

ENGAGING SUSTAINABILITY – A MULTILEVEL APPROACH TO STRATEGIC SUSTAINABILITY CHALLENGES

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ABSTRACT

“Sustainability” challenges the limits of human decision making capability but managerial prescriptions and recommendations for sustainability are mostly based on simplifying disciplinary assumptions that reduce the complexity of the challenge that organizations face. This limits the effectiveness of organizational initiatives for change. A deeper appreciation of the problem context is required. When is coupled with a process-oriented problem structuring methodology and a learning-based approach to innovation, this can result in organizational strategies that are both more effective and that ensure organizational flourishing. This paper describes an engagement process that is based on three elements: an inquiry and structuring process based on Aristotelian causality, the use of systems thinking for analysis and communication, and an innovation process based on the logic of effectuation. Aristotelian causality is the foundation of the engagement process and links systems thinking and effectuation in a natural way. The organization’s learning culture is shown to be a key element in the engagement process.

Key words: Learning, effectuation theory, sustainability, innovation, wicked problems, problem structuring

1 INTRODUCTION

The years following the publication of Rachel Carson’s *Silent Spring* [1] saw a dramatic increase in regulatory and institutional structures designed to address the environment. Establishing emission standards and having enforcement power dramatically improved the environment in almost all parts of the world. Reliance on rules and regulations are examples of a command and control policy that has resulted in improvements but which also had unintended outcomes. One is that the focus on emission standards contributes to a technology-based approach to environmental management which has the effect of creating a belief that technology can solve all problems. The second consequence is that it has encouraged a reactive mindset in organizations. Firms’ environmental strategies are designed to meet the letter of the law, but not necessarily the spirit in which the laws were intended.

The book “*Our Common Future*” [2] introduced the concept of sustainable development to a broader public. The definition offered by book, “... development that meets the needs of the present without compromising the ability of future generations to meet their own needs,” was inspirational, but did not provide a solid basis for action. Unlike easily collected physical measurements of emissions and energy consumption, terms such as poverty and intergenerational equity are characterized in many different ways, some of which conflict with each other. The playing field may have changed but the rules remained the same. The essence of the sustainability challenge was well captured by Schön[3], “*In the swampy lowland, messy, confusing problems defy technical solution. The irony of this situation is that the problems of the high ground tend to be relatively unimportant to individuals or society at large, however great their technical interest may be, while in the swamp lie the problems of greatest human concern.*”

This quotation highlights that the challenge for incorporating “sustainability” into society’s efforts to

improve the human condition will require a shift in focus away from the established ways of thinking. Sustainable development has influenced the development of alternative performance measurement systems. For example, the triple bottom line [4] and similar frameworks were developed to capture sustainability's three traditional dimensions – economic success, environmental protection, and social responsibility. Although a “sustainable” organization was seen to be one that managed to balance all three concerns, [5] points out that reducing unsustainability is not the same as sustainability.

Internally, organizations also face challenges. These come from several sources: employees have a desire for a “better world” and want to orient their organizations in this direction and “green imperatives” from upper management. These are confronted with powerful obstacles such as established organizational values that reject change, accounting systems that disregard externalities, reward systems that are tied to quarterly profits, and the ongoing reality of meeting the bottom line (see [6]).

In the control perspective, managerial prescriptions and recommendations for achieving sustainability are based on simplifying assumptions regarding the business context. In this view, the outcome is a known and generally agreed upon set of performance measures. The management question is how to best achieve the desired effects given the selection of possible means. “Sustainability” stretches the limits of human decision making capability and policy makers often retreat to their disciplinary roots for guidance, overlooking potential synergisms with other disciplines [7]. An alternative approach for the sustainability awareness-driven business environment is based on the idea that the future can be created. Thus, traditional control is not applicable [8]. The approach uses the logic of effectuation and concentrates on using available means to create possible outcomes. It is the logic of innovation and offers a more effective way to engage with sustainability issues.

While implementing traditional initiatives for improved environmental performance is better than doing nothing, we argue that a deeper appreciation of the problem context is required. In the following we present an approach to engagement that draws from multiple disciplines and effectively uses the organization's learning capabilities to develop more innovative, high leverage initiatives to improve organizational sustainability performance.

2 THE CONTEXT OF SUSTAINABILITY

Sustainability has no single disciplinary foundation. Although most of the work in sustainability comes from either economics or ecology, which derives from the same linguistic root, much of the thinking about how to “do” sustainability is locked into an “either-or” mindset. Initiatives such as certification, information systems, and technical improvements to existing processes dominate the set of options that are considered. Some of these are required by law, others are driven by shareholder demands, but they all represent a reactive attitude on the part of the organization. These activities are important and have resulted in significant improvements, but they have relatively low leverage [9] and are insufficient to meet future expectations.

2.1 What is a “problem”?

“Problems” do not have a life of their own. They are artificial constructs; there are only situations or conditions. In order for a “problem” to exist there must be some sort of reference point against which to compare the current situation with some desired or expected condition. The desired conditions reflect the aspirations and expectations of the stakeholders who are involved in the situation. As a consequence of multiple perceptions, there may also be differences regarding the significance of the size of the gap, or even if the condition is important. A current example can be found in the debates surrounding the existence (or non-existence) of human-caused climate change.

There are many possible explanations for such disagreements, including ideological ones [10]. Fundamentally, they are all based in the concept of the mental models of the actors who are involved with the situation. People are sense-makers [11] who attempt to create understanding through using mental models, or small-scale cognitive constructs of reality [12] that are employed to make sense of real-world situations and to anticipate events in the world.

2.2 “Wicked problem” characteristics and sustainability

The concept of sustainability and its implications are arguably the most difficult and problematic issues facing society today. “Sustainability” is an ill-defined problem. Rittel and Webber [13] formally

described a class of ill-structured problems as “wicked” and identified ten characteristics of wicked problems. The criteria that are most relevant for sustainability include 1) there is no definitive problem definition, 2) there is no stopping rule, the process is on-going, 3) there are no right or wrong solutions, only good or bad ones, 4) the problems are essentially unique, 5) the “problem” can be explained in many different ways, which influences the choice of methodology, and 6) due to complexity and interrelationships, every problem is a symptom of another problem.

3 A FRAMEWORK FOR ENGAGEMENT

Despite the “wickedness” of the context, it is possible to navigate through this environment as well as to improve the situation. The common element in this process is Aristotelian causality. It is central in structuring the context and is related to both systems thinking and innovation. In the following section we argue why a hierarchical approach for structuring, systems thinking for analyzing and communication, and effectuation theory for innovation are necessary elements of a framework for engaging sustainability.

3.1 Structuring with Aristotle’s four causalities

The American engineer C.F. Kittering stated that “a problem well stated is a problem half answered.” Formulation imposes a structure on the decision context that translates the initial conditions into a set of problems, causes, and questions [14] that are required to implement an appropriate methodology. The literature on problem structuring is extensive (for example, see [15], [16]). We apply the hierarchical approach suggested by Braman’s [17] and the notion of Aristotelian causality to structure our understanding of sustainability.

While the questions of inquiry and methodology are rife with philosophical and epistemological questions [18], these are of little direct concern to organizations concerned with the practical challenge of meeting demands for more sustainable behavior. Braman [17] proposed a hierarchical approach to structuring the concepts of “information” as a guide for policymakers. Information also suffers from a definitional dilemma that complicates the task of developing an information regulatory regime [17, p. 234]. Sustainability has an analogous challenge. Using a very narrow definition necessarily excludes many issues that are irrevocably connected. This leads to overly simplistic, low leverage initiatives. This approach can favor one disciplinary perspective over others, some of which may be more effective than the chosen perspective’s recommendations. Essentially, the process can become politicized, for example see [19].

The issue of sustainability and the organization’s responsibilities with respect to it may be understood at many different levels. A key question that decision makers should reflect upon is “Why?” What is the purpose of what is being done? The question is important because how it is answered guides the selection of methodologies employed to address the situation. An organizational sustainability inquiry process must support multiple levels of insight. Each level of perception, ranging from the real world of hard measurement to the level of human aspirations and goals, yields different insights and suggests different courses of action. The Aristotelian philosophical approach to the question of “Why is something the way it is?” provides a framework for integrating the components of organizational engagement with sustainability.

According to the Aristotelian tradition, there is only a single answer to the “why” question but there are several different approaches to getting at it. These have been identified as:

- Material cause – natural capital: an objects focus in the material domain.
- Efficient cause – processes: a subject-objects focus in the material domain.
- Formal cause – design: a subject-subject focus in the relational domain.
- Final cause – intent: a transpersonal focus in the relational domain.

3.2 Systems thinking for analyzing and communicating

Systems thinking is the art and science of linking *structure* to *performance*, and *performance* to *structure* – often for purposes of changing *structure* (relationships) so as to improve *performance*. Systems thinking consists of a *paradigm* and an associated *learning methodology*. Systems thinking seeks to change the way in which decision makers structure and explore their understandings of the

problem situation. It is based on the concept of feedback and is a framework and methodology for becoming more aware of the full range of consequences of the actions under consideration, and for finding high leverage action points [9].

There are two main reasons for considering systems thinking. First, interdependencies are becoming increasingly difficult to ignore. These exist at all levels. Second, as webs of interdependencies among systems expand, the likelihood of any action having *unintended consequences* increases, as does the ramifications of those consequences in both space and time. The more unintended consequences that are generated by an action, the less likely it is that the *intended consequences* of the action will be achieved. Another common effect of attempting to change a complex system is *counter-intuitive behavior* [20] where the system does not perform as expected by the policy maker.

The systems thinking perspective requires that we shift our focus from the detailed “things” that make up the system to considering the relationships among the system’s components [21]. The “pushed back” portion of the multiple level vantage point causes three shifts in viewing orientation: 1) from seeing either/or to seeing continuity, 2) from seeing differences to seeing commonalities, and 3) from seeing events to seeing patterns. This shift is significant; rather than focusing on the specific differences inherent in the pieces, the “natural” way, we see the generic nature of relationships. And although the attention is taken away from specific events, they now become interesting within a longer-term pattern of behavior.

3.3 Acting through effectuation

Increasing pressures for organizations to become more “sustainable” presents a fundamental challenge to the institutionalized idea of management as control. A decision problem consists of effects and means, where the effect is the operationalization of an abstract human aspiration [22, p. 245]. The means are the ways in which the effect can be realized. Traditional decision-making represents a process of causation where the effect is given and the focus is on selecting the best means to achieve it. This decision function is a mapping of many means to a single effect.

An alternative decision logic, effectuation, is based on the notion that the effects are not given a priori but are a set of operationalized general aspirations. The means are identified by the characteristics or circumstances of the decision-maker [22, p. 249]. The essential difference between the logic of causation and the logic of effectuation lies in the view of the future. From the causal perspective the future is seen to be a continuation of the past and can be predicted. The effectuation view sees the future as a function of the actions of willful agents. In effect, this is the notion of creating the future and taking the actions required to realize it. In this framework, structuring is the critical step because it sets the stage for all subsequent activities. The causality approach to problem-solving is to assess a number of means with respect to their ability to achieve a desired effect. Effectuation logic [23] starts with an assessment of the means and considers the question of what set of possible effects (outcomes) can be created with them.

Aristotelian causality has a natural connection with the decision-making approaches described by causation and effectuation. While significant improvements in the environment have been achieved through technical achievements, these advances are the consequence applying a causation-based decision approach. Initiatives linked to the material domain also include institutional and regulatory programs of taxation, standard settings, and oversight agencies. The implicit objective is to continue economic growth. The question is how best to accomplish this; questions of this type are linked to Aristotle’s material cause and efficient cause. Both of these are based in the material world of objects (material cause) and processes (efficient cause). With respect to sustainability, these are necessary but not sufficient conditions.

Engaging with sustainability in an effective manner will require that more emphasis be placed on the redefinition of goals (formal cause) and paradigms (final cause). This will automatically result in changes in the material domain. The reverse is not always the case – more fuel-efficient cars have not changed the underlying attitude towards personal transportation. Ehrenfeld [5, p. 13] claims that we need “a shift in our consciousness and in the language we use to give meaning to the incoherent signals the world sends our senses.” Using the hierarchy of Aristotelian causality helps us to conceptualize sustainability in a manner that includes the beliefs, values, and aspirations of human beings. Aside from the current focus on nature (the mechanistic view), it is important to address the loss of caring and ethical behavior (the relational view) that makes the human species distinct. Aside

from the current focus on nature (the mechanistic view), it is critical to address the loss of caring and ethical behavior (the relational view) that makes the human species distinct. Greater focus on the formal and final causes will contribute to making responsible and ethical decisions that develop more sustainable habits and mindsets.

4 DISCUSSION

4.1 Engaging sustainability - Integrating multi-levels of sustainability

Vanasupa et al.[25] made the linkage between systems thinking and Aristotelian causality explicit. Figure 1 shows how the four causalities are related to the systems thinking skills of discerning events, patterns, structuring, mental models, and vision.

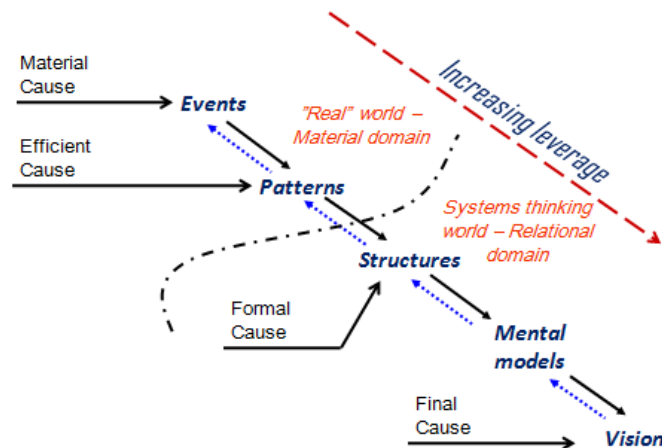


Figure 1. Engaging sustainability framework

Sustainability can be approached by two modes of thinking -causation and effectuation. Sustainability as causation is shown by the solid arrows between the levels and begins with the current situation at the level of events and seeks to develop the underlying systemic structure that generates this behavior. In this way, the underlying mental models associated with the unstated paradigm can be revealed and the assumptions upon which it is based may be tested. This approach is applicable to the material domain because it is based in the consequences of the current situation. Sustainability as effectuation, shown by the dotted arrows, begins with a vision of desired end states and works through the new paradigm to the design of new structures that will result in observable conditions that are desired.

While much of the effectuation literature is focused on the individual entrepreneur, our interest is in leveraging individual entrepreneurial energy in an organizational context. The process is completed by emphasizing the learning aspects of the engagement activities. Individual and organizational learning are the most essential skills and capabilities that an organization can develop and is a prerequisite for effective organizational performance.

Senge [24] identified three skills for working with mental models. *Reflection* is a personal skill where the decision maker works consciously to maintain a critical attitude towards his or her own mental models. *Inquiry* involves interacting with others and is the act of attempting to understand other actors' mental models. *Advocacy* involves making explicit the stakeholder's reasoning and evidence in support of a desired course of action. Consequently, the emphasis in structuring should be dialogue based and focused on the "Why?" question when exploring the stakeholders' mental models.

4.2 An organizational learning culture perspective

Effectuation theory is concerned with understanding the nature of entrepreneurial expertise and the object of focus is the individual and associated attributes [23]. Making effectuation happen in an organizational context requires a willingness to make changes in how the organization is managed. A firm's learning orientation is the most important aspect that influences organizational effectuation [26]. Associated with the learning orientation, an expression of the organization's learning culture, are

a set of facilitating factors. These describe the structures and processes that influence the difficulty and quality of the learning that does occur.

An effectuation-based approach to innovation is supported if the firm's learning style is compatible with the characteristics of the effectuation process. In Table 1, the effectuation process elements [15, p.15] are linked with the factors that characterize an organization's learning environment.

In addition to the learning culture, the success of the effectuation process depends on the ability of the innovator to build a network of committed stakeholders. Organizations are designed and function according to formal structures and processes but are also comprised of individuals who develop informal social networks. This creates a shadow organization that functions in the background of the formal structure. The interaction of formal and informal networks influences the learning ability of individuals as well as the organization as a whole.

The dynamics inherent in formal and informal organizational structure provide a context that both facilitates and constrains the exchange of information and organizational learning processes in the organization [27]. However, successful organizational effectuation requires a clear picture of the organization's capability to enable cross-border collaboration and to foster the possibility to develop and test ideas that are not directly linked to daily business activities.

Table 1. Combining learning culture and elements of the effectuation process

<i>Effectuation process elements</i>	<i>Organizational learning culture elements</i>
Entrepreneur's self-assessment	Skill development focus Involved leadership
Focus on possibilities rather than what ought to be done	Climate of openness Concern for measurement Experimental mindset Multiple advocates Systems perspective
Stakeholder selection – self-selection based on making commitments	Documentation mode Dissemination mode
Increasing commitments implies new means and goals for the venture	Systems perspective Climate of openness
Network growth increases access to resources but also increase constraints on changes and recruitment	Climate of openness Continuous education
Assuming stakeholder accumulation process does not abort the venture, goals and network converge to form new market and a new firm	Experimental mindset Operational variety Learning focus Multiple advocates Value chain focus

5 CONCLUSIONS

The business environment has expanded from the relatively simple forces of the marketplace to one that is significantly influenced by many non-traditional stakeholders and processes. The underlying driving forces of these challenges require that business managers adopt both a broader and more sensitive attitude to the world outside the immediate competitive environment. In order for organizations to interact effectively with the wicked problem of sustainability, the initial step of developing an understanding of the context becomes important.

The four Aristotelian causalities provide guidance in this aspect of engagement. Previous work in environmental management has focused attention on the causalities in the material world. The important limitation of the answers to the "Why?" question at this level is that they do not address the underlying paradigm that guides behavior. In this sense, the material causalities correspond to incremental learning. The relational level causalities provide deeper answers to the "Why" question. Effectuation-based innovation enables decision makers to assess their capabilities and to design a

future that can be achieved with them. This may entail challenges to established ways of perceiving and acting but can result in developing significantly higher leverage initiatives for change. These initiatives are also more difficult to develop and to implement as they require behavioral change at the personal level.

Systems thinking is both a methodology for analysis (performance) and a communication tool (meaning). The methodology is especially useful in situations where there may be different understandings of the causes of problematic behaviors that are being experienced. The tools of systems thinking enable policy and decision makers to operationalize and experiment with the many possible answers to the questions generated by applying Aristotelian inquiry to the organization's engagement with sustainability.

In the effectuation perspective, an important innovator attribute is access to others. The scope of the innovator's personal network influences the process of innovation by providing access to others with relevant means to support the innovator. Organizations concerned with innovative engagement with sustainability issues have to establish the internal conditions that enable the entrepreneurial employees to develop themselves. A requirement for this type of performance is enabling employees to leverage their aspirations and skills in support of a vision of sustainability. These are the conditions that influence the organization's learning culture. The attributes of the learning culture, operationalized through learning orientations and facilitating factors, significantly influence the ability for individuals to engage in effectual thinking.

Finding the balance between the need for a requisite degree of coordination and control (performance) and simultaneously supporting an organizational environment of inquiry and experimentation (meaning) will be difficult. It is important to recognize that there are no solutions to sustainability in the commonly understood sense. As a wicked problem, there are no stopping rules. The organization interested in a meaningful commitment to working with sustainability must recognize that this will be an on-going process that is dependent on the internal organizational environment being alert to supporting a culture of inquiry, experimentation, and learning. Traditional economics-based approaches will still play a role, but other approaches based on discourse and mutual learning offer better prospects for engaging a broader set of stakeholders in this common challenge.

REFERENCES

- [1] Carson, R. *Silent Spring*, 1962. (Mariner Books, New York).
- [2] World Commission on Environment and Development. *Our Common Future*, 1987. (Oxford University Press, Oxford UK.).
- [3] Schön, D. *Educating the Reflective Practitioner*, 1987. (Jossey-Bass, San Francisco CA).
- [4] Elkington, J. *Cannibals with Forks*, 1997. (Capstone, Oxford UK).
- [5] Ehrenfeld, J. Beyond sustainability: Why an all-consuming campaign to reduce unsustainability fails. *Change This*, 2006, 25(03), pp.1-17.
- [6] Kerr, S. On the folly of rewarding A while hoping for B. *Academy of Management Executive*, 1995, 9(1), pp. 7-14.
- [7] Bilalic, M. and McLeod, P. Why good thoughts block better ones. *Scientific American*, 2014, 310(3), pp. 58-63.
- [8] Wiltbank, R., Dew, N., Read, S. and Sarasvathy, S.D. What to do next? The case for non-predictive strategy. *Strategic Management Journal*, 2006 (in press).
- [9] Meadows, D.H. Places to intervene in a system. *Whole Earth*, Winter 1997, pp. 78-84. (<http://www.wholeearth.com/issue-electronic-edition.php?iss=2091>).
- [10] Oreskes, N. and Conway, E.M. *Merchants of Doubt*, 2010. (Bloomsbury, New York).
- [11] Weick, K., Sutcliffe, K.M. and Obstfeld, D. Organizing and the process of sensemaking. *Organization Science*, 2005, 16(4), July–August, pp. 409–421.
- [12] Craik, K.J.W. *The Nature of Explanation*. 1943. (Cambridge University, Cambridge UK).
- [13] Rittel, H.W.J. and Webber, M.M. Dilemmas in a general theory of planning. *Policy Sciences*, 1973, 4, pp.155-169.
- [14] Woolley, R.N. and Pidd, M. Problem Structuring - A Literature Review. *The Journal of the Operational Research Society*, 1981, 32(3), pp.197-206.
- [15] Mitroff, I.I. and Mason, R.O. Structuring ill-structured policy issues: Further explorations in a methodology for messy problems. *Strategic Management Journal*, 1980, 1(4), pp. 331-342.
- [16] Gioia, D.A. and Pitre, E. Multiparadigm perspectives on theory building. *The Academy of Management Review*, 1990, 15(4), pp. 584-602.
- [17] Braman, S. Defining information - An approach for policymakers. *Telecommunications Policy*, September 1989, pp. 233-242.
- [18] Brown, V.A., Harris, J.A. and Russell, J.Y. (eds.) *Tackling Wicked Problems Through Transdisciplinary Imagination*, 2010. (Earthscan, Washington DC).
- [19] Dembinski, P.H. Towards a multi-modal causation framework of entrepreneurship. *Estudios de Economica Aplicada*, 2006, 24(2), pp. 339-358.
- [20] Forrester, J.W. The counterintuitive behavior of social systems. *Theory and Decision*, 1971, 2, pp. 109-140.
- [21] Richmond, B. The thinking in systems thinking: How can we make it easier to master? *The Systems Thinker*, 1997, 8(2), pp. 1-5.
- [22] Sarasvathy, S.D. Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. *The Academy of Management Review*, 2001, 26(2), pp. 243-263.
- [23] Sarasvathy, S.D. *Effectuation: Elements of Entrepreneurial Expertise*, 2008. (Edward Elgar, Cheltenham UK).
- [24] Senge, P. *The Fifth Discipline: The Art and Practice of the Learning Organization*, 1990. (Doubleday, New York).
- [25] Vanasupa, L., Burton, R., Stolk, J., Zimmerman, J.B., Leifer, L.J., and Anastas, P.T. The systemic correlation between mental models and sustainable design: Implications for engineering educators. *International Journal of Engineering Education*, 2010, 26(2), pp. 438-450.
- [26] DiBella, A.J., Nevis, E.C. and Gould, J.M. Understanding organizational learning capability. *Journal of Management Studies*, 1996, 33(3), pp. 361-379.
- [27] Kutzschenbach, M.v. and Brønn, C. You can't teach understanding, you construct it: Applying social network analysis to organizational learning. 2010, *Procedia-Social and Behavioral Sciences*, 4, pp. 83-92.