Preface

In management science, as with the broader social sciences, theories appear to be of limited efficacy and not fully appreciated by the business world. Even when we set our specific theories aside and rely on the benefits of a general education, the results are mixed. While no one denies the benefits of a general business education, that same education has also been implicated in corporate scandals such as the downfall of Enron. From these issues, one might imagine a crisis of confidence for management studies.

Yet, while the fortunes of business rise and fall, there is something different happening here. We management theorists are not a corporation, we are a community dedicated to advancing knowledge, and we are part of a science. And, the science continues to advance; sometimes in small steps, sometimes in great paradigmatic leaps. Instead of shutting down our science (like a business might close its doors) the realization of our limitations has inspired calls for more theory, improved theory, and more innovative theory – all in an attempt to reach beyond the horizon of our own limited comprehension. This book is informed by those calls while realizing that there is the need for something more.

To ask for a better theory without providing a better understanding of how theory emerges, is like asking a garden to provide a more bountiful harvest – without providing more light, fertilizer, and water. The underlying prerequisites are simply not in place to support success. We are doing more of the same thing while expecting different results. To facilitate a shift in thinking, my approach in instigating this project was to encourage the investigation of theory itself. Only by developing new ideas into the creation, structure, testing, and application of management theory can our science be expected to gain the metatheoretical insights needed to develop better theory. Since metaphorically theory can be understood as a lens through which we view the world, this approach asks for the creation of new lenses, and the re-arranging of existing lenses, to better understand the manager’s world.

When looking at a drop of water, a magnifying glass might show dots where the naked eye saw nothing. If we arrange multiple lenses, one in line with another, we have a greater opportunity for learning because we have created a microscope. And, importantly, we gain an improvement in resolution by 100 times or more. Now those dots are seen to be living creatures (and we have enabled the emergence of a new branch of the biological sciences). This is the highest purpose of theory – making clear what was once invisible. Where management science contains many theoretical lenses for viewing the manager’s world, this book is about applying the lenses of systemic thinking to better understand the lens of management theory. In this process, we hope to dramatically improve our ability to make sense of the world and our organizations.

The next section contains a brief overview of the primary lens (management theory) and secondary lenses (cybernetics and systems theory) from which this book emerges. An additional sub-section will provide a brief overview of theory and metatheory. The following sections will then describe the usefulness of the book, the target audience, brief descriptions of the sections and chapters of this book, and the impact this book will have on some fields of study.
FROM MANAGEMENT TO METATHEORY

While the roots of management studies reach back to Weber’s studies on bureaucracy (and beyond), a reasonable starting point may be found in Taylor’s analyses of workflow in the beginning of the 20th century. The field has grown steadily ever since with most universities providing courses and programs in management at the undergraduate and graduate level. From those original time and motion studies, management studies have extended to include communication, entrepreneurship, strategy, ecology, sustainability, neurology, leadership, decision-making, best practices, organizational change processes, ethics, marketing, and knowledge management (just to name a few).

Given the recent studies questioning the efficacy of management theory, and the related call for new and better theory, the greatest challenge for management science is to develop theories that may be reliably applied in practice for incontestably efficacious results. As we move toward that goal, an intermediate step is to develop theories that will provide us with general and specific understandings of the many aspects found in the field of management.

While new theories are continually emerging, our view of theory creation has (for the most part) remained the same – mired in the traditions of the past century. For example, Mintzberg has suggested that we use intuition and avoid paying conscious attention to the process by which we make our theories. In contrast to this intuitive approach, there is a growing interest in grounded theory, whose proponents suggest that theory building should be accomplished through rigorous and specific methodology. Some where in the middle are the vast majority of the social scientists who apply a certain level of academic rigor that appears to be acceptable to editors and reviewers (although that rigor seems to result in theory that is insufficient for practitioners).

With this proliferation of theories and paradigms (criticized by Donaldson, among others), there exists the increased opportunity to examine the field of management. This is best accomplished by using lenses that are specifically adapted for understanding the complexity and systemic relationships that exist within and between the many paradigms of management studies. In this book, we purposefully adopt such a view by looking at management theory through the lenses of cybernetics and systems theory. It is important, always, to know what kind of lenses we are using. One would not, for example, choose to wear reading glasses to view distant mountains!

Cybernetics

As the practice of management is (to a large extent) about moving toward individual and organizational goals, one lens that does seem well adapted to understanding management is cybernetics. The term is derived from the Greek “kybernetes” or “steersman” and the general focus is to understand why and how systems move toward their goals – through an understanding of communication, feedback, and control. Founded by Norbert Weiner, Cybernetics began in the middle of the 20th Century and the field has developed over the decades, impelled by pioneering work such as von Bertalanffy (primarily in biology), von Neumann (cellular automata), and Ashby (including his law of requisite variety for system control). By the late Seventies, second-order cybernetics emerged with the work of Foerster (self reference), and Maturana (autopoiesis and cognition).

The field of cybernetics has grown to include investigations into artificial intelligence, robotics, control systems, simulation, and more. Stafford Beer was a leading figure in bringing cybernetics into the realm of management theory, particularly with his Viable System Model. And, more recently, Stuart
Umpleby has been an influential figure in the field with his work on social cybernetics and cybernetics in management theory. In management theory, concepts from cybernetics are part of studies in communication, learning organizations, self-organizing teams, and others. The cybernetic approach suggests the opportunity to integrate and so better understand the relationships **between** the many aspects of management theory (e.g. communication).

**Systems Theory**

Many cyberneticists also conducted investigations in the more general realm of systems theory (for example, Ashby’s studies of complex systems). General systems theory was advanced by the likes of von Bertalanffy (philosophy of systems), Gerard (in neurology), and Boulding (economics and social science). The work of Prigogine in self-organizing systems is particularly notable as is the development of complex adaptive systems theory by Holland, Gell-Mann and others. Systems theory has emerged to inform a variety of fields including catastrophe theory, chaos theory, context theory, complexity theory, and complex adaptive systems theory. More recently the work of Checkland has proved influential with investigations of messy systems in the field of management. In management, systems theory supports a wide variety of perspectives such as “systems thinking” (promoted by Senge and others).

Derived from the Greek “sunistánai” relating to how things stand together. Systems theory has proved to be an important perspective in studying management by the simple yet important idea that things (including processes, objects, actions, and individuals) can best be understood in relation to other things. These systemic interrelationships support our ability to understand the human condition and take more effective action. This systemic approach suggests the opportunity to better understand the interrelationships **within** the field of management theory (e.g. the structure of communication theory).

**Theory and Metatheory**

Broadly, a theory might be understood as conceptually similar to a schema, model, mental model, or metaphor – a lens to see the world. All so-called “facts” are understood to be valid only in terms of the theoretical lens through which the researcher views the undifferentiated world. That is why, for example, two people can look at the same situation and come to two different conclusions – they are viewing the world through different lenses. As social scientists, we may have a heightened awareness of our lenses because an important part of our work is the process of making lenses (in our research and writing) and helping others to try on different lenses so that they too may understand the world in new ways (in our classrooms).

This perspective of perspectives may be understood as the theory of theory, or metatheory. In past years, it should be noted, metatheory was given a bad name when it was applied to the creation of speculative over-arching theories. As our conversation of metatheory in the 21st Century gains momentum, however, the metatheoretical perspective is better understood as relating to the study of theory (including the rigorous development of new theories), and the critical analysis of theory (including methods of creation, structure, testing, validation, falsification, and application).

However, as suggested above, most scholars have not employed a specific metatheoretical methodology. Developing theory without a guiding metatheory is akin to managing a business “by the seat of the pants;” purposefully eschewing formal education and conscious reflection. This is not to say that intuition is irrelevant – only that we need to differentiate between intuition, theory, and action, if we are
to understand how they are interrelated and enable ourselves to become more effective in scholarship and practice.

In short, it should be noted that our understanding of lens making is, itself, a lens. More philosophically than metaphorically, the theory is what frames the epistemological validity of the knowledge, while metatheory frames the ontological validity of the theory. And, as theory guides practice, we need to understand the relationship between these aspects of our management science paradigm if we are to gain indisputably effective insights into practice.

FROM PRACTICE, TO THEORY, AND BACK AGAIN

The practice of management is fraught with uncertainty. As the business world grows increasingly chaotic due to the parallel growth in global uncertainty (e.g. economic collapse), the need for useful theory of management transcends our need as academician to add another brick to the ivory tower. We must rise above our personal and academic interests to serve the greater good. A few publications that have addressed this issue recently include “Great Minds in Management” (Hitt & Smith, Eds.), “Engaged Scholarship” by Andrew Van de Ven, and the forthcoming “Emerging Perspectives on Metatheory and Theory,” a special issue of the “Integral Review.” This higher-level conversation is expected to support academicians as they strive to advance theory. That advance, in turn, is expected to provide long-awaited improvements in practice.

Cybernetics and systems theory show great potential for advancing how we understand the process of management. And, it is interesting to note, the growing influence of cybernetics and systems theory does not seem to be a “fad of the year;” rather, there is continual growth as scholars investigate ways of thinking systematically. Organizations such as ISCE, NECSI, and Plexus, seek to develop our understanding of systems and investigate the relationship between complexity and management. Some universities, such as Fielding, build entire doctoral programs around a systems approach. And, consulting firms such as Human Systems Dynamics Institute and the Mountain Quest Institute to consciously apply systemic perspectives to organizational analysis and development. This is not the “big boom” of an overnight fad. Rather, systemic thinking has been expanding for decades – with no signs of slowing.

Yet, the call for better theories is only partially answered by applying cybernetics and systems theory to management science. While this book certainly presents innovative theories, the authors go one step further by engaging in a conversation that essentially metatheoretical.

WHO SHOULD READ THIS BOOK

This book is primarily directed toward those who seek an innovative understanding of management theory. This book will be useful for management scholars who draw (or would like to draw) on ideas from cybernetics and systems theory. In this book, they (and, to some extent, researcher in the broader social sciences) will find innovative tools to support rigorous and effective research.

Professors will want to use this book to provoke rich and interesting discussions among advanced undergraduate students because systems thinking is increasingly common in management studies. And, for graduate students, this book will be of interest because the innovative chapters in this book will suggest new directions for study. Students might find some parts of this book challenging. However, if they
persist, they will be amply rewarded by cutting-edge insights and an understanding of the conversation that is occurring at the border between systems thinking and management science. Many chapters also suggest specific and exciting directions for future research. Those interested in computer modeling will likewise find intriguing opportunities to advance their abilities and investigations.

Scholar-practitioners, particularly managers and consultants who are thinking at the doctoral level, will gain useful insights into practical management. Additionally, they will gain new tools and new insights that will challenge many preconceived notions.

Scholars who are interested in, and challenged by, interdisciplinary studies will also find this a useful book because the systemic approaches used by these authors can be applied usefully to find links between, and to integrate, a variety of fields and disciplines. In addition to the focus on management science, this book will also be of interest to those whose focus is directed more specifically toward cybernetics and/or systems theory. Finally, readers with an interest in theory of theory or metatheory will find this book a useful resource.

**A TASTE OF THE BOOK**

In this section, we introduce the layout of the book, along with a few key ideas from each chapter. This “amuse bouche” is intended to whet the intellectual appetite of the reader and provide some idea of where the reader may want to focus his or her reading at a level that cannot be found in a mere table of contents. Due to the linear nature of the printing process, the chapters are necessarily in order. Be sure to read the detailed table of contents for alternative orders for these chapters.

**Chapter 1**

Alexander and Kathia C. Laszlo present a very readable chapter, highlighting the challenges faced by businesses in the 21st century. In this they take note of critical global issues and opportunities for evolutionary change. Importantly, they make a convincing call for new perspectives, based on a systems view, to support the development of improved management theories and practices. A critical part of that perspective is the need to address knowledge management as a “provocative invitation to engage in the purposeful and conscious evolution of knowledge management as a future creating activity.” This exciting challenge is worthy of deep consideration by academics and practitioners, alike.

These authors make clear the inadequacy of existing measures of business success. Must ‘success’ refer only to wealth, growth, and power? Or, are there alternative measures? Alexander and Kathia press toward the idea of “sustainable stewardship,” a process of caring for and creatively cultivating a wide variety of resources. The ten forms of capital described in this chapter represent a ten-dimensional, interrelated, understanding of what success could be in the emerging century.

They frame ‘business as usual’ as the simple compliance with legal requirements. Yet, as recent global events have shown, it is possible for most businesses to be in compliance, while we all suffer an economic collapse. Clearly, something more is needed. The Laszlo’s begin by describing multiple stages of corporate responsibility, from business as usual – to the level where an organization might achieve a true practice of dynamic sustainability. However, they do not stop with sustainability. Indeed, their far-sightedness suggests something more – an additional level of internal and external dynamic equilibrium which organizations should endeavor to attain.
The Laszlo’s brilliantly illustrate the how interdependence is a more reasonable law of nature than survival of the fittest. In this, they challenge us to move toward syntony – a conscious realization of meta-stability in consonance with the larger co-evolutionary process. This conscious relationship with the dynamic environment presents a bold challenge for theory and practice.

Chapter 2

In their chapter on Leaders, Decisions, and the Neuro-Knowledge System, Alex and David Bennet offer solid research that is cogent and well presented. Their approach interweaves emerging understandings of the human brain with multiple forms of knowledge, theory, cybernetics, and complexity to gain new insights into the decision-making process. Their clear and effective definitions provide readers with a solid foundation for exploring the new frontier of neurology as it relates to human behavior and organizational effectiveness.

Increasing levels of change, uncertainty, and complexity in the business world make the idea of simple, deterministic, decision-making a thing of the past. Instead of seeking simple decisions, the Bennet’s suggest that decision-makers should recognize they are on a “decision journey,” a journey of discovery that will simultaneously result in expected and unexpected outcomes. The cybernetic feedback process relating to these decisions (and the results) is an important key to understanding effective decision-making in terms of the situational context, the theories of the decision-maker, and the knowledge created in the process.

Alex and David address the issue of decision-making through combining multiple points of view. We learn what is going on from the view of inside the decision-maker, as well as the view from outside the decision-maker. And, significantly, we begin to understand the importance of the pattern similarity between inside the human brain and the surrounding environment. Our brains naturally anticipate the outcome of our decisions. By understanding this predictive power of the cortex, we can gain new insights into decision-making. Leaders have the opportunity to become more effective decision-makers by understanding the resonance between the complex human brain and the complex decision environment.

To some extent, we are both enabled and impeded by the “invariant forms” of patterns stored in our brains. While these forms (such as facial recognition) are frequently useful (it is easy to recognize our friends), they may also lead to poor decisions. For example, when we think we recognize a friend and it turns out to be a stranger. This insight has profound implications for leaders. For example, if a CEO sees an increase in commodity prices, her mental patterns might suggest those prices represent a short-term bubble (suggesting one course of action), or a long-term trend (suggesting a different course of action). In short, the same ‘facts’ might appear to make different kinds of sense to different people depending on what theories they hold in their heads. Only by understanding the complex relationships between mind, environment, and the spectrum of theories available to the decision-maker can we move toward the ability to make more effective decisions in complex situations.

Chapter 3

The chapter by Kurt A. Richardson is less academic and more accessible. If you have an interest in management theory as it relates to complexity theory, this is the place for you to start. Despite the conversational tone of the author, this chapter presents a wealth of thought-provoking ideas. With depth and precision, Kurt explores opportunities for drawing deeper, more insightful connections between
complexity theory and management theory. And, to the purpose of advancing management science, Kurt
provides three frames for thinking about complexity thinking.

The first is the path of metaphor; this is one where flexible ideas are more casually acquired and the
manager must trust intuition for successful implementation. The second path is neo-reductionism where
ideas from cybernetics, complexity, and systems thinking are used to develop new conceptual tools for
managers. Those tools would be carefully developed, purposefully chosen, and rigorously applied. The
third path, critical pluralism, represent an interweaving of the first two – and also adds the importance
of critical reflection, open mindedness and humility.

Taken as a set, these three schools present a range of possibilities for engaging, thinking, and apply-
ing complexity in management. Importantly, Richardson’s framing has implications that extend beyond
complexity and systems thinking out to the broader range of management science. By bracketing our
thinking as schools of thought we may engage each school in a more precise manner and so work more
purposefully toward the advancement of management along multiple, intertwined, paths.

From an applied perspective, Richardson suggests that managers (and other members of organization)
should, to some extent, become philosophers. That is to say he/she should spend some time contem-
plating deep questions from multiple perspectives. For a ‘simple’ example, every manager must make
decisions based on what he/she believes to be true. Yet, in philosophy, the nature of truth is still an open
question. For managers, developing a new understanding of truth might inspire an entire organization
toward greater trust, improved communication, and a clearer sense of purpose. This does not make the
managers’ life any easier. Instead, it presents a new challenge for managers to find the openness needed
to address deep questions and the courage to do so in humility and collaboration with others.

Chapter 4

Decision Integrity and Second Order Cybernetics is the chapter by Anthony Hodgson. This readable
and thought-provoking work offers timely insights into decision making theory. Hodgson addresses the
difficult issue of decision making from a nonlinear perspective in a profound way. First, he revisits von
Foerster’s idea that the only decisions we can make are those that are actually about undecidable questions.
Because, in a sense, the easy decisions have already been made for us by our way of framing them.

Then, Hodgson introduces the rich idea of “decision integrity.” This approach requires that the deci-
sion maker should understand the relationship of learning to deciding, as well as addressing important
ethical concerns. The discussion of decision integrity includes an investigation into uncertainty and risk,
as well as “integration.” This last idea requires that the decider must expand her approach to include the
bigger picture, rather than the most immediate concern.

The idea of looking at the “big picture” is not only about gathering more information. There are also
special, temporal, and structural concerns to consider in the light of cybernetic feedback and understand-
ing of systemic relationships. The big picture approach has intriguing implications for practice. For
example, if a manager faces a simple decision, the immediate implication is that he should expand his
understanding of the broader implications until he crosses the boundaries of any objective framework
and experiences the decision as difficult or impossible.

Anthony’s many, wonderfully interwoven, ideas are integrated and more easily understood through
the use of a mathematical language based on Spencer-Brown’s laws of form. This symbolism can be
used to describe the structure of undecidable questions and the relationship between the decider and the
decision field. This understanding opens the door for insights into self-reference, “second order manage-
ment” and a variety of challenging and useful opportunities for practical application.
Chapter 5

Most managers seem to work from a perspective of Cartesian reduction. Such management often involves the use of simple, linear, models such as the classic organizational chart. In this chapter, Donald C. Mikulecky shows how this approach is ultimately ineffective.

He begins with a historical narrative that touches on important concepts of complexity, cybernetics, and biology. Usefully, he includes a particular focus on long-undervalued insights from Robert Rosen, particularly the idea that every organization has a metabolism and is, to some extent, self-repairing. This rich collection of concepts and insights are combined to challenge the reductive philosophy that has trapped managers in the Cartesian mode of thought. By updating our philosophical foundations, Mikulecky suggests a path towards more complete understanding, and more effective management practices.

While all managers create mental models, Mikulecky effectively argues that the habit of Cartesian reduction has led managers to “manage the model” rather than manage the real complex system in which they are embedded. Where simple models are used to identify simple cause and effect, no organization is really that simple. The simpler the model used by the manager, the more the manager loses in terms of his or her ability to manage effectively.

This author builds on Rosen's work in theoretical biology to investigate how an understanding of complex causality may be used to help us understand a system more effectively than using linear causality. To advance this conversation, Mikulecky notes the importance of using multiple forms of Aristotelian causality. This approach encourages managers to avoid asking the reductionist question of, “How?” that leads to answers that are simple, linear, and inaccurate. Instead, readers are shown the importance of asking, “Why?” that leads to richer, more complex, and more accurate understanding of complex causal relationships.

Advancing “relational systems theory,” this chapter suggests a more effective approach is for managers to identify the complex causal relationships as a way to understand and manage the real system more effectively. Managers who attempt to “manage the model” instead of the real complex system may find themselves inhibiting the effective functioning of the organization.

Chapter 6

Holger Schiele and Stefan Krummaker take case study research to an impressive new level in their chapter on Consortial Benchmarking. In this, the authors describe their participation in a process of academic and managerial collaboration for benchmarking best practices in business. There are four steps to this process: Preparation (the forming an academic-industry consortium), Kick-off workshop (where academics present relevant theory, the consortium chooses what firms to be studied, both sides create questionnaire), Benchmark visits (the members of the consortium visit firms, conduct interviews, share insights), and Final meeting (collate and discuss results and prepare final report). The key distinguishing feature of consortial benchmarking is that practitioners are involved as co-researchers, not just as objects of analysis.

This is an important new approach with major implications in several areas. First, in response to calls for more engagement between academic and business circles, this chapter provides an example that scholars and practitioners should both follow. And, importantly, this process will result in benefits for all participants. Practitioners can expect to improve their business operations without being trapped in obscure and abstract academic theory. Academicians will also benefit as they can expect, through their
participation, to acquire sufficient material for multiple publications. Also, the opportunity presents itself for both sides to use scholar-practitioners to facilitate the process because they, as high-level consultants, speak the language of academia as well as the language of business.

Second, this chapter is goes beyond answering the call for more and better theory. These authors explain a better process for building that theory. On a deeper level, the opportunity also exists for creating more complex theory – grounded in a new paradigm of conscious and purposeful collaboration between business and academia. Third, Holger and Stefan point the way for academia to develop theory that is more relevant to business. And, this process results in the creation of theory that is more likely to work in practice.

Importantly, this chapter sets a standard for “next generation” case study research by overcoming many of the biases and limitations of existing case study methodology.

Chapter 7

Recognizing the complex and systemic nature of disruptive organizational change, Marianne W. Lewis writes on the Systemic Paradoxes of Organizational Change. Her interesting and effective approach employs metatriangulation – the use of multiple lenses to better understand a complex situation.

Lewis applies these lenses in a case study analysis to investigate the implementation of Advanced Manufacturing Technology (AMT). In an excellent example of this kind of metatheoretical approach, she describes that change through four separate lenses and identifies a common theme between them – paradox. It should be noted at this point, that paradox is a foundational concept of systems thinking, as may be illustrated by the relationship between stability and change. So, in identifying and investigating paradox, Marianne is conducting an important exploration at the core of our science.

At this point, some authors might be satisfied to conclude their chapter with some quip about the universe being founded on paradox; Lewis, however, does not stop here. Moving boldly forward, she presents a compelling metaframework for understanding organizational change in terms of multiple paradoxes (cognitive, action, and institutional). Further, Marianne provides a useful description of management practices that will support these change efforts.

This chapter is written with great clarity, nuance and insight. And, while not neglecting personal reflection, is written in perfect academic form. Finally, this chapter provides readers with suggestions for future research. One important direction is found in the difference between linear change theories, and change theories of plurality and paradox. These suggestions open the door for further innovation and advancement in the theory and practice of organizational change.

Chapter 8

The engagingly written and provocative chapter by Mark G. Edwards notes the failure of corporate management, and strives to provide a useful guide for management theorists interested in purposefully and effectively advancing their science. Citing the need for better metatheory as a prerequisite for the development of better theory, Mark uses a metatheoretical discourse to gain a clearer view of management theory. He describes four general forms of transformational management theory – as that theory suggests groundbreaking, whole-system change. The pre-conventional form is seen as primarily egocentric and focused on top-down management methods. Conventional management theory is similarly top-down, but the focus has shifted to an organizational-centric view. Post conventional management
is framed as community-centric and employing bottom-up philosophies of change. Finally, integrative forms of management theory are suggested as glocal-centric and reciprocal between top and bottom (and other areas).

Importantly, Mark steps out of the either-or debate between the benefits of self vs. organization, or top-down vs. bottom-up theories of management. And, in doing so, transcends those debates to integrate and extend the extremes by looking through the metatheoretical lens of relationality.

This broad and radical reframing of management theory will be very useful to scholars studying corporate social responsibility, spiritual leadership, ethics, sustainability, and more. His collection of ideas, some necessarily abstract, provides an extensive list of concepts and definitions that management scholars will find very useful in framing their own investigations. Edwards’ chapter is more purposefully metatheoretical than most in this book. And, as such, provides a useful guide for scholars interested in exploring the newly revived (and more rigorously applied) metatheoretical conversation.

Chapter 9

In Thomas Kuhn’s influential “Structure of Scientific Revolutions,” he suggests that a paradigm revolution is one where there is a major improvement in theory and practice. This kind of shift is as large as the difference between Newton and Einstein, or between Ptolemy and Copernicus. Following this idea, some scholars (and some popular management authors) claim that their work represents a paradigmatic revolution of Kuhnian proportions. Despite these claims, studies have shown more failure than success in business process reengineering (BPR), total quality management (TQM), and other methods and theories. This contradiction between claims of effective theory and the limitation of actual results has led to a loss of legitimacy for the social sciences in general and to management programs in particular.

These specious claims are possible for three reasons. First, because Kuhn did not describe exactly how much change constitutes a revolution. Second, because Kuhn focused on the ability of objective empirical analysis to advance a paradigm, rather than the structure of theory for that purpose. This chapter explores the structure of theory as an indicator for paradigm revolution and so provides a reliable frame of reference for future claims.

Another issue is the question of comparability between theories of physics and theories of management. Importantly, this chapter finds that theories of physics and theories of management are legitimately comparable if we focus on the structure of those theories as determined by the level of interrelationship between co-causal propositions. This is an important consideration because we have no theories in the social sciences that can be unequivocally described as “revolutionary.” Therefore, to determine what constitutes a legitimately revolutionary structure of theory in the social sciences, we must analyze theories from physics to understand how they evolved toward revolutionary status.

Having identified the common ground between social and physical science, this chapter investigates the structure of theory by applying “propositional analysis” to determine the formal robustness of a set of theories spanning 1,500 years of history. The results show that increasing formal robustness seems to be a useful predictor of paradigm revolution. This, in turn, suggests that scholars who are interested in developing revolutionary theories should develop theories with a high level of formal robustness. Further, these results suggest that practitioners may be able to choose the more effective theory from among a set of theories based on the robustness of the theory. While there is certainly room for additional studies, this chapter has profound implications for the advancement of management science toward true paradigmatic revolution.
Chapter 10

Gianfranco Minati begins by taking note of some fundamentals of complexity theory including logical openness, cybernetics, coherence, and a constructivist approach that is a refreshing contrast to the objectivist approach. He sees human social systems as multiple systems or collective beings that are generated by human elements simultaneously interacting in different ways.

To manage complexity, Minati, presents his approach of Dynamic uSAge of Models (DYSAM). Usefully, DYSAM is a meta-approach that should be of great use to scholars investigating complex systems because it provides a framework for integrating approaches, models, and theories. The goal of DYSAM is to represent every aspect of the system at all of its levels.

Rather than investigating the changing values of existing systems, DYSAM relates to the acquisition of properties that may then exhibit those changing values. In Minati’s chapter, this approach is used to gain new insights into growth, development, sustainability, non-reductionist management techniques, and emergence.

Among other insights, Minati suggests that the study of management, and management theory, should not be limited to reductivist models. For example, a simulation that seeks to model only how agents optimise a single condition would be understood as far too limited to derive the kind of revolutionary insights needed to obtain quantum leaps in the field of management science. Minati’s suggestions have profound implications for simulation modelling; and, they imply important new directions for the broader community of management scholars. Further theoretical developments relate to modelling processes of emergence by using meta-structures and meta-structural analysis.

Chapter 11

Maurice I. Yolles presents a deep and challenging exploration of knowledge cybernetics. His approach begins with the ideas of Stafford Beer, and adds the insights from Eric Schwarz. Maurice then extends those ideas to create a more complete model of socially viable systems (SVS) – based on the idea of circular causality, and capable of modeling more complex social relationships than previously possible. His model is then applied as a social frame of reference to understand organizational patterning, personality type, and knowledge profiling.

Maurice shifts the conversation on knowledge cybernetics from one of epistemology to one of ontology – an important step. And, in the process, extends and deepens Beer’s viable systems model (VSM) developing a lateral ontology (where a systems is understood as a contextual domain consisting of sub-contextual domains or sub-systems) and transverse ontology (relating to emergence and higher-order control of the system) to better understand and redefine the paradigm and develop new tools for analyzing organizations.

Importantly, this new model can be applied to understand a variety of system pathologies that might be found within an organization. Pathologies that might pass unrecognized, even in collaborative change processes. Some applications of knowledge cybernetics have been applied to create successful empirical studies in organizational coherence, organizational pathology, and cultural mapping. Therefore, researchers should realize that this is a well-developed model and, as such, should be applied and tested in research projects. One approach might be to apply this model to case studies, and later move into fieldwork. Testing this model provides an excellent opportunity for researchers seeking to make their mark on the academic world.
Chapter 12

Alexander Riegler presents a new look at an old theory. Recognizing some shortcomings in our current understanding of evolution, he outlines a specifically Batesonian view of evolution. For example, where a “fitness landscape” relates to the optimization of an organism by increasing levels of fit, an “epigenetic landscape” serves to illustrate a developmental pathways for the organism, based on the interrelationships within the DNA. These pathways are understood as purposeful – a more useful description than “random mutation.”

In contrast to the traditional understanding of evolution guided by external forces of selection, Dr. Riegler investigates how a cybernetic theory of evolution suggests that evolution is channeled by internal constraints based on the reciprocal dependencies of the genetic material.

For management theory, importantly, if we understand evolution as occurring only through external influences, we may transfer that point of view to organizations. Such a view might suggest that a work-team’s ability for creativity, evolution, and change is influenced only by some external force – a manager imposing his will on the team. Instead, by understanding evolution as occurring because of interrelationships between bits of genetic material, we may gain new insights into how the cybernetic, self-organizing, interactions of employees, supports creativity, and change.

Indeed, by gaining the ability to understand developmental paths, we may gain the ability to predict the development of a team, or an organization.

Chapter 13

Thomas Hansson takes a new approach to the question of human agency with an investigation into the nature of human interaction in organizations. Where other theories present confusing views, (such as Vygotsky’s stages of human development, ideas around learning objects, and general action theory), He identifies how self-management, self-awareness, and professional thinking combine to develop new systemic views for understanding the interrelationships between individuals and groups. An important part of his approach is avoiding a dualistic point of view (for example, where increasing the agency of a manager can only occur at the expense of the employees). And, instead, looking at the manager and the employees as working in a dialectical relationship – one that is generative.

Dr. Hansson finds support for these views by applying an innovative research technique involving a facilitated group working both live and networked, so the researcher can capture interactions as well as reflections. He investigates the combination of individual and social influences to develop a new theory of learning object creation. Importantly, he finds that they are created in a purposeful way as well as non-purposefully. These insights into social construction shine a new light onto an age-old question – and open the door for a new path of investigation.

Chapter 14

František Čapkovič uses Petri nets to develop metamodelling insights into multi agent systems. He considers multiple levels of interactions of agents, their interfaces, and the related environment. He presents examples from inter-personal cooperation, inter-organizational negotiations, supervisor-system relationships, supervised-agents, and relationships in an environment of limited resources. This last (limited resources) is of particular importance, as limited resources will limit productivity and is often
a cause of conflict. His results suggest opportunities for understanding paths for avoiding conflict and improving productivity in a wide variety of situations.

Chapter 15

Kyarash Shariari takes on an impressive challenge – to improve our ability to predict the accuracy of models. He shows how alternative approaches to prediction (deterministic and probabilistic) are limited. His approach looks at the model parameters as, “…time-varying but bounded variables, which are characterized by an interval of real numbers. Since the model parameters are intervals, the predicted system’s response at any instant is not anymore a real number but an interval of real numbers. The set of predicted intervals at different instances generates a tube through time called *wrapping envelope*.” This innovative metamodelling approach can be used to identify (and so limit) modeling error. In short, he opens the door for the creation of more effective models.

Chapter 16

Nicholas Nechval, Konstantin Nechval, Maris Purgailis, and Uldis Rozevskis combine their creative and mathematical talents to investigate the problem of “subset selection” (or, variable selection) – that arises when attempting to model the relationship between a topic of interest and the multiple, potential explanatory variables. This kind of problem is common in many decision-making or strategic planning situations where there is no easy answer; indeed, there are multiple possible answers with no way to be sure which one might be best.

These authors submit new, simple, variable selection criteria. Their ambitious goal is to select the smallest number of decision-making criteria that can be used without losing any explanatory power. Their approach is tested with chemical processes, manpower allocation, housing prices, corporate profitability, supervisor performance, and more. The potential importance of this approach should be evident to anyone who has had to make a difficult decision.

ALTERNATIVE ORDERS

You, the reader, may want to pick and choose among these chapters, read one or two sections, or read the book cover-to-cover. Alternatively, depending on your interests, you may want to consider reading these chapters in one of many possible sequences. Here are some alternative foci for reading this book. These are, of course, mere starting suggestions and readers are encouraged to blaze their own trails!

If you are more interested in cybernetics, particularly at a higher level of thought, you might be more interested in chapters 4, 11, and 12. Chapter 5 might also be of interest. If your interest is more focused on systems theory, the chapters of greater interest might be 3, 10, and 12. Of additional interest might be 1 and 11. For those who are interested in metatheory, chapters 8 and 9 will be of greatest interest; followed by 7 and 3. Some have an interest in the logical/mathematical approach, while others feel uncomfortable while reading numbers and formulae. For the former, I would recommend chapters 4, and 10 - while chapters 14, 15, and 16 are highly mathematical. For the latter, chapters 1, 2, 3, 6, 7, 8, and 11. Chapters 5 and 9 are somewhere in the middle.
On the subject of scale, chapter 2 is focused at the level of neurology and decision-making while chapter 5 relates to the individual decision maker. Chapters 6 and 10 address the organizational level while 4 and 6 look at relationships between organizations. Chapter 11 spans individual learning and organizational diagnosis, while chapter 1 reaches from individual to global-scale systems. Chapters 12, 13, and 14 provide innovative view across levels. Finally, 3, 8, 9, 12 are focused more on concepts, theory, and metatheory.

There are a few, more tightly focused, topics that may also be of interest to readers. Again, these are meant as starting-places for exploration; you will find many related ideas in other chapters (for such is the nature of systems sciences). The failure of classical management theory is implicit through much of the book. Some additional focus on this topic may be found in chapters 1, 5, 8, and 9.

Those who are interested in Knowledge Management you may want to begin with 1, 2, and 11. The limits of knowledge are noted in 3, and 4, while decision-making is an important part of 2, and 4. A closely related topic is the investigation of the decision maker as an integral part of the decision environment; this idea is discussed in 4, and 5. If you are interested in the highly intriguing idea that we may understand information as a form of energy, you should read 2 and 12.

You may have an interest in the idea of evolution. If so, chapter 12 provides an intriguing cybernetic view of evolution. Chapter 1 discusses the purposeful evolution of organizations while 9 investigates the evolution of theory. Finally, is your interest is in growth and development, you will find interesting readings in chapter 1, 2 and 6; and an interesting challenge in chapter 3. Some additional ideas are suggested in chapters 10 and 11.

These groupings should not be taken as a suggestion that these authors are in full agreement on all of the concepts in their chapters. Indeed, their approaches, ontologies, and epistemologies may be very different. Therein lies the opportunity for new insights to emerge and new opportunities for present themselves.

CONTRIBUTION AND IMPACT

This book will impact management science, cybernetics, systems theory, computer modeling, and the nascent field of metatheory. Additionally, this book is expected to impact research methodology and, if practitioners are able to rise to the challenge, there may be meaningful impacts in the practical application of these theories. As may be inferred, this book also supports a mission to accelerate the advancement of the social sciences. This book has a strong “focus on the future” to suggest innovation directions that will inform the work of scholars for the next decade or more. Metatheory is the “new world” for the 21st century. Not, I hasten to add, a continent inhabited by indigenous people doomed to be exploited; instead, this is a new collaborative world, waiting to emerge.

Among these chapters are some ideas that are fairly straightforward, and others that are quite complex. The reader who looks at those complex ideas and thinks, “this is too difficult to use in research or to be applied in practice” is asked to consider one last challenging idea; the idea that such complex approaches may be necessary if we are to develop theories and methodologies for practical management. That is to say, simple theories may be effectively applied to improve our understanding the physical world. For example as Ohm’s law is used to understand the interrelationship between (only) three aspects of volts, amps, and ohms. It may be, in contrast, that a truly useful theory of the social sciences will require dozens of aspects. This is a challenging concern, to be sure. However, we are scientists; we are here to be challenged.
CONCLUSION

In this project, it has been my honor as editor to open a space, an attractor, where authors are allowed and encouraged to reach their highest level of intellectual expression and advance our interrelated fields of study. This includes presenting their most innovative ideas in the writing style that best expresses their personal voices. As editor, I am privileged to support these authors and their pursuit of bold insights that serve to advance our understanding of management science. While every effort has been made to maintain high academic standards, authors have not been required to fit every academic convention of style. This emphasis of boldness over baby-steps – of adherence to high standards over adherence to a standard style – is part of what makes this book a worthy read. We are moving consciously toward a revolution in management science – and it is not possible for the paradigm to remain the same while undergoing change.

These chapters represent a variety of epistemologies, ontologies and methodologies. The reader must decide among this “team of rival ideas” which are the most worthy of advancement and adoption. I encourage the reader to enjoy the interplay of ideas, both complimentary and contradictory; because it is that relationship between ideas that opens the human mind to creative insights. Therefore, in the same sense that this book, as a project, opened a space for authors to develop new ideas, the chapters presented here generate openings for the emergence of powerful new ideas in the minds and conversations of the readers.

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