

PROPOSING VALUES AND PRACTICES FOR A CULTURE OF ORGANIZATIONAL INGENUITY: HACKING SYSTEMS THINKING TO PURSUE THE PREPOSTEROUS AND PRODUCE THE IMPOSSIBLE

Kendra Rosencrans
6406 113th Ave NE
Kirkland, WA 98033

Abstract

What is the difference between people outside, or within, organizations that look at a problem with a lot of limits and see unusual and new possibilities, and those who look at a problem with a lot of limits and see no way out? How would an organization intentionally transform its worldview and its problem-solving practices to creatively reconsider its own structures, policies, and assumptions when solutions to key needs and complex problems are limited or prevented by institutional or resource constraints? Education, government, and business leaders agree that creativity and innovation are essential for future organizational success and even survival, yet leaders are often blinded by past policies, organizational goals, or assumptions about resources and systems relationships when faced with complex and changing problems. However, research suggests that there are qualitative differences between individuals, teams, and organizations that become cleverly, resourcefully innovative in the face of complex problems under constraints, and those who do not. The culture and practices that activate shrewd, transdisciplinary, and unconventional problem-solving in the face of resource limits and other constraints are associated with a familiar, but largely unexamined, concept called *ingenuity*. Most frequently, ingenuity has been used to describe innovative solutions that are surprisingly smart, unconventionally resourceful, and contextually superior, often completely changing an institution or social-technical culture. In this messy intersection where creative, innovative problem-solving is at once demanded and prevented, ingenuity is the human factor necessary to hack the hairball, to pursue the impossible by being willing to seek unconventional connections arising from diverse knowledge, skills, and perspectives; dialogue at the margins; resilience; imagination; creative and resourceful improvisation; and systems thinking. The culture and practices of organizational ingenuity integrate systems thinking into a framework designed to provoke the unconventional approaches to complex problems that produce exponentially better solutions for sustainable business and a sustainable world. As organizations develop broad-based cultures and capacities for ongoing innovation, there is a need to distinguish the concept and value of an innovation culture that integrates systems thinking and the resilient, empathetic, value-driven, collaborative, improvisational, diverse, counter-intuitive, paradoxical capacities of ingenuity.

Keywords: systems thinking, innovative, business, resilience, human factor

ORGANIZATIONAL INGENUITY

What is the difference between people outside, or within, organizations that look at a problem with a lot of limits and see unusual and new possibilities, and those who look at a problem with a lot of limits and see no way out? Could an organization intentionally transform its worldview to creatively reconsider its own structures, policies, and assumptions when stuck between the need

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to solve a compelling problem or meet a critical need, and untenable resource constraints? While leaders in education, government, and business agree that creativity and innovation are essential for future success and even survival, there is great debate over how and in what ways those capacities, skills, practices are brought forward within organizations to solve increasingly challenging and complex problems within changing conditions and resource limits in order to craft services and solutions that sustainably support a peaceful, thriving 21st century planet (Southern, Gaffney, & Moore, 2012; Homer-Dixon, 2001).

The qualitative difference between those individuals, teams, and organizations that become shrewd, clever, and inventive problem-solvers in the face of constraints and those that do not has been linked to a familiar, but largely unexamined, capacity called *ingenuity*. Ingenuity, as a skill, a capacity, and a way of thinking and acting, inhabits and arises from the tension between needs and constraints that provokes reconsideration of existing methods and resources, and propels connections and novel solutions previously thought impossible (Kuhn, 1963; Lampel, Honig, & Drori, 2011, Homer-Dixon, 2001).

Organizational ingenuity, defined by Lampel and colleagues (2011, 2014) is “the ability to create innovative solutions within structural constraints using limited resources and imaginative problem solving.” Organizational ingenuity denotes a shift in how people, teams, and organizations think and act when standard processes and solutions either fail, are unable to, or are prevented from solving problems or meeting market needs. Other business researchers have proposed the term, frugal innovation, as a way to conceptualize the skills, values, and processes for creative problem-solving in scarcity and adversity. These scholars define frugal innovation as “the gutsy art of improvising ingenious solutions” (Radjou, Prabhu, & Ahuja, 2012).

The concepts overlap, but scholars in both areas of emerging research agree that in our interconnected, complex, and changing world, where “yesterday’s solutions have given rise to today’s problems,” and today’s standard practices and assumptions stand in the way of tomorrow’s best solutions, the resilient, transdisciplinary mindset and skills that differentiate ingenuity from routine innovation are urgently needed, poorly understood, and in short supply (Homer-Dixon, 2001; Lampel et al, 2011, 2014).

This essay examines the literature on organizational ingenuity through a cultural lens, proposing that there are key values, principles, and practices that, if structured into or cultivated within an organization, would predispose people, teams, and leaders, including nonprofit and social or civic organizations, toward a more agile, resilient, resourceful, and imaginative style of problem-solving when facing critical problems in complex, paradoxical conditions and resource constraints. This review first examines the need for creative problem-solving in an era of complexity. Next, the essay will examine research on organizational ingenuity and frugal innovation. Third, the review will discuss the values, principles, and practices common to these two concepts, proposing that each offers small, but important, opportunities for organizations to become more agile, transformative problem-solvers in a complex, rapidly changing world.

The need for ingenuity and the case of Flint, Michigan

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The research on ingenuity as organizational practice and worldview is linked to declarations by scholars analyzing current and future threats to national and global security arising from the known, unexpected, and unintended complexities of a growing population, environmental change, and technological advances. The world is experiencing an “ingenuity gap,” Homer-Dixon (2001) said, marked by “the very real chasm that sometimes looms between our ever more difficult problems and our lagging ability to solve them.”

Social ingenuity reimagines relationships between people and organizations, how they communicate, how they partner, and what they value (Homer-Dixon, 2001). In this way, the products of technical ingenuity flow through the networks of relationships developed through social ingenuity. This capacity of social ingenuity to re-invent and re-configure values, priorities, and resources is a phenomenon that, in decades past, gave rise to the changes and transformations “that have shaped our current economic, social, and political realities” (Courpasson, Arellano-Gault, Brown, & Lounsbury, 2008).

A lack of ingenuity is often more noticeable for the dramatic problems that result when institutions or social agencies “become progressively more complex and rigid, and in turn, progressively less creative and able to cope with sudden crises and shocks” (Homer-Dixon, 2001), potentially giving way to political or economic chaos. The water crisis in Flint, Michigan, is a recent, horrifying example of how a lack of ingenuity over decades among multiple systems crystalized in a dramatic, unintended consequence: Lead-contaminated drinking water and the poisoning of thousands of city residents, including children (Davis, Kolb, Reynolds, et al, 2016).

A state task force of physicians and researchers reviewing the Flint water crisis concluded that the health catastrophe and public agency disaster stemmed directly from the interactions between multiple, complex phenomena: the inability of the region to recover economically from the collapse of General Motors; rising poverty among Flint residents; a declining tax base; an aging city infrastructure filled with lead pipes, and a state law that replaced local elected officials with state emergency managers charged with fiscal recovery rather than public service and accountability (Davis et al, 2016).

From a financial perspective, the decision by state emergency managers to end Flint’s contract for water with the Detroit Water and Sewage Department and use the city’s own water treatment plant on the Flint River made sense. However, state emergency managers ignored the complexities and the social ingenuity behind the arrangement. The industrial companies that had founded Flint, now gone, had, over decades, released tons of chemical-laced waste water into the Flint River. Such a polluted water source demanded an expensive clean-up and a modernized water treatment plant, too expensive for Flint’s city budget. Therefore, over the years, Flint and Detroit leaders agreed to make DWSD, located on Lake Huron, the region’s primary water supplier, allowing resources to be focused on keeping it up-to-date. Flint officials could then maintain, but not modernize, the city’s water treatment facility on the Flint River as the region’s secondary, emergency back-up system (Davis et al, 2016).

As this case illustrates, organizations and institutions that act without curiosity, insight, and empathy are unable to navigate complex problems, ending up paralyzed or, conversely, spending

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more resources to meet complexity with complexity, becoming unsustainable (Tainter, 2006). This same warning, about the pitfalls for organizations and institutions that rely on familiar or traditional patterns, mindsets, structures, approaches, and practices when viewing both problems and opportunities, is repeated in many ways and through much research (Bolman & Deal, 2013; Senge, Smith, & Krschitz, 2010; Argyris & Schon, 1996).

Technology alone will not deliver a just, equitable, or sustainable world. Instead, in a technological culture, more humanistic approaches to problem-solving and innovation, based on relationships, imagination, purpose, are needed to bring people together and spark the imaginative, transformative, and unexpected social breakthroughs necessary for a more sustainable world (Aanstoos, 2015). The work of organizations is to both inhabit this space as transformational innovators, and to train growing generations of inventors, change-agents, and leaders to operate with resilience in paradoxical conditions and engage in the creative, collaborative art of working across boundaries to inspire organizational ingenuity.

In this messy, paradoxical intersection where resilient, agile innovation is at once demanded and prevented, creative problem-solving with a spirit of ingenuity has been demonstrated to empower people to make sense of problems, constraints, and possibilities in ways that propel novel, but better, solutions. As organizations develop broad-based cultures and capacities for ongoing innovation, there is a need to better distinguish the concept and value of an organizational culture that includes the resilient, improvisational, systemic capacities of ingenuity, as ingenuity has been shown to produce the kind of solutions to intractable problems that are not just useful, but “an exponentially better fit for purpose” (Lampel, Honig, & Drori, 2014).

Ingenuity: Bringing a systems perspective to innovation in a complex world

Creativity and innovation for businesses, nonprofits, and increasingly civic and social institutions, have become increasingly important for organizational performance, success, and survival (Anderson, Potocnik, & Zhou, 2014; Sarros & Santora, 2008; Ahmed, 1998; Schumpeter, 1934). Creativity is viewed as the idea-generating phase of innovation, the process that converts novel, useful ideas into products and services (Amabile, 1996). As research shows, creativity does not simply spring forth from creative individuals, but depends on the social system, or work environment, that either fosters or undermines creativity through communication, values, deadlines, and other attitudes and structures (Amabile, 1996). Ongoing research among executives and organizational leaders continues to show that while leaders recognize that corporate cultures of creativity and innovation are critical, most are unsure how to foster the beliefs, values, and practices to generate creativity, experimentation, and innovation throughout their organizations (Horth & Vehar, 2014; Amabile & Khaire, 2008). Additionally, industrial-era values, assumptions, and practices woven deeply within many organizations, especially institutions, to manage daily work with stability and reliability end up resulting in rigid, unimaginative, and constrained responses to sudden, difficult, and complex problems (Amabile, 1996; Amabile & Khaire, 2008).

When the road to innovation is blocked by organizational attitudes and/or policies, or constrained by scarce financial or material resources, the challenges to creative problem-solving and invention are that much greater. However, some individuals and organizations have found ways

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to be more, rather than less, innovative in the face of constraints by supporting unconventional and imaginative problem-solving processes often associated with scrappy geniuses like Nikola Tesla, the Wright brothers, and Steve Jobs. Within organizational studies and strategic management research, the act of “creative problem-solving under institutional constraints” is being conceptualized as *organizational ingenuity* (Lampel et al, 2014; Kirkham et al, 2013). In other business literature, a similar concept, frugal or frugal innovation, is being defined as the practical, clever, and entrepreneurial problem-solving characterized by “the gutsy art of spotty opportunities in the most adverse circumstances and resourcefully improvising solutions using simple means” (Radjou, Prabhu, & Ahuja, 2012).

Ingenuity reframes the language and methodology of problem-solving and innovation within organizations in a way that is better suited for a rapidly changing, complex, world constrained by limited resources and environments. Organizations and individuals that use ingenuity for creative, clever, transformational problem-solving under constraints utilize knowledge, relationships, and other practices “to see patterns and similarities among vastly different things and to allow ideas to flow across the porous boundaries” (Homer-Dixon, 2001, p. 202). The skills and tactics necessary to shift perspectives to see and address unexpected challenges that drive needs and constrain resources in an interconnected and complex world require the core capability to see systems, collaborate across boundaries, and reframe problems as opportunities to co-create innovative solutions (Senge et al., 2010).

By translating the capacities and mindsets commonly ascribed to outstanding and unusual individuals to organizations, the values and practices that characterize ingenuity can be integrated into an organization’s culture to expand innovative capacities for problems arising from crisis, limits, and scarcity. While Homer-Dixon (2001) and others call for more social ingenuity, there is a gap in the literature as to how ingenuity and frugal innovation would translate into the culture of nonprofit organizations, social or civic organizations, and governmental agencies, the kinds of organizations that work in education, health care, community services. And yet, the ongoing mission of these organizations exists in the paradoxical intersection where the desired solutions to important problems are challenged or prevented by limits on resources, socio-economic variations in the community, and institutional constraints.

REVIEW OF THE LITERATURE

Organizational ingenuity

The word, ingenuity, like innovation, originated in the 1500s, in the midst of the Renaissance, a period marked by social, technological, and artistic transformation. By definition, the concept of ingenuity contains the concept of innovation, but conveys the ability of being inventive with the human capacity for solving problems in new ways, often involving cleverness and cunning, according to the Oxford English Dictionary. The common definition now is that ingenuity is “the quality of being clever, original, and inventive,” but it is also associated with a sense of being “resourceful” and “cunning” in making or remaking something new. The Latin root, *ingenuitas*, carries a sense of innate intellectual virtue, an inborn talent for not just being inventive, but for gaming the system.

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The term ingenuity is used freely and inconsistently, but usually with a sense of admiration, throughout the popular press and academic literature to generally describe a new idea or process or product that is also clever and out of the ordinary. Within organizational studies, organizational ingenuity is being conceptualized as a problem-solving process that is activated within paradoxical conditions – the interplay between a pressing problem and resource or institutional limits; between the demand for innovation and restrictions on creativity; between the desire for change within an institution and its own opposition to that change (Banerjee, 2014). Ingenuity is characterized by researchers as both a skillset for analyzing problems and developing solutions, and as a mindset that empowers experimentation and unconventional ideas (Lampel et al, 2014; Bolman & Deal, 2013, p.12). As a problem-solving process, ingenuity uses the “simple rules of complex conceptual systems” (Cabrera & Colosi, 2008) to make distinctions, see systems, connect relationships, view other perspectives (DSRP). Kirkham and colleagues describe these steps as define, discover, determine. By working through iterations of these steps, the solution-seeker will expand and shift perspectives, generating new connections and insights (Binks, Mosey, & Kirkham, 2009).

Organizational ingenuity occurs in the both/and, Lampel and colleagues (2011) propose, when, “to meet the challenge of the situation, (organizational) actors develop a set of skills, social tactics, and mental orientation “to create innovative solutions within structural constraints using limited resources and imaginative problem solving.”

Within organizational studies, scholars have examined ingenuity by looking at unusual design strategies used to reframe and stimulate new product ideas (Matthews & Bucolo, 2012; Matthews, 2014); and at the development of unusual partnerships between communities, solar energy companies, and provincial government agencies to press for broader national solar energy policies and grid access in Canada (Walker, Schlosser, & Deephouse, 2014). Other studies have studied the paradoxical relationship between scarcity and entrepreneurial activity (Pina e Cunha et al., 2014); and the demand for, and opposition to, innovation within universities (Stam, Wakkee, & Groenewegen, 2014).

The studies compiled through Lampel and colleagues on organizational ingenuity also examine the concept through other dimensions related to problem-solving, such as how constraints paradoxically improve creativity in problem-solving (Rosso, 2014); or how innovators in large organizations hoard, pirate, scavenge, and re-use resources without formal authorization in order to improvise and pursue early-stage innovations beyond sight of too-eager managers, or to build legitimacy for their ideas (Kannan-Narasimhan, 2014).

As much as researchers and business experts strive to define best practices for ingenuity, or characterize the steps within an ingenious problem-solving process, the literature so far shows that the conditions for, and the characteristics of, ingenuity, vary widely across industries and organizations, depending on the context, the problem, the constraints, and the need. However, scholars seem to agree on one characteristic: That ingenuity operates under paradoxical conditions involving “contradictory yet interrelated elements that exist simultaneously and persist over time” (Smith & Lewis, 2011).

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Lampel and colleagues have noted that future research into organizational ingenuity should examine the organizational characteristics or conditions that might directly foster ingenuity, as well as the pre-conditions, contexts, events, and values that empower ingenuity. The problems and constraints that create the conditions that demand ingenuity, that provoke a realization that the processes, resources, and solutions of the past no longer suffice, also arise from multiple complex systems. Although definitions of ingenuity emerging within business and organizational research (Figure 1) differ, they concur that ingenuity is a flexible, creative, cognitive capacity needed to solve problems arising from complex systems.

Future scholarship could examine how, or in what ways, the leadership practices needed to foster organizational ingenuity might be connected to research on paradoxical leadership developing within behavioral science, positive psychology, and complexity science. The skills and capacities identified within business and organizational research as important for organizational ingenuity (Figure 1) would align with skills identified within psychology and leadership studies as critical for paradoxical leadership: The ability to hold contradictory ideas; cognitive complexity and fluency; conflict management, and communication (Smith & Lewis, 2012).

Table 1: Definitions and dimensions of ingenuity

Author	Definition	Dimensions	Source of ingenuity
Homer-Dixon (2001)	The set of instructions that tell us how to arrange the constituent parts of our social and physical worlds to help us achieve our goals	Resilience, cognitive fluidity, flexibility, creativity, difficulty, and scarcity	Arises within culture, passes on knowledge, experiences and lessons from the past that inform the future.
Lampel, Honig, & Drori (2011, 2014)	The ability to create innovative solutions within structural constraints using limited resources and imaginative problem solving	Creativity, persistence, innovation, bricolage, questioning, rethinking, social tactics for partnering, bartering, leverage.	Emerges from contexts, values, skills, social tactics, mental orientations
Kirkham, Mosey, & Binks (2009, 2014)	A problem-solving process to realize new ideas.	Reasoning, knowledge, intuition, imagination, ability to tolerate uncertainty, ability to move forward without a plan, iteration	Three-step thinking process of definition, spending more time on relationships, causes; discovery, looking widely and imaginatively for new ideas; determination, using appropriate judgment to foresee consequences
Radjou, Prabhu, & Ahuja (2012)	An innovative fix; an improvised solution coming from cleverness and resourcefulness; doing more with less	Entrepreneurial spirit, frugal, flexible mindset, ability to see opportunity in challenges and constraints	Gaming the system Finding new uses for everyday objects; persistence
Bray (2013)	The skill of working out how to achieve things or invent new things or ideas	Critical thinking, creativity, entrepreneurship, collaboration, improvisation, question standard practices	Rooted in a set of teachable competencies and skills that should be included in the K-12 public school curriculum

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The concept of ingenuity crosses across creativity (Amabile & Khaire, 2008); innovation (Ahmed, 1998); future system design (Senge et al, 2010); organizational culture (Lampel et al, 2014); communication (Southern, 2005); complexity (Tainter, 2006; Homer-Dixon, 2001); business strategy (Ahuja, 2015); entrepreneurship (Kirkham, Mosey, & Binks), education (Bray, 2013), scarcity (Pina e Cunha et al, 2014), frugal innovation (Radjou et al, 2012), constraints (Gibbert & Scranton, 2009), problem identification (Binks, Kirkham, & Mosey, 2009); sense-making (Weick, 1995), management (Anderson, Potocnik, & Zhou, 2014); paradoxical leadership (Smith & Lewis, 2012), and more. Each of these topics provides a way to consider ingenuity, but the volume of research and articles in these subject areas is large, expanding, and increasingly fragmented into specialized publications.

Business strategy scholars Lampel, Honig, and Drori (2011) have said that one intention in conceptualizing organizational ingenuity within organizational research is to invite studies that connect these strands. Step-wise managed approaches are sufficient for routine operations, and even routine innovation, but ambiguous, changing, and limited conditions also require non-linear, problem-solving processes that provoke evolutionary leaps, where the next generation solution is simply, exceptionally, and often, inexpensively better than what came before (Lampel, Honig, & Drori, 2014b).

Creative problem-solving concepts similar to ingenuity

Ingenuity is not the only word being used by researchers to describe practices and cultures that foster creative problem-solving and innovation within contexts of change, crisis, and scarcity. In behavioral and social change research, the term positive deviation is used to describe how some people develop creative, practical solutions to seemingly unsolvable problems against the odds, and with no extra resources or knowledge than their peers (Pascale, Sternin, & Sternin, 2010; Sternin & Choo, 2000).

In other countries, business research on ingenuity often connects the processes of clever problem-solving to an aspect of cultural identity. For example, in New Zealand, research on ingenuity, or “making something out of nothing,” is called *No. 8 Wire* (Bridges & Downs, 2000). In Kenya, the term for inventing or innovating despite constraints is called *jua kali*, Swahili for “hot sun,” as local inventors work outside “under intense heat and with limited resources” (Daniels, 2010). In China, clever inventive problem-solving happens through *guanxi*, that is, flexible personal networks that can be activated as unusual supply and value chains, as well as through *shanzhai*, that is, innovation coming out of piracy, where inventors copy high-tech gadgets in low-tech ways to sell to customers living on the margins (Radjou et al, 2012).

The concept of frugal innovation is getting a lot of attention from businesses and scholars. Rooted in the practical experiences of entrepreneurial inventors in India, frugal innovation, or *jugaad*, is being conceptualized as a way to reframe the language and methodology of innovation, creating a tangible set of values and practices adaptable to other organizations. *Jugaad* is a colloquial Hindi word meaning “an innovative fix; an improvised solution born from ingenuity and cleverness.” (Radjou et al, 2012, p. 4). Frugal innovation is being conceptualized as a set of problem-solving techniques, similar to organizational ingenuity; a navigation chart for a different kind of innovation for complex, constrained, difficult problems. Frugal innovation is a

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way of “thinking and acting in response to challenges, of doing more with less” (Radjou et al, 2012, p. 4).

Frugal or *jugaad* innovation is behind changes in banking and mobile communications in the developing world, where Kenya-based Safaricom and UK-based Vodafone have developed ways for people to save and transfer money using their cellphones for low fees and without having a bank account (Mas & Radcliffe, 2011; Radjou et al, 2012). The mindset, principles, and practices of *jugaad* also prompted Mansukh Prajapati in India to invent an electricity-free refrigerator built from clay, and Illac Diaz to invent a solar bottle light bulb using plastic water bottles filled with bleach-treated water for shantytown residents in the Philippines (Radjou et al, 2012).

In much of the developing world, the entrepreneurial art of improvising and gaming the system is how many people not only make do, but creatively address critical needs and socio-economic issues, such as a lack of electricity, water, and food (Radjou et al, 2012). Therefore, these values and practices can be embraced by nonprofit organizations, governmental agencies, universities, and other social and civic organizations that are in the business of addressing education, healthcare, and other social and economic issues. A culture of organizational ingenuity may empower innovation within these organizations and the systems they serve because there are multiple, variable contextual factors at every local level that require adaptive, creative problem-solving. These principles could be applied as heuristics, or rules of thumb, to guide or complement or invigorate problem-solving to help organizations better cope with meeting the challenges of complexity: limited resources; diverse stakeholders; interconnectivity; rapid, volatile change, and globalization (Radjou et al, 2012). Considering these principles, or strategies, for imaginative problem-solving under constraints through the lens of organizational culture can give leaders insight into how to build capacities for social and technical ingenuity.

PROPOSING A CULTURE OF INGENUITY

Foundational values

Likewise, ingenuity is embedded in American culture and history, from the Yankee ingenuity of the Revolutionary War, to the pioneer spirit that settled the West, to the conquest of space. Through these tales, the United States built a cultural mythology that ordinary Americans can and do muster genius plus grit, bringing ingenuity to innovation in order to overcome great obstacles and impossible odds.

Understanding ingenuity in national culture is important for organizational culture because “understanding culture at any level now requires some understanding of all of the levels. National, ethnic, occupational, organizational, and microsystem issues are all interconnected” (Schein, 2010, p.4). Culture most often refers to the dynamic system of values, practices, roles, and norms through which people interact and share meaning (Schein, 2010, p. 13; Gauntlett, 2015). Culture is dynamic, meaning that it has been formed and is being formed by people through relationships, communication, through past, imagined, and lived experiences, and through shared sense-making (Schein, 2010; Weick, 1995; Southern, 2005, 2006). Cultural systems convey explicit and embedded assumptions and beliefs about appropriate behaviors, skills, knowledge, and ideas that guide an organization’s perceptions of what is possible, with

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potential conflicts between what is espoused and what is practiced (Schein, 2010; Argyris & Schon, 1996; Schneider, Ehrhart, & Macey, 2013).

Organizational cultures of innovation broadly support and strengthen creative problem-solving and production by valuing and supporting “the creative potential of all employees and their knowledge about customers, competitors, and processes (Leavy, 2005; Ahmed, 1998). Corporate or institutional values and aspirations create the foundation for structures and actions within the organization, channeling communication and experiences between people in particular ways. (Schein, 2010; Southern, 2006).

The proposed framework for a culture of ingenuity (Figure 2) is synthesized from the literature, building on Homer-Dixon’s (2001) proposition that ingenuity encompasses core values for ordering, re-imagining, and re-inventing society. This proposal builds on the work by Lampel and colleagues (2011, 2014) that ingenuity arises in individuals and organizations through “context and values” that support the “mental orientations, social tactics and skills” needed to undertake “creative problem-solving within institutional constraints.” The values and practices that characterize frugal innovation support the ingenuity necessary for creative problem-solving and innovation in an era of complexity, especially when the conditions surrounding problems demand resilience and the agility to examine problems, needs, resources, and potential solutions from multiple perspectives.

1. Resilience: We will rise to the challenge and persist through adversity
2. Passion: We believe in a better future worth pursuing
3. Empathy: We will value and listen to others
4. Resourcefulness: We will work within limits and find other ways
5. Improvisation: We can respond well to changing conditions without a map
6. Insights: We value a-ha connections and alternative ways of knowing
7. Adaptability: We can adjust to the demands of change
8. Frugality: We use resources wisely and do not equate expense with quality
9. Failure: We value the learning from failing quickly, cheaply, and often
10. Simplicity: We see value in simple steps and good enough solutions
11. Diversity: We value diverse people, knowledge, perspectives, and relationships

These values surround six principles adapted from Radjou and colleagues (2012):

1. Seek opportunity in adversity
2. Do more with less
3. Think and act flexibly, seek diverse perspectives
4. Keep it simple
5. Include the margin, seeking out missing stakeholders
6. Follow your heart; act with passion.

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Values & principles for a culture of ingenuity

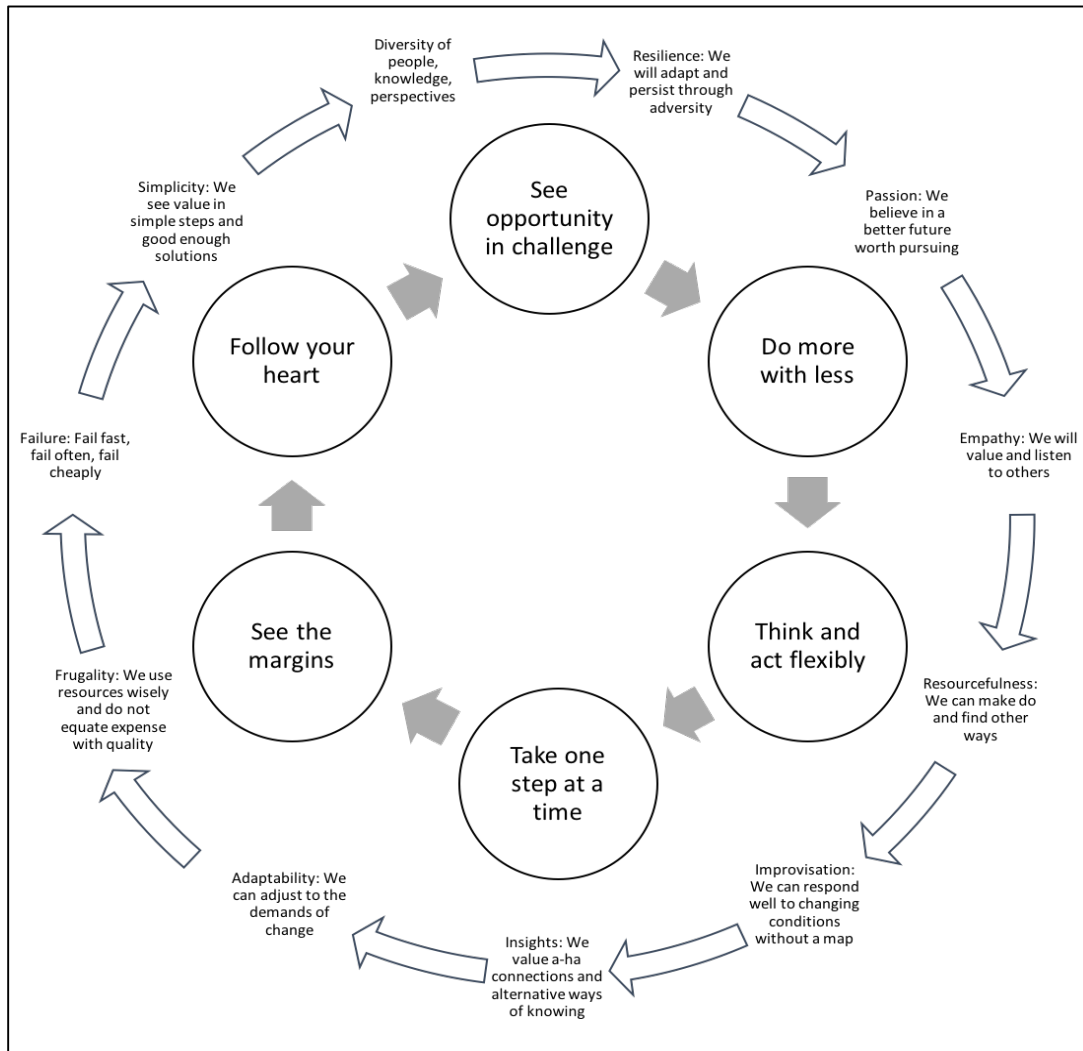


Figure 1: Values and principles for a culture of organizational ingenuity. Adapted from Lampel, Honig, & Drori, 2014; Radjou Prabhu, & Ahuja, 2012; Homer-Dixon, 2011; Kirkham, Mosey, & Binks, 2013; Bray, 2013.

Leadership: Putting values into action under paradoxical conditions

Leaders that aim to foster a culture of ingenuity need to translate values into the goals, expectations, and practices “that animate” creative ideas and problem-solving processes (Miller & Bankovic, 2010). The pull between problems, potential solutions, and constraints creates tension, and possibly conflict, challenging leaders to embrace, rather than resist or reject competing demands (Smith, Besharaov, Wessels, & Chertok, 2012). Therefore, how, and in what ways, leaders communicate about paradoxical situations, about competing demands, about creativity, about resilient and flexible thinking, will create the conditions to enable people to think differently, bring forth ingenious ideas, and experiment with unconventional, but potentially better, solutions (Drori et al, 2014).

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Ingenuity is characterized by a mindset and practices that allow individual actors, teams, and organizations to question and reframe problems, constraints, and solutions in order to deviate from standard approaches while working within the structural constraints of the organization or institution (Lampel et al., 2014; Bolman & Deal, 2013, p.12). Leaders can facilitate organizational ingenuity by reframing challenges, ambiguities, and constraints as opportunities, combined with these three practices:

1. Openly acknowledge the tension and paradoxes in complex problems.
2. Use collaboration and dialogue to cross boundaries and diversify ideas.
3. Connect challenges to passion, purpose, and potential.

Openly acknowledge tensions and paradoxes in complex problems

The paradox of organizational ingenuity that improves or changes social institutions, such as education, health care, and government, is that the institution that demands innovation, often through top-down initiatives, may oppose or otherwise constrain creative, transformative change, especially when constraints are constraints embedded “in the legitimate logic of the organization” (Walker, Schlosser, & Deephouse, 2014; Lampel et al, 2011). As leaders acknowledge, embrace and communicate the value of paradoxical thinking, the organization makes sense of a seemingly unresolvable problem (Weick, 1995), freeing people within to generate vastly different ideas and possibilities toward a better solution by working in metaphors, looking at the margins, using systems thinking, changing perspectives (Singh, Gupta & Mondal, 2012).

For example, like most large hospitals around the country, Stony Brook University Medical Center in New York routinely forced admitted emergency patients to wait for hours, sometimes days, along crowded emergency department hallways until hospital treatment beds became available. Research on this phenomenon has documented the detrimental, and often deadly, impact admission delays have on patients (Innes, Grafstein, Stenstrom, et al, 2007). Yet, Stony Brook, like many hospitals, was caught between more people seeking care on nights and weekends and administrative agreements and budgets that limited medical staff on nights and weekends.

However, once leaders at Stony Brook University Medical Center in New York acknowledged that administrators saw no way out of the paradox, medical staff members approached with an unusual, but inexpensive, idea. What if admitted patients simply were relocated from the emergency department to other hospital hallways to wait under nursing supervision until they were assigned to a treatment bed?

The idea worked. Discomfited by seeing sick and injured patients waiting in hallways, nurses, doctors, and housekeeping staff throughout the hospital began to work differently. “Rooms got cleaned faster. Patients were discharged more efficiently. Available beds were registered in the system more quickly,” and wait times were cut almost in half. Once Stony Brook University Medical Center determined that moving patients was both safe and in compliance with state and federal regulations, the hospital made the practice standard protocol (Viccellio, Santora, & Singer, et al, 2009).

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Use collaboration and dialogue to cross boundaries and diversify ideas

In as much as the ingenuity that transforms can happen quickly, intensely, in a flash of connection or insight born out of a crisis or deeply compelling need, paradoxically, the ingenuity that transforms may happen slowly, in a series of small steps and containable risks, over several years, in a way that does not necessarily look like innovation at first. Organizations often move in small steps when facing complex, ambiguous problems, and yet, leaders that empower collaboration and dialogue as solution-seeking methods enhance the possibility for ingenuity. Collaboration can open the boundaries and constraints around a problem by facilitating diverse insights, multiple perspectives, as well as a systemic understanding of the problem. In another way, collaboration could be used to move around or through constraints as people develop a high-degree of trust and a shared vision “to see beyond the present and create the future” (Southern, 2014; Ahmed, 1998).

For example, a severe economic crisis in the 1990s forced K-12 and higher education leaders in Long Beach, California, to see that the region’s future vitality was linked to the quality of its school system. Yet, with more children coming from impoverished families, combined with school funding cuts, and a history of contentious relationships between public school and university administrators, it seemed unlikely that educators could do anything to improve education in the beleaguered city.

However, the economic crisis prompted public school district, community college, and state university leaders to set aside past fights over poorly trained teachers and failing students, and start talking with each other about the future. This dialogue between leaders developed into conversations between university professors and classroom teachers, into collaborations and small experiments aimed at improving teacher training and connecting the K-12 learning goals to higher education. Through collaboration and dialogue, the three separate educational systems developed relationships and agreements based on a shared passion and vision for the future: “We believe that all children in our community, regardless of income, will learn, graduate, and go to college.”

The ingenuity and creativity that emerged through these small steps and conversations developed into a new model for public education that envisions students progressing smoothly through a K-20 system that includes financial support for college tuition. The Long Beach Seamless Education Partnership, now almost 20 years old, has been identified as one of the world’s most improved school systems (Ruhl, 2014; Mourshed, Chijioke, & Barber, 2010; Mongeau, 2016).

Connect challenges to passion, purpose, and potential

Ingenuity occupies the space known as integrative skills, where business and tech and specialized knowledge meets the scrappy, make-do, go sideways inventiveness of the tinkerers and on-the-ground trailblazers who love a challenge, who naturally ask “How else could this be done?” or “If we cannot go through, can we go around?” In order for organizations to work with ingenuity, leaders need to communicate and create trustworthy ways for people to follow their insights and move forward without expecting a complete, logical assessment of a problem or potential solutions (Kolko, 2015).

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Within Rice University, the Rice360 Institute for Global Health encourages ingenuity by bringing together vision, empathy, and expertise with a two-fold purpose: Improving health care in developing countries, and developing a new generation of bio-engineers. The approach is intentional, said the program's director, Rebecca Richards-Kortum, chairwoman of bioengineering at Rice. "One of the wonderful things about working with 18-year-olds is that they're so creative. They don't have fixed ideas about what might not work. And so you get really crazy ideas. Like inside our bubble CPAP machine, there are aquarium pumps" (Palca, 2014; Rice360, 2016)."

A team of Rice360 students developed a low-cost, durable breathing machine for infants by following up on a strange insight: That the technology inside an expensive device needed to help babies with breathing difficulties was the same as aquarium bubblers used in fish tanks. In the developing world, respiratory distress contributes to newborn deaths in 20 to 38 percent of cases, and the percentage is much higher for premature infants. Conventional bubble CPAP machines, at \$6,000 each, are too expensive for most hospitals in the developing world, and often too delicate to withstand electrical outages (Kawaza, Machen, Brown, et al, 2014). The students built a prototype using aquarium pumps and a plastic shoe box from Target (Palca, 2014; Rice360, 2016). After refinement and testing, clinical studies have found that the student-designed bubble CPAP machine not only met the same medical and clinical standards as the conventional device, but was also durable, easy-to-use and repair, and, at \$350, considerably less expensive (Kawaza et al, 2014).

Within an organizational culture designed to empower creative problem-solving within the financial and other constraints of developing countries, these students used ingenuity to develop a medical device that is a better fit for resource-poor hospitals. The developing work on organizational ingenuity says that ingenuity can also be considered as the capacity of being skillful, improvisational, and utilizing a frugal imagination when faced with a lack of resources, such as time, materials, or money (Lampel et al., 2011; Banerjee, 2014; Pina e Cunha et al, 2014).

Without the interplay between these components, it is possible that constraints and limits arising from outside the Rice360 system could be too substantial for the ingenuity mindset to survive. One example can be seen in the actions of large, multi-national medical device companies, such as Medtronic, Boston Scientific, and Siemens Medical Solutions, that constrain start-up medical device companies or new low-cost inventions by strategically buying the patent or company, hiring new talent, or partnering with universities. These strategies enable the established companies to maintain order and control of the devices and the marketing relationships with healthcare providers and hospitals in the developing world (Donoghoe, Gupta, Linden, et al., 2012).

CONCLUSION

In looking at the literature and at examples, one can find ingenuity showing up in different ways. It can be creative rebellion against the status quo, but not always. It works within paradoxes and defies categorization, and yet has simple, common sense components. It is a skill, but not only a

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skill. It uses expert knowledge, but not only experts. In that way, organizational ingenuity may need to be considered as both a mindset and a practice for solving or addressing complex problems under constraints and against the odds, where the need, the limits, and the context are primary.

Ingenuity is called for within the tension between “the image of what we truly want to see exist and world as it is today” (Senge et al, 2010, p. 295). It taps into the “practical know-how” specific to a context, is willing to look anew at limits and problems, but also “fosters a sense of possibility about ‘what we can *do*” (Senge et al, 2010, p. 303), even though a person or team may be working within organizational constraints even as they seek to go around, over, or through them (Lampel et al, 2014).

Using a cultural lens to view organizational ingenuity is a useful starting point for conceptualizing ingenuity and how organizations might adopt a culture of organizational ingenuity for creative problem-solving under constraints. Ingenuity is “a pluralistic, blended skill, built on a fusion of aptitudes, capabilities, proficiencies, and abilities” (Bray, 2013). Therefore, to construct ingenuity as a process, practice, or culture with too much specificity risks being prescriptive, as in, take these five steps and voila, ingenuity. In that way, this proposed framework for conceptualizing key elements and characteristics for those people or organizations that want to encourage or develop a capacity for ingenuity steps away from the ongoing parsing of creativity, design, and innovation within business and organizational research to take on much in common with more with hacking, making and doing, and playful cultures.

In that way, ingenuity thinking or ingenuity culture becomes another way to “create habits and tools that help people become empowered and willing to actively contribute to the design of their lives and communities” (Fischer, 2013). “not the ability to access or learn existing knowledge, it is having opportunities to make new knowledge together, addressing issues of shared concern (Gauntlett, 2015) finding ways to build bridges between local knowledge and by exploiting conceptual collisions and breakdowns as sources for innovation” (Fischer, 2013; Gauntlett, 2015).

Organizational ingenuity can develop as a capacity within organizations to solve challenging problems creatively, but it also emerges when individuals or teams seek to overcome the challenges of problem solving in a particular organizational context. A world of complex, ambiguous, and interconnected challenges calls for different kinds of relationships and practices within and between people and organizations to facilitate “a greater understanding of our organizational systems and a deep commitment to doing what is needed to support sustainable communities locally and globally” (Hoberecht, Joseph, Spencer, & Southern, 2011). Working within the frames and skills that support ingenuity do not guarantee ingenious solutions, but, the practices of setting aside disbelief, becoming intentionally curious, playing with unconventional ideas, questioning standard approaches, seeing the opportunities within challenges empowers people within organizations to come up with the unusual, but transformative things that sometimes change the world.

REFERENCES

Proposing a Culture of Organizational Ingenuity

- Aanstoos, C. M. (2015). Humanistic psychology in dialogue with cognitive science and technological culture. 243-254. In J. F. T. Bugental, J. Pierson, & K. J. Schneider (Eds.) *The Handbook of Humanistic Psychology: Theory, Research, and Practice*. New York, NY: Sage Publications. Retrieved from SAGE Database (Saybrook Library: SAGE).
- Ahmed, P. K. (1998). Culture and climate for innovation. *European Journal of Innovation Management*, 1(1), 30-43. <http://dx.doi.org/10.1108/14601069810199131>. Retrieved from Emerald Insight Database (Saybrook Library: EMERALD).
- Ahuja, S. (13 October, 2015). The innovative mindset your company can't afford to lose. *Harvard Business Review*. Retrieved from <http://www.hbr.com/>.
- Amabile, T. M. (1996). *Creativity in context*. Boulder, CO: Westview Press.
- Amabile, T. M., & Khaire, M. (October, 2008). Creativity and the Role of the Leader. *Harvard Business Review* 86(10) Retrieved from <http://www.hbr.edu/>.
- Anderson, N., Potocnik, K., & Zhou, J. (2014) Innovation and creativity in organizations: A state-of-the-science review, prospective commentary, and guiding framework. *Journal of Management*, 40(5), 1297-1333. doi:10.1177/0149206314527128. Retrieved from SAGE Publications Database. (Saybrook Library: SAGE).
- Argyris, C., and Schön, D. A. (1996). *Organizational Learning II: Theory, Method, and Practice*. Reading, Mass.: Addison-Wesley.
- Banerjee, A. (2014). The roots of organizational ingenuity: How do qualitatively superior ideas come about? In B. Honig, J. Lampel, & I. Drori (Eds.), *Handbook of organizational and entrepreneurial ingenuity*. Cheltenham, UK: Edward Elgar
- Bethencourt, D. (23 November, 2015). Detroit eyes adding livestock to urban farms. *The Detroit Free Press*. Retrieved from <http://www.freep.com/>.
- Binks, M., Mosey, S., Kirkham, P. (2009). Necessity should be the mother of invention. *NUBiz*. Retrieved from <http://www.nottingham.ac.uk/>
- Bittman, M. (17 May, 2011). Imagining Detroit. *The New York Times*. Retrieved from <http://www.nytimes.com/>.
- Bolman, L. G., & Deal, T. E. (2013). *Reframing Organizations: Artistry, Choice, and Leadership*. San Francisco, CA: Jossey-Bass.
- Bray, D. H. (2013). Ingenuity: A new super skill, a new assessment challenge, a new national conversation. *Assessment Update*, 25(4), 3-13. Retrieved from EBSCO database. [Saybrook Library: EBSCO].
- Bridges, J. & Downs, D. (2000). *No. 8 wire: The best of Kiwi ingenuity*. Auckland, NZ: Hodder Moa Beckett.
- Cabrera, D., & Colosi, L. (2008). Distinctions, systems, relationships, and perspectives (DSRP): A theory of thinking and of things. *Evaluation and Program Planning*, 31(3), 311-317. doi:10.1016/j.evalprogplan.2008.04.001
- Courpasson, D., Arellano-Gault, D., Brown, A., & Lounsbury, M. (2008). Organization studies on the look-out? Being read, being listened to. *Organization Studies*, 29(11), 1383-1390. doi: 10.1177/0170840608099520. Retrieved from SAGE Publications database. (Saybrook Library: SAGE).
- Daniels, S. (2010). Making Do: Innovation in Kenya's informal economy. Palo Alto, CA: *Issuu Inc*. Retrieved from <http://www.issuu.com/>.
- Davey, M. (2 September, 2013). Big dreams, but little consensus, for a new Detroit. *The New York Times*. Retrieved from <http://www.nytimes.com/>.

Proposing a Culture of Organizational Ingenuity

- Davis, M. M., Kolb, C., Reynolds, L., Rothstein, E., Sikkema, K. (March 2016). *Flint Water Advisory Task Force Final Report*. Lansing, MI: State of Michigan. Retrieved from <http://www.michigan.gov/>.
- Donoghoe, N., Gupta, A., Linden, R., Mitra, P., & Beyer von Morgenstern, I. (2012). *Medical device growth in emerging markets: Lessons from other industries*. London, UK: McKinsey & Company. Retrieved from <http://www.mckinseysociety.com/>.
- Drori, I., Honig, B., & Lampel, J. (2014). Ingenuity research: current problems and future prospects. In B. Honig, J. Lampel, & I. Drori (Eds.), *Handbook of organizational and entrepreneurial ingenuity*. Cheltenham, UK: Edward Elgar.
- Fischer, G. (2013). *Social creativity and cultures of participation: Bringing cultures of creativity alive*. Billund, Denmark: The LEGO Foundation. Retrieved from <http://www.legofoundation.com/en-us/research-and-learning/foundation-research/cultures-of-creativity/>.
- Gauntlett, D. (2015). The LEGO System as a tool for thinking, creativity, and changing the world. *Making Media Studies: The Creativity Turn in Media and Communications Studies*. New York: Peter Lang. Retrieved from <http://davidgauntlett.com/>.
- Hoberecht, S., Joseph, B., Spencer, J., & Southern, N. L. (2011). Inter-organizational networks: An emerging paradigm of whole systems change. *OD Practitioner*, 43(4), 23-27. Retrieved from <http://www.academia.edu/>.
- Homer-Dixon, T. (2001). *The Ingenuity Gap*. New York, NY: Knopf Doubleday Publishing Group.
- Horth, D. M., & Vehir, J. (2014). How leadership makes the difference. *Center for Creative Leadership*. Retrieved from <http://www.ccl.org/>.
- ingenuity. (n.d.). *Dictionary.com Unabridged*. Retrieved April 06, 2016 from Dictionary.com website <http://www.dictionary.com/browse/ingenuity/>.
- Innes, G. D., Grafstein, E., Stenstrom, R., Harris, D., Hunte, G., Schwartzman, A. (2007). Impact of an overcapacity care protocol on emergency department overcrowding. *Journal of the Academy of Emergency Medicine*, 14(5), (Supplement 1):S85-S85. doi: 10.1197/j.aem.2007.03.936.
- innovate. (n.d.). *Dictionary.com Unabridged*. Retrieved April 06, 2016 from Dictionary.com website <http://www.dictionary.com/browse/innovate/>.
- Kannan-Narasimhan, R. (2014). Organizational ingenuity in nascent innovations: Gaining resources and legitimacy through unconventional actions. *Organization Studies*, 35(4), 483-509. doi: 10.1177/0170840613517596. Retrieved from SAGE Publications database. (Saybrook Library: SAGE).
- Kawaza K., Machen H. E., Brown J., Mwanza Z., Iniguez S., Gest A., et al. (2014) Efficacy of a Low-Cost Bubble CPAP System in Treatment of Respiratory Distress in a Neonatal Ward in Malawi. *PLoS ONE* 9(1): e86327. <http://dx.doi.org/10.1371/journal.pone.0086327>. Retrieved from <http://journals.plos.org/>.
- Kirkham, P., Mosey, S., & Binks, M. (2013). *Ingenuity*. Nottingham, UK: Haydn Green Institute for Innovation and Entrepreneurship.
- Kolko, J. (September 2015). Design thinking comes of age. *Harvard Business Review*. Retrieved from <http://www.hbr.org/>.
- Kuhn, T. S. (1963). The function of dogma in scientific research. In A.C. Crombie, (Ed.) *Scientific Change: Historical Studies in the Intellectual, Social and Technical*

Proposing a Culture of Organizational Ingenuity

- Conditions for Scientific Discovery and Technical Invention, From Antiquity to the Present*. New York, NY: Basic Books.
- Lampel, J., Honig, B., & Drori, I. (2011). Discovering creativity in necessity: Organizational ingenuity under institutional constraints. *Organization Studies*, 32, 458–460. doi: 10.1177/0170840611407012. Retrieved from SAGE Publications database. (Saybrook Library: SAGE).
- Lampel, J., Honig, B., & Drori, I. (2014). Organizational ingenuity: Insights and overview. In B. Honig, J. Lampel, & I. Drori (Eds.), *Handbook of organizational and entrepreneurial ingenuity*. Cheltenham, UK: Edward Elgar.
- Lampel, J., Honig, B., & Drori, I. (2014b). Organizational ingenuity: Concept, processes and strategies. *Organization Studies*, 35(4), 465-482. Retrieved from SAGE Publications database. (Saybrook Library: SAGE).
- Leavy, B. (2005). A leader's guide to creating an innovation culture. In Randall, R. (Ed.). (2005). *Strategy & Leadership: Innovation*, 33(4), 1-64. Bradford, GBR: Emerald Group Publishing Ltd. Retrieved from <http://www.ebrary.com/>.
- Mas, I., and Radcliffe, D. (2011). Mobile Payments Go Viral: M-PESA in Kenya. *Capco Institute Journal of Financial Transformation*, 32, 169-182. Retrieved from <http://www.capco.com/>
- Matthews, Judy H. & Bucolo, Sam (2012) Creating new possibilities: using design processes to overcome constraints. In *28th EGOS Colloquium 2012: Design !?*. Aalto University, Helsinki.
- Matthews, J. (2014). Stimulating organizational ingenuity with design methods. In B. Honig, J. Lampel, & I. Drori (Eds.), *Handbook of organizational and entrepreneurial ingenuity*. Cheltenham, UK: Edward Elgar.
- Miller, P., & Bankovic, A. (2010). Building a “creative culture” for sustainable innovation. *IESE Insight*. Retrieved from <http://www.ieseinsight.com/>.
- Mongeau, L. (2 February, 2016). The Long Beach Miracle: How the working-class California city saved its schools. *The Atlantic*. Retrieved from <http://www.theatlantic.com/>.
- Mourshed, M., Chijioke, C., & Barber, M. (2010). *How the world's most improved schools systems keep getting better*. London, UK: McKinsey & Company. Retrieved from <http://www.mckinseysociety.com/>.
- Nye, H. (10 April, 2014). Saving newborns in Malawi with bubble CPAP. *Respiratory Therapy Magazine*. Retrieved from <http://www.rtmagazine.com/>.
- Palca, J. (4 January, 2014). Saving babies' lives starts with aquarium pumps and ingenuity. *Rhode Island Public Radio*. Retrieved from <http://www.ripr.org/>.
- Pascale, R., Sternin, J., & Sternin, M. (2010). *The power of positive deviance: How unlikely innovators solve the world's toughest problems*. Boston, MA: Harvard Business School Publishing.
- Pina e Cunha, M., Rego, A., Clegg, S., Neves, P., & Oliveira, P. (2014). Unpacking the concept of organizational ingenuity: learning from scarcity. In B. Honig, J. Lampel, & I. Drori (Eds.), *Handbook of organizational and entrepreneurial ingenuity*. Cheltenham, UK: Edward Elgar. 34-56
- Radjou, N., Prabhu, J., & Ahuja, S. (2012). *Jugaad Innovation*. San Francisco, CA: Jossey-Bass.
- Rice360 Institute for Global Health. (2016). [Web site]. Retrieved from <http://rice360/>.
- Rosso, B. (2014). Creativity and constraint: Exploring the role of constraint in the creative

Proposing a Culture of Organizational Ingenuity

- processes of new product and technology development teams. *Organization Studies*, 35(4), 551-585. Retrieved from SAGE Publications database. (Saybrook Library: SAGE).
- Royte, E. (27 April, 2015). Urban farming is booming, but what does it really yield? *Enzia: Institute on the Environment at the University of Minnesota*. Retrieved from <http://www.ensia.com/>.
- Ruhl, A. (29 April, 2014). Graduation rates improve at LBUSD. *Gazettes*. Retrieved from <http://www.gazettes.com/>.
- Sarros, J., Cooper, B., & Santora, J. (2008). Building a climate for innovation through transformational leadership and organizational culture. *Journal of Leadership & Organizational Studies*, 15(2), 145-158. doi:10.1177/1548051808324100.
- Schein, E. H. (2010). *Organizational Culture and Leadership*. San Francisco, CA: Jossey-Bass.
- Schumpeter, J. A. (1934). *The theory of economic development*. Cambridge, MA: Harvard University Press.
- Senge, P., Smith, B., & Krschitz, N., Laur, J., & Schley, S. (2010). *The necessary revolution: How individuals and organizations are working together to create a sustainable world*. New York, NY: Doubleday.
- Singh, R., Gupta, V., & Mondal, A. (2012). Jugaad – From ‘making do’ and ‘quick fix’ to an innovative, sustainable and low-cost survival strategy at the bottom of the pyramid. *International Journal of Rural Management*, 8, 87-105. doi:10.1177/0973005212461995.
- Smith, W. K., Besharov, M. L., Wessels, A. K., Chertok, M. (2012). A paradoxical leadership model for social entrepreneurs: Challenges, leadership skills, and pedagogical tools for managing social and commercial demands. *Academy of Management Learning, & Education*, 11(3), 463-478. <http://doi:10.5465/amle.2011.0021>
- Smith, W. K., & Lewis, M.W. (2011). Toward a theory of paradox: A dynamic equilibrium model of organizing. *Academy of Management Review*, 36, 391-403.
- Smith, W. K., & Lewis, M. W. (2012). Leadership skills for managing paradoxes. *Industrial and Organizational Psychology*, 5(2), 227-231. doi:10.1111/j.1754-9434.2012.01435.x.
- Southern, N. L., Gaffney, S., & Moore, B. (2012). Leaning into complexity: Supporting leaders through transformative learning. *Integral Leadership Review*. Retrieved from <http://www.integralleadershipreview.com/>.
- Southern, N. L. (2005), Creating Cultures of Collaboration that Thrive on Diversity: A Transformational Perspective on Building Collaborative Capital. In M. M. Beyerlein, S. T. Beyerlein, F. A. Kennedy (Eds.) *Collaborative Capital: Creating Intangible Value*. Bingley, UK: Emerald Group Publishing Limited. Retrieved from Emerald Fulltext database. (Saybrook Library: Emerald).
- Southern, N. L. (2006). Creating a culture of collaboration in a city government. *OD Practitioner*, 38(4), 12-17. Retrieved from <http://www.academia.edu/>.
- Southern, N. (14 March, 2014). Revitalizing downtown communities. [Web log]. *Rethinking Complexity*. Retrieved from <http://www.saybrook.edu>
- Stam, A. M. C., Wakkee, I. A. M., & Groenewegen, P. (2014). Acting ingeniously: opportunity development through institutional work. In B. Honig, J. Lampel, & I. Drori (Eds.), *Handbook of organizational and entrepreneurial ingenuity*. Cheltenham, UK: Edward Elgar.
- Sternin, J., & Choo, R. (2000). The power of positive deviancy. *Harvard Business Review*. Retrieved from <http://www.hbr.edu/>.
- Tainter, J. A. (2006). Social complexity and sustainability. *Ecological Complexity*, 3, 91-103.

Proposing a Culture of Organizational Ingenuity

doi:10.1016/j.ecocom.2005.07.004.

- Viccellio, A., Santora, C., Singer, A. J., Thode Jr., H. C., & Henry, M. C. (2009). The association between transfer of emergency department boarders to inpatient hallways and mortality: a 4-year experience. *Annals of Emergency Medicine*, 54(4), 487 - 491. <http://dx.doi.org/10.1016/j.annemergmed.2009.03.005>. Retrieved from <http://www.annemergmed.com/>.
- Walker, K., Schlosser, F., & Deephouse, D. L. (2014). Organizational ingenuity and the paradox of embedded agency: The case of the embryonic Ontario solar energy industry. *Organizational Studies*, 35(4), 613-634. doi: 10.1177/0170840613517599. Retrieved from SAGE Publications database. (Saybrook Library: SAGE).
- Weick, K. E. (1995). *Sensemaking in organizations*. Thousand Oaks, CA: SAGE Publications.