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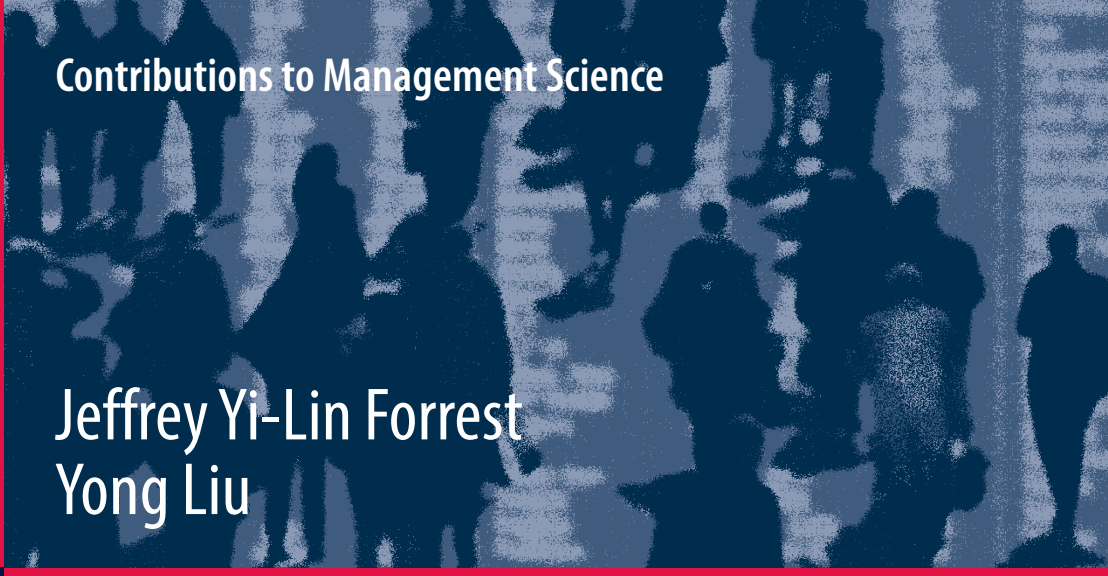

Jeffrey Yi-Lin Forrest
Yong Liu

Value in Business

A Holistic, Systems-based Approach to Creating and Achieving Value

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Contributions to Management Science

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Value in Business

A Holistic, Systems-based Approach to Creating and Achieving Value

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Jeffrey Yi-Lin Forrest
Department of Accounting, Economics and Finance
Slippery Rock University of Pennsylvania
Slippery Rock, PA, USA

Yong Liu
School of Business
Jiangnan University
Wuxi, Jiangsu, China

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Synopsis

The objective of this book is of two folds. First, it attempts to provide marketers, managers, and entrepreneurs with a scientific tool of analysis to assist them with decision-making, while knowing that their decisions are mostly reliable. Second, it offers scholars with a brand-new approach to exploring opportunities of value creation and capture. Instead of data- and anecdote-based analysis, this book accomplishes this practically significant and theoretically important objective by establishing results based on systems science and a logical reasoning that is parallel to that commonly used in mathematics and natural science. By employing such an approach, all limitations of econometric methods can be avoided.

This book is composed of six parts, addressing various key issues related to value creation and capture. The first part introduces the basics of systems science necessary for the rest of this book, develops a general theory on how a market of free competition evolves and how the resource-based theory of the firm can be established through axiomatization. The second part, entitled *Demand- and Supply-Side Strategies*, looks at the supply-chain ecosystem of a firm, how its upstream and downstream affect a firm's performance, and when synergetic innovations, involving, for example, simultaneous utilities and multi-sided markets, appear. The third part explores how to generalize the well-known Porter's value-chain framework by first investigating the systemic structure of the mind, how consumers classify product information, and how value can be created out of innovation and resources and captured along with memberships in strategic networks and blocks.

The fourth part, entitled *Customer Values*, examines when effective consumer value propositions (CVPs) emerge, how CVPs can lead to values and competitive advantages, and why market-sensing capability is vitally important to firm performance. The fifth part, entitled *Some Roles of Manufacturing and Artificial Intelligence*, addresses why manufacturing is important in the present transformation of industries and how artificial intelligence affects technological innovations. The sixth part, entitled *Government Policies and Supports*, looks at such questions as how the government can help stimulate economic growth and when government policies can

lead to improvements in firm performance. As the conclusion of this book, the afterword, entitled *Need for A Multi-Approach Methodology and Economic Induction*, fills several important methodological holes that emerge throughout the book and outlines the next steps for future research based on what has been established here.

The existent literature on value creation and capture is mostly dominated by data and/or anecdote analysis. Although such works establish potential facts and provide managerial suggestions, consequent decisions have been time and again shown to be problematic. That surely is one of the reasons why one magnificent success in a particular value-related effort cannot be readily copied to another effort although various conjectures or theories have been developed to explain how the initial success appeared. That is the very reason why this book opens up a brand-new territory valuable for scholarly research and practical decision-making, while providing reliable managerial recommendations that are expected to produce real-life benefits.

This book aims particularly at graduate students, researchers, and practitioners in areas related to the creation and capture of value. By referencing to what this book presents, the reader will be able to employ systems methods and holistic thinking to resolve various demanding issues in his/her life and career. By masterfully employing the systemic intuition—the yoyo mode, he/she will be able to make decisions fairly swiftly without unnecessarily spending other resources of limited availability.

Preface

Among all research areas of business and economic studies, value creation and capture stand for one of the central topics intensively considered by both scholars and practitioners. Because of this reason, there appears the need to organize relevant concepts and conclusions in a systematic fashion. However, instead of proposing another seemingly plausible theory, like many other theories in social science, based on conjectures suggested empirically, this book develops the planned theory in a scientific way in the language of systems science by using a logical reasoning that is parallel to the one commonly employed in mathematics and natural science.

The motivation for us to take this particular approach in our effort to develop the planned theory is the sharp difference between studies of mathematics/natural science and those on value creation and capture. The former establishes scientifically sound results, which can be widely employed to design and produce useful commercial products, while the latter derives theories, from isolated events and processes that cannot be generally applied successfully to different situations or different times. By carefully comparing the difference, it can be seen clearly that mathematics and natural science develop new conclusions, such as theorems, based on a few postulates or laws through using rigorous logical reasoning, while studies on value creation and capture tend to be data and anecdotes driven through using econometrical models. Even for theoretical studies of value creation and capture, they generally derive conclusions based on earlier empirical discoveries, which, of course, do not constitute a solid ground on which to build reliable theories. Therefore, methodologically speaking, studies in mathematics and natural science develop conclusions and principles that can be widely employed so that as long as one knows about the functionality of a product, he/she is able to reproduce it without any need of knowing exactly how the earlier ones are made. However, the same is not true with studies of value creation and capture, where recognized successes, no matter how well they are studied, cannot be readily reproduced in another business setting at a different location. To potentially help resolve such a problem with studies of value creation and capture, this book attempts to identify a few axioms, instead of empirical discoveries, on which the planned theory is reliably constructed.

Another important realization about the difference between studies of mathematics and natural science and those on value creation and capture is that the logical reasoning of the former references heavily on some kinds of intuitive playgrounds, while the latter simply does not have one such playground. For example, Euclidean plane geometry relies heavily on the two-dimensional plane; calculus and statistics make frequent use of the Cartesian coordinate system; concepts of set theory are illustrated conveniently by using Venn diagrams; to overcome this deficit for studies of value creation and capture, this book adopts the systemic yoyo model as its intuitive playground on which many conclusions can be figuratively seen first and logically shown second. Because of the particular approach of analysis and intuitive playground employed, the theory developed in this book is able to avoid influences of individually different backgrounds and knowledge structures of all involved scholars. And because of this reason, one can expect that conclusions established in this book will be independent of scholars' individually different experiences and background knowledge and will be generally employable in real-life applications.

When the world is seen as piles of isolated objects, and when natural processes are cut into unrelated subprocesses, as done conventionally, the concepts of numbers and numerical variables are introduced. On top of such backgrounds, calculus-based approaches and statistics-based methods are developed and conventionally adopted to investigate the natural world, human organizations, and mutual interactions between the world and men and between organizations. However, what is clearly missing in all of these efforts of scholarly endeavors is the organizational nature of the world and the organic and holistic feature of human organizations and their interactions. That is the very reason why this book adopts systems science as its basic way of thinking and reasoning so that the conventionally ignored features of organization and wholeness can be brought back to the center stage and purposefully emphasized in order for us to develop more realistic conclusions than previous studies.

This holistic approach is more appropriate than the conventional ones because studies of value creation and capture focus on how various economic agents, be they large or small, interact with each other, while the agents generally possess their respectively different, yet rich, internal structures. For instance, each business enterprise has its explicit history, organizational culture, and operational processes, all of which jointly constitute the unique system of resources the enterprise can employ to innovatively understand market signals and then take appropriate actions. And each individual enjoys the kinds of consumptions fundamentally determined by his/her deeply rooted values and beliefs about the world, which are formulated gradually over time through the person's interactions with the environment. In other words, all economic agents generally possess their individually different internal structures (or organizations); and it is due to the natural existence of these internal organizational structures that this book readily adopts systems science to investigate issues of value creation and capture, believing that this approach is more adequate than any other tools developed on numbers or numerical variables, such as calculus and statistics. More specifically, calculus-based approaches generally extrapolate the present situation (or the initial value) into the situation for which a

prediction is needed, while statistics-based methods attempt to extend the past (or data/anecdotes). Other than these epistemological limitations, the former requires such conditions as continuity and differentiability, while the latter imposes strict requirements on the quality of samples. However, these conditions and requirements are generally not satisfied, not met in practical applications, making derived conclusions not very reliable. That explains why there is a need for our planned theory of value creation and capture to go beyond the epistemological boundaries of the conventional calculus-based approaches and statistics-based methods.

Indeed, both the concept of numbers and that of systems stem from the same natural world, to which humans and human organizations belong. They harmonically characterize this world in two different angles. The concept of numbers emerges when a business enterprise is seen as a collection of people, properties, investments, etc. The concept of systems comes into being when the organization of the enterprise is examined as a functional whole underlying the enterprise, where the isolated components are joined together through various associations to form a visible being, known as a firm. With the existence of the firm, it is the associations among the component parts that make the firm visible and identifiable. With this understanding in place, it can be seen naturally that most issues considered in the studies of value creation and capture are fundamentally problems about organizations (or systems) and their interactions. Here, the organizations can take the form of individuals, business enterprises, markets, industries, economies, and others.

Other than characterizing the natural world in two different angles, the concepts of numbers and systems represent two different aspects of that same world. In particular, numbers and relevant approaches focus more on small-scale and local phenomena, while systems and methods developed on the basis of systems emphasize on large-scale organizational features of the world. Another major difference between these two concepts is that numbers exist after existence, and systems come into being at the same time when an existence is still in the process of emerging. This difference vividly illustrates why number-based methodologies, such as those developed on either calculus or statistics, tend to be limited with their abilities when prediction, be it long term or short term, is concerned with, and why system-based methodologies are appropriate tools for the investigation of value creation and capture since the internal structures of the involved economic agents in such studies cannot be ignored.

To potentially make our planned theory of value creation and capture theoretically relevant and practically useful, we try to make this theory satisfy the following four conditions in order for it to have a glorious and long-lasting life, as argued by Y. Lin (2009) in the monograph *Systemic Yoyo: Some Impacts of the Second Dimension* (CRC Press, New York):

1. It can be read readily without much difficulty.
2. It concurs with such an intuition that people can easily imagine.
3. It possesses a beauty that can be easily felt when people learn or apply it.
4. It provides meaningful theoretical results and practical insights.

Specifically, to make our theory satisfy Condition 1, we try to phrase each conclusion and related argument in nontechnical terms as much as possible. In this regard, although Chapter 3 is the most technical part of the entire book, accompanied with all the necessary symbolic proofs, each of the following chapters rephrases results from Chapter 3 in nontechnical terms and gathers needed symbolic proofs in chapter-specific appendixes. So, for readers who are not mathematically inclined, they can conveniently skip over all technical arguments and symbolic proofs without interrupting their enjoyment of the entire book. In order to meet the need of Condition 2, systemic intuitions are provided as frequently as possible for readers to intuitively understand concepts and conclusions. The beauty of our theory (Condition 3) is constructed by various figures of relevant yoyo model representations. And the usefulness of this theory (Condition 4) is demonstrated with the large array of topics investigated in this book and by managerial recommendations provided at the end of each chapter.

It is our hope that you, the reader, will have an enjoyable time reading this book and consequently find it useful in your real-life endeavors. We love to hear from you and learn about your comments and suggestions. We can be reached at jeffrey.forrest@sru.edu (Dr. Jeffrey Forrest) and clly1985528@163.com (Dr. Yong Liu).

Slippery Rock, PA, USA — Jeffrey Yi-Lin Forrest
Wuxi, Jiangsu, China — Yong Liu

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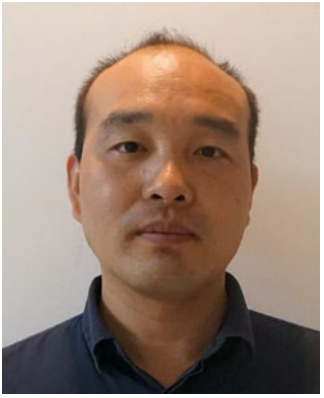
About the Authors

Jeffrey Yi-Lin Forrest also known as Yi Lin, holds all his educational degrees in pure mathematics and had one-year post-doctoral experience in statistics at Carnegie Mellon University. He had been a guest professor of economics, finance, mathematics, and systems science at several major universities in China, including Nanjing University of Aeronautics and Astronautics. And currently, he is a professor of mathematics and research coach for the School of Business at Slippery Rock University, Pennsylvania, and the president of the International Institute for General Systems Studies, Inc., Pennsylvania. He serves either currently or in the past on the editorial boards of 13 professional journals, including *Kybernetes: the International Journal of Systems, Cybernetics and Management Science*, *Journal of Systems Science and Complexity*, *International Journal of General Systems*, *The Journal of Grey Systems*, etc. Currently, Dr. Forrest serves as the editor-in-chief of three book series, *Systems Evaluation, Prediction, and Decision-Making (CRC Press, New York)*, *Communications in Cybernetics, Systems Science and Engineering (CRC Press, Balkema)*, and *Communications in Cybernetics, Systems Science and Engineering—Proceedings (CRC Press, Balkema)*.

Some of Dr. Forrest's research was funded by United Nations, State of Pennsylvania, National Science Foundation of China, and German National

Research Center for Information Architecture and Software Technology. As of the end of 2019, he has published well over 500 research works, including over 50 monographs and special topic volumes. Some of these monographs and volumes were published by such prestigious publishers as Springer, Taylor and Francis, World Scientific, Kluwer Academic, and Academic Press. Over the years, Dr. Forrest's scientific achievements have been recognized by various professional organizations and academic publishers. In 2001, he was inducted into the Honorary Fellowship of the World Organization of Systems and Cybernetics. His research interests are wide ranging, covering areas like economics, finance, management, marketing, data analysis, predictions, mathematics, systems research and applications, philosophy of science, etc.



Yong Liu earned a B.S. degree in civil engineering and his M.S. and Ph.D. degrees in System Engineering and Management Science and Engineering from Nanjing University of Aeronautics and Astronautics. As a visiting professor, he spent one year at Slippery Rock University of Pennsylvania, USA. Currently, he is a full professor at School of Business, Jiangnan University. As of the end of 2019, Dr. Liu had published over 60 research papers and one monograph. His research activities are mostly in areas of the science and technology of management and are recognized, respectively, by Jiangsu Provincial Department of Education, Wuxi Municipal People's Government, China Business Federation, and Jiangsu Province Social Science Application Research Excellent Project. Over the years, Dr. Liu's works have been financially sponsored by various funding agencies, such as National Social Science Foundation, National Natural Science Foundation, Jiangsu Social Science Foundation, and Jiangsu Natural Science Foundation.

Chapter 1
Some Challenges Encountered in Value Creation and Capture

Abstract As the title suggests, this chapter introduces the reader to the exciting journey this book is about to embark on by outlining how this volume contributes to the existent knowledge on value creation and capture. It describes important gaps that exist in the knowledge of value and deficiencies the commonly and widely employed methods of analysis and reasoning experience. Collectively, these gaps and deficiencies point to the need to adopt systems science and methodology as the next best tool for analyzing situations of value and for developing a cohesive theory of value. After all these objectives are accomplished, this chapter turns its attention to briefly introduce some of the fundamentals of systems thinking and relevant methodologies needed for the rest of this volume.

Keywords Blind men and an elephant · Gaps in literature · Implementing best practices · Methodological deficits · Systems

This chapter is organized as follows. Section 1.1 details the gaps in the literature this book attempts to fill. Section 1.2 analyzes the deficiencies that exist with the methods and approaches of reasoning widely used in the literature. Section 1.3 demonstrates why systems thinking and methodology are needed in the study of value creation and capture. And then this chapter concludes in Sect. 1.4 that outlines the contents of the book.

1.1 Gaps in Literature this Book Attempts to Fill

The subsections detail the gaps in literature this book attempts to fill by developing a general theory of value creation and capture based on a set of rigorously developed game-theoretic results.

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1.1.1 The Theoretical Foundation

The first gap that exists in the foundation of the theory this book attempts to develop is the lack of a practically useful theory on how a market of free competition evolves with price as the primary factor, followed by secondary factors, such as business models, technologies, and government policies. In particular, by a primary factor, it means such a factor that human can control and make adjustment. And by a secondary factor, it stands for one that somehow directly or indirectly appears naturally as a consequence of the functional effect of primary factors. In the marketplace, price drives the levels of consumption and production, which in turn encourages technological development so that productivity can be desirably improved. The competitive need to steadily improve productivity forces firms to adopt different business models in order to improve their managerial efficiency. To guarantee the smooth operation of market exchanges, the government plays its role by providing laws, regulations, and relevant reinforcement.

Clearly separating primary and secondary factors is very important in the development of our planned theory for the following reason: although studies in business and economics often involve many interacting factors, scientifically speaking, neither natural science nor mathematics knows how to deal with the general mutual interaction of three factors, which is the well-known three-body problem (Lin, 2009), letting alone scenarios involving more than three variables. This end explains why developmental economics has provided inconsistent conclusions regarding how a nation could kick-start a self-sustaining momentum of economic growth (e.g., Lipton, 1977; Rostow, 1960; Studwell, 2013) until Wen (2016) and Forrest et al. (2018) arrive at the scene. In particular, the conventional studies in developmental economics attempt to explore the mutual interactions of many factors, way more than three, simultaneously so that the roles of primary and secondary factors are entangled together and confused with one another, leading to varied and inconsistent conclusions that are dependent on which specific angle researchers take. On the other hand, these recent works (Wen, 2016; Forrest et al., 2018) anecdotally discover and theoretically confirm, respectively, that for a nation to develop a self-sustained momentum of economic growth, it needs to keep its market exchanges open to free competition, which is rooted in market prices.

Regarding this gap, this book presents a systematic theory on how market price drives competition and invites innovation based on game theory. And on top of this rigorous development of market dynamics, the rest of the theory of value creation and capture is constructed.

The second gap in the foundation of the theory this book attempts to develop is concerned with resources. Since the time when Penrose (1959) recognizes how important organizational resources are in terms of a firm's success, the concept of resources has been employed by many scholars to empirically elucidate and envisage what underlies the competitive advantage and performance of a firm (Crook et al., 2008; Kozlenkova et al., 2014). However, empirical analyses and hypothesis tests suffer from severe constraints. So, to convert empirically confirmed claims into

reliable facts, scientifically speaking, they need to be shown by using rigorous logical reasoning with a set of solid starting axioms.

To fill this gap in the literature, this book introduces three basic axioms about firms and their resources, followed by the development of a series of generally true formal propositions regarding associations between resources and the emergence of sustainable competitive advantages, resources and capabilities, and resources and performance of firms. This approach is similar to Rathod et al. (2019) where an axiomatic approach and process variable are utilized to build their model of agile system in supply-chain design.

The third gap in the foundation of the theory this book attempts to develop is related to the effort of management and marketing scholars devoted to developing the capability of explaining and predicting the bases of a firm's competitive advantage and performance (Crook et al., 2008; Kozlenkova et al., 2014). In the past decades, although these scholars have confirmed a good number of discoveries and theories, mostly based on summarizing anecdotes or analyzing data, they are still generally limited to providing managerial suggestions instead of recommendations. This fact explains why business decisions, especially those of mid- to long-terms, tend to be not very reliable (Forrest et al., 2020; Lin & OuYang, 2010).

To fill this gap of the literature developed on the resource-based view of the firm, this book generates a cohesive theory of resources on top of the afore-described axioms by referencing some of the thought-provoking empirical discoveries of the past. Because of the novelty of the methodology used in this book—systems reasoning (Lin, 1999) and the systemic yoyo model (Lin, 2009), this book is able to develop general results on such important issues, among others, as when a firm is likely or certainly to develop sustainable competitive advantages, how the capability-rigidity paradox can be avoided, what could potentially help improve firm performance, how relational resource impacts the innovativeness of the firm, when interactions of resources could lead to undesirable outcomes, when and how a capability would evolve or cease to exist, and when a firm would fail to consistently exploit its resources.

1.1.2 Understanding of Supply-Chain Ecosystems

It is well recognized (Adner et al., 2013) that when a firm comprehends a market invitation innovatively, other than internal reasons other players in the ecosystem of the firm's supply chain greatly affect how well the firm can capture the opportunity to develop a significant competitive advantage over its competitors. One good example to illustrate this end is the current development of flying cars (Lemoussu et al., 2018). It is surely one possible solution to the difficult daily commuting problem confronting those individuals who live in a suburban area and commute to work inside a major US metropolitan. Although the manufacturing of such cars is readily possible based on modern physics and engineering, the true practicality of this idea depends on the availability of such key complements as road conditions and

air traffic controls so that flying cars can move around freely in an orderly manner. So, a gap in the relevant literature appears as follows: After a firm comprehends a market invitation innovatively, how will the success of the firm be consequently dependent on the innovation and technological capabilities of other players in its ecosystem? To fill this both theoretically and practically important gap, this book first distinguishes suppliers and complementors so that suppliers provide their outputs for the focal firm of concern to integrate into its market offer and complementors facilitate necessary conditions for customers to fully utilize the offer.

Another gap in the literature is well illustrated by the following questions. When a firm innovatively deciphers a market invitation, how will the consequent design of the firm's new product(s) post challenges to other players within its ecosystem? And how can the firm systemically manage its vertical interdependence within its ecosystem? In its temptation to address these questions, this book correspondingly establishes the following main conclusions among others: (1) the performance advantage of a focal firm over its competitors is positively correlated to the level of challenges the firm's suppliers face, and negatively to that of the firm's complementors; (2) to successfully ride waves of transient competitive advantages, a firm has to introduce such innovative products that suppliers can possibly provide necessary components and complementors can readily facilitate needed complements; and (3) when contracting with upstream suppliers, a firm has to deal with technological and behavioral uncertainty, where the former affects the firm's creation of value and the latter impacts the firm's capture of value.

McGrath (2013) and others demonstrate that firms need to develop organizational cultures and capabilities necessary for them to effectively ride fast-changing waves of transient competitive advantages. To do so successfully, a firm can look inwardly or outwardly to see what values it can create for consumers (e.g., Barney, 1991, Eisenhardt & Martin, 2000), and to find out where consumer synergies are located and what can be potentially offered (Drucker, 1954). In this regard, a firm can identify potentials of different competitive advantages through economies of scope by diversification at either the producer side (Porter, 1985; Santalo & Becerra, 2008) or the demand side (Ye et al., 2012) or a combination of both. Corresponding to this approach of creating competitive advantages, there are two gaps in the relevant literature. One is about how a firm can create producer-side synergies if the strategy of economies of scope is employed and the other is concerned with the development of demand-side synergies through using simultaneous consumer utilities and multisided markets; after all, it is consumers who determine a firm's success (Penrose, 1959). To potentially fill these gaps and address these questions, this book rigorously develops a cohesive theory on how to potentially develop synergistically innovative ideas at either the producer side or the demand side.

By continuing the thinking logic of effectively riding fast-changing waves of transient competitive advantages (e.g., McGrath, 2013), this book addresses the following natural questions, derives results on how to produce consumer synergies through developing simultaneous consumer utilities, two-sided markets, and other related ideas. (1) What fundamental decisions can a retailer make in terms of its offers to consumers? (2) How can a retailer create simultaneous consumer utilities by

collocating products and/or services? (3) When can a positively correlated multisided market be developed? And, (4) without particular talent and luck, how can a firm innovate synergistically?

1.1.3 Development of Value-Chain Framework

The categorization paradigm can explain how consumers compare products and services and make their consumption decisions by considering how consumers receive and process market information. By utilizing this paradigm, scholars are able to develop marketing initiatives of varying degrees of success by identifying consumer-based variables, such as consumer attitudes towards and evaluations of products/brands, as well as consequent inferences about product attributes and qualities. For details, see, for example, Chiou et al. (2018), Chowdhury et al. (2018), Schrift et al. (2018), Sahni (2016), Moss (2009), Nedungadi (1990), Meyers-Levy and Tybout (1989), Sujan (1985) and Mandler (1982). To theoretically and practically make marketing efforts more effective, this book develops the missing theory on the structure of the human cognitive system so that marketers will be able to produce and execute their campaigns by more reliably predicting consumer behaviors than before.

Because decisions are outcomes of mind activities, this book investigates the hierarchical structure of the mind in order to lay down the necessary background for us to understand how and why the categorization paradigm actually works. Considering that each mind activity is jointly affected by self-awareness, imagination, conscience, and free will, this book explores how the mind functions so that marketers will be able to appropriately predict consumer behaviors under different circumstances. Along this line of thinking, among others, this book demonstrates the following conclusions: (1) Each person orients towards the goal of being happy; (2) A person's cognitive system is manifested in a systemic spin structure, consisting of hierarchical networks of what is in his/her mind and in the environment; and (3) within any taxonomy of things, events, and thoughts, no category of the highest level of abstraction can exist.

Based on the hierarchical structure of the mind as described above, this book is able to develop the theory on why different people employ different methods to process information, making predicting consumer behaviors more reliable than before. Considering how much money companies spent on advertisements, being able to predict consumer behaviors with better accuracy than before will no doubt make the production of marketing programs more effective. Specifically, in terms of the categorization paradigm, this book establishes that (1) no matter when and who is concerned with, at least one area of his/her imagination is occupied by an active circulation of information, experience, and knowledge; (2) no matter when a person's categories of experience and knowledge are abstracted in three levels: superordinate, basic, and subordinate; and (3) categorization behavior manifests itself along different levels of abstraction of a specified taxonomy in the number of

subcategories generated by individual people for any given collection of product items.

New opportunities for wealth creation have appeared with the current globalization of the world (Forrester Research Report, 2000), where known forms and rules of competition have been altered in the process when businesses and individuals adapt to emerging formats of decision-making and interorganizational interactions. With these speedy changes and the emergence of transient business opportunities, scholars, managers, and entrepreneurs are greatly challenged (Hitt & Ireland, 2017) in terms of creating unconventional ways to acquire information, develop knowledge, and share know-hows (Amit & Zott, 2001). In particular, a comparison between what is quickly happening in real life and how the literature of value expands shows that most studies on value creation and capture provide managerial suggestions instead of general recommendations due to various empirical constraints. Hence, there is a clear need for scholars and managers to bridge between empirically confirmed suggestions on value creation and capture and generally true conclusions that do not suffer from the inherent constraints of data- and anecdote-based analyses.

Successfully constructing such a bridge is epistemologically very important. Such effort will inevitably help introduce new methodologies into studies of business-related topics and issues that can be employed widely to develop useful conclusions instead of the suggestions as currently done. Simultaneously, it is also practically significant because competitive advantages, some of which were once sustainable, have become mostly transient and consumers become less patient and their preferences evolve rapidly (Forrest & Tallapally, 2018; McGrath, 2013). In its attempt to build such a bridge, this book examines respectively innovations and resources and develops the following formal, generally true conclusions, among others: (1) By allowing free competition, innovation can effectively help create value if protective property rights and complementary assets are available. (2) Within a market of free competition, exchanges help resources reveal their dormant values. And (3) mobility of resources is positively proportional to the capability of value creation.

The current fast-changing business landscape has presented entrepreneurs a stimulating era to create new avenues of value creation and capture. It has led to quickened turnovers of innovative products, services, and informational goods (Amit & Zott, 2001; Priem et al., 2018). Based on what has been established for how value can be created out of innovation and resources, this book continues to examine value capture out of interorganizational networks and platforms that directly connect sellers and buyers and generalizes Porter's (1985) value-chain framework. This new and general framework can be appropriately applied to analyze firms that offer physical products, or services, or informational goods, instead of only manufacturing firms, as called for by Stabell and Fjeldstad (1998) and Vendrell-Herrero et al. (2017). Specifically, these scholars find that Porter's method is not quite applicable for analyzing service firms and providers of informational goods. In other words, this book presents an adequate value-chain framework that can be applied to the present rapidly changing world of business. Additionally, generally true conclusions are developed through respectively looking at the market state of

mutual forbearance, interorganizational networks, platforms that directly connect sellers and buyers, and how information flows affect the emergence of creative destruction.

1.1.4 Studies of Consumer Value Propositions

By methodically evaluating market demands, Sonoco Products was able to successfully formulate its adequate customer value propositions (CVPs) on which it achieved consequent phenomenal performance in the marketplace (Anderson et al., 2007). Along with this story of success, it has been repeatedly confirmed (Payne & Frow, 2005; Webster, 2002) that companies first organize themselves effectively on particular CVPs and then create values for customers on top of their effective CVPs.

The idea of CVPs has been noted since over 100 years ago. For example, in the area of marketing, Starch (1914) studied the concept of propositions. However, the necessity to communicate created values to customers, as a practically important way to potentially capture value for a company, is not accentuated until the 2010s (Marketing Science Institute, 2010). Even with such much delayed recognition of the need to proactively communicate created values to customers, as recently as of this writing, the concept of CVPs is still poorly defined, unconcernedly talked about, and discussed inconsequentially in both theory and practice (Lanning, 2003; Payne et al., 2017). It is in 2017 that Payne et al. finally introduce a workable definition for the concept of CVPs.

Considering the theoretical and practical importance of CVPs, as just described, a clearly visible gap existing in theory and practice that urgently needs to be filled is to develop a widely useful theory of CVPs and successes of relevant applications. Evidently, to make it widely useful, the theory has to be established on some foundation of rigor with conclusions derived in such a way that they are not constrained by particular samples of data, by the limitations of econometrical methods, and by the required conditions of calculus-based tools. To this end, by utilizing the intuition of systems research and the rigor of game theory this book presents such an imagined theory that

- Includes sufficient conditions under which a firm can formulate an effective CVP and acquire additional profit beyond the case without the CVP;
- Can practically reveal how CVPs play their parts in general aspects of business operation and how CVPs assist the creation and capture of values for individual companies; and
- Demonstrates how CVPs affect the development of competitive advantages for a company, how adopted CVPs could increase values for shareholders, and how a CVP's impacts can be materialized.

Because of the characteristics of how relevant conclusions are established within this theory based on a rigorous foundation, it is anticipated that these conclusions can practically produce visible economic benefits for managers and entrepreneurs.

In terms of market sensing, Day (1994), Forrest et al. (2017), and McGrath (2013) either confirm or demonstrate that it is an important capability for a company to first survive and then succeed in increasingly fast-evolving markets. However, Ardyan (2016) finds that such capability does not have any positive effect on companies' profitability. Lindblom et al. (2008) reveal some effects although not significant. As for its impacts on the quality of market entry and the creation of knowledge, Sugiyarti and Ardyan (2017) find that this capability has only some positive impacts, while Alshanty and Emeagwali (2019) show that it has significant impacts. That is, the existent literature points to inconsistent findings. To help sort through these inconsistencies, this book theoretically looks at what the inconsistent results mean in theory and in practice.

The importance of such effort cannot be overlooked because no matter whether it is for a market leader or for a follower, knowing the future direction of consumer demands is essential for a firm to plan itself strategically. Specifically, the current world of business presents such a case where once sustainable competitive advantages have become transient (McGrath, 2013). And, beyond sorting through the inconsistencies existing in the literature, this book also enables us, as case studies, to look at profit opportunities in stagnant industries that experience little or no market growth and show how market knowledge and relevant innovative understanding of the knowledge can assist a company to construct effective CVPs.

1.1.5 Comprehension of Manufacturing and Artificial Intelligence

With the maturing technology of Internet and fast emergence of artificial intelligence, a number of nations from around the globe have been engaging in a new round of industrial transformation. These forward looking nations include China (State Council of the PRC, 2015), France (Marc et al., 2018), Germany (Industry 4.0), the Great Britain (Hall & Pesenti, 2017), Japan (Government of Japan, 2015), and the USA (OWH, 2016a). They planned and implemented their efforts by focusing on the manufacturing sector based on a domineering lesson of the past successes of industrial revolutions (Wen, 2016). Such nearly simultaneous efforts of the leading powerful nations naturally lead to theoretical curiosity about the role manufacturing plays in a nation's effort to generate and advance its self-sustained momentum of economic growth. The curiosity is considered natural because recent literature suggests that the advancement of the service sector would be the basis underlying the coming rounds of economic booms (e.g., Szirmai & Verspagen, 2015). In particular, recent data from both developed and developing countries indicate that services account for more than 50% to over 80% of the economy.

That makes it increasingly difficult for developing economies to industrialize through purposefully growing their manufacturing because that sector steadily provides fewer employment opportunities.

Although this curiosity has been explored by many scholars from different angles, all of them produce either inconclusive or inconsistent results (Wen, 2016) due to the employment of data- or anecdotes-based approaches. In order to face this challenge satisfactorily, Rostow (1960) points to the need for new methods of analysis and different logics of thinking.

On top of this 60-year-old call, this book theoretically confirms the rationale behind various nations' attempts to maintain their leading positions in the world by focusing on the manufacturing sector. At the same time, it introduces systems thinking and methodology, and the logical reasoning that has won victories one after another for mathematics and natural science (Kline, 1972) into the study of industrial revolutions. Because of the novelty of the methodology employed, this book is able to develop sharp theoretically important and practically meaningful conclusions and insights regarding the role manufacturing plays in economic development.

The current political and geographical developments around the world have altered patterns of economic growth in unprecedented ways. To adjust appropriately to the fast-changing environment, many nations adopted different strategies by zooming in on artificial intelligence (AI) as their next direction of economic development. For example, the government of Japan recommended (Government of Japan, 2015) the establishment of a national R&D promotion mechanism to center on Internet of things, big data, AI, and other technologies, and the realization of a super-intelligent society through extending AI to all aspects of life. In 2016, the Obama White House put out seven chief stratagems for the advancement of AI in the United States of America in two documents, entitled respectively "Preparing for the Future of Artificial Intelligence" and "The National Artificial Intelligence Research and Development Strategic Plan" (OWH, 2016a, 2016b). To keep pace with Japan and the United States, the term of AI appeared in the 2017 Report of the 19th National Congress of the Communist Party of China (Xi, 2017); and the European Commission (EC, 2018) submitted in May of 2018 its document, "Artificial Intelligence: A European Perspective." It pronounced the EU's place in the international AI competition and presented a plan for relevant actions.

Although the importance of AI has been widely recognized and AI technologies have been increasingly employed, scholarly research on how AI impacts technological innovation is still scant and in the stage of infancy. The focus of published works is mainly on how to define relevant concepts. Still open and waiting to be addressed are many questions regarding how AI and technological innovation are related to each other. This is exactly the place where this book makes its contribution in the following two aspects: (1) At the height of theory it explores the inherent mechanism underneath how AI affects technological innovation and (2) based on the panel data of the provincial level from China, it empirically confirms the impact of AI on technological innovation.