1

FROM SUSTAINABILITY CONSTRAINTS TO CREATIVE ACTION: INCREASING MANAGERIAL INNOVATION BY SIMULTANEOUSLY SOLVING SOCIAL AND COMMERCIAL NEEDS

Goran Calic
McMaster University, Hamilton, ON, Canada

Maryam Ghasemaghaei
McMaster University, Hamilton, ON, Canada

Introduction: From Constraints to Innovation

In this chapter, we aim to advance the following proposition: Simultaneously solving social and commercial needs – *sustainability constraints* – results in greater product innovation. The common belief is that this position is false, because the simultaneous attention to both of these needs necessarily constrains the idea set, from which a manager can draw, to only those ideas that simultaneously do more good than harm to the environment and society (i.e. those that are socially sustainable) and those that are profit generating (i.e. those that are commercially successful). Such product ideas are rarer than are those that meet only the social or the commercial criteria. One would

expect that this constraint would have negative consequences on product innovation by decreasing the number of opportunities available to a manager, but we argue that the opposite is true. In doing so, we present a straightforward yet counterintuitive way to enhance managerial innovation.

The marketplace for new products, with continuous changes in consumer preferences, presents managers with a constant stream of potential opportunities. Those opportunities are captured through innovations that meet specific consumer needs and wants. Yet innovation can proceed only if managers discover creative ideas (Stage 1) and subsequently implement those ideas as better procedures, processes, or products (Stage 2). Thus, new product innovation first requires discovery, then it requires action.

Before continuing, we must emphasize that enhancing product innovation may not result in better performance (e.g. greater profitability, higher market share, better solutions to problems, more benefits for managers). Innovation is inherently uncertain. Product offerings that are dramatically different from past products can result in inordinate losses or gains. How managers can reduce the likelihood of negative outcomes is briefly covered in Section 1.4 of this chapter.

Because pictures are good at conveying relationships, we rely on simple graphs to present the intuition behind the argument that simultaneously solving social and commercial needs will increase product innovation. The graphs are not only an alternative method of presenting the same arguments. They have the potential to provide the reader with insights beyond those explicit in the text.

The remainder of the chapter is organized as follows. In Section 1.1, we define innovation as a two-stage process – creativity as the first stage and implementation as the second stage. In Section 1.2, we link the two concepts and discuss their point of intersection. In Section 1.3, we present arguments supporting a positive relationship among sustainability constraints, creativity, and implementation. Here we also introduce some guiding questions managers can consider in order to include both social and commercial criteria in decision making. We introduce the corporate sustainability agenda, a strategy for turning sustainability constraints into performance, in Section 1.4. In Section 1.5, we cover situations when sustainability constraints reduce innovation. Section 1.6 concludes the chapter.

1.1 The Inherent Uncertainty of the Innovation Process

The innovation process begins with creative problem solving. A creative process generates ideas that are original and useful and have the potential to revolutionize or change the direction of a field. Such ideas are also characterized by uncertainty and nonobvious utility to the individual, as they are generally new and untested approaches. That is, the manager generating the idea is ignorant of a creative idea's utility until the idea is implemented.

Although newness is closely related to creativity, an idea does not have to be completely new to be considered creative; it must only be creative in the context to which it is applied. The application of an existing product to a new market is consistent with this conceptualization of a creative idea. In the context of business, a creative product need

not be new. An imitation product can also be creative. Entrepreneurial competition involves businesspeople who follow the leader with cheaper or similar products. An entrepreneur who successfully "follows" an originator and offers a similar product still discovers an opportunity in the marketplace (e.g. better location, better price). For instance, if the follower's profits are the result of a product shortage, the manager foresaw the future fact that consumers would want more of the product than anyone, including the originator, expected. Yet creativity alone is not enough for innovation to occur.

Researchers have examined the possibility that creativity and implementation are two distinguishable elements of the innovation processes. Evidence from this line of work suggests that creative ideas are likely to be met with resistance, skepticism, and hesitation. Thus, although creative ideas may be desirable, their very nature is likely to generate reluctance about their implementation. Successful innovation requires both the generation of creative ideas and their subsequent implementation. In the next section, we discuss this interaction.

1.2 Innovation: The Tension Between Creativity and Implementation

Maximizing the conditions that increase creativity is unlikely to translate directly into a maximization of implementation. In fact, the maximization of some factors that increase creativity may result in the inhibition of implementation.

Restructuring of knowledge has been linked to creativity. Such restructuring results in a movement away from an "either/or" and toward a "both/and" way of thinking about the world. Because a movement toward a more flexible thinking style increases the availability of alternative perspectives, "right" and "wrong" are no longer fixed. When managers begin to permit the simultaneous existence of multiple perspectives, the environment can be interpreted in many more ways. Such a representation of the environment allows for the possibility of more creative solutions. However, such representations will also increase uncertainty, not necessarily in the sense that managers are less capable of implementing the creative idea but in the sense that more viable alternatives exist. More options mean much more information is sought out before a course of action is taken; and when a course of action has been taken, it is less fixed, and managers remain open to the perception that other choices may have been superior. This is the inherent tension faced by managers during the implementation process. In a quest to become more creative, people usually also become more indecisive. The relationships among creativity, uncertainty, and implementation can be represented graphically, as shown in Figure 1.1

Figure 1.1 plots the tension between creativity and implementation. The continuously increasing line, ρ, is the creativity of a generated idea in relation to its perceived uncertainty. This graph represents the fact that managers are more uncertain about creative ideas than they are about conventional ideas. The slope of the curve represents the strength of the relationship. That is, a steeper curve would mean a stronger positive

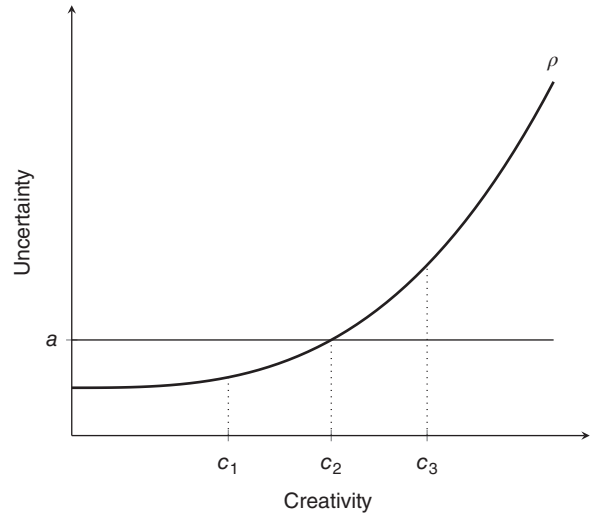


Figure 1.1: Resulting uncertainty from idea creativity levels *c*1, *c*2, and *c*3. Notes: A manager's uncertainty limit is represented by horizontal line at uncertainty level of *a*. The positive and increasing relation between creativity and uncertainty is represented by line ρ.

relation between creativity and uncertainty. The representation also demonstrates that the greater the uncertainty in an idea, the faster uncertainty tends to increase. In other words, small gains in creativity of conventional ideas increase uncertainty less than do small gains in creativity of creative ideas. The straight line at uncertainty = *a* represents an uncertainty limit on implementation, which is the uppermost boundary of uncertainty a manager is willing to face. Uncertainty above *a* will preclude action. Conceptually, ideas found on or below the uncertainty limit are sufficiently close to the current way of doing things that management is willing to commit resources and take the necessary risk to implement an idea. For example, an automotive industry manager attempting to reduce carbon dioxide emissions may invest in hybrid powertrain technology (a product innovation that can be represented by c_2 in Figure 1.1) because it combines ideas that are more conventional (i.e. the internal combustion engine, which can be represented by c_1) with ideas that are more creative (i.e. full-electric powertrain, which can be represented by c_3). In this example, the hybrid technology product innovation would fall on the manager's uncertainty limit. The same manager may reject the idea of a full-electric powertrain because the idea's future success is highly uncertain and above the manager's uncertainty limit. It is important to note that we focus on the manager's cognitive process as it pertains to the generation of ideas and the decision to act on those ideas. We avoid discussion about external inhibitors of innovation, such as the firm's or consumer's reluctance to accept a novel product.

Given the graph in Figure 1.1, a manager interested in enhancing innovation could attempt to (i) increase her uncertainty limit (an upward movement of a) and/or (ii) increase average idea creativity (a rightward movement along the creativity line). Neither alone would enhance innovation. In the next section, we explore how sustainability constraints can result in increases to creativity and implementation together.

1.3 Sustainability Constraints: Enablers of Innovation

Social and commercial needs may seem desirable in isolation, but they are often contradictory when combined. The need to address these demands simultaneously leads to a risk of unintended consequences, since a solution to one criterion (social or commercial) could be detrimental to that of the other criterion. For instance, a restaurateur may choose to reduce her environmental impact by restricting food sourcing from global to local suppliers. However, profitable local sourcing can turn out to be more complex than the manager first thought. Local sourcing reduces the total number of ingredients available to a chef, which makes the production of some dishes impossible. This could result in a less appealing menu. Furthermore, local sourcing can add operational complexity by fragmenting the supply chain from one, or few, global supplies to many small, usually less managerially sophisticated, suppliers. Small suppliers are less likely to deploy total quality management (TQM) or just-in-time (JIT) systems than are large multinational firms. As such, sustainability constraints can result in a decision-making context that pushes a decision maker to think creatively and take risks. Combining interrelated yet seemingly contradictory elements, such as social and commercial needs, can increase both creativity and implementation.

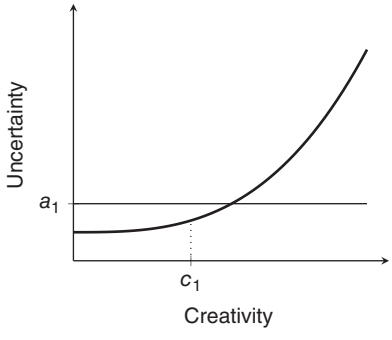
Sustainability Constraints: Enablers of Creativity

Sustainability constraints may be especially effective at enabling creativity. A number of studies find that constraining a task increases the number of creative inventions generated by participants. In several studies of creative imagery, the number of creative inventions increased significantly as the task became more constrained. The greatest number of creative inventions was obtained when component parts and the interpretive categories were randomly constrained at the beginning of the experiment. In 1080 trials of the experiment, 49 objects were classified as creative when the category and parts were randomly restricted. When the participants could choose the parts, 17 creative inventions were generated; when they could choose the category, 31 creative inventions were generated. Similarly, it can be expected that a chef restricted to fewer ingredients resulting from a move to local food sourcing may produce more creative dishes. Indeed, Noma, a two-Michelin-star Danish restaurant known for its creativity, came about because of René Redzepi's desire to create the ultimate local-seasonal cuisine. Mr. Redzepi regularly dispatches his cooking staff to collect seasonally available ingredients found within a short walk or drive of the restaurant. While seasonal availability and the short distance are both factors that are in line with sustainable sourcing, they limit ingredients and impose tremendous constraints to creating a high-class menu. Furthermore, studies of entrepreneurial funding success find that entrepreneurs who adopt both a social and a commercial orientation developed more creative product ideas, which resulted in higher funding success.

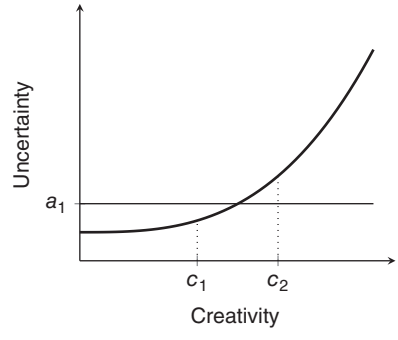
The preceding examples suggest that the probability of generating a creative idea is greater whenever an individual is forced to think within constraints, as would be the case when a manager is asked to simultaneously meet both social and commercial needs. The simultaneous attention to both of these needs constrains the idea elements from

which an individual can draw to only those found at the union of these two categories. It also constrains the outcome categories to those that are both profitable and socially beneficial. Such constraints increase the likelihood the manager will attempt to reframe the problem space in search of new possibilities, potentially identifying new, previously unnoticed, alternatives.

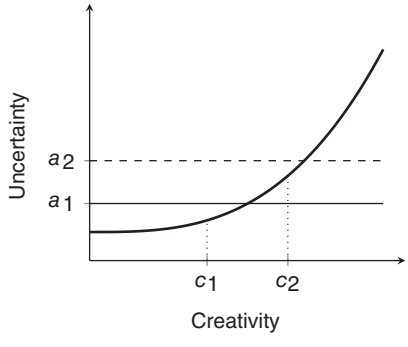
Figure 1.2 summarizes the innovation-enhancing effect of sustainability constraints. In the figure, graph (a) is the manager's status quo state of mind, with an uncertainty limit of a_1 and a creativity level c_1. Simultaneous consideration of social and commercial needs facilitates the generation of new, creative ideas. This change in creativity is represented in graph (b) by a movement along the creativity curve from point c_1 to point c_2. This alone is not enough to enhance innovation if the creativity level of the new idea



(a) Current Stable State: Mostly conventional ideas, represented by c_1, are pursued.



(b) Enhanced Inventiveness: Simultaneously attending to social and commercial needs increase managerial creativity, represented by a move from c_1 to c_2.



(c) Workable Certainty: Simultaneous attention to social and commercial needs does not reduce uncertainty but creates, "a more manageable mess from which managers can work", represented by an upward movement in the uncertainty limit.

Figure 1.2: Sustainability constraints as enablers of creativity and the decision to implement.

is above the manager's uncertainty limit. The idea must be acted on by the manager in order to have any organizational impact. Next, we discuss how simultaneously adopting commercial and social frames facilitates the decision to implement.

Sustainability Constraints: Enablers of Implementation

As managers attempt to make sense of a complex world, they simplify reality. Such artificial simplifications help managers make decisions in a world of near-infinite interdependencies. While simplifying reality can be useful, it can make managers shortsighted – they do not see possibilities that are not immediately obvious.

A sustainability orientation can reveal the hidden complexity of a task by encouraging the reconciliation of contradictions. For instance, introducing managers to a divergent viewpoint allows them to see an issue from a different vantage point than they did before. The new vantage point helps managers to tolerate inconsistencies in others' motives and behavior. Studies of individual creativity provide evidence for this argument. In laboratory studies exploring the effects of contradictions on creativity, participants introduced to contradictory ways of thinking (e.g. creativity is compatible with low cost) were more tolerant of novel ideas.

Simultaneously considering both social and commercial needs increases the likelihood that managers break away from existing knowledge that may prevent action on a creative idea. Breaking from existing knowledge reduces the functional fixedness or "curse of knowledge" bias. Functional fixedness is the bias that restricts a person to using an object only in the way it is traditionally used. For example, if people need a hammer but only have a frying pan, they may not see how the frying pan can be used as a hammer. By restricting the availability of existing options, a sustainability orientation can prevent existing knowledge about products, strategies, approaches from limiting which future ideas are pursued.

When managers embrace contradictions as simultaneously possible, they start thinking about ideas rather than tasks, which allows them to move toward a more workable certainty. Workable certainty is built on the idea that people can never fully grasp intricate situations. Rather than try to understand a complex world, managers must continually experiment with new ways of thinking. The restructuring of the LEGO company in the late 1990s is a case of how managers adopting contradictions as simultaneously possible became more open to novel ideas.

In 1998, LEGO, led by its chief executive officer, Kjeld Kirk Kristiansen, launched a comprehensive restructuring that changed the very nature of middle management at the company. As a result, many managers experienced an intense need to reinvent their roles according to a change they did not expect. The researchers studying the change found that managers searched for creative reinventions of their roles only when they were pushed to identify the latent contradictions (control versus autonomy) of their job. One manager who stated: "I'm stuck. I am ultimately responsible for my project leader's decisions, but I am supposed to let him, as well as everyone else, have more control over their performance. So how can I also be responsible?" (Lüscher & Lewis, 2008). The recognition that simultaneously achieving autonomy and control was required encouraged action on creative ideas. Viewing their role through this new lens helped managers

to consider other perspectives, alter their assumptions, and explore issues in fundamentally different ways. Indeed, it helped managers move beyond a search for simple, local solutions to a more meaningful and actionable understanding. By embracing contradictions, managers at Lego started asking strategic questions that challenged simplistic either/or solutions and encouraged experimentation. Simultaneously attending to social and commercial needs will not eliminate uncertainty of creative ideas, but it will create "a more manageable mess from which managers can work" (ibid.).

In Figure 1.2c, workable certainty is analogous to an upward shift of the uncertainty limit from a_1 to a_2. Under workable certainty, c_2 is now considered a possibility for investment and implementation.

Emphasizing Sustainability Constraints by Asking Questions

Managers can adopt sustainability constraints during the decision-making process by asking themselves whether their current approach sufficiently meets customers' social and commercial needs. The underlying theme of the social and commercial needs, and the resulting questions managers can ask, is described in the following paragraphs, and example questions for each criterion are presented in Table 1.1. Managers should brainstorm social and commercial questions that are most relevant to their organizational context, which includes the industry's environmental and social impact and the resources available to improve commercial success and social welfare (see Section 1.5).

Table 1.1: Creating sustainability constraints

Need	Questions to be considered during decision making	Outcomes	
Social	How does the product sustain the physical world, including the earth, biodiversity, and ecosystems? This includes intrinsic values, such as "beauties of the earth." More specific questions: How can we design buildings and workspaces that are environmentally responsible and resource efficient? How can we encourage vendors to comply with our sustainability goals and standards? How does the product sustain the complex web of relationships between sets of individuals who share norms, meanings, history, and identity? More specific questions: How does our way of business affect equal opportunity? How does our way of business result in noneconomic gains for our employees, such as education and career mobility, both within and outside our company?	CREATIVITY	WORKABLE CERTAINTY
Commercial	Does the product generate sufficient profit for reinvestment and redistribution to organizational stakeholders (employees and owners)? Does the product generate economic benefits for society? These benefits include the development of regions, institutions, and community organizations.		

Sustainability criteria can be organized into the sustainability of nature and communities. "Nature" refers to the physical world and includes the earth, biodiversity, and ecosystems. If these are not sustained, the lives of many species, including those of human beings, are threatened. For instance, studies show that exposure to green space improves human health and that the destruction of ozone has resulted in higher risk of skin cancer. The environment also serves the utilitarian purpose of providing resources and life support for humankind. If the environment is not sustained, life support for humans can be severely threatened. For instance, the reduced purification capacity of aquatic habitats due to contamination may lead to a shortage of drinking water.

The term "communities" refers to complex sets of relationships between people who share common values, norms, meanings, history, and identity. Culture, groups, and places are what make communities distinctive. Communities, from families to other larger groups, provide a sense of personal identity within large societies and are related to healthy functioning of human beings. The loss of cultural identity has been associated with alcoholism and diminished physical health and life expectancy. Places, cultures, symbols, and history serve as important community artifacts and can be threatened by commercially oriented actions.

Commercial gain is regularly seen as the counterpart to sustainability. However, it is central to the continued functioning of private organizations. The commercial perspective emphasizes the development of economic gains for the organization and society. Profitable organizations have the capacity to increase general social welfare by enriching employees and adding jobs to the economy. These commercial gains are an important goal. By enhancing the socioeconomic status of people, commercial gains can also lead to improved emotional, psychological, and physical health. This effect transcends generations, since the socioeconomic status of parents leads to enhanced childhood well-being.

Simultaneously considering questions related to social and commercial needs can enhance innovation by improving creativity and increasing the likelihood of implementation. Yet innovation may not translate to better performance. In the next section, we briefly consider the link between innovation and performance and what can be done to improve it.

1.4 From Innovation to Performance: Creating a Corporate Sustainability Agenda

Managers can obtain an innovation advantage through superior information about the future profitability of an idea. To managers, the utility of an idea is the final idea's future profit minus the cost of developing and implementing the idea. Utility is positive when future value is greater than total implementation cost. If the cost of implementing an idea is greater than the expected returns from that idea, managers will not obtain above-average industry performance. It follows that managers who have more accurate future expectations about costs and profits will be more successful. To that end, many

firms have recently begun using advanced data analytics tools to estimate the benefits and costs of new ideas.

Managers can obtain information about the future value of an innovation through an environmental analysis (external analysis) or by analyzing resources they already control (internal analysis). For example, external analysis can be performed by accessing big data (click streams, videos, tweets) to extract new information and better understand markets, products, and customers. Managers increasingly view external data as a critical driver of innovation and competitive advantage. Yet, because the environment is observable by all market participants, environmental analysis cannot be assumed to improve expectations about implementation costs of some managers more than of others, and thus it cannot be a sustainable source of more accurate expectations about the ultimate value of an idea.

The analysis of internal organizational resources, which are partially unobservable to outsiders, can result in more accurate expectations about ideas. For instance, managers are privy to the costs of internal transfers, employee salaries, depreciation of equipment, ongoing research and development projects, and other costs necessary to implement an idea. Managers can use descriptive analytical tools (i.e. understanding what happened in the past), predictive tools (i.e. understanding what will happen in the future), and prescriptive tools (i.e. simulating outcomes of possible actions) to better understand unique organizational resources. Together, these internal analyses can be used to formulate superior future expectations about the utility of an idea. Considering social and commercial needs within the context of internal organizational capabilities has been referred to as formulating a corporate social agenda. Following Porter and Kramer (2006, 2011), a corporate social agenda means mapping social opportunities to organizational capabilities to solve commercial needs.

A corporate sustainability agenda deliberately leverages the organization's source of advantage. This means utilizing the organization's unique and rare capabilities. Take, for instance, Walmart's mission to reduce fossil fuel consumption through supply chain innovation, a source of advantage for Walmart. Not only did Walmart's mission have positive effects on profitability by driving costs down by $200 million, but it also reduced greenhouse gas emissions by cutting more than 100 million miles from the company's delivery routes in 2009. This new thinking revealed the benefit of utilizing Walmart's superior supply chain management to simultaneously benefit society and shareholders.

Figure 1.3 graphs the effect of a corporate sustainability agenda. As before, idea creativity is graphed against its uncertainty. The relation between creativity and uncertainty depends on how surprising the creative idea is to managers. Less surprising ideas result from leveraging resources managers are relatively familiar with. For instance, Walmart's managers have relatively more familiarity with supply chain management than do their competitors. This allowed Walmart managers to implement ideas that are relatively more innovative. Superior familiarity can be represented by a shift in the uncertainty-creativity curve from ρ_1 to ρ_2. Stated differently, leveraging existing resources should lead to an advantage unique to a manager's organization (i.e. competitors' managers will find those ideas more surprising than will the focal manager). This change in slope between the curves represents a change in perception of uncertainty. The total competitive advantage gained by better expectations can be

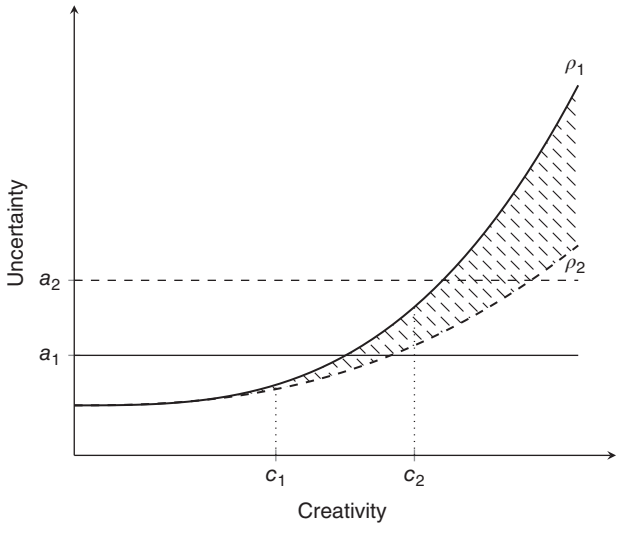


Figure 1.3: Effect of a corporate sustainability agenda on creativity and innovation. Note: Shaded area represents competitive advantage differential of better future expectations.

represented graphically as the shaded area between curves ρ_1 and ρ_2, with greater advantage accruing at higher levels of creativity.

Sustainability constraints are efficacious because they highlight the multiplicity of goals and perspectives that were previously latent. At the same time, contradictions can result in conflicts between organizational members and may result in lower performance or innovation. These dynamics are discussed in the next section.

1.5 Avoiding the Potentially Negative Effects of Adopting Sustainability Constraints

Under some circumstances, sustainability constraints may lead to behaviors of defensiveness, anxiety, and rigidity. This is most likely when managers face high degrees of external demands or threats. Under such conditions, simultaneously trying to maximize social and commercial elements in a decision may drive managers to choose only one category. In this case, an attempt to simultaneously attend to social and commercial needs could create the appearance of false trade-offs, whereby commitment to one approach reinforces the need for the other, which can further intensify the underlying contradiction and thus also the mindless commitment to one way of doing things. Such trade-off-based decision making in the face of constraints may result in lower innovation.

The likelihood of negative dynamics is greatest when a manager faces high levels of external demands – such as scarcity of resources, time pressure, and fierce competition. Evidence suggests that creative cognition occurs when individuals are free from

pressure, feel safe, and experience relativity positive emotions. For instance, time pressure will increase a manager's need for a quick solution, which will reduce willingness to achieve a thorough and rich understanding of the problem – a necessary condition for successful innovation. Time pressure also reduces length of incubation time, a critical component of creative cognition. In a study of 22 work groups from 7 US companies, Amabile et al. (2002) found that deadline pressure reduced creativity, resulted in frustration with work, and led to a feeling of helplessness. For sustainability constraints to result in higher innovation, managers should be shielded from high levels of external demands and threats.

Managers facing significant time pressure, competition, or resource limitations should avoid searching for the one best solution. Instead, they should rely on rapid iteration of ideas. Rapid iteration of ideas starts with the generation of ideas that represent the smallest set of activities needed to test the viability of the product and involves gaining feedback from inside (e.g. finance, manufacturing, marketing) and outside the organization (e.g. customers, suppliers). Relying on rapid iteration emphasizes learning rather than immediate product-market fit and should bound uncertainty generated by external pressure. By bounding uncertainty, managers are less likely to exhibit behaviors of defensiveness, anxiety, and rigidity.

1.6 Conclusion

The ability to innovate is a central feature of successful managers. However, innovation presents managers with challenges: factors that increase creativity often reduce the likelihood of implementation. In this chapter, we advance the argument that simultaneously solving social and commercial needs increases the likelihood both that creative ideas will be generated and that managers will decide to implement those ideas. We also briefly discuss how innovation, particularly innovation stemming from simultaneously attending to social and commercial needs, can be leveraged to increase performance. Last, we discuss the possible negative dynamics resulting from high external demands and threats and how these can be managed by emphasizing rapid iteration of ideas and learning.

Our arguments may be true of other types of constraints. However, at least two factors make simultaneously attending to social and commercial needs most important. First, attending to social and commercial needs has received a great deal of attention from management scholars, and good evidence exists between meeting such needs and innovation performance. Second, while other types of constraints may also result in the tension necessary to spur innovation, the contradictions between social and commercial needs are nearly universally felt by managers across industrial, geographic, and cultural boundaries. As a consequence, the effects of the contradiction between social and commercial needs should apply across a broad range of contexts. This is the case because transactions by profit-seeking organizations will unavoidably produce negative externalities, which are costs suffered by third parties (i.e. those parties not involved in the transaction), and such costs are examples of the greatest market failures we have ever seen (e.g. anthropogenic climate change).

We support our arguments using research at the intersection of human cognition and management science. Relying on creative problem-solving research, we argue that sustainability constraints enhance creativity by forcing individuals to think in unconventional ways and that these constraints enhance implementation by increasing tolerance for unusual ideas. Management research suggests that superior performance can be achieved through more accurate expectations about the future utility of organizational decisions if management focuses on internal, rather than external, analysis. In line with this research, we argue that a corporate sustainability agenda will result in superior expectations about the future value of innovations and thus enhanced performance.

References

Amabile, T. M., Hadley, C. N., and Kramer, S. J. (2002). Creativity under the gun. *Harvard Business Review* 8: 52–61.

Lüscher, L. S. and Lewis, M. W. (2008). Organizational change and managerial sensemaking: working through paradox. *Academy of Management Journal* 51: 221–240.

Porter, M. E. and Kramer, M. R. (2006). The link between competitive advantage and corporate social responsibility. *Harvard Business Review* 84: 78–92.

Porter, M. E. and Kramer, M. R. (2011). Creating shared value. *Harvard Business Review* 89: 62–77.

About the Authors

DR. GORAN CALIC joined McMaster University in Hamilton, Ontario, in 2016 as a tenure-track research professor in Strategic Management, with affiliate membership in Information Systems. He holds a PhD in Strategic Management from Purdue University. Dr. Calic's research focuses on understanding why some individuals are more creative and some organizations are more innovative than others. His area of research is primarily concerned with early-stage entrepreneurship. His work on creativity in organizations was awarded the 2015 Max Henri Boisot Award. He has written in a variety of academic publications, such as the *Journal of Management Studies, Rutgers Business Review,* the *Academy of Management Learning and Education*, and the *Oxford Handbook of Organizational Citizenship Behavior*. Dr. Calic worked for four years in Osnabrück, Germany, at Georgsmarienhütte GmbH. During this time, he was involved in activities related to market research, sales, and organizational strategy.

DR. MARYAM GHASEMAGHAEI is an Assistant Professor of Information Systems at DeGroote School of Business at McMaster University, Hamilton, Ontario. Her research interests relate to technology adoption and the impact of data analytics on firm outcomes. She has published in a variety of peer-reviewed academic journals such as *MIS Quarterly*, *Journal of Strategic Information Systems, Information & Management, Decision Support Systems, Computers in Human Behavior, Journal of Computer Science,* and *Journal of Retailing and Consumer Services*.