

# Mindful Organizing for the CIO: Towards a Conceptual Model for Transformational Leadership

*Completed Research Paper*

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## Abstract

*Considered invaluable to corporate entities, CIOs are relied upon for the strategic oversight of technological infrastructure as well as the articulation of a business case for IT resources. How can CIOs prepare for and respond to the dynamic, and often uncertain changes, which challenge organizational resources, processes, and strategies? Research continues to indicate that technological transformation and integration of newer, faster IT capabilities have become a critical focus for the CIO. Extant literature on mindfulness suggests that mindful organizing (MO) can facilitate success and enhance the effectiveness of strategic level decision makers. Integrating insights from MO, we present and analyze the literature to build an action orientated framework to support the CIO in leveraging the dynamic capabilities under his/her purview. Our objective is to examine key attributes of mindful organizing which are especially critical to building a level of awareness that cultivates an environment for reliable performance of systems and teams under transformational leaders.*

**Keywords:** CIO, dynamic capabilities, mindful organizing, decision making

## Introduction

Business visionary, Peter Drucker stated that the millennium would be an era of the three C's: accelerated change, overwhelming complexity, and tremendous challenge. We live in a climate of ever changing technology and demands for organizations to demonstrate competitive advantage through the integration of innovation. His assertion is best exemplified in the level of organizational expectation and responsibility resting on the shoulders of Corporate Information Officers (CIO). The constantly evolving role of the CIO has been reported as a problem in IS management literature particularly as business and technological demands have been challenged by role ambiguity (Peppard, Edwards, & Lambert, 2011), innovation adoption (Malladi & Krishnan, 2012), and wavering strategic influence (Jha & Ranganathan, 2008). IS management literature provides numerous examples of the importance of strategic level management over IT infrastructure and processes aligned to business processes and valued within the organization as an investment (Henderson & Venkatraman, 1993). However, the IS literature calls our

attention to a higher form of strategic processing (Guiette, Matthyssens, & Vandenbempt, 2014) from the now established executive whose duty is to guide, influence, and manage changes to both technology and business operations. Mindful organizing is characterized by managerial processes and practices which build awareness, paying attention, anticipating cues, and countering dominant ways of thinking through a present-oriented, flexible state of consciousness (Guiette et al., 2014; Karl E. Weick, Sutcliffe, & Obstfeld, 1999). Building on the work of Vogus and Sutcliffe (2012, 2014) on mindful organizing as a form of higher level processing and decision making. This paper presents a review and syntheses of the literature to extract and categorize managerial cognition processes which build organizational capabilities to support reliable system and team performance. It emphasizes strategic-level management practices that drive the development organizational capacity for resiliency and reliability.

This paper contributes to existing literature in the following ways. Firstly, the role of mindful organizing as an approach to strategic organizational performance has not been explored especially in the context of the CIO position. To our knowledge, this paper is the first to discuss the application of mindful organizing for the CIO and to elaborate on cognitive-based strategies to support the execution of management and socio-technical functions. This research not only investigates the role of the concept, but also extends the applicability of MO perspective by identifying strategies which are important within organizational management structures to foster mindful organizing. We integrate mindful organizing with insights from dynamic capability theory, focusing on the transformational role the CIO strategically can play in justifying, acquiring, and integrating IS resources within an organization. The paper focuses on strategic level leadership, decision making, and organizing since issues of technological innovation and business process change are widely linked in IS and management literature (Carter, Grover, & Bennett, 2011). Secondly, this paper introduces mindfulness processes to the dialogue of digital innovation at the crossroads of leadership in order to enrich our understanding of strategic level competencies that can drive and manage change and adaptation. While this paper does not question the role of the CIO, the research examines the drivers and challenges which require a more refined analytical processing and differentiation among these leaders. We intend to be provocative by offering a newer theoretical perspective that advocates for mindful organizing as a mechanism for building dynamic capabilities within an organization. The process of mindful organizing identified by Vogus & Sutcliffe (2012) will act as the foundational force of our essay as we construct strategies for the CIO to consider to appropriately respond to the dynamics of the marketplace while steering the organization onward towards success.

Using a concept-centric approach (Webster & Watson, 2002) to explore the strategic management domain literature from across multiple disciplines, we identify significant concepts and methodologies in the use of MO by CIOs. Overall, our work attempts to contribute to IS management literature by steering discourse among this target audience about dynamic capability in the following way: 1) realistic of the strategic level organizational complexity; 2) cognizant of pragmatic analysis and synthesis of literature; and 3) non-tautological in highlighting critical findings which inform us of the organizational demands for reliable performance faced by these leaders. The remainder of the paper is structured as follows. Section 2 provides the analysis of the CIO role and drivers which influence organizational leadership capability and resource management. Section 3 presents dynamic capabilities theory and mindful organizing which we use to suggest an approach to strategic management and IS operations. The paper draws upon mindfulness principles in order to explore and identify key attributes which support the development of competencies for enhanced attention and awareness. Section 5 presents mindful organizing strategies as a conceptual model to support building processes and capabilities which lead to performance outcomes. By focusing on the practices of CIOs to mobilize resources and transform strategic objectives, this paper answers the call to apply mindful organizing to an analysis of management cognition to adapt to organizational change in today's complex and dynamic environment (Gärtner, 2011; Guiette et al., 2014; Vogus & Sutcliffe, 2007).

## **The CIO: Profiles, Roles, and Even More Responsibilities**

The critical role of the CIO in management and implementation of technology has been extensively highlighted by past studies such as Henderson and Venkatraman (1999), Preston et al (2008), Peppard et al (2011), and Milovich (2015). This section discusses the challenges associated with *being* the CIO, and *doing* the CIO job.

## **The Dichotomy of the CIO**

In an interview with industry leader Brian Donovan, Milovich Michael (2015) discussed the transformation of the CIO as a strategic figure head to the need for a “socioemotional leader” focused on relationships and interactions with an organization. The dichotomy at the center of this discussion was how a CIO performs in “doing” leadership tasks and requirements as opposed to competencies which allowed a CIO to “be” a leader in yielding influence and developing strategy for an organization. There is a clear expectation that a CIO has a grasp of technology, understanding of business operations, and understanding of the market, clearly articulating a challenge faced by the CIO to be “all things, to all men (or women)” for an organization to maintain a technological competitive advantage. Instead of discussing the myriad of leadership qualities and attributes suggested to personify someone fit for the role of CIO (Ja and Ranganathan, 2008), we will discuss the challenges identified in the literature to illustrate the drivers for a new approach to IS organizational management. One of the most significant challenges faced by CIOs, and actively discussed within the IS domain for 30 years, is the effect that strategic vision and influence has on the organization’s bottom line (Grant, 1991; The Economist, 2013). Issues related to organizational performance, resource and infrastructure investment, and decision making have been correlated in a number of organizational research studies. Initial literature focused on the conceptualization of the CIO role within a firm, often justifying the business need for the CIO (Grant, 1991; Bharadwaj, 2000). The body of knowledge has transitioned towards research exploring the effect of strategic management, organizational behavior, and process perspectives to impact firm performance, culture, and value propositions (Birkinshaw, Bresman, & Håkanson, 2000; Melville, Kraemer, & Gurbaxani, 2011). Regardless of the investigatory lens, strategic decision making is an underlying theme distinguishing the examination of a level and degree of decisions made by c-suite executives which have significant and lasting impact on organizational performance (Preston, Leidner, & Chen, 2008).

Milovich (2015) identified four clear implications for IS management literature on leadership which highlight anecdotal gaps in our understanding: (1) Expectations for IS leaders will rise as they demonstrate technical and business competencies within the C-suite setting; (2) IS leaders bear the active responsibility of building their skillsets through understanding trends in the industry, improving technical understanding, and obtaining needed professional or personal development; (3) IS leaders should use technology as a means of gaining strategic influence within an organization in guiding business directions and responding to uncertainty; and (4) Leadership models are changing from traditional hierarchy to toward sharing responsibilities through building relationships with IT departmental teams and vendors (pg. 46-48). Ensuring that the CIO can focus on the efficiencies, security, and governance of systems and IT resources. This highlights and introduces the descriptions dichotomy which sharply divides research in the IS domain, distinguishing the dynamics human behavior from the technological artefact (Thomas, Gupta, & Bostrom, 2008). IS literature presents two spheres which contribute to our understanding and study of strategic management from who the CIO is (*being*) and what the CIO does (*doing*). The literature underscoring *being* generally discusses personality attributes and leadership characteristics to develop profiles of the CIO. Preston, Leidner and Chen (2008), for example, looked at CIO personality, characteristics, and competencies for impactful decision authority. *Doing* literature emphasizes resource-based perspective of organizational leadership with a focus on competitive advantage (Bharadwaj, 2000; Peppard & Ward, 2004). The latter body of literature embodies work that has generated interest in practices and strategies to enhance efficiency and innovation in the work place (Bendoly, Bharadwaj, & Bharadwaj, 2012; Ray, Barney, & Muhanna, 2004), while the former produced approaches to promote knowledge and technical capabilities (Andreu & Ciborra, 1996; Leonard-Barton, 1993). A unifying and underlying theme across the significant and growing literature on strategic level leadership are based in the classical resource based views of capability, efficiency, and performance which have been directed at the management of the IT artefact. As a consequence, it has failed to analyze the role of cognition and behavior in understanding IS capability in IS management research.

## **Challenges to Doing the CIO Role**

This section provides a high level identification of challenges presented in a survey of academic and practitioner sources focused on management organizing activities done by the CIO. The literature presents an evolutionary tale of the establishment of the CIO as the executive provider of a technological vision to an organization pulled from the “back office” ranks of an organization. Henderson and

Venkatraman (1999) provided critical articulation for IT strategy being driven by business strategist to support the management of IS infrastructure aligned with the formulation and implementation decisions and choices which created a strategic fit for an organization. This led to an organic maturation of IT leadership within an organization (Peppard et al, 2011) associated with competitive advantage through firm implementation and integration of technology into organizational practices (Armstrong & Sambamurthy, 1999). Current academic literature focuses on role complexity (R. Maes, 2008), demand for flexibility (Patten, Whitworth, Fjermestad, & Mahindra, 2005), the lack of clarity or ambiguity (Peppard et al, 2011) around the role of the CIO. Additional to these challenges, others are well articulated in practitioner literature focused on the internal and external expectations and pressures which affect CIO leadership, authority, leadership, and performance. A number of sources, magazines, and news outlets provide surveys focusing on the CIO. For example, the Economist conducted a global survey and interview of more than 150 CIOs to investigate the strategic role in risk management, innovation opportunities, and firm performance outcomes (2013). They found that CIOs were instrumental in setting organizational strategy to maintain operational effectiveness through their decision making authority, while simultaneously bearing the responsibility to maintain foresight on market trends and uncertainties for a technological and competitive advantage. Integration of emerging technology and fluency in business functions were seen as the critical responsibilities for a CIO to position themselves for success in across geographic regions and industry sectors. The following Table 1 presents challenges summarized in the literature as impediments to *doing* the job.

Challenges	Reference
<b>Extreme pressure</b> to perform with uncertainty, unexpected changes	Gebauer, 2012; Kane & Goldgehen, 2011
<b>Teams</b> of people relying on the IS strategy that works and gets results	Maes, 2008; Patten et al, 2005
<b>Capability</b> testing and training in early detection and situational awareness from system malfunction and interruptions	Patten et al, 2005; Braun and Martz, 2007
<b>Firm Performance</b> through the establishment and use of strategic level presence	Jha and Ranganathan, 2008; Banker et al, 2008
<b>Business Interface</b> with organizational processes, models, and practices that need to be reinvented or modified to integrate market changes and emerging technologies	Economist, 2012; Renault et al., 2010;
<b>Innovation</b> and rapidly changing technology and integration of emerging technologies	Peppard et al, 2011; Economist, 2013; Huang & Quaddus, 2008
<b>Business Decision Making</b> through collaborative technology decision-making for business goals, outcomes, and activities	Armstrong and Sambamurthy, 1999
<b>Role</b> clarity, ambiguity, and complexity	Peppard et al, 2011; Maes, 2008; Economist, 2013

**Table 1. Challenges to CIO Role**

### ***Descriptions of Being a CIO***

The strategic-level decision making authority of the CIO is considered instrumental to the alignment of IT infrastructure with IS strategy in organizational goals and performance. Preston et al (2008) argued that the impact of IT was contingent upon an appropriate fit between the CIO and organizational goals. They identified four profiles of CIOs (Orchestrators, Mechanics, Advisors and Laggards) in literature based on strategic knowledge, interpersonal skills, membership in the top management team, and the organization's strategic IT vision. The profiles were: IT Orchestrators who demonstrated high capabilities and authority; IT Mechanics who had low leadership capabilities and authority; IT Advisors who had high capability and low authority; and IT Laggards with low capability and high decision making authority. The factors, based on the leadership capabilities and decision making authorities of the CIO, paved the way for more discussion characterizing the CIO. Five themes emerge from these discussions where other IS literature focus on attributes around such as the CIO being an orchestrator and equilibrist (R. Maes, 2008); a flexible anticipator, agile and adaptive (Patten et al, 2005); and an entrepreneur and intermediary (Iacono et al, 1995). We will apply modified labels to reflect the combination of mechanical

technical knowledge (Technologist), innovative outlook (Innovator), collaborative approach (Interpersonal), ability to articulate strategic vision (Strategist) first prescribed by Preston et al (2008). While these works profile the CIO's contribution to an organization, the focus on the attributes of a leader only provides limited insight into their role within the organization and the expectations placed upon them as leaders. Table 2 below gives a review of the CIO profiles emergent describing the attributional styles of CIO leadership and the outcome it has in the espousing of an IT vision for an organization. Just as research has recognized the importance of organizational fit with strategic leadership, there is also a correlation in literature of effect that leadership attributes have on decision making and management style. Echoing the sentiment of Preston et al (2008), it is critical for a CIO have a heightened awareness of their profile, to build leadership capabilities in tandem with a level of decision making authority which benefits the needs of the organization. The *Combination* attribute recognizes the transitional quality of these leadership attributes and capabilities for the purpose of decision making and establishing an organizational IS vision. A research focus on *being* the CIO using mindfulness theory is intended to provide a lens to frame the driving forces of the CIO dichotomy.

<b>CIO Attribute</b>	<b>As Technologist</b>	<b>As Innovator</b>	<b>As Strategist</b>	<b>As Interpersonal</b>	<b>As a Combination</b>
<b>Description</b>	Leadership granted over IT resources in organization with higher priority activities	Effective leader granted a great deal of freedom in making strategic decisions	Effective leader granted freedom in making strategic decisions and empowered to influence organizational outcomes.	Effective leader with strategic knowledge and strong interpersonal skills	Flexible use of strategic knowledge and interpersonal skillsets for organizational environment
<b>IT Vision &amp; Outcome</b>	Vision of IT that is more automation-oriented than transformative	Vision for formal top management member with organizational IS support and investment	Vision that IT can strategically transform the organization	Vision that IT can have a high level of IT impact despite minimized IT investment or organizational commitment	Vision for significant strategic positioning & investment in IS/IT
<b>Body of Knowledge</b>	Preston et al, 2008; Jha and Rangentahan, 2008; Carter et al, 2011; Maes and DeVries, 2008; Iacono et al, 1995				

**Table 2 CIO Attributes described in IS Management Literature**

Extant research argues that activation of mindfulness within an organization can produce the capability to discover and manage uncertainty that the CIO regularly faces. Organizational mindfulness is viewed as a capability for rich awareness of discriminatory details that facilitate the discovery and correction of potential accidents specifically in high reliability organizations like nuclear facilities. This research uses mindfulness to give insight into how the cognitive processing of CIOs in the form of mindful organizing supports their role at the helm of innovation and performance within an organization. The next section orients us in the area mindfulness that focuses on dynamic, social processes involved with mindful organizing.

## **Defining Mindful Organizing for IS**

Initially postulated to be fad theory for IS research (Baskerville & Mayers, 2009), mindfulness has been used to investigate IS phenomena such as innovation, technology adoption, system design and

development, and reliability. This section looks at the level constructs of individual, collective, and organizational mindfulness to come to a definition of mindful organizing.

### ***Literature Review Methodology***

A concept centric framework (Bandara, Miskon, & Fielt, 2011; Webster & Watson, 2002) was adapted for this review to evaluate organizational science, management, and information systems literature. The approach consists of the five following phases: 1) Selection of the sources; 2) Search Strategy; 3) Coding Scheme; 4) Paper Review; and 5) Analysis and Write-up. First, the topic of interest is identified to determine which literature sources would be most relevant for gathering information to conceptualize managerial cognition. As the search crossed a number of disciplines, a search of the following databases was conducted: JSTOR, Web of Science, Science Direct, and AIS Electronic Library. A number of key search terms were identified for both topics, which initially consisted of “mindfulness,” and “decision making,” and “management,” but an iterative approach was used to build and refine terms. This resulted in 58 papers related to individual, collective and organizational mindfulness to be collected. After a review of publication abstracts was conducted for topic relevance, 22 papers were selected to include in the review. A determination of the information to be gathered from the pool of papers ensured that the conduct of the review was effective and efficient (Bandara et al., 2011). For this research, the characteristics of problem formulation, information processing, and decision making was captured within the concept centric matrix. This included information on the theoretical dimensions, methodological approaches, and analytical findings to help provide a current understanding of topics involved. The review used on a concept-centric approach as recommended by Webster & Watson (2002), as opposed to an author-centric approach that could fail at an appropriate literature synthesis. The variables of interest were transcribed in a concept centric matrix used to extract key concepts for analyzing the attributes of mindfulness on individual, group, and organizational cognition. The captured data from the literature under review provide a grounded understanding of mindfulness based decision making, and the following sections provides an analysis of the three dimensions of mindfulness synthesized from the literature.

### ***Individual Mindfulness (IM)***

The body of mindfulness literature has its origins in the field of social psychology (Langer, 1989) representing a Western perspective and a Far Eastern perspective derived from Buddhist philosophies (c.f. K. E. Weick & Putnam, 2006). The Western perspective of individual mindfulness (IM) is seen as an approach to characterizing present awareness and active engagement by individuals through cognitive methods of differentiation and refinement of context and perception (Langer, 1997). The Eastern perspective of IM focuses on philosophical principles of introspective awareness of the body, feelings, consciousness, and mental objects to counter the undisciplined mind of habit, laxity, scattered attention, and mindlessness (Thera, 1996 in Weick and Putnam, 2006). Both perspectives highlight a purposeful attention to detail to scan and interpret nuances in perception and reality, suggesting techniques individuals should employ to enhance abilities to do both tasks. A large portion of mindfulness literature in IS extends and applies the work of Langer (1989, 1991) to examine discrete cognitive processes (c.f. Stefi, 2015) in IT adoption; post IT implementation system use (c.f. Goswami, Teo, & Chan, 2008) and approaches to individual behavior within organizations (c.f. (Carter et al., 2011; Gackenbach & Bown, 2011; Wolf & Pinter, 2011). Empirical research suggests that IM has a positive impact on both individual and organizational performance informing our understanding of the role of mindfulness in supporting various activities such as software development through processes which encourage individuals to be flexible and open minded when approaching projects, situations, or tasks. This stream of IM research has extended our knowledge of managerial intervention in enabling innovation (Carter et al, 2011) as well as our understanding of IM on system use and job performance (Wolf et al, 2011). It provides constructs to apply IM principles for an approach directed at the CIO’s management of IT specific problems within an organization.

### ***Collective and Organizational Mindfulness (OM)***

The concept of IM was extended by Weick et al (1999) to describe group and organizational attributes of collective and organization mindfulness (OM). The originating two strategies intended for individual improvement: attention to context and attention to variability identified by Langer (1989) were expanded

into a broader collective capacity of awareness and activity when investigating these cognitive processes in adaptable, reliable organizations like hospitals and air traffic control systems (K. Weick & Roberts, 1993; Karl E. Weick & Sutcliffe, 2006). They define OM as *a capability for rich awareness of discriminatory details that facilitate the discovery and correction of potential accidents* based on five processes observed in high reliability organizations (HROs), described in Table 3.0: 1. Preoccupation with failure; 2. Reluctance to simplify interpretations; 3. Sensitivity to operations; 4. Commitment to Resilience; and 5. Migration to Expertise. This look at the collective capacity of awareness and activity occurring in HROs implied a perpetual state of being ready to respond to a situation. Once prompted by a trigger that is a deviation from routine processes, procedures or activities are detected, mechanisms which enable collective awareness, sensitivity and interpretation of such deviations are activated (Karl E. Weick et al., 1999; Karl E. Weick, 1987). Table 3 summarizes each mindfulness process and its corresponding organizational cognitive process.

<b>Mindfulness Process</b>	<b>Organizational Cognitive Process</b>
Preoccupation with failure	Increased attentiveness to all failures which offer opportunities to assess the health of the system, analyze near failures and focus on reliability of the system.
Reluctance to simplify interpretations	Use of methods to increase awareness of complexity from divergent perspectives preserved by system and process redundancies.
Sensitivity to Operations	Maintenance of situational awareness which provides an integrated picture of operations in the moment based on perception, synthesis, and projection.
Commitment to Resilience	Capacity to “bounce back” from unanticipated dangers after they occur and surprises in the moment through the use of informal networks and improvisation.
Deference to Expertise	Migration of expertise through flexibility and organizational structure to link expertise with problems, solutions and decisions.

**Table 3 Organizational Mindfulness Processes (Weick et al, 1999)**

### ***Mindful Organizing (MO)***

Where organizational mindfulness has been characterized in the literature as a strategic, top-down approach (Ray et. al, 2011), Vogus and Sutcliffe (2012) proposed the differentiation of mindful organizing (MO) in management and organization literature. The latter represented a social and *dynamic process comprising of specific ongoing actions rather than an enduring organizational characteristic (pg 724)*. MO is presented as having a heavy reliance on communication and group interaction supported by three claims: 1) results in bottom-up processes; 2) enacts the context of thinking and action of the front line; and 3) relative fragility and need for continuous accomplishment (pg. 725). The characterization of collective mindfulness proposed by Butler & Gray (2006) allude to these social and dynamic aspects of MO through an emphasis of perception among individual that affected actions within an organization:

*In general, mindfulness involves the ability to detect important aspects of the context and take timely, appropriate action. However, more so than with individuals, in organizations the processes of perception are often separate from the processes of action. Front-line employees are often most knowledgeable about the true state of the organization’s systems and capabilities (pg. 216).*

MO has been researched more extensively in management literature where Vogus and Sutcliffe (2012) argued that *it exists to the extent that it is collectively enacted* supporting the notion of social, dynamic attributes of IM are engaged and operationalized within organizations. The core argument of their research is that OM provides the context whereby an organizations can shape processes and engage individuals for reliable performance:

*...organizational mindfulness creates the context for mindful action through leader-driven top-down processes that inhere in relatively stable organizational structures and practices. Middle managers serve to translate this strategic-level organizational mindfulness into more operational terms. In turn, organizations mindfulness shapes the behaviours of employees in the form of more mindful organizing (pg. 727).*



Consideration of behavior, perception, and task interdependence were used to explore organizational culture and processes in the articulation of MO. It focuses on the distinctive qualities of organizational attentiveness and responsiveness which create reliability on individual and organizational levels. While literature suggests that OM is a strategic level approach, we argue that MO has strategic level implications to implement processes and cultivate a culture for OM to thrive. As Gebauer (2012) describes: *reliability in organizations is not achieved by a set of stable routines and concepts, but by a set of cognitive processes of perception and collective sense making (pg. 207)*. Underlining MO is the strong commitment to resilience and adaptive learning where organizational practices such as decision making are concerned with anticipating and “bouncing back” from unanticipated changes. The CIO serves as the organizational figurehead symbolizing that commitment to organizational reliance with regard to IT/IS infrastructure and integration. The next section explores two areas of managerial cognition which are influenced by mindful organizing that build capabilities within an organization for greater sense-making

### ***Mindfulness Organizing through Decision Making and Process Implementation***





Strategic level decision making remains a primary function of the CIO according to the Economist 2013 CIO survey indicating a need for an approach that specifically supports this critical function. Research incorporating a mindful organizing approach to decision making suggest that the higher perceptual accuracy for decision making is progressive and contingent upon the enhancement of each level (or dimension) of mindfulness. (O'Connor & Fiol, 2002) presented the concept of mindfulness as a capacity for decision making which emphasizes the ability of strategic level leaders to examine organizational capabilities and opportunities like an entrepreneur. This extension of Weick (1999) considered OM processes on scanning and interpretation primarily to categorize the attributes of the processes within organizations. Mindfulness was derived as a benefit of engaging in OM processes which were purported as having a casual effect on cognitive based decision making. This research argued that mindful thinking was supported and reflected in three organizational processes: 1) creation of new categories that expand alternatives; 2) openness to new information; and 3) awareness of multiple perspectives (pg. 21). This research proposed mindfulness as an ability to think strategically within healthcare organizations from the perspective of entrepreneurship. Further work by Fiol & O'Connor (2003) in OM applied bandwagon theory to understanding cognitive and behavioral decision making. The emphases of this work was on “micro-level” decision contexts which lead to strategic level decision making and structures that enhance perceptual accuracy. Building on cognitive based decision making in the scanning and processing of information, the research argued for the moderating affect of mindfulness on decision structures which result in expanded scanning processes, improved interpretation processes and more discriminating decision making outcomes. Conversely, mindlessness reflected an opposing decision making phenomena of restricted scanning, less interpretation and less discriminate decision making.

Fiol and O'Conner's work made a considerable contribution to understanding how decision makers assess external environmental conditions against internal organizational capabilities to achieve dynamic, real-time accuracy. The researchers encouraged future work in defining and modelling OM constructs and exploring the conditions which allowed OM to be a value or barrier to both decision making and organizational activities. Through focus on attributes of IM and OM which support reliability, Butler and Gray (2006) presented a conceptual application of both Langer (1999) and Weick et al, (1999) to explore information system design, management and use. This work indicated the need for systems and processes to promote both individual and organizational mindfulness from a perspective focused on reliability as an organizational outcome. This focus on organizational reliability emphasized capacity building that was demonstrated in repeatable performance which has been the focus of many management programs such as Six Sigma and Lean management. Mindfulness based reliability was proposed in contrast to routine based approaches to work and performance, where mindfulness represented cognitive action that supported reliable and repeatable performance.

This research proposes the application of mindfulness in the IS domain as a strategy for individuals and organizations to achieve reliable performance with broader implication for better interpretation of system design, management and operation. This perspective recognized mindfulness as both a state of organizational being as well as an organizational capability driven by cognitive processes which supported IM and OM respectively. Mindful organizing generates a focus on organizational processes and outcomes to build system and team reliability for greater resiliency (Nagle, McAvoy, & Sammon, 2011). It emphasizes the expanding of ability, skills, and competency to cultivate and environment for high level



cognition for decision making. The use of MO also requires that an individual develop and utilize individual capability in perceptual and contextual configuration and functioning to make sense of an instantiation to construct a reality for deciding on an appropriate response. This suggests to initiate a collective, then organizational, capacity for high level awareness to discriminating detail and system cues which support an organizational ability for acute, flexible, and highly adapted response processes and structures (Mu & Butler, 2009). Table 4 below illustrates the dimensions of mindfulness described in the section above, highlighting progressive tasks related to individual and group cognition which are directed towards outcomes for reliability. The perceptual functioning of the individual leads to interactions among groups which build a capacity for collective mindfulness (Vogus & Sutcliffe, 2007). This contributes to the development of coordination strategies which serve to support organizational mindfulness by developing strategic and organizational functions that integrate processes and structures for greater awareness. The next section expands our understanding of dynamic capabilities to integrate mindful organizing as a managerial approach to rapid, unexpected change.

Table 4. Mindfulness Dimensions of Perception Functionality and Cognitive Awareness				
	Being	Doing	Outcome	
Focus	Processing & Response	Interaction	Coordination Strategies	Reliable Performance
Tasks	<b>Perceptual Functioning</b> <ul style="list-style-type: none"> <li>Concentration</li> <li>Scanning</li> <li>Interpretation</li> </ul> <b>Cognitive Awareness</b> <ul style="list-style-type: none"> <li>Categorization</li> <li>Information Gathering &amp; Processing</li> <li>Adaptable behavioral response</li> </ul>	<b>Individual and Group Function</b> <ul style="list-style-type: none"> <li>Communication Reliance</li> <li>Individual or Group Context</li> <li>Decision making processing</li> <li>Openness to novelty and alertness to distinction</li> </ul> <b>Collective Cognitive Awareness</b> <ul style="list-style-type: none"> <li>Information Gathering</li> <li>Sense-making: scanning and interpretation</li> <li>Enhanced attention quality and awareness</li> </ul>	<b>Strategic Functioning</b> <ul style="list-style-type: none"> <li>Context and Awareness from Organization Signals for Flexible Response</li> <li>Resource-Technology, Human, and Business-Awareness and Support</li> </ul> <b>Organizational Awareness</b> <ul style="list-style-type: none"> <li>Organizational Processes and Structures</li> <li>Strategies for communication, engagement and adaptable learning</li> </ul>	<b>Organizational Function Systems</b> <ul style="list-style-type: none"> <li>Context Sensitivity to System and Team signals (Alerts, Risks, Errors and Targets)</li> <li>System discrimination and awareness</li> </ul> <b>Team Performance Indicators</b> <ul style="list-style-type: none"> <li>Organizational culture and structure</li> <li>Process, resource, and functional allocation, integration and reconfiguration</li> </ul>
Mindful Dimension	<b>Individual Mindfulness</b> 	<b>Collective Mindfulness</b> 	<b>Organizational Mindfulness</b> 	
Reference	Langer, 1989; Wolf et al, 2011; Zietz, 2013)	Fiol & O'Conner, 2003; Ray et al, 2011; Vogus and Sutcliffe, 2007, 2012; Swanson & Ramiller, 2004; Butler & Grey, 2006; Mu & Bulter, 2009; McAvoy et al, 2013	Weick et al, 1999; Butler & Grey, 2006	

**Table 4 Mindfulness Dimensions of Perception Functionality and Cognitive Awareness**

## Dynamic Capabilities Enabled by Mindful Organization

The resource-based view of dynamic capabilities which dominates IS literature has enriched our understanding of competitive advantage. However, calls for broader exploration into dynamic capabilities also focuses on associations with cognitive tasking, information processes, and decision making to shape ideas of competence. This section looks at how dynamic capabilities are enabled by MO to facilitate reliable performance of systems and teams as the strategic goal which should be articulated by the CIO.

### *Dynamic Capability and Mindful Organizing*

For the purpose of this analysis we adopt the Teece & Pisano (1994) definition of dynamic capabilities as *the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments*. While much organization science and management literature has

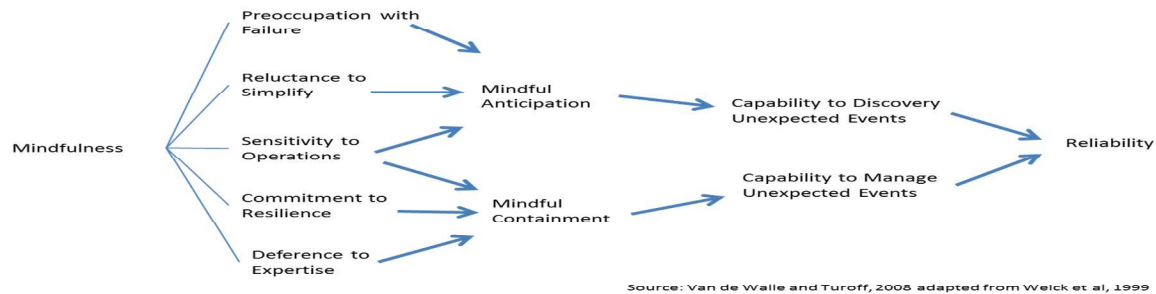
approached dynamic capabilities as a method of obtaining competitive advantage and market positions (c.f. Leonard-Barton, 1992; Makadok, 2001;), we focus on the competency and capabilities associated with sensing and responding to dynamic internal and external environmental changes. Research suggests that dynamic capabilities involves a heightened sense of awareness of the marketplace to seize potential opportunities to reconfigure or acquire existing assets and competencies to position an organization for success (c.f. Harrell, 2007). This draws us away from seeing capabilities through a limited resource-based view of the firm to a broader view of capabilities as an engagement of processes and functions within an organization to obtain a competitive advantage. From this perspective, we can see dynamic capabilities as a constantly evolving adaptation of organizational routines and processes, a redirection of the originating postulate when considering the role of strategic leadership and change.

Similarly, Eisenhardt and Martin (2000) argued for a reconceptualization of dynamic capabilities to highlight the complexities and variability associated with market patterns and outcomes which were unpredictable, yet helped an organization evolve and shape itself through learning. Guette et al (2014) suggested the use of mindful organizing to bridge the gaps in areas of strategic change to *reflect organizational life's equivocality, interdependencies and intricacies* of dynamic adaptive organizational capability. Where much IS management literature has focused on resource management and analysis of organizational routine, we look at strategic level organizing essential to sense-making and decision making. In a review of the micro-foundations of dynamic capabilities, Gartner (2011) propositioned that the use of mindfulness added clarification to the nature and development of dynamic capabilities. Mindful organizing was seen as providing the managerial cognition that supported knowledge creation and organizational learning. This provided an organization with the capacity to act flexibly and enhance their knowledge base. He argued that mindfulness “*be depicted as a medium and outcome of social practices which involves enacting power and drawing pre-reflectively on a background that is built up by routines (pg. 253).*” This was facilitated through adding new concepts and approaches to managerial activities that focus to reflect on and change performance rules and outcomes. Individual cognition and action become jointly combined with organizational processes and organizing practices to conceptually extend a postulation of linkages between reconfiguration of resources based on an opening and willingness to change actions. Gartner presents a critical examination that supports managerial capacities among individuals with decision making authority to drive and direct mindful organizing or a cognitive-based approach to information processing, perception, and mental modelling which serve as a basis for sound decision making.

### ***Reliable Performance of Systems and Teams***

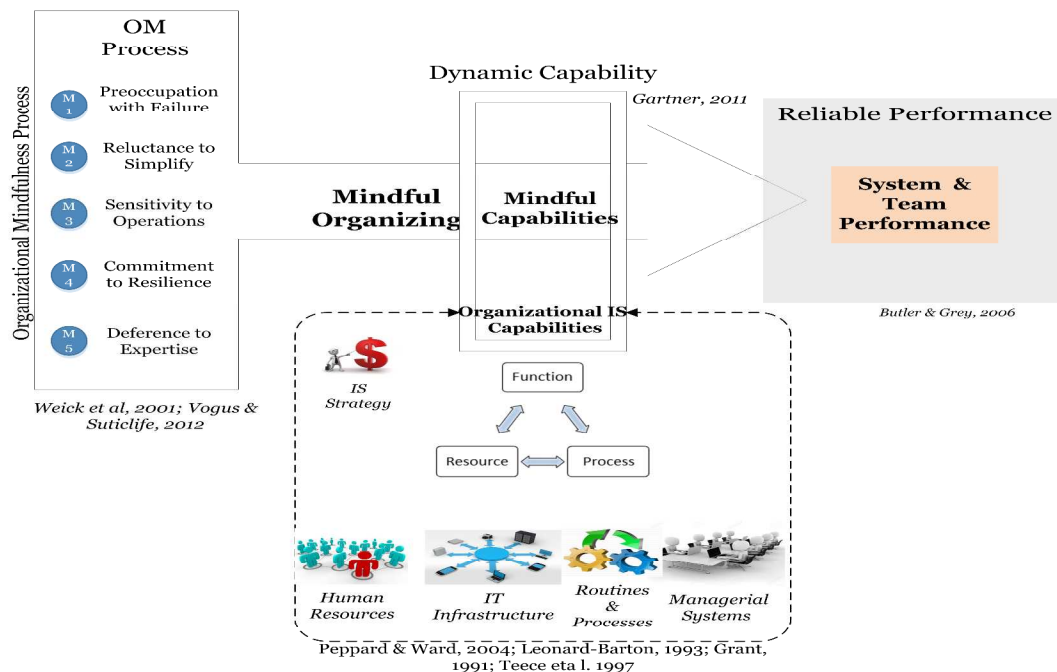
Butler and Grey (2006) presented a view that characterized mindfulness based on the attributes of engagement of adaptable processes to demonstrate an outcome in the form of reliable performance. This proposed alternate view of OM as a potential theoretical foundation to achieve reliable individual and organizational performance suggested implications to IS design, management, and operational use. The capability-based view to openness to novelty, alertness to distinction, sensitivity to context, awareness of multiple perspectives and orientation in the present was seen as actively occurring in individuals, collectively among groups, and within organizations. This work additionally described the adaptability of systems to respond to dynamic changes in environments to demonstrate reliable performance. Reliability has been defined in both Weick et al (1999) and Butler and Grey (2006) as “*the unusual capacity to product collective outcomes of a certain minimum quality repeatedly (Hannan & Freeman, 1984, pg. 153 as cited in Weick et al (1999).* Both works describe the reliability in terms of the routines which allude to repeatability or reproducibility of actions or patterns which are thought to reduce capabilities for adaptation. Mindfulness is proposed in contrast to that within HROs to describe the stability of cognitive processes and reliability under dynamic environmental conditions (Karl E. Weick et al., 1999). The infrastructure that is created as a result of the interaction of OM processes drive the development of capabilities for discovery and management of unexpected events. As a capability, OM implies a perpetual state of being ready to respond to a situation once prompted by a trigger that is a deviation from the routine processes, procedures or activities based on mechanisms which enable collective awareness, sensitivity and interpretation of such deviations. Further refinement of Butler and Grey (2006) by Van de Walle & Turoff (2008) also argued for OM as an IS capability-based method of inquiry and interpretation for systems to demonstrate reliable performance, illustrated in Figure 1. Based on the theoretical paradigms which have shaped our understanding of group and organizational cognitive processing, our

research considers the influencing role of CIO in the engagement of teams using organizational processes and IS designed to support reliable performance (Vogus & Sutcliffe, 2012). Adopting a perspective for examining the role of the CIO to support reliable performance based on mechanisms for system-enabled inquiry and interpretation (Butler and Grey, 2006), capabilities are built upon engagement with the operational IT/IS front lines of the organization (Leonard-Barton, 1993).



**Figure 1 Mindful-Based Capability for High Reliability (Van de Walle and Turnoff, 2008, adapted from Weick, et al, 1999)**

The conceptual framework develops from an interpretation of dynamic capabilities and reliability illustrating dimensions of interaction between managerial cognition and organizational capability which become oriented towards outcome and performance that are repeatable and reproducible. We purport that MO (informed by OM processes) creates the ability to leverage organizational resources in a purposeful, adaptable, and dynamic way. Efficiency and effectiveness in organizing is obtained when organizational functions, resources, and processes demonstrate cognitive processing to discover and manage the unexpected. Figure 2 illustrates the engagement these processes through MO to demonstrate an ability to leverage the capabilities of human resources, infrastructure, processes or managerial systems (Leonard & Barton, 1993; Peppard & Ward, 2004). When reliable performance is the goal of IS strategy, it is implied that there should be a translation in the organizing and resourcing of activities to support dynamic capabilities (Gärtner, 2011) which ensure that the organization is responding in a proactive, rather than reactive manner (Butler & Grey, 2006). In the context of organizing, the model implies that successful mindful organizing requires consideration of both routine and mindful processes in building and enhancing organizational capability. The CIO sets the tone and priorities for an IS strategy, representing those interests at the executive roundtable, and serving as the chief organizer of those



organizational capabilities. **Figure 2 Mindful Organizing Conceptual Framework (created by researcher)**

Effective strategic management requires an orientation which views dynamic capabilities beyond IT resources which can be acquired, developed, and implemented throughout an organization, to a view of situational awareness competency which must be harnessed within an organization focused on reliability and resiliency.

### **Techniques for Mindful Organizing Processes and Organizational Outcomes**

Building on the implications of mindfulness on managing and organizing, Gärtner (2011) presented a model for management practices which leverage the expertise of an organization so that experts can contribute to identifying problems and solving challenges. Expertise is elevated more than hierarchy, authority, plans or goals (Weick and Sutcliffe, 2007) to encourage interactions in order to enhance organizational capacity in response to uncertain change. On the surface the flatter decision making structure encouraged by OM may seem counterintuitive. This section elaborates on the five processes describing how each manifest themselves in management practices and organizational outcomes. The techniques proposed in this section emphasize the creation of mindful organizing as a mechanism of dynamic capability building (Gärtner, 2011) and positive utilization of human resources which have been found to positively influence MO (Vogus & Welbourne, 2003) among groups. The following are focused on cognitive-behavioral practices described in literature, using and incorporating suggested strategies to inform our conceptual model.

#### **Preoccupation with failure**

*Preoccupation with failure* refers to organizational principles and processes that increase attentiveness to failures which offer opportunities to assess the health of the system, analyze near failures, and focus on reliability of the system. CIOs should consider failures as an indication of errors within the system as learning opportunities that are used to encourage reporting and reduce complacency.

<b>Mindful Organizing Practice</b>	<b>Organizational Outcomes</b>
<p><b>Stress Testing:</b> Find opportunities to test the system to identify <i>push points</i> for failures as an indication of errors</p> <p><b>Corrective Actions:</b> Use errors and failures within the system as learning opportunities, not scape-goating, blaming, incompetence, or sustained conversation focused on failure.</p> <p><b>Decision Making Models:</b> Develop and use protocols based on naturalistic decision making such as STICC (Situation, Task, Intent, Concern, and Calibrate)</p> <p><b>Balanced Scrutiny:</b> Develop practices for balanced evaluation of error and not constant scrutiny that leads to repressive practices and structures that erode trust and respectful communication.</p>	<p><b>Failure Reporting:</b> An organizational culture without individual blaming but focus on root causes for failure and interruption.</p> <p><b>“Suspicious Organization” Warning:</b> Organizational trust, respect, and consistency to counter the effect of opportunistic behaviour which may create an atmosphere of distrust and paranoid</p> <p><b>“Good Management” Practices:</b> Facilitative structures and practices that facilitate positive emotion, meaning and connection within and across teams as an outcome of the practice.</p>
References: O’Conner and Fiol, 2002; Kets de Vries, 2004; Butler and Gray, 2006; Goswami, et al., 2008	

#### **Reluctance to Simplify Interpretations**

*Reluctance to simplify interpretations* refers to the use of methods to increase awareness of complexity from divergent perspectives preserved by system and process redundancies. By creating a complete picture of how a system operates, a CIO is able to position themselves and the organization to face complexity, instability, and unpredictability. Simplifications are thought to lead to misspecifications and

assumptions which may interfere with seeing potential issues and indicators that would serve as a source of concern (Weick et.al., 1999).

Mindful Organizing	Organizational Outcomes
<p><b>Cross-Disciplinary Training:</b> Use employees from other disciplines to create divergent ideas</p> <p><b>Sustained Situation Awareness:</b> Focus on levels of awareness of resources capabilities and system operations to identify and assess triggers and deviations from normal operations.</p>	<p><b>Information Leveraging:</b> Processes and mechanisms to get strategic level visibility of anomalies and small events to leverage resources of power.</p> <p><b>Information Filtering:</b> Processes to enable strategic level situational awareness geographically dispersed from operational (or day to day) activities</p> <p><b>Label Suspension:</b> Practices and processes to suspend automatic labelling of a change or deviation by forcing awareness to stay in the present situation (Guiette et. al, 2014; pg. 613)</p>
References: Endsley, 1995; Dutton, 1997; Weick and Sutcliffe, 2006; Guiette et. al, 2014	

### Sensitivity to Operations

Attentiveness to regular situations allows for organizations to have an ability to continually adjust the system to prevent errors. This *sensitivity to operations* refers to the maintenance of situational awareness which provides an integrated picture of operations in the moment based on perception, synthesis, and projection. Mindful organizing has been argued to encourage scanning and interpretation of opportunities and threats because of a sensitivity to internal and external changes which affect system operations and organizational processes (Weick et al, 1999; Butler and Grey, 2006). This mechanism of mindfulness supports a critical function of dynamic capabilities, where awareness and sensitivity to operations support the evaluation of changes which have the potential to affect the whole system (IT based and organizational).

Mindful Organizing	Organizational Outcomes
<p><b>Technology-Based Scanning:</b> Use technology-based systems to maintain awareness and analysis of deviations in normal operations and connect anomalies</p> <p><b>Resource Reconfiguration:</b> Awareness of changes and opportunities should encourage the reconfiguration of available resources and integration of new resources in order to cope with changed conditions</p>	<p><b>Interdependent Awareness:</b> Knowledge of complexity in the interdependences embedded in the organization beyond the unanticipated event which contribute the operational picture, decisions, information, resources, and workflow.</p>
References: Weick et al, 1999; Mu and Butler, 2009; Vogus and Sutcliffe, 2012	

### Commitment to Resilience

Unexpected events will occur within any system. The activities which help anticipate a potential failure are coupled with a *commitment to resilience* which allows the continuity of operations after a failure or in the presence of continuous stress. The principle refers to a capacity to “bounce back” from unanticipated and anticipated dangers after they occur and surprises in the moment through the use of informal networks and improvisation. Dynamic capabilities consist of building and reconfiguring routines of collective (i.e., organizational) behavior specific to a situation using simple interpretation (O’Connor and Fiol, 2002). Mindful organizing emphasizes the integration of multiple interpretations and distinctions to create adaptable and flexible routines to meet the needs of a situation. Consequently, commitment to resilience in mindful organizing recognizes the appropriate response may rely on the awareness and use

of mindful processes as opposed to routine ones. This allows for an individual to act mindfully, when a situation calls for it (Levinthal & Rerup, 2006)

Mindful Organizing	Organizational Outcomes
<p><b>Resilience Processes Pathways:</b> Focus on keeping errors small and improving workarounds to ensure that the system maintains the ability to function</p> <p><b>Routine Re-Fitting:</b> Build awareness of routine-based and mindful-based processes that are fit to the needs of a situation.</p>	<p><b>Appropriate Resource Allocation:</b> Resources into training, cross training, and building of redundancy into the system, technology, or personnel resources available to respond to unexpected events.</p>
References: Levinthal & Rerup, 2006; Vogus and Sutcliffe, 2012	

### Deference to Expertise

Decision making migrating to the appropriate expert is a feature of OM which allows for decisions to be made by individuals because of specific and/or specialized knowledge. This *deference to expertise* allows for the accumulation of a diversity of expertise within an organization creating a capability to empower knowledgeable team members to act (Weick et al, 1999). One of the criticisms of this principle is that a deference to authority and experience may affect the acceptance of a novice perceptions of a situation. The “Beginner’s Mindset” is encouraged in mindful organizing, depicted in exploring new concepts that value expertise and beginner perception to adapt to changed environmental conditions and open possibilities for context categorization (Suzuki, 1980).

Mindful Organizing	Organizational Outcomes
<p><b>Resource Leveraging:</b> Identify technical expertise and social skillsets to understand issues and persuade others of benefits;</p> <p><b>Mindful power plays:</b> Aligning resource leveraging in alignment with organizational procedure focus on resource allocation, coordination, and investment guided by awareness of organizational benefits.</p> <p><b>“Beginner’s Mindset:”</b> Have openness for the perspectives of novice as well as experts in decision making to overcome cognitive distortion and inform actions.</p>	<p><b>Flexible Hierarchy:</b> An IT organizational structure that is has the flexibility to link expertise with problems, solutions and decisions.</p> <p><b>Bottom-Up Decision Making:</b> Decision making which may happen a lower levels based on where the expertise is positioned.</p>
References: Crozier and Friedberg, 1980; Suzuki, 1980; Vogus and Wellbourne, 2003; Vogus and Sutcliffe, 2012	

## Towards a Conceptual Model for Transformative Leadership

In this section, a broader, more adaptable model of leadership is presented, drawing upon the concepts of MO and dynamic capabilities discussed above. This model, referred to as the “Transformational Leadership Model for Mindful Organizing” is set out in Figure 3. It presents an illustration of concepts in earlier sections which direct us to a transformational leadership approach to engage in mindful organizing.

### *Transformative Leadership through Mindful Organizing*

This paper has recognized the dichotomy of CIO capability, where one aspect focuses on organizational performance, and the other emphasizes competencies for strategic leadership and decision making. Building on Gartner’s (2011) argument that mindful organizing *are preconditions or the medium and*

*results of agent's activities (pg. 262)*, we suggested building social strategies and practices which focus on outcomes which shape and influence further practices for mindful organization. This starts with a keen recognition of the transformative power that the CIO possess to cultivate an environment where mindfulness is fostered and encouraged. Transformative leadership has been described as *leadership that facilitates the redefinition of a people's mission and vision, a renewal of their commitment, and the structuring of their systems for goal accomplishment (Roberts, 1985 cited in Leithwood and Poplin, 1992, pg 9)*. With roots in educational strategic management, this approach to leadership recognizes that the leader not only has the ability, but the intrinsic responsibility to maintain a culture of collaboration, foster development, and improve group problem solving. MO is proposed as a mechanism by which a CIO can assess and cultivate capability building using a bottom-up approach where organizational processes reinforce or encourage awareness abilities critical to system and team performance. It argues for a capacity to stay focused and aware of events, changes, emerging technologies, and uncertainty in its various forms to transform social practices to adapt appropriately and meet the needs associated with that disruptive change.

A dominant theme in IS management literature to summarize CIO capability is *flexibility* as a strategic leader representing a dynamic resource embedded within an organization. Patten et al, (2005) offers a compelling argument of how the CIO leads in a way where they are prepared to anticipate change and agile in the ability to wait for changes to occur then react in an effective manner to fix a problem. Articulated as an *IT Flexibility Framework*, this perspective gives credence to the application of mindful organizing to bridge what the CIO *does* with the type of leader the CIO *is*. With a strategic focus on resiliency, MO offers the tools to channel the transformational power of the CIO in a way that benefits the leader, the IT team, and the organization. In research, MO has been suggested as the paradigm in which to develop management skills for building awareness and adaptive learning programs and processes. The tenets of Gebauer's (2012) findings ring true: *principles of MO show managers that organizing and performing reliably in dynamic contexts is a matter of constantly checking, revalidating, decontextualizing and adapting—a perpetual process of seeking high reliability, rather than an end state that will be reached (pg. 228)*. Suggestions of strategies for CIOs to consider to build mindful organizing capabilities are centered in the goal of performance outcomes. This not only enhance the ability to respond, but also focus on building robustness of capacity in a dynamic and continual way.

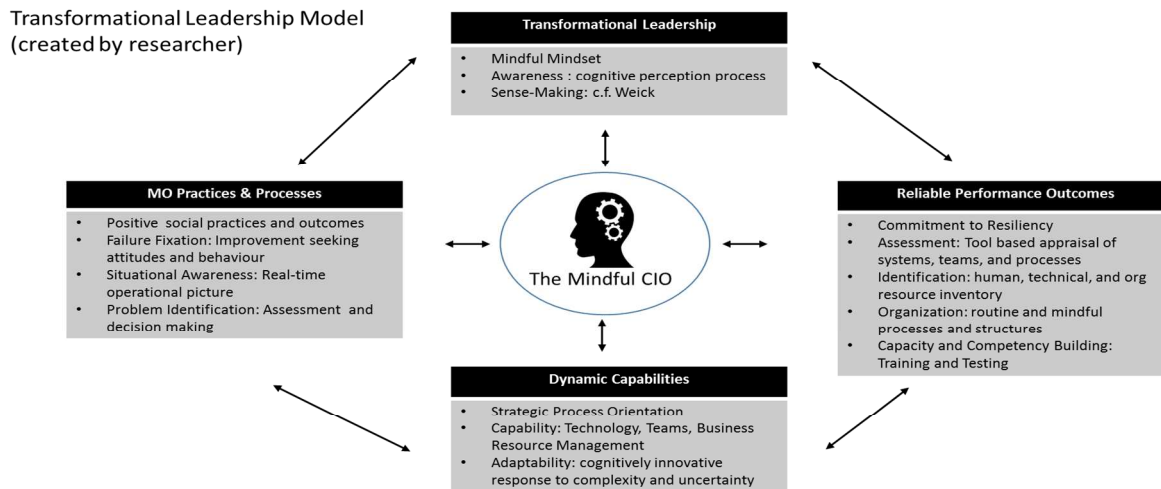
### **Conceptual Model for Transformative Leadership**

Research suggests the prevalence of two themes for successful implementation of MO: 1) preparation and coping with uncertainty and vulnerability by understanding the limitations of management; and 2) analysis of the causes, learning from unexpected events by making sense of them and analysis of their aftermath (Hülshager, 2015; Reb, Narayanan, & Ho, 2013). This suggests that instead of trying to just adhere to an approach of understanding structures and activities of mindfulness processes, transformative leaders should also focus on the dynamic capabilities they can influence. The first theme suggested that CIOs should focus on the OM principles for an anticipatory and containment focused approach to unexpected events. The second theme emphasizes the adaptive learning and flexibility associated through their fixation on failure and commitment to resiliency. The transformative leadership model, depicted in Figure 3, presents the linkages of mindfulness and dynamic capabilities towards the building outcomes set on reliability and resiliency. The mindful CIO is personified as the transformative leader who first develops an individualized mindset for acute perception and context awareness and then cultivates those abilities in his/her sphere of strategic influence. The four elements represented in the model expresses a cognitively-based approach to organizing which links the attributes of dynamic and mindful capabilities to organizational performance. Each element provides a point of reference with respect to attributes which build social processes and structures that emphasize a level of individual competency that intricately connected to collective engagement.

We build on management literature that suggests that leaders should drive processes in the form of structures and practices which cultivate an environment conducive to mindfulness (Vogus and Sutcliffe, 2012). The transformational leader has a mindset that influences their attitude and behavior towards the engagement of activities that generate positive outcomes. The managerial practices that focus on building these cognitive processes enable a strategic process orientation that focuses on system and team abilities which allow for an organization to be adaptable. The leader builds up the capabilities within his/her organization to achieve reliable outcomes. Their commitment to resiliency is demonstrated in the desire



to continually assess the health of the system by stressing it and filling the gaps found with improvements to the system and building the capability of teams through planning, training, and testing. Theoretical and empirical literature about mindfulness suggests that certain practices, processes, and procedures lead to an ability to anticipate or contain unexpected events at individual, group and organizational levels. Cognitive associations of individual, group (or collective), and organizational attention to context and perception are seen to affect leadership competence and behavior.



**Figure 3 Transformational Leadership Model (created by researcher)**

## Model Validation

This research intends to validate the constructs related to capability from its functional, resource and process oriented dimensions to evaluate reliable performance of teams using specialized decision support systems. Our research extends literature from a multi-disciplinary perspective to focus on group cognition and decision outcomes developed as a result of a mindfulness paradigm obtained among strategic level leaders in HROs. A major problem identified in DSS for highly dynamic environments, is with determining the effectiveness of system utilization on work performance. A perspective considering cognitive-behavioral attributes has broad implications in how systems are designed to support decision making among strategic level manager, and how they are evaluated in terms of demonstrating value to performance. Using OM constructs, we intend to investigate perceptive group scanning, interpretation and decision making (O’Conner & Fiol, 2002) which come as a consequence of integrating DSS with adaptable organizational processes. By investigating the intervening role of utilization, we hope to deepen our understanding of systems enabled decision making. Mindfully designed tools would be organizationally oriented based on domain knowledge (Fogli & Guida 2013) and able to support coordinated real time decision making among strategic level leaders. Where consideration of team behavior looks at the nuances of mindful organizing, a focus on organizational methods, processes, and structures distinguishes measures associated with mindfulness as an environmental pre-requisite facilitated by the CIO. Both are suggested to present indicators for explaining OM outcomes on strategic and operational levels within an organization (Vogus and Sutcliffe, 2012). While the concept of mindfulness is most prevalent in the area of IS innovation, we apply its principles and approaches to the design and utilization of systems in the organizational environments from within which the principles are derived. Further research in this area will use design science to focus on using OM propositions to explore the nature of this cognitive-behavioral relationship on system utilization for strategic level decision making during periods of disaster-related uncertainty.

## Conclusion

This paper presents an argument for the critical role that cognition plays in developing dynamic capabilities derived from the initiatives and actions of leaders directed by cognitive orientations (Gärtner, 2011; Reb et al., 2013). Core problems and topics of interest to mindfulness have ranged from management decision making to individual and organizational manifestations of cognitive-based

processes to investigate challenges of IT adoption, innovation, and software development. This paper provides strategies, derived from literature, to support the CIO in ensuring the reliability of IT infrastructure and enhancing their ability for managerial cognition in decision making through mindful organizing. We started with a discussion of the dichotomous nature of *being* a CIO and *doing* a CIO's role to better understand the challenges at this organizational level. An orientation in MO, a key component of organizational mindfulness and reliable system and team performance, was presented to guide decision making and process implementation. Conceptually, MO could offer IS management literature a perspective for the construction of mental models which directly affect organizational practices to support leadership in making sense of the complexity of strategic management and organization (Hatch & Schultz, 2002). By considering how MO involves the leveraging of organizational functions, processes, and resources in a way to cultivate an environment for dynamic capacity building, we offer a different lens to conduct research with significant implications on practice. It recognizes the importance of the practical wisdom of teams and experts above the predictive power of algorithms and analytics, while encouraging practices to leverage resources to support the CIO.

The results of this research has implications for theory and practice in the consideration and integration of managerial cognition to our understanding of strategic leadership and organizational management. A consideration of the transformational role that the CIO has in influencing policy for competitive advantage is limiting. An expanded view of mindful organizing as a means for fostering dynamic capabilities places the functional abilities of organizational resources in tandem with the capabilities of human resources and organizational processes. Further empirical research is essential and encouraged in the mindfulness domain to explore how group cognition affects performance, as well as utilization of information systems. While there has been considerable work focused on managerial cognition in decision making, there is general paucity of research relating to the role of the CIO in the cultivation of an organizational environment conducive to dynamic and mindful processes and practices. This review has sought to bring together disparate areas of knowledge from management and organizational science literature to present a framework for continued study in the area of IS strategic management. This paper has postulated a conceptual model for mindful organizing and transformational leadership for the CIO focused on pragmatic and executable strategies. It extends the concept of strategic level decision making beyond the narrow focus of resource and management capabilities to include behavioral and cognitive dimensions. By providing action-oriented strategies for leaders, we hope to contribute this expanded perspective to organizational leaders and teams alike. We put forth a position that suggests a fundamental change in our discourse about leadership and organizational performance to incorporate the multiple dimensions of mindfulness as a form of managerial cognition. Building on the body of knowledge of organization science and IS utilization, we propose employable techniques for the CIO to consider to improve team performance in the challenging, changing, complex era of the 3C's.

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