you needed to bridge and keep some traditional metrics as long as they were still relevant. So you know when we have a major change like when we did when we had business lines, we, for a couple of years, reported on both old and new.” (809)(3)</td>
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<td>“I never necessarily just blindly rely on proven existing metrics, it’s always changing, so I would start with, B, but I don’t know if that’s ideal either, but that’s, I think, would be the fallback, always, it seems to me.” (818)(2)</td>
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<td>“Well we done three, is it financially viable, does it contribute to our community, do we have to do it or is somebody else already doing it?” (803)(3)</td>
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<td>“Ok, number 3. It depends on the size of the new activity. If it’s small, I don’t</td>
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| Prudence (Practicality, conserve energy) | “Putting two systems in place is ridiculous. If you’re changing your changing” (808)(3)  
“I think number two; I like number two, being pragmatically responsive to the situation and adjusting accordingly.” (812)(2)  
“Number three, has the appeal, of maybe, consistency across everything that you’re working on, but maybe two in terms of expense and effort, could be better traded off for something more productive, so I kind of go for number two, conserve some of the energy and effort to do something else.” (802)(2)  
“this is where your ideal, versus, the real, like, ideally you’d do three. I think I’d really do 1. Because it’s a big undertaking to do the third” (814)(2) | bother. If it’s big I create new metrics.”(817)(3) |
| Self vs context tension  
(Tension between personal views and decision context) | “I rebel against the notion that there are these constant metrics that provide through time a kind of consistent measure of performance, achievement, and outcomes because that's associated in my mind with a lot of bogus economics and bogus - that whole school of thinking about measuring peoples performance and stuff” (801)(3)  
“I think the ideal is three, but in reality that never works out that way, I think what you're doing, what you should be doing is the middle one, I think that's where I would end up.” (818)(2)  
“Like I find the part of any senior person's job, the part that is creating the metrics, creating the systems that manage and measure performance, is really time-consuming, and I find, while it's the right thing to do, I lack the patience to do that, I don't like to be distracted from the work we're doing, and I'd rather try to explain the new context and the results given the new context, rather than develop a whole system that is modernized to do that, and I'm not saying that's the right choice, but what I would do” (814)(2) | Exploit tension to achieve strategic goals  
“If I can get away with it, three. Again it's buying license. I would do whatever is necessary. But I see metrics as one of the tools in my toolbox to achieve what I consider to be important. And I don't really care except as an instrumental piece of the thing.” (806)(3) |
Scenario 5 (Q029) Marketing – Explore versus exploit

As a manager, you value the freedom to create new products and services, but you also want to align any innovation with existing products and services, which constrains your freedom. For example, you may be able to develop an innovation quickly to gain legitimacy with a client or stakeholder, but doing so may lower product or service quality compared to the past. What do you do?

- Focus on superior product quality or alternatively on satisfying unique customer needs.  (1)
- Pursue innovation only in cases where quality will not be compromised.  (2)
- Pursue a strategy of developing new products that can be adapted quickly to specific customer needs while maintaining quality.  (3)

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<td>Integration</td>
<td>“it truly is, it truly is a trade-off been how quickly can you move, and how much are you willing to make compromises on quality, but definitely, the strategy, at least our goal would be number three. You build a platform that you can, you can do a lot with in the future. I think maintaining quality is actually a really good way to say that. Certainly you don't want to bring down quality, but it doesn’t necessarily need to be perfect.” (826)(3)</td>
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<td>Heuristics and analogies</td>
<td>“What I always [did when I] made decisions, it’s like cost-benefit, it’s my whole mindset. What’s the cost-benefit?” (820)(2)</td>
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<td>“We have to do quality all the time. So I pick number three.” (821)(3)</td>
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<td>“for me, innovation is never about speed.” (831)(3)</td>
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<tr>
<td>Prudence</td>
<td>“you wouldn’t want to let go of all the past stuff.” (827)(2)</td>
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|                                       | “Number two is not throwing away what you are have, more incremental, that allows you to test things more quickly and not just
<table>
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<tr>
<th>Self vs context tension (Tension between personal views and decision context)</th>
<th>commit to something that you're unsure about” (820)[2]</th>
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<tr>
<td>“I gotta go with the middle one, I guess, I think, yeah, that would be me, not all would agree, but that's what I would do. (832)[2]</td>
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| Outside of range of convenience | “I feel a little bit of all three. There are times where, you know, we are talking about short-term demand where the organization is focused on, you know, producing what members want at a quality that they expect but overall as an organization we are trying to migrate to a way of working that is more aligned with number three. So, I'm having a hard time picking one. Because in this context there are times where you have an immediate need but then there is sort of the longer-term strategy where you're trying organize yourself to be able to respond to needs more flexibly” (822)[0] |
| “this is one where I feel very uncomfortable because it has a very business orientation as opposed to a government orientation. So it doesn't feel relevant, not in my purview.” (824)[0] |
Scenario 6 (Q030) Visioning – Uncertainty versus certainty

As a manager, you accept that innovation is inherently risky. Yet being comfortable with risk during the innovation process requires you to have confidence and certainty. For example you need to communicate a strong vision, but that vision needs to evolve as innovations unfold. How do you achieve this?

- Decide to communicate a strong existing vision or an irresistible new vision. (1)
- Communicate the existing vision as long as it remains relevant, and then do major revisions to bring it up to date. (2)
- Create a higher-level vision statement that incorporates the existing vision and allows for things to evolve. (3)

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<tr>
<td>Integration</td>
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<td>&quot;You can’t bring sufficient energy to the new vision by throwing out what people had as meaning to begin with. What I want is the new meaning but you get people to the new meaning by validating the old meaning. And giving them a supplement of something wider or stronger or more interesting. So the old does not get rejected it becomes part of the new” (839)(3)</td>
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<td>Oneness (profound)</td>
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<td>&quot;Sometimes I just feel, I've been told in policy let's vague this up, let's vague this up and we can drive a truck through it, anybody can see themselves, but I also get the idea that crisp and clear at a high enough level that you still allow change over time. (845)(3)</td>
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<td>&quot;[option 3] kind of wishy-washy, but I like that.” (845)(3)</td>
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<td>&quot;It’s [vision] really more the values manifestation. It's almost in the Dharma sense it's not something to believe in, it's something to do. (835)(3)</td>
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"You can’t bring sufficient energy to the new vision by throwing out what people had as meaning to begin with. What I want is the new meaning but you get people to the new meaning by validating the old meaning. And giving them a supplement of something wider or stronger or more interesting. So the old does not get rejected it becomes part of the new” (839)(3)
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<tr>
<th>Dynamic</th>
<th>“If I buy in and believe in the current vision, then I will communicate that to the best of my ability, but I would want the right to be able to communicate a new vision.” (834)</th>
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<td>“We have a new vision statement, based on this merged partnership we have between the two organizations, we’re using that vision statement, what we’re communicating to staff, that as we go through the strategic planning process, we will re-adjust that vision statement if necessary, you know in other words we’re, we think it’s a good Northstar for us right now, and it’s going to help us in our strategic planning process, but at the end of that strategic planning process, if we feel the need to go back and adjust that new vision statement, we will. (842)</td>
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<td>“If your purpose changes your vision evolves with that change and purpose.” (836)</td>
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<td>Self vs context tension</td>
<td>It also for me, has to do with the disconnect with how most people think about vision and how we think about vision.” (835)</td>
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<tr>
<td>(Tension between personal views and decision context)</td>
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<td>Prudence</td>
<td>“I don’t agree with the first one, the third one, while attractive, I think is a bit dangerous, because, like if we’re talking about visions, I think it needs to be consistent, like if I was making a vision I wouldn’t want necessarily to have a vision that was easy to evolve, because then it’s like, the vision going to, it’s going to go anywhere” (844)</td>
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<td>“In our work it will be two because before you have things figured out it is status quo” (837)</td>
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<tr>
<td>Exploit tension to achieve strategic goals</td>
<td>“I think I would do the third one, I think that's, and it doesn't necessarily mean a higher level vision or it may not be necessarily different from the middle one, but I think to keep people interested, you have to make it seem</td>
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<tr>
<td>Outside of range of convenience</td>
<td>&quot;in my experience, it is none of those for me.&quot; (838)(0)</td>
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<td>like it's a higher level vision [laughter]&quot; (848)(3)</td>
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Scenario 7 (Q031) Organizational Change – Stability vs change

Q031 As a manager, you understand that the growth provided by innovation and change is desirable for the health of the organization and the well-being of employees. While your organization may benefit from employees responding positively to opportunities for growth, there may be costs to your organization associated with their resistance to changing familiar patterns of activity. Where do you place your focus?

- Focus on providing attractive innovation-related opportunities for growth or on dealing with resistance to change respectfully. (1)
- Take time to address resistance now, in order to create a more innovative organization over the long run. (2)
- Pursue innovation and overcome resistance by giving staff a higher organizational purpose and providing them with opportunities for self-directed activity. (3)

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<tbody>
<tr>
<td>New ideas/ New ways (Staging)</td>
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<td>&quot;well you know my goal would be three. I mean in practice it probably; you would probably have to stage elements of the other two to get there. Fair enough. But ultimately three.” (860)(3)</td>
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<td>&quot;it's the second one that will work. If you think that not dealing with the resistance head on, 3 is what you want, which is what you normally say, oh yeah, of course I want to do this and I'll, you know, you'll, resistance, people resume, but it just doesn't work when you practice in reality, so it just takes time, head on the resistance, and then you can bring them on board, in my experience.” (868)(2)</td>
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<td>Heuristics and analogies</td>
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<td>“I always thought when I came into an organization of three buckets of staff - those had been hoping they’d get someone like me as a boss, those who hadn’t thought about it but can sort of see it would be okay and those who get up in the middle of the night scared that somebody like me might come and the secret is to identify who is two and three as quickly as possible and to throw group 3 out of the boat” (859)(3)</td>
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<td>“the one thing I like about option three: That’s what everybody wants - autonomy, agency in their own work, coupled with the quiet life.” (852)(3)</td>
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<td>“in the larger changes, you can’t get rid of 350 people nor do you want to, so you do both innovation and overcome resistance at the same time, because that’s the only practical solution, and because you need the expertise, the knowledge, the relationships, that those experienced people who may be resistant have for you, and you need to help them understand how they can keep their moral compass but come along with you, on the innovation that you’re trying to do” (861)(3)</td>
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<td>“My experience is that all of them [the options] work and all of them don’t work under certain circumstances. You can’t compartmentalize. Sometimes you have to understand how the context changes.” (857)(3)</td>
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<td>“Don’t try to deal with resistance head on. One third of people understand, one third can learn, one third will not understand and will leave.” (870)(3)</td>
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<td>“I’m of the school of thought, dealing in the start-up business, that, I used the ski racers analogy, if you’re always in control you’re probably not going fast enough, and, nothing gets cooked unless it’s hot in the kitchen.” (871)(3)</td>
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<td>Integration</td>
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<td>“I’m going to go for number 3, in the latter part of that phrase, you’re giving them a sense of agency, kind of implicitly in the self-directed activity, so it’s not a steamroller on them, you’re trying to see how there is some freedom, in the new hierarchy” (864)(3)</td>
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<td>“we were creating new rules all the time, because that was the job, we were creating policy, but, I mean, internally, there was a process for developing policy that was fairly consistent and, I mean, we followed those rules” (866)(3)</td>
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<td>Self vs context tension (Tension between personal)</td>
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<td>“I would do three but realistically I think the</td>
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<td>views and decision context)</td>
<td>organization would do two.” (855)(3)</td>
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| Exploit tensions to achieve strategic goals | “The other piece of this in organizations is; one of the benefits of not pandering too much to resistance is that people who are wedded to the old ways think you’re an a__ h___ and leave. So part of refreshing vision is also refreshing the team. And it’s good to be clear that you’re either joining the new voyage or you are not on the boat. (859)(3)

“maybe I’ve been criticized for not dealing with resistance to change, again on the ESG side, but I don’t care, if you’re in that kind of an organization [changing], you’re in it or you are out of it.” (871)(3) |