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Simplexity Thinking and the Basadur Innovation Profile Assessment



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Introduction

Rapidly accelerating societal and economic change is posing new, more complex challenges for management researchers seeking to improve organizations. Many organizations that prospered during more stable times – times that rewarded routinized efficiency – now find themselves poorly adapted to today’s new economic and social realities. In every direction, traditional structures are abruptly being reshaped or falling down. Once successful companies are finding that their sure-hit formulas no longer work. Long revered icons of organizational excellence have been humbled and even bailed out of bankruptcy and imminent demise by government intervention. Individuals, families, and entire communities are finding the world shifting beneath their feet as traditional markets, industries, and sources of employment disappear under the impact of new information technologies, global competition, lack of regulation of financial institutions,

uncertainty about global warming, transitioning to new energy sources, and a restructuring of the world economy. It is not surprising that organizations whose main virtues during previous times were predictability and reliability should find it difficult to adapt to this increasingly dynamic environment. Their employees, too, are struggling to deal with these changing times as the vast scale of change has resulted in an unprecedented need for information processing and problem-solving skills. There has been a dramatic increase in psychological research aimed at better understanding the cognitive capabilities of employees, in order to improve employee productivity and well-being (Hodgkinson and Healey 2008).

This chapter addresses the need for organizations to develop more innovative ways of thinking and behaving in order to succeed in a turbulent world. While many organizations possess ample efficiency and analytical capability, successful organizations must also learn to integrate effective adaptability and creative capability into their repertoire. Creativity attitudes, behaviors, and cognitive skills, embedded into a specific organization-wide problem-solving process, must be learned and developed such that they are second nature if organizations are to survive and thrive. Innovative thinking ability must be made a way of organizational life, side by side with analytical thinking ability, not as a “sometimes thing” or “once in a while thing.” Research has established that efficiency and adaptability are both necessary for organizational effectiveness (Mott 1972).

Operationalizing adaptability can be achieved through Simplicity Thinking, a system comprised of a number of attitudinal, behavioral, and cognitive skills embedded within a multistage problem finding, defining, solving, and implementing creative process. This system does not exclude analytical thinking and analytical tools; on the contrary, it is clear that organizational creativity competency enhances and complements incumbent analytical capabilities. One of our goals is to help the field of creativity become better understood in its applicability to real-world work, rather than a discretionary, once in a while add-on.

In management research up until the late twentieth century, the primary determinant of a firm's performance was perceived to lie *outside* the firm, that is, in its external environment. This was the standard industrial organizational (IO) neo-classical economics viewpoint (Porter 1980a, b; Caves and Porter 1977; Caves 1980). In other words, according to the IO perspective, the source of a firm's profits was ultimately determined by its market position and the structure of the industry to which it belonged and protected by barriers to entry into the market. This perspective led to the notion that leaders need only to design appropriate organizational structures and continue to make well-reasoned decisions (Edmondson 1996) in order to achieve continued economic success. An opposing point of view perceives that the source of superior profitability lies *inside* the firm. Known as the resource-based view, this perspective regards the firm as a bundle of resources not dependent on external market and industry structures (Ambrosini 2003; Rumelt 1984; Amit and Shoemaker 1993). It suggests that these resources – primarily the people of the firm – are responsible for a firm's sustainable competitive advantage, as they are capable of adapting to changing external circumstances. The resource-based approach of Simplicity Thinking focuses specifically on the capability of the people inside the firm to use their creativity to deliberately and proactively make valuable changes internally or externally and adapt to new situations that arise, in order to continuously develop and sustain healthy profitability. One well-cited example of this is how Southwest Airlines, which is famous for its people-centered management style, continued to be profitable in the

post-9/11 period while most US airlines went into near or full bankruptcy.

Organizational Effectiveness, Adaptability, and Creativity

Research has shown that effective organizations have two major but very different characteristics: efficiency and adaptability. Efficiency means perfecting routines in order to attain the highest quantity and quality for the lowest possible cost. High efficiency means mastery of routine, or standard, prescribed methods by which the organizational unit carries out its main tasks. The efficient organization follows well-structured, stable routines to deliver its products or services in high quantities with high quality and at low cost. On the other hand, adaptability means continually and intentionally changing routines and finding new things to do and better ways to do current work. Adaptability means scanning the environment to anticipate new opportunities and problems and deliberately changing methods in order to attain new levels of quantity, quality, and cost. Adaptability yields both new methods and new products and services. High adaptability means a high rate of positive change of routine.

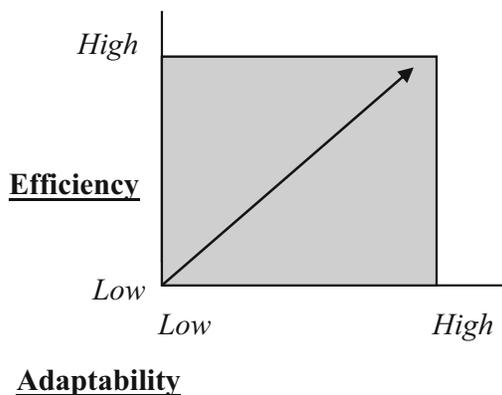
In a stable world, efficient organizations may be successful. But in today's changing world, organizations need adaptability. While efficiency implies mastering routine, adaptability means mastering the *process of deliberately changing* internal and external environments. Adaptable organizations anticipate problems and opportunities and develop timely solutions and new routines. The people in such organizations accept new solutions promptly, and the acceptance is prevalent across the whole organization. While adaptability is a *proactive* process of looking for ways to change, efficiency includes *reacting* quickly to unexpected turns of events and maintaining routines with minimal disruption and without getting mired in organizational bureaucracy. According to Mott's research (1972), the most effective organizations are both efficient and adaptable simultaneously, while the least effective organizations lack the right amount

of either or both attributes. The following equation summarizes the findings:

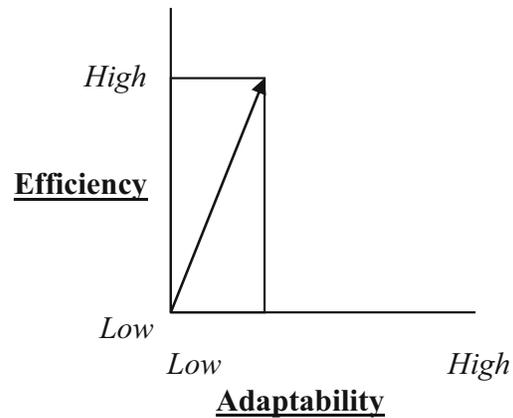
$$\text{Organizational Effectiveness} = \text{High Skill in Efficiency} + \text{High Skill in Adaptability}$$

High skill in adaptability (or efficiency) means the ability to implement higher or lower levels of adaptability (or efficiency) performance as desired (Fig. 1).

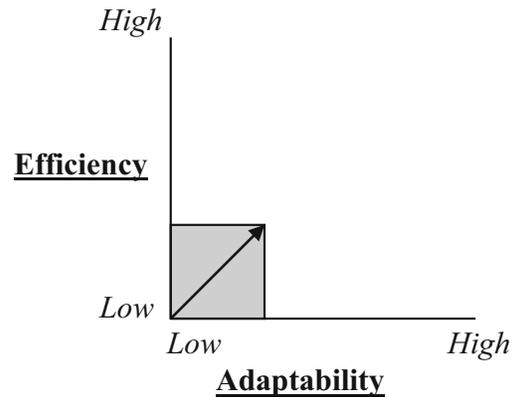
Through the years, many organizations whose success was built on predictable technologies, markets, or other environmental factors learned to become highly efficient but neglected to build capacity for adaptability (Fig. 2). For example, prior to the 1970s, North American consumers bought almost all of their cars from one of the Big Three domestic automakers. American automakers became accustomed to building large, fuel-inefficient vehicles suitable for a stable environment in which fuel was plentiful and inexpensive. Industry innovation was largely limited to cosmetic style changes each model year (low adaptability). As a result, when Japanese automakers began introducing more reliable cars, better options, and smaller vehicles that addressed new problems such as the 1970s oil crisis, they were quickly able to take advantage of the lack of attention the Big Three had paid to both efficiency and adaptability (Fig. 3).



Simplexity Thinking and the Basadur Innovation Profile Assessment, Fig. 1 Balance of efficiency and adaptability appropriate for a rapidly changing, unstable environment



Simplexity Thinking and the Basadur Innovation Profile Assessment, Fig. 2 Balance of efficiency and adaptability appropriate for a predictable, stable environment



Simplexity Thinking and the Basadur Innovation Profile Assessment, Fig. 3 Balance of efficiency and adaptability inappropriate for any environment

A similar story can be told about the North American tire industry during the same time period. The radial tire introduced by France's Michelin in 1945 was displacing the bias-ply tire everywhere but in North America. Until about 1975, North America's automotive tire industry enjoyed a predictable environment. Consumers bought their tires every 20,000 miles or so from Goodyear, Firestone, or any of their well-known competitors. With the tires basically of the same quality, consumers shopped for the best price and friendly service ~ and suppliers concentrated on providing these efficiency factors (Fig. 2). However, by failing to adapt to the radial tire innovation, due to management resistance, much of the

North American market was lost virtually overnight to Michelin and Japan's Bridgestone, which found a public receptive to the advantages of the new tires. For the North American suppliers, what had appeared to be a predictable environment became anything but. They should have been operating according to Fig. 1; instead they were operating according to Fig. 2 (efficient enough but not adaptable enough). Adaptability deficiencies have become more frequent in our times of rapidly accelerating rate of change. Famous names like Polaroid, Kodak, Blockbuster, Blackberry, and Sears come to mind.

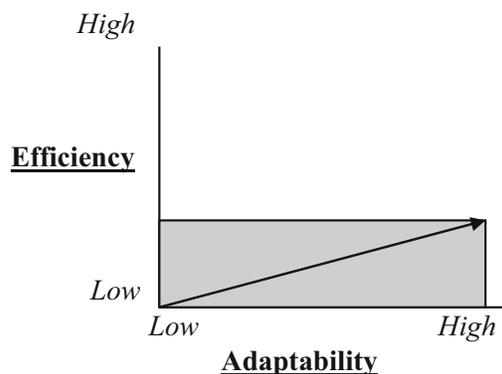
It is also possible for an organization to be too adaptable but not efficient enough (Fig. 4). Some highly successful organizations – such as 3 M, which is famous for continuously creating new products – carefully monitor their own activities so as not to overemphasize adaptability at the expense of efficiency (which would be an appropriate balance only in the most extremely turbulent environment). Microsoft has been criticized for introducing new products too hastily, before ensuring they have been optimized and are error free. Mediocre organizations compromise unnecessarily, trading off efficiency against adaptability in a zero-sum fashion. However, the most effective organizations ensure they have the right amount of both efficiency and adaptability. In today's highly competitive North American car market, many companies – North American,

Japanese, and German – stress both high efficiency and high adaptability. Their consumers demand high levels of both quality and innovation. In a rapidly changing, unstable environment, both high efficiency and high adaptability are necessary (Fig. 1).

While all organizations need skills in both efficiency and adaptability in order to be effective, most organizations understand the concept of efficiency and find it easier to mainstream than that of adaptability. One of the most important factors in determining the appropriate ratio between efficiency and adaptability is the volatility of an organization's environment.

Early approaches to improving organizational effectiveness by researchers and practitioners centered on embedding humanistic ideals and values, including personal development, interpersonal competency, participation, commitment, satisfaction, and work democracy (French and Bell 1999; Mirvis 1998), into the workplace. These approaches became part of a field known as “organizational development,” which has evolved adding interventions almost too numerous to mention.

Many of these interventions have been useful in improving organizations in the short run. But many seemingly successful and permanent changes regress or disappear within a relatively short time after their implementation. This is sometimes called the fade-out effect (Hinrichs 1978). The specific intervention called total quality management (TQM) has often failed to live up to expectations (Spector and Beer 1994), partly because it has often been introduced as a grab bag of tools (and management rhetoric) without any change-making skills or process (Basadur and Robinson 1993). However, TQM has succeeded when installed not only as a tool (intervention) but as part of a continuous process of change-making supported by a comprehensive, well-planned system of skill training, additional tools, management leadership, and employee engagement toward well understood, specific, strategic goals (Basadur and Robinson 1993). Top managers must look at what they practice versus what they preach (Beer et al. 1990). If they truly want change, they must become proficient in change



Simplicity Thinking and the Basadur Innovation Profile Assessment, Fig. 4 Balance of efficiency and adaptability overemphasizing adaptability at the expense of efficiency (inappropriate except in the most extremely unstable, unpredictable environments)

Simplexity Thinking and the Basadur Innovation Profile Assessment, Table 1 Examples of inconsistencies between desired behaviors and reward systems

We hope for. . .	But we reward. . .
Long-term growth, environmental responsibility	Quarterly earnings
Setting challenging “stretch” objectives	Achieving goals: “making the numbers”
Commitment to total quality	Shipping on schedule, even with defects
Teamwork and collaboration	The best team members
Innovative thinking and risk taking	Proven methods and not making mistakes
Development of people skills	Technical achievements and accomplishments
Employee involvement and empowerment	Tight control over operations and resources
High achievement	Another year’s effort

making. One of the most obvious examples of the lack of understanding of change making among managers is the inconsistency between organizational rewards and desired behaviors (Kerr 1995). Table 1 details these examples.

While creative strategies abound, many organizations struggle to effectively translate those strategies into action because employees aren’t sufficiently equipped to respond in ways that yield positive individual and collective outcomes (Hodgkinson and Healey 2008). Discrete interventions and tools continue to be the mainstay of organizational development work, with interventions perceived as the activities “through which changes in elements of an organizational work setting are implemented” (Robertson et al. 1993).

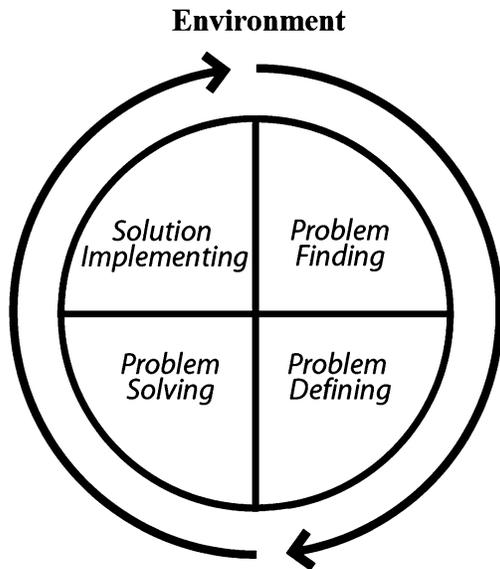
Simplexity Thinking, a process of organizational creativity with embedded creativity skills at all levels and across all disciplines, can be used to effect ongoing change making as an everyday way of life. Very importantly, it requires equipping internal organizational members with the ability to apply the process and skills for self-sufficiency, that is, without interventionist help from the outside. In this approach, change making is a continuous process of finding and solving problems and implementing solutions, which is

synonymous with the Simplexity Thinking process. Without a precise change-making process that people can follow, and the necessary attitudinal, behavioral, and cognitive skills needed to make the process work, organizations cannot mainstream adaptability, that is, make it an ongoing routine way of organizational life.

Simplexity Thinking: A Specific Method of Operationalizing Adaptability

Simplexity Thinking can be defined as a system of knowledge, process, and skills needed to make the process work, tools (e.g., creativity techniques such as brainstorming), and appreciation of process style differences (Basadur and Gelade 2006). Unlike traditional OD approaches, which lack a strategic perspective and rely on single or multiple interventions to change making, Simplexity Thinking is comprised of employees at all levels, highly skilled in constantly executing a process of finding relevant internal and external problems, strategic and tactical, solving them, and implementing the solutions for organizational adaptability. In effect, this defines Simplexity Thinking as “implemented change.” The most effective organizations know that creative attitudes, behaviors, and cognitive skills and a creative process are necessary for successful sustained implemented change (Kriegesmann et al. 2005; Stein 1975). Real sustained organizational change comes as a result of a structured process of applied creativity and attitudinal, behavioral, and cognitive skills employed by organizational members and modeled by leadership.

Studying and discussing creativity can be quite difficult and complex, because no single, agreed-upon definition of this quality exists and because researchers have taken vastly different approaches to its understanding. We focus on demonstrating a circular process of creativity as part of a continuous system of adaptability (Fig. 5). We have chosen to describe creativity in organizations as a continuous process of deliberate problem finding, problem solving, and solution implementation



Simplicity Thinking and the Basadur Innovation Profile Assessment, Fig. 5 Creative activity in an organization

(Kabanoff and Rossiter 1994) and attitudes, behaviors, and cognitive skills that enable the process to work (Basadur et al. 1982; Basadur 1994). Problem finding means continuously finding new problems to address. This includes addressing things that are going wrong but also anticipating and seeking out current or future changes, trends, challenges, and opportunities. Problem finding also includes taking the time to explore problems in depth rather than merely finding quick solutions or “fixes” (Senge et al. 1994). This permits the discovery of not only underlying issues but also new opportunities and recognition of the interconnectedness of decisions within the organization. This recognition is the essence of systems thinking and the starting point for making long-term, permanent improvements. Problem solving means developing new and useful solutions to identified problems. Solution implementation means making new solutions succeed. Implementation usually leads the organization to find new problems to solve. As Runco (2004) noted, creativity is not only reactive – a response to problems and challenges – but also proactive, as a contributor to change. Thus new problems arise as the system and its environment react to each newly implemented solution.

Therefore, organizational creativity can be understood as the fundamental driver of, and virtually synonymous with, adaptability, including a circular process of continuously finding, defining, and solving important problems and implementing new solutions which represent valuable changes that enable the organization to succeed (Fig. 5).

This approach also removes any distinction between creativity and innovation (despite views of some researchers who distinguish between creativity as the generation of an idea and innovation as its implementation). Here, creativity is defined as a multistage complete and continuous process driven by attitudinal, behavioral, and cognitive creativity skills in each stage, including problem generation and formulation, idea (solution) generation, and solution implementation. This inclusive process is described as Simplicity Thinking.

In addition, there are various creativity tools which can be applied in the various stages. However such tools are of little value, and may even be harmful, without the prerequisite creativity skills to apply them. An example of such a tool is “brainstorming” which is frequently misused due to lack of skill and misunderstanding by researchers who lack experience in real-world situations (Basadur and Basadur 2009).

Effective organizations know how to establish a well-understood process and set of skills for adaptability. They do not expect adaptability to be achieved without effort. For example, 3 M sets a corporate objective that every 5 years, 30% of their products must be new. Effective organizations also create a positive climate toward problems and seek them out as opportunities for disruptive change (Mott 1972). As solutions are implemented, new problems (or opportunities for innovation and improvement) are discovered. For example, Basadur (1982) reported that top Japanese corporations place newly-hired R&D scientists and engineers into sales departments to begin their careers. The intent is for them to learn experientially the problems of the customer and recognize that such learning is the beginning of innovation. Thus, a positive mindset toward creativity begins with a positive attitude toward *problem finding*, meaning the behavior of continuously

and deliberately discovering and formulating new and useful problems to be solved.

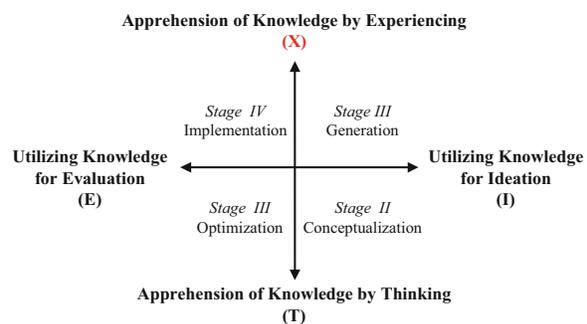
The Four Distinct Stages of the Simplexity Thinking Process

The evolution of models of multistage creative thinking and problem-solving processes began with Wallas’s (1926) four main stages: preparation, incubation, illumination, and verification. Later process models incorporated additional stages, but all include, as a first step, a process in which a problem is recognized, identified, and constructed (Reiter-Palmon and Robinson 2009). This is where the problem is formulated. However, all the pre-existing models tend to assume that a problem, task, or goal requiring creativity already exists or has been presented and that a creative process is subsequently applied. This reduces these models to mere tools or problem-solving interventions or episodes which start with a problem and end with a solution. A more complete process of creativity begins before a problem is available to be formulated (Basadur et al. 1982, 1990). Figure 5 outlines a continuous circular process that begins with the deliberate seeking out (*generating*) of new problems and opportunities. The second stage of the process is *conceptualizing*, or formulating, defining, and constructing a newly generated problem. In the third stage, *problem solving*, evaluation, and selection of solution ideas takes place, while the fourth stage results in *solution implementation*. The process then begins anew, as every implemented solution (action) results in the opportunity to discover (generate) new problems and opportunities. For example, the automobile’s invention provided not only a new solution to an old problem (improving transportation) but created many brand-new problems (e.g., pollution, energy, and accidents). Each stage of the process requires specific attitudinal, behavioral, and cognitive skills in order to be successfully completed.

While effective innovation requires strong performance in each of the four stages of the creativity process, research has found that individuals, teams, and organizations may prefer some stages

of the creative process more than others. Effective leaders must learn to synchronize these different creativity preferences or *styles* (Basadur 2004, 2005). In teams, for example, the members must learn to combine their individual preferences in complementary ways. Basadur and Head (2001) showed that heterogeneous teams composed of people with different styles outperformed homogeneous teams whose members had similar preferences.

Creative problem-solving process styles are measured using the Creative Problem Solving Profile (CPSP) which was first published by Basadur et al. (1990) and subsequently further developed and established through ongoing research and application experience. This includes scale consistency and reliability psychometrics by Basadur et al. (2016) and by Basadur et al. (2014); predictive validity by Basadur et al. (2009); and occupational, vocation, and work demands content validity by Basadur et al. (2008) and Basadur and Gelade (2009).



As shown, the CPSP measures two bipolar, orthogonal, dimensions of cognitive activity underlying the Simplexity process. The first dimension, shown on the vertical axis, represents the *apprehension* of knowledge and measures two opposing ways of apprehending knowledge (experiencing vs. thinking). Experiencing is a more open, nonrational, experiential, and divergent form of gaining understanding. It is learning by doing or by “physical processing.” In contrast, thinking is more closed, rational, theoretical, and convergent. It is a method of gaining knowledge through detached, abstract thinking (pondering), or by “mental processing.” All individuals and

organizations gain knowledge in both ways but the relative amounts (ratios) differ from those of others. Following is a description of each of the stages (Basadur and Gelade 2005).

The Quadrant I stage is called *generation* and involves apprehension by experience and utilization for ideation. Here, physical contact with, and involvement in, real-world activities (X) alerts the individual to inconsistencies and difficulties. This knowledge is then used to suggest new problem areas, to identify opportunities for improvement, and to propose projects that might be worth undertaking (I). At this stage, problems and opportunities are recognized but are not yet clearly articulated or understood.

The Quadrant II stage is called *conceptualization* and involves apprehension by thinking and utilization for ideation. Here, a proposal, problem, or opportunity identified in the previous stage is systematically thought through (T) to create a sound conceptualization or model of the problem domain. Here, understanding of the problem area is gained not by direct experience but by abstract analysis. This conceptual knowledge is then used as the basis for ideation whereby one or more plausible solutions are developed (I).

The Quadrant III stage is called *optimization* and involves apprehension by thinking and utilization for evaluation. In this stage the conceptualizations of stage II are critiqued (T) against real-world constraints in order to identify practical difficulties. Alternatives are systematically examined in order to select (E) an optimal plan for implementing the solution that can be executed with existing resources.

The Quadrant IV stage, *implementation*, completes the creative process and involves apprehension by experiencing and utilization for evaluation. Creative activity in this stage consists of experimenting with the new solution (X), evaluating the outcomes (E), and making adjustments if necessary to successfully implement them.

Stages I to IV in Organizations

Individuals in organizations have varying preferences for each of the stages in the creative process because they have varying preferences for the bipolar modes of apprehension and utilization.

Generating ideas for new products, services, and methods must start somewhere. Individuals inclined toward generating are continually experiencing and scanning the environment, picking up data and cues from customers, suppliers, and others, and suggesting possible opportunities for change and improvement. Thus, the generation stage is where new information and possibilities are raised – usually not fully developed but in the form of starting points for new projects. People with dominant conceptualizer styles lead in compiling facts and idea fragments from the generator stage into well-defined, insightful problems and challenges, and more clearly developed ideas and projects worth further evaluation. Skilled conceptualizers give sound structure to fledgling ideas and opportunities. People inclined toward optimization usually lead in taking these well-defined ideas and finding a practical best solution and detailing efficient plans for proceeding. Finally, implementers lead in carrying forward the practical solutions and plans, including convincing colleagues or customers of the worth of the changes and adapting the solutions and plans to make them fit real-life situations and conditions. Basadur and Basadur (2011) provided evidence that Generators are in short supply in corporations at all levels and suggested that leaders desiring more innovation should consider strengthening the generation capability of their organization.

How Organizations Can Become Skilled in Simplicity Thinking

Many shortcomings in attitudinal, behavioral, and cognitive creativity skills plague individuals, teams, and organizations. As detailed in Basadur (2004), for many individuals, problem finding is a foreign concept. Many people wait for others to find problems to solve rather than actively seeking out problems or avoid important problems that cross departmental lines (“that’s not our problem”). Conceptual skills in defining problems are lacking, and much time is wasted “working on the wrong problem.” Even after finding and defining problems, some people find it difficult to solve

them creatively and imaginatively. Some individuals are also critical of new ideas, which can prevent productive thinking. While many people may be able to implement routine solutions to routine problems, few can implement creative solutions to new, non-programmed problems. Teamwork is also often uncreative. Group members are unable to communicate clearly in simple terms, for example. Unaware of variations in individual thinking styles, groups fail to synchronize these differences, jump into “solving the problem” without first considering what the real problem is, and then flounder. Inter-functional teams become stalled arguing about territorial issues. Meeting leaders steer toward their own points of view rather than facilitating the group to work open-mindedly and cohesively. The design of many organizations remains along bureaucratic, functional lines – a design that itself minimizes creativity. Jobs are programmed for maximum control, highest quality, and lowest cost per unit. Creativity skills and change making are limited to

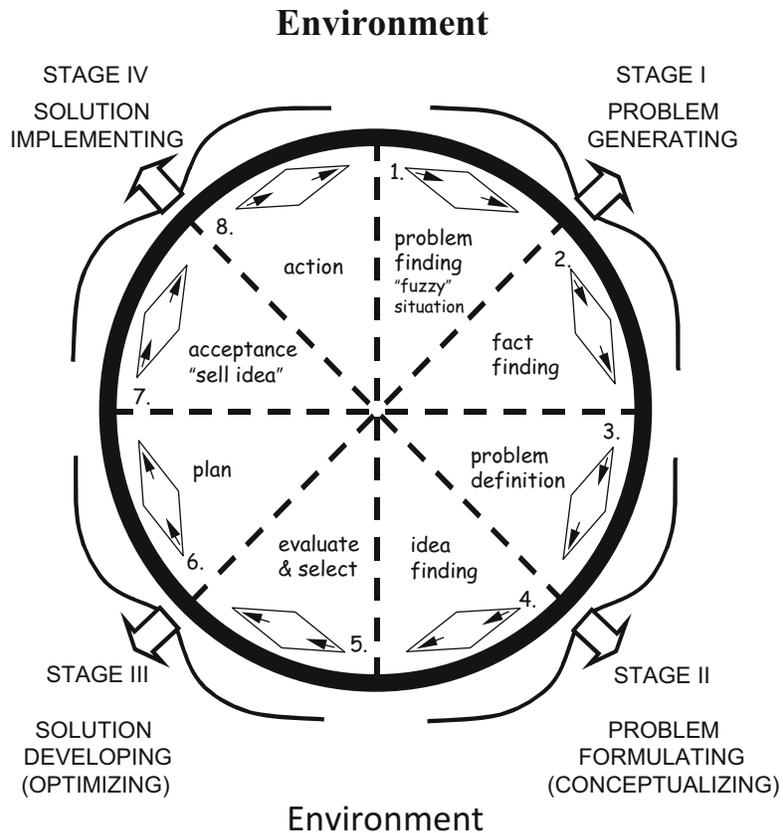
short-term quick fixes during emergencies. For organizations without a positive mindset toward creativity, problems and changes stemming from new technology, customer tastes, and foreign competition are viewed as irritants that disrupt well-functioning, established routines, despite the fact that the essence of adaptability and the first phase of the creative process is problem finding. Basadur et al. (1982) demonstrated that many of these shortcomings can be overcome by developing specific skills. Training to build these skills is based on two central concepts.

1. Change making is a process with distinctly different stages.

In practice, it is useful to break the four-stage change process shown in Fig. 5 into a circular process of eight smaller steps as shown in Fig. 6. These steps include problem finding and fact finding, which collectively make up “problem generation” or stage 1, problem definition and idea finding (“problem

Simplexity Thinking and the Basadur Innovation Profile Assessment,

Fig. 6 The organizational change-making process



(1) competency in executing the process as a whole, (2) competency in respecting and helping synchronize different styles in the process, and (3) competency in executing each step and stage of the process. Competency in executing the process as a whole includes being able to distinguish the different steps from each other, for example, executing, communicating, and separating (1) problem-finding activity from (2) problem-defining activity and from (3) solution development activity and from (4) implementing activity. It also includes avoiding unconsciously leapfrogging the process steps, such as jumping backward from discovering a fresh new problem (step 1) into immediate action (step 8) only to discover later that the problem was not what it seemed to be at all and regretting the time wasted by not permitting the process unfold naturally from 1 through 8.

Competency in respecting and synchronizing different process styles includes understanding how the creative process depends upon different ways of apprehending knowledge and understanding and utilizing knowledge, however, apprehended. Not only are both necessary for creative performance but frustration and inefficiency in working together can be avoided. For example, if some individuals on a team prefer stage 2, conceptualization, while others on the same team prefer stage 4, implementation, it is important that these individuals understand and respect each other's opposite preferred ways of apprehending knowledge (experientially and concretely vs. theoretically and analytically) and of utilizing knowledge (to create options divergently vs. evaluate options convergently).

Competency in executing each step of the process includes competency in executing the ideation-evaluation mini-process described previously which combines the three necessary creativity thinking skills within each step: (1) creating options within the step (divergent thinking), (2) evaluating and selecting the most important options within the step (convergent thinking), and (3) skill in separating divergent from convergent thinking within each step (deferral of judgment). Integrated into early creative problem-solving theories and models, including Osborn (1953),

Guilford (1967), and Parnes et al. (1977), these skills in the mini-process have been more deeply explored in more recent empirical research which has described them more completely and identified their attitudinal, behavioral, and cognitive components. For example, in a multi-method, multi-measure field experiment, Basadur et al. (1982) identified attitudinal, behavioral, and cognitive effects of training which were readily observable back on the job (along with performance effects). The effects included:

- Attitudinal: More openness to new ideas and more positive reaction when confronted with new unusual ideas
- Behavioral: More likely to pause to try new, unusual approaches to solving problems, less time spent in negative evaluation while creating options, and less likely to jump to conclusions as to the nature of the real problem
- Cognitive: Increased quantity and quality of options created, more time spent in divergent thought prior to evaluating, and more options created prior to selecting one as best

Additional examples of the attitudinal, behavioral, and cognitive components of each of the three-process skills throughout the complete eight-step process are provided in Tables 2, 3,

Simplexity Thinking and the Basadur Innovation Profile Assessment, Table 2 Examples of deferral of judgment skill

Attitudinal
Tackle problems with an optimistic "can do" attitude
Enter meetings open to ideas that might disrupt one's own department's routine
Behavioral
Visibly value, appreciate, and welcome other points of view
Avoid making premature, negative judgments of fledgling thoughts
Cognitive
Recognize hidden, unconscious, unwarranted assumptions
Maintain an awareness that some facts are more difficult to perceive than others
Understand that some problems require a longer time to solve and do not expect immediate results

Simplicity Thinking and the Basadur Innovation Profile Assessment, Table 3 Examples of active divergence skill

Attitudinal
Deliberately push oneself to create unusual, thought-provoking ideas
Turn premature, negative evaluations of ideas into positive challenges to keep the creative process flowing; when others say “We can’t because...” counter with, “How might we...?”
Behavioral
Show leadership in pinpointing changes, trends, problems, and opportunities for improvement throughout the organization
Share information and ideas freely with other people and departments
Share “bad news” as quickly as “good news” to aid organizational problem solving
Facilitate teams to formulate problems in ways that transcend departmental considerations
Cognitive
Search out many different facts and points of view before attempting to define a problem
Define problems in multiple and novel ways to get a variety of insights

Simplicity Thinking and the Basadur Innovation Profile Assessment, Table 4 Examples of active convergence skill

Attitudinal
Be willing to accept and participate in consensus decisions and move on in the change-making process
Accept ownership of measures of success of new ideas being implemented
Take the risk of failing or being criticized for implementing new ideas
Behavioral
Take reasonable risks to get action taken within time limits rather than waiting for the “perfect” option to emerge
Follow-up on implementation; do whatever it takes to ensure successful installation of a chosen solution
Cognitive
Select, clarify, and focus on the most significant facts available prior to attempting to define a problem
Develop unbiased criteria for selecting from among options rather than letting preconceptions or hidden motives sway decisions
Understand how clear, simple, and specific implementation plans motivate action and overcome inertia
Understand the importance of including both long- and short-term decision-making criteria

and 4 (Basadur and Robinson 1993; Basadur et al. 2000a). It should be noted that the examples below overlap a great deal across attitudinal/behavioral/cognitive distinctions and also across the three-process skills distinctions.

The field research by Basadur et al. (1982) provided evidence that unless creativity training was sufficiently impactful to successfully *unfreeze and change* participants, no improvement in creativity skills and performance would be achieved. In other words, to achieve meaningful increases in problem finding, defining, and solving and solution implementation performance, the impact of training must be sufficient to increase acceptance and practice of the attitudinal, behavioral, and cognitive creativity skills within the multistage creativity process. However, their research also suggested that to *refreeze* the acceptance and application of the new skills built in training to on-the-job creativity performance, specific strategic structural organizational factors must be developed and put into place to reinforce and motivate their on-the-job practice (Basadur 1994). Basadur et al. (1986) found that the

training effects in creativity process and skills as shown in Fig. 7 on manufacturing engineers persisted back on the job were more permanent when they were trained together in intact teams. Team members learn to accept and share their members’ diverse experience more completely, support differing viewpoints, and risk implementing novel ideas (Basadur et al. 1982). This helps to avoid “group think,” the tendency for members to follow the crowd into inadequate solutions instead of offering possibly controversial, superior viewpoints. Applying the process makes participation in problem solving safe and fun because people no longer fear advancing fledgling points of view and do not feel they must be constantly on guard.

Getting Two for the Price of One

Organizations, which provide the right skill training, create the right infrastructure, and participate

in and reward continuous problem finding and solution implementing, achieve several outcomes. Some creativity outcomes are directly economically oriented and others are not. Creativity leads directly to new and improved products and methods; these are economic outcomes associated with adaptability. However, creativity also leads to specific people outcomes, including motivation and commitment, which serve as intermediate steps leading to economic outcomes associated with efficiency (Basadur 1993).

Motivation and Commitment Are Outcomes of Creative Activity

Workplaces that establish adaptability as a daily, continuous process of problem finding and defining, problem solving, and solution implementation may experience increased employee commitment and motivation. Numerous research studies have shown that curiosity, activity, and exploration are intrinsically enjoyable and motivating. People develop negative attitudes toward repetitive tasks and experience fatigue and boredom. Permitted to engage in finding and solving problems, workers become motivated and desire even more participation in creative activity. They also work harder at perfecting their routine jobs to increase quality and quantity and reduce costs, thus increasing organizational efficiency and short-term organizational effectiveness. Workplace accomplishments improve self-esteem and human need for achievement, while creative activity stimulates team building as people help each other to solve problems. Some research has also suggested people are more motivated to achieve goals that they have been given a chance to choose, which supports the importance of problem finding as an employee motivator, as well as an organizational necessity.

By giving employees the encouragement and opportunity to find and solve their own challenging problems and implement their own solutions, organizations can provide intrinsically rewarding work and tap into the need for achievement for motivation.

Reducing Turnover, Absenteeism, and Increasing Personal Development

The link between inducing creativity on the job and increasing job satisfaction and commitment is important not only from the perspective of having happier and more motivated people at work but in other ways as well. Industrial and organizational psychology research has identified substantial correlations between job satisfaction and commitment and direct economic variables such as lower turnover and lower absenteeism (Locke and Latham 1990; Organ 1988). Other outcomes which are both people and economically oriented include better selection, placement, career planning, and personal development for organizational members. For example, if we understand peoples' unique individual thinking and creative problem-solving process styles better, we can match them with jobs better (Basadur and Gelade 2003).

Setting Up the Internal Environment to Encourage Creative Work

While the commitment of an individual is the prerequisite for the development of expertise, the study of expert performance acknowledges the support structure surrounding individuals as crucial to facilitating eventual success. In developing of the creative competency of employees, the internal environment of an organization and its managers must act like the coaches, teachers, and parents studied in athletic and artistic expert performance. While the motivation and drive of employees to develop creative thinking skills is critical, management must structure the environment so that it enables the continuous growth of employees' expertise, and leaders must monitor the performance of employees and instruct them using methods that challenge them to reach ever higher levels of competence.

Despite research showing that most people at work are multi-motivated, the majority of global business and industry is still organized and managed on the overly simplistic "scientific management" concept made popular in the early twentieth

century by Frederick Taylor (1967). Taylor believed that employees are motivated by one dominant factor – money. Fortunately, using creativity as a formula for motivation can be almost as simple as using money. There are many straightforward ways to encourage people to be creative on the job and achieve a motivated organization. Top Japanese organizations manage their world-class employee suggestion systems to induce creative behavior and to drive creative output including cost savings and new products and procedures. The primary objective of these suggestion systems is not to improve economic outcomes directly but to motivate people and increase their commitment (Basadur 1982).

Creativity for Job Enrichment

Proactive creative activity, or adaptability, leads to a continuous flow of new methods and new products. However, acceptance of change by employees is assured because they are taking ownership of finding and solving their own problems and implementing changes themselves. In effect, they are redesigning their own jobs, which is consistent with a well-documented axiom of social psychology: people do not resist change; they do resist being changed (Coch and French 1948). Employees enrich their own jobs by being creative.

Simplicity Thinking as the Transformational Engine

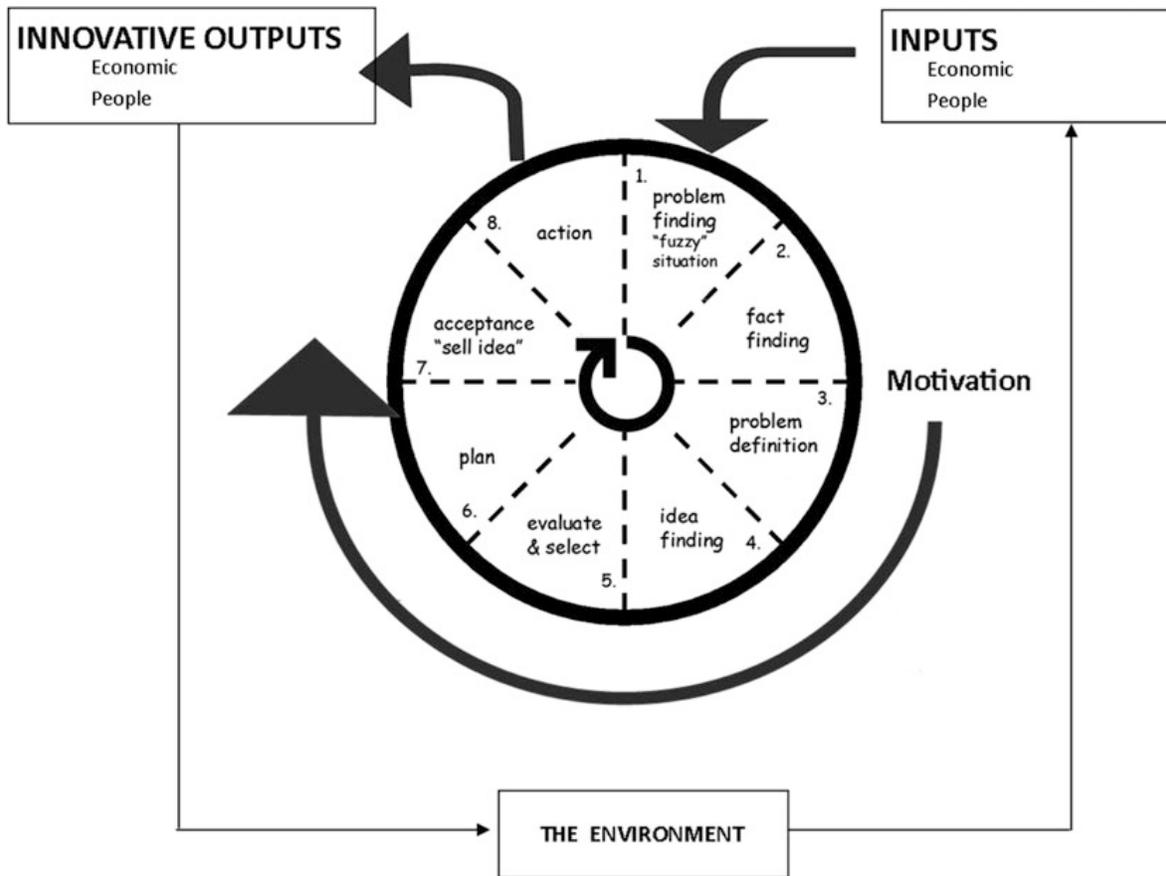
Simplicity Thinking accelerates the identification and solution of problems and opportunities across an organization. These problems and opportunities may originate in either the external or internal environments of the organization, and as they are moved through fact finding, problem definition, and then solution optimization and implementation, the organization is transformed into a state of adaptability.

Figure 8 illustrates how Simplicity Thinking works to operationalize adaptability. As problems

and opportunities for change are “inhaled” into step 1 and then “spun around” the eight-step circular process (“the wheel”), the resulting implemented change (step 8) is projected out as innovative output to be mixed in with the environment and cycled back through step 1. This creative activity not only results in a continuous supply of new and improved products and methods, it also leads to intrinsically motivated, committed, and job-satisfied people. The motivation induced is the power that drives “spins” the wheel from step 1 to step 8.

In contrast, Fig. 9 models an organization unskilled in Simplicity Thinking. Unable to think problems through creatively, they instead move them directly in from step 1 to step 8. Without the help of the creative process, the outputs are not innovative and the people are not motivated.

Although adaptability skills are essential, it would be naïve to believe that all that is needed is to train employees at all levels in the Simplicity Thinking process and the skills to make it work. This would only be one third of the battle. In order to make adaptability performance a normal way of life, an organization must integrate creativity thinking skills and process with a clear-cut business need and infrastructure to encourage employees to experience success applying the skills and process. Creativity skills and process must be accompanied by communication and acceptance of a well-understood and motivating organizational business need for adaptability. People need to understand why they suddenly need to use their creativity on the job. The business need must be translated into a specific goal (s) to pursue. Measurable adaptability goals must be placed into the corporate strategy alongside efficiency goals. As well, a complementing infrastructure must be created which makes it easy and encourages people to routinely use their skills to pursue the goals. An ideal scenario, for example, might see employees receive creativity training based on application of training to specific company real-world problems rather than non-work-related “practice” or theoretical problems. Thus, progress is made against the goals during the training itself. Of course the infrastructure must



Simplexity Thinking and the Basadur Innovation Profile Assessment, Fig. 8 An organization skilled at using Simplexity Thinking to operationalize adaptability and achieve innovative outputs

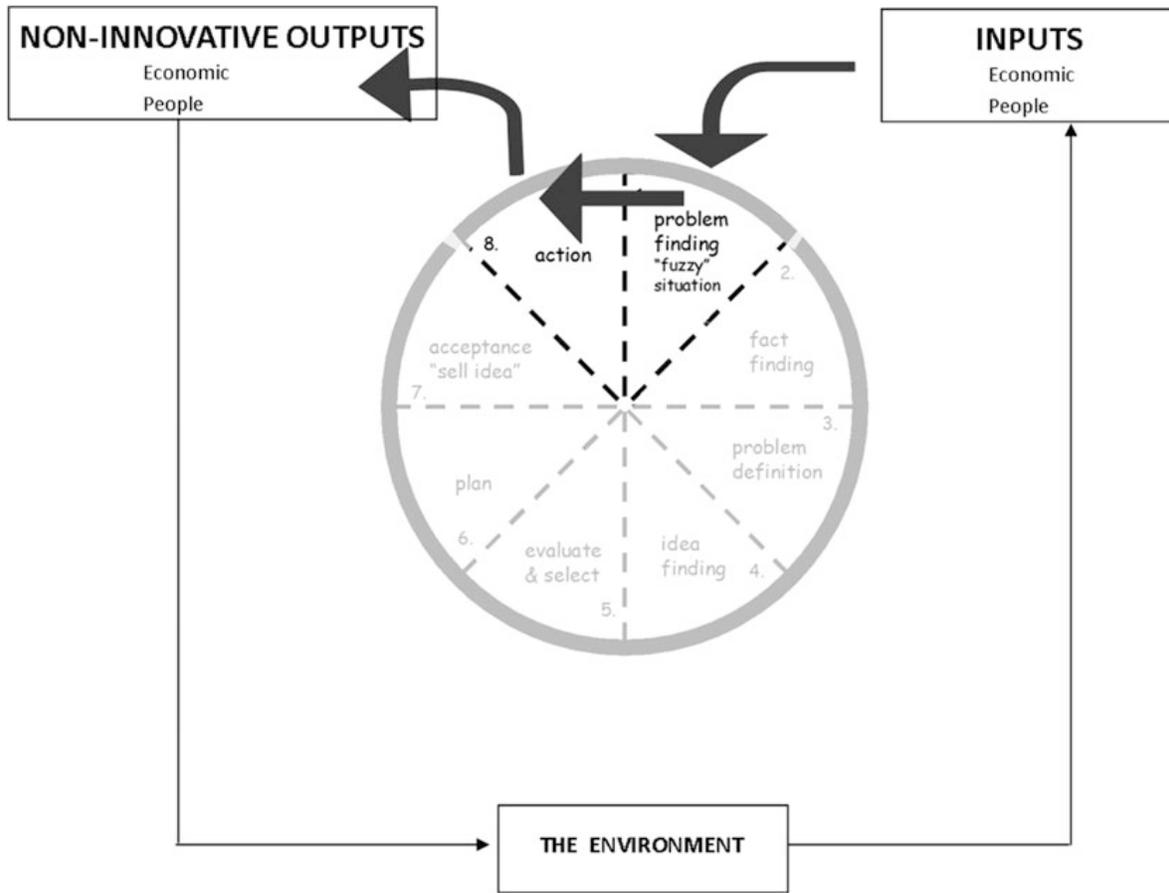
extend beyond the training. Figure 10 illustrates how these three components support each other.

Many worthwhile interventions have floundered because the organization lacked at least one of these three components: business need, infrastructure, and change-making process and skills (Basadur and Robinson 1993). If senior leaders wish to introduce an intervention, they must spell out what specific business need they intend to address (such as lower costs, higher sales, fewer defects or customer complaints, better teamwork, shorter turnaround times or faster time to market, better products or services) to ensure that employees buy into the intervention and can measure success. The organization must also ensure an effective infrastructure, such as performance appraisal systems or membership on interdepartmental teams, is in place so new philosophies and tools are applied regularly. Along with clear business needs, and infrastructures for

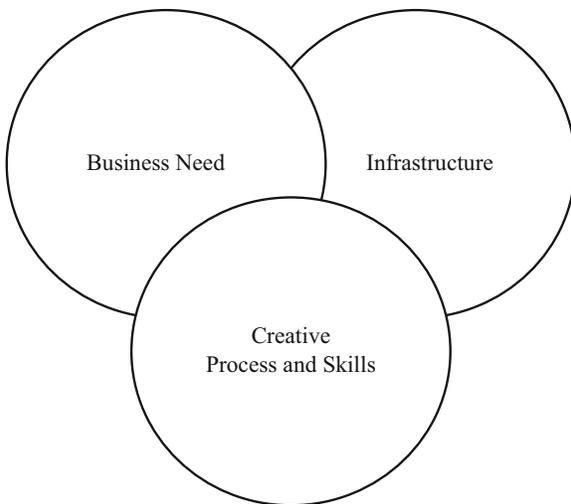
implanting new initiatives, organizations must also avoid underestimating the effort required to establish people’s change-making skills, attitudes, and behaviors and must provide adequate training.

Conclusion and Future Directions

Simplexity Thinking offers a new approach to organizational adaptability in which deep skill in executing creativity as a standard everyday process is the key, equally important to traditional deep skill in executing traditional efficiency processes. Most of today’s executives lack this creative skill, and many have turned out to be inadequate leaders, especially in recent times of accelerating change and ambiguity. However, many organizations are not as effective as others because they value short-term results above all



Complexity Thinking and the Basadur Innovation Profile Assessment, Fig. 9 An organization not skilled at using Complexity Thinking moves directly to action without benefit of creative process and achieves non-innovative outputs



Complexity Thinking and the Basadur Innovation Profile Assessment, Fig. 10 The three necessary components of a successful effort to institutionalize adaptability

and reward successful implementers of routines disproportionately. Simply put, organizations favor efficiency at the expense of adaptability.

Many companies still regard innovation as an irritant, something that gets in the way of the “real work.” They are content to turn out standard quantities of standard products and achieve the sales, cost, and profit goals for this month, this quarter, and this year. Their response to greater competition is to cut staff, reduce costs, lower service levels, and, in some cases, lower quality. Too few respond creatively. Sometimes this is because they simply do not know how to go about it. It may be that various concepts of creativity and innovation are demystified through integration into a single simplified approach focused specifically on improving organizational performance short and long term.

Perhaps, more managers would be willing to give this simplified approach a try, especially if they could be shown how it helps them achieve even short-term results more efficiently. Perhaps, future research could focus on strategies for helping managers grasp and increase comfort with the innovation process, skills, techniques, and styles described.

Simplexity Thinking is a deliberate and continuous change-making system of attitudes, behaviors, and cognitive skills driving a process of problem generation, conceptualization, problem solving, and solution implementation, which is virtually synonymous with adaptability. It requires attitudinal, behavioral, and cognitive skills in deliberate change making and incorporates interventions into the process as tools. Under the new approach, organizations can learn to mainstream adaptability by doing two things: encouraging employees to master new skills, which increase their creativity, motivation, and engagement, and creating an infrastructure that ensures that these skills will be used regularly.

More research is needed to reassure innovating organizations that they are on the right track, particularly when the results of emphasizing adaptability may take considerably longer to appear than the results of an emphasis on efficiency. A clue may be found in Japan: whereas much North American decision-making is driven by the next quarter's results, Japanese organizations favor long-term planning and reporting (Dertouzos et al. 1989). Well-thought-out strategies that enable organizations to confidently shift the balance between adaptability and efficiency will help them prosper over the long term and prevent them from being surprised and damaged by a volatile environment.

An additional avenue for further research is to identify factors which enable an organization to effectively alter its "appropriate" balance of adaptability and efficiency rather than being caught unaware by upcoming environmental changes. What are the signals that prompt senior management to request more creativity, that motivate middle managers to act upon a top management requirement for more creativity, and that encourage individuals in the organization to act

more creatively (assuming in each case that they know how to do so)? A clue may be found in several North American corporations that had the appropriate balance for an earlier era but had to drastically change that balance during the 1980s in order to react to changes in their environment or circumstances. While suffering through 13 consecutive quarters of huge losses in the early 1980s, Ford made massive top-down training interventions to become a less authoritarian, more innovative, and more efficient organization with higher employee involvement. In order to respond to new competition, Xerox reinvented itself from a copier company into a document company and instituted a continuous process to fundamentally change how its employees work and manage. More recently, IBM reorganized itself after seeing its stock price plummet when smaller competitors capitalized on the market shift to personal computers from mainframes. An excellent research question would be how these organizations might have recognized the need to shift their balance much sooner than they did.

Implications for Leadership

Today's leaders must understand creativity as an ongoing continuous change-making organizational process, not just a sometime occurrence or a program of discrete interventions and philosophical values of "what's good" for organizations. Effective leadership is really implanting and sustaining a system of organizational creativity that can be learned and mainstreamed to provide continuous and deliberate adaptability. Leaders must learn and adopt the corresponding new skills and new ways of thinking and behaving. To provide effective leadership in the twenty-first century, managers must become effective change agents in their everyday work (rather than to leave this as a "sometime thing" to others). In the future, managers, who may have been accustomed to a command and control style which includes creating strategy and policy by themselves and then passing it down to a waiting organization, will need to learn skills in engaging

their subordinates in co-creating strategy. By engaging a wider range of people in the process of developing new strategies, ownership and successful implementation of the new strategy is more likely to occur (Coch and French 1948). Porras and Robertson (1992) describe the characteristics of an effective change agent as (1) interpersonal competence (relational skills, ability to support, nurture, and influence others); (2) theory-related problem-solving and change skill (the ability to conceptualize and diagnose, to present options to others), (3) skill as an educator (able to create learning experiences), and (4) self-awareness (ability to have a clear understanding of one's own needs and motivations). These are all different from purely analytical thinking and problem-solving characteristics. To supplement these analytical skills, today's managers must learn to think and behave in new ways and to lead others to think and behave in new ways. Mintzberg (1973) documented that most managers operate primarily as short-term implementation doers. Other research (Basadur and Basadur 2010) supports this finding, suggesting many managers are especially under-skilled in problem finding and problem definition, which represent the essence of strategic thinking and adaptability. Thus the training of managers to improve conceptual thinking skills to combine with optimizing and implementation thinking must become an important intervention to improve fundamental leadership skill.

References

- Ambrosini V. The resource-based view of the firm. In: Ambrosini V, editor. *Tacit and ambiguous resources as sources of competitive advantage*. New York: Palgrave Macmillan; 2003. p. 3–6.
- Amit R, Shoemaker P. Strategic assets and organizational rent. *Strateg Manag J*. 1993;14:33–46.
- Basadur MS. Research in creative problem solving training in business and industry. In: *Proceedings of creativity week 4*. Greensboro: Center for Creative Leadership; 1982.
- Basadur MS. Impacts and outcomes of creativity in organizational settings. In: Isaksen SG, Murdock MC, Firestein RL, Treffinger DJ, editors. *Nurturing and developing creativity: the emergence of a discipline*. Norwood: Ablex; 1993. p. 278–313.
- Basadur MS. Managing the creative process in organizations. In: Runco MJ, editor. *Problem finding, problem solving and creativity*. Norwood: Ablex; 1994. p. 237–68.
- Basadur MS. Leading others to think innovatively together: creative leadership. *Leadersh Q*. 2004;15: 103–21.
- Basadur MS. Chapter 15, Management: synchronizing different kinds of creativity. In: Kaufman JC, Baer J, editors. *Creativity across domains: faces of the muse*. Lawrence Erlbaum; 2005. p. 261–79.
- Basadur MS, Basadur TM. Creativity skills and problem solving style: impact on creativity social network position. Presented at Academy of Management Annual Conference, Chicago; 2009.
- Basadur TM, Basadur MS. The role of creative problem solving style in advice network formation and subsequent creative performance. Presented at the Southern Management Association (SMA) annual meeting, October 28, 2010, St. Petersburg; 2010.
- Basadur MS, Basadur TM. Where are the generators? *J Psychol Aesthet Creat Arts*. 2011;5(1):29–42.
- Basadur MS, Finkbeiner CT. Measuring preference for ideation in creative problem solving training. *J Appl Behav Sci*. 1985;21(1):37–49.
- Basadur MS, Gelade G. Using the creative problem solving profile (CPSP) for diagnosing and solving real-world problems. *Emergence J Complexity Issues Organ Manag*. 2003;5(3):22–47.
- Basadur MS, Gelade G. Modeling applied creativity as a cognitive process: theoretical foundations. *Int J Think Problem Solving*. 2005;15(2):13–41.
- Basadur MS, Gelade G. The role of knowledge management in the innovation process. *Creat Innov Manag*. 2006;15(1):45–62.
- Basadur MS, Gelade G. Creative problem solving style and cognitive work demands. Presented at the Annual Conference of the Society of Industrial and Organizational Psychology, New Orleans. April 2–4; 2009.
- Basadur MS, Head MM. Team performance and satisfaction: a link to cognitive style within a process framework. *J Creat Behav*. 2001;35(3):227–45.
- Basadur MS, Paton BR. Creativity boosts profits in recessionary times – broadening the playing field. *Ind Manag*. 1993;35(1):14–9.
- Basadur MS, Robinson S. The new creative thinking skills needed for total quality management to become fact, not just philosophy. *Am Behav Sci*. 1993;37(1): 121–38.
- Basadur MS, Graen GB, Green SG. Training in creative problem solving: effects on ideation and problem finding in an applied research organization. *Organ Behav Hum Perform*. 1982;30:41–70.
- Basadur MS, Graen GB, Scandura TA. Training effects on attitudes toward divergent thinking among manufacturing engineers. *J Appl Psychol*. 1986;71:612–7.
- Basadur MS, Graen GB, Wakabayashi M. Identifying individual differences in creative problem solving style. *J Creat Behav*. 1990;24(2):111–31.

- Basadur MS, Ellspermann SJ, Evans GW. A new methodology for formulating ill-structured problems. *OMEGA Int J Manag Sci.* 1994;22(6):627–45.
- Basadur M, Pringle P, Speranzini G, Bacot M. Collaborative problem solving through creativity in problem definition: expanding the pie. *Creat Innov Manag.* 2000a; 9(1):54–76.
- Basadur MS, Runco MA, Vega L. Understanding how creative thinking skills, attitudes and behaviors work together: a causal process model. *J Creat Behav.* 2000b;34(2):77–100.
- Basadur TM, Basadur MS, Gelade G. Cognitive problem solving style as related to person-vocation fit and person-organizational hierarchy level of fit. Presented at the Southwest Academy of Management Conference, February 24–28, Houston; 2008.
- Basadur MS, Gelade G, Basadur TM, Skorokhod T. Testing the predictive validity of the Basadur creative problem solving profile (CPSP). Published in the Proceedings of the Southwest Academy of Management Annual Meeting, February 25–28, 2009, Oklahoma City; 2009.
- Basadur MS, Gelade G, Basadur TM. Creative problem solving process styles, cognitive work demands and organizational adaptability. *J Appl Behav Sci.* 2014;50(1):80–115.
- Basadur MS, Gelade GA, Basadur TM, Perez R. Improved reliability and research applications of the Basadur Creative Problem Solving Profile (CPSP). *Kindai Manag Rev.* 2016;4:101–12.
- Beer M, Eisenstat RA, Spector B. Why change programs don't produce change. *Harv Bus Rev.* 1990;68(6): 158–66.
- Caves RE. *Competition in an open economy: a model applied to Canada*. Cambridge, Boston: Harvard University Press; 1980.
- Caves RE, Porter M. From entry barriers to mobility barriers: conjectural decisions and contrived deterrence to new competitors. *Q J Econ.* 1977;91:241–62.
- Coch L, French J. Overcoming resistance to change. *Hum Relat.* 1948;1:512–32.
- Dertouzos ML, Lester RK, Solow RM. *Made in America*. Cambridge: MIT Press; 1989.
- Edmondson AC. Three faces of Eden: the persistence of completing theories and multiple diagnoses in Organizational Intervention Research. *Hum Relat.* 1996; 49(5):571.
- French WL, Bell CH. *Organization development: behavioral science interventions for organization improvement*. Upper Saddle River: Prentice Hall; 1999.
- Guilford JP. *The nature of human intelligence*. New York: McGraw-Hill; 1967.
- Hinrichs JR. *Practical management for productivity*. Unpublished manuscript; 1978.
- Hodgkinson GP, Healey MP. Cognition in organizations. *Annu Rev Psychol.* 2008;59:387–417.
- Kabanoff B, Rossiter JR. Recent developments in applied creativity. *Int Rev Ind Organ Psychol.* 1994;9:283–324.
- Kerr S. More on the folly-executive fax poll results. *Acad Manag Exec.* 1995;9(1):15–6.
- Kriegesmann B, Kley TM, Schwering MG. Creative errors and heroic failures: capturing their innovate potential. *J Bus Strateg.* 2005;26:57–64.
- Locke EA, Latham GP. Work motivation and satisfaction: light at the end of the tunnel. *Psychol Sci.* 1990;1(4):240–6.
- Mintzberg H. *The nature of managerial work*. New York: Harper Collins; 1973.
- Mirvis PH. Practice improvisation. *Organ Sci.* 1998; 9(5):586–92.
- Mott PE. *The characteristics of effective organizations*. New York: Harper & Row; 1972.
- Organ DW. *Organizational citizenship behavior: the good soldier syndrome*. Lexington: Lexington Books; 1988.
- Osborn AF. *Applied imagination: principles and procedures of creative problem solving*. New York: Charles Scribner's Sons; 1953.
- Parnes SJ, Noller RB, Biondi AM. *Guide to creative action*. New York: Scribner's Sons; 1977.
- Porrás JI, Robertson PJ. Organizational development: theory, practice, and research. In: Dunnette MD, Hough LM, editors. *Handbook of industrial and organizational psychology*, vol. 3. 2nd ed. Palo Alto: Consulting Psychologists Press; 1992. p. 719–822.
- Porter M. *Generic strategies and performance: an empirical examination with American data*. New York: Sage Publications; 1980a.
- Porter M. *Competitive strategy*. New York: Free Press; 1980b.
- Reiter-Palmon R, Robinson EJ. Problem identification and construction: what do we know, what is the future? *Psychol Aesthet Creat Arts.* 2009;3(1):43–7.
- Robertson PJ, Roberts DR, Porrás JI. Dynamics of planned organizational change: assessing empirical support for a theoretical model. *Acad Manag J.* 1993;36(3): 619–34.
- Rumelt RP. Towards a strategic theory of the firm. In: Lamb RB, editor. *Competitive strategic management*. Englewood Cliffs: Prentice-Hall; 1984. p. 566–70.
- Runco MA. Creativity. *Annu Rev Psychol.* 2004;55: 657–87.
- Senge P, Kleiner A, Roberts C, Ross R, Smith B. *The fifth discipline fieldbook*. New York: Doubleday; 1994.
- Spector B, Beer, M. Beyond TQM Programmes. *J Organ Change Manag.* 1994;7(2):63–70.
- Stein MI. *Stimulating creativity*, vol. 2: group procedures. New York: Academic Press; 1975.
- Taylor FW. *The principles of scientific management*. New York: W.W. Norton & Company; 1967.
- Wallas G. *The art of thought*. New York: Harcourt Brace; 1926.