The Butterfly Effect in Competitive Markets

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The Butterfly Effect in Competitive Markets

Driving Small Changes for Large Differences

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To Arati, and my little grandson Akhilesh, who gave me scope to relax from always sitting upright and working on this project

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Foreword

Markets are less predictable than ever. All around us we see the unexpected rise and spectacular demise of products and services. Companies like Facebook can quickly grow to a $200 billion market capitalization, while others (like Kodak, for instance) suffer spectacular demise. Some products become almost ubiquitous overnight, but there are also products with years of steady sales that suddenly vanish. Markets display spectacular turbulence. We "experience" chaos at work in many settings. More than ever we need to understand its origins. We also need to identify corporate strategy, preferably a steady course, to cope with the resulting uncertainty in our pursuit of success in this chaotic environment.

Complex, mathematically "chaotic" phenomena are difficult to "see": it seems that our brains are more inclined to attribute observations to causality rather than complexity (Appelo, 2011). Our minds favor linear thinking. Weinberg (1992) has dubbed the human preference for easily explainable events with simple causes and simple effects the "causation fallacy" – "Complexity science teaches us that applying linear thinking to complex problems can lead to painful mistakes."

Many authors (and so does Rajagopal) draw parallels between the chaos in markets and a Darwinian (biological) model of survival of the fittest. A Darwinistic approach to optimizing your marketing mix implies trial and error, with an emphasis on measurement and experimentation. We expect and accept many innovation attempts to fail. Then drop those products from our portfolio. By rational allocation across our offerings, you evolve to sustainable growth. This way we leverage the consequences of chaos, rather than falling victim to it.

The last few decades have seen the emergence of complexity theory. It is hard to pinpoint exactly where this branch of science started, but certainly Edward Lorenz (1917–2008) was an early thought leader. It was Lorenz who coined the term "butterfly effect" in his landmark paper from 1972 called "Predictability: Does the Flap of a Butterfly's Wings in Brazil Set Off a Tornado in Texas?" Lorenz was a meteorologist and mathematician by background. Early in his career (1950s) he appreciated that there were serious flaws in the linear models being applied to weather forecasting in those days. Most atmospheric phenomena behind weather forecasting are non-linear, and therefore Lorenz challenged the appropriateness of linear models to describe these processes (Lorenz, 1972). Lorenz discovered a mechanism of deterministic chaos in computer models. Simple systems, with (very) few variables, can still display complicated and unpredictable behavior. Lorenz showed that even deterministic systems have limits to their predictability.

The well-known Cynefin framework distinguishes between complicated and complex systems. Simple systems, with few variables, can nonetheless show unpredictable and sometimes chaotic behavior. Although this could be demonstrated in simulations, it took a while before these phenomena could be demonstrated in real-world, physical systems. It wasn't until 1977 that Libchaber conducted a series of seminal experiments. He created a small system in his lab to study convection (chaotic system behavior) in a cubic millimeter of helium. By gradually warming this up from the bottom, he could create a state of controlled turbulence. Even this tightly controlled environment displayed chaotic behavior: complex unpredictable disorder that is paradoxically governed by "orderly" rules.

The "butterfly effect" refers to the phenomenon that a seemingly stable system (as in Libchaber's 1 ccm cell of helium) can be exposed to very small influences (like heating it up a mere 0,001 degree), and can transform from orderly convection into wild chaos. Although governed by deterministic phenomena, we are nonetheless unable to predict how such systems will behave over time. The scientific study of chaotic system behavior took off. Initially in hard sciences like Mathematics. Then Biology, and later in social sciences like Economics and Sociology. Some people have called this the third scientific revolution of the twentieth century. After relativity, quantum mechanics, now complexity science (sometimes called chaos theory) is an idea whose time has come.

We live in an interconnected, or rather a hyper-connected society. Organizations and markets "behave" like networks. This triggers chaotic (complex) rather than linear behavior. Although this may all be blatantly obvious to the layman, science has been rather slow to evolve from almost exclusively linear models to system dynamics and complexity science. Another example of linear models is that of the "rational customer" who always maximizes economic utility. When I was in university I vividly remember hearing about the assumptions that needed to be made in order to justify working with economic (regression) models. Interestingly, it was clear to everyone that these were evidently inaccurate assumptions. There was (and is) undisputed scientific evidence that consumers do *not* behave like rational agents. They do *not* constantly try to maximize economic utility.

Dan Ariely's book *Predictably Irrational* was a bestseller, and few people dispute his findings. It strikes me as odd that *still* the overwhelming majority of economic theories rest squarely on the assumption of the rational consumer (Ariely, 2010). It seems we are at the fray of a change in research tradition. As this paradigm shift unfolds, it is only natural to see more and more applications of complexity science. *The Butterfly Effect in Competitive Markets* by Rajagopal pertains to marketing and business strategy, and aims to enable forward-thinking marketers to *benefit* rather than *suffer* from butterfly effects.

We all seem to be looking for the Holy Grail, the nexus point in a complex system. This is where a small change in the marketing mix will yield a large improvement in marketing dynamics. Many memorable innovations in hindsight seem remarkably small adjustments to existing products. Like the change from mp3 players to iPod didn't seem such a big deal at the time. Yet some of these innovations drive enormous revenue growth.

The nexus point in a complex system is where you have (the most) leverage. In any other place, you may well be pushing and pushing, only to spend more money and create more waste, without seeing any sustainable change. Systems have a tendency to "bounce back," to "resist change" as system dynamics (Sterman, 2000) has taught us. Were the early smartphones all that different from the existing mobile devices? Isn't a tablet computer "merely" an intelligent compromise between a smartphone and an ultra-portable laptop? Yet both have defined new product categories, essentially creating a new market. But many other seemingly "brilliant" improvements faded into oblivion.

Unless the customer is getting more value, he is unlikely to be willing to pay a premium. At least not for long, until a competitor comes along that steals your thunder. Rajagopal answers the question how you carry innovation forward to enhanced products and offerings, on the road to a *sustainable improvement* of value for your customers.

Tom Breur

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In the past 15 years Tom Breur has specialized in how companies can make better use of their data. Teaching at universities, MBA programs, for the IQCP (Information Quality Certified Professional) and CBIP program (Certified Business Intelligence Professional), his focus is on Agile approaches to data-driven decision-making and business intelligence. In 2013 he published a book on Big Data. *Tom is author of several papers in peer-reviewed journals, an active blogger, and regular keynoter at international conferences. At the moment he is a member of the editorial board of the* Journal of Targeting, *the* Journal of Financial Services Management, *and* Banking Review. *He is Chief Editor for the Palgrave* Journal of Marketing Analytics. *He was cited, among others, in* Harvard Management Update *about state-of-the-art data analytics. Tom works as VP of Data Analytics at Cengage Learning, Inc. in Boston, Massachusetts, USA.*

Preface

I have argued in my previous book, *Architecting Enterprise: Managing Innovation, Technology, and Global Competitiveness*, published by Palgrave Macmillan, that most global firms are penetrating bottom-of-the-pyramid market segments by introducing small changes in technology, value perceptions, marketing-mix strategies, and driving production on an unimagined scale of magnitude to derive a major effect on markets. This book is an outcome of the continuum of the thought process of the previous book, which gave a platform to address the issues concerning how small changes could lead to large differences in driving business at the global scale. This phenomenon has been explained as the butterfly effect in market competition and indeed most multinational companies in consumer goods sector, for example, Colgate-Palmolive, Procter & Gamble, Kellogg's, Unilever, Nestlé, Apple, and Samsung, have experienced this effect in their business growth in the global marketplace. Well-managed companies drive small changes in their business strategies by nipping the pulse of consumers on issues such as customizing globally standardized products that are advanced, led by competitive technology, are functional and reliable, and offered with competitive benefits to sensitize the market. These companies benefit from enormous economies of scale in production, distribution, marketing, and management. Successful new enterprise in the global marketplace needs enormous efforts in innovation, competitiveness, and application of technology for sustainable growth.

A fundamental management challenge, particularly in large diversified global companies, has emerged as stress in engaging toward continuous innovation to stay competitive in the market. Wise companies in the competitive fray are catching up with the concepts of the butterfly effect and driving low-cost and customer-centric moves in their business strategies to embed an emotional appeal among consumers to lead to competitive advantage in the market. The butterfly effect driven by emerging firms is seen as widespread in the taxonomy of markets ranging from macro to niche levels, and prompts short-run growth of firms in the competitive marketplace. Most firms use such effect by making a small change in their strategy in reference to produce, price, place, promotion, packaging, pace (competitive strategies), people (salesforce), performance, psychodynamics (communication through social networks), posture (developing corporate image), and proliferation (value-driven diversifications in product and services attributes, and marketing strategies) to gain higher market share and profit in a short span. The butterfly effect is obvious in the market during peak sales season as even a small discount leverages higher market share of competing firms.

As the globalization of firms has increased during the early twenty-first century, the need for innovation and technology application has swiftly drawn the attention of emerging firms to make sustainable moves in the competitive marketplace. Most firms that are new and at the grassroots of the market have started to redefine key aspects of their marketing-mix, and by using innovation and customer-driven technology solutions have grown stronger to sustain the market competition. Most companies, thus, lean toward investing in market-oriented technology and encourage the co-creation of differentiated products and services. A large number of firms operating in mature markets have the resources to launch unique and superior products with a compelling value proposition. However, contemporary studies show that sustainable customer-centric innovations are relatively few, while improvements and modifications to existing products are increasing.

Globalization and frequent shifts in consumer preferences toward products and services have accelerated chaos in the market due to the rush of firms, products, and business strategies. Chaos theory in markets addresses the behavior of strategic and dynamic moves of competing firms that are highly sensitive to existing market conditions triggering the butterfly effect. Accordingly, small differences in the strategy of marketing-mix elements, brand, and corporate business conditions yield widely diverging outcomes in market dynamics, rendering long-term impacts. Chaos in the market happens as a result of random changes in the marketing strategies of firms, even though at a small scale. It has been observed that the larger the number of firms in the market the higher the degree of chaos. The sensitivity to small changes in marketing strategy is identified as the butterfly effect.

It is argued in the book that most firms look for gaining competitive advantage in the marketplace by driving tactical moves, inculcating small, cost-effective changes in marketing approaches. Sometimes such small changes are introduced into niche markets, which yield macro effects in large markets. Often the butterfly effect is initiated by user-friendly innovations that enable consumers to realize that with such interventions in the market they could not have gained such value before at the offered price. Such consumer perceptions may have a large impact on the market in terms of market share and profitability. This book explains how to "refresh" consumer value with small changes in marketing policy to larger and sustainable effects in threshold markets to gain competitive advantage. As competition among the firms in the marketplace across territories and market segments is perennially growing, the butterfly effect has become much more dispersed, complexity in market predictions has increased, and tactical interventions have turned to business models involving consumers and social media in demonstrating effects on a much larger scale. Companies successfully driving the butterfly effect in the global–local marketplace need to overcome the organizational barriers and transaction costs involved with innovation, technology application, and managing intellectual property besides developing effective production, operations, and marketing strategies. Firms must also evaluate how best to appropriate value to innovations and technology interventions within the organization and marketplace. The arguments in this book harness the power of firms toward sensitive market interventions through marketing-mix strategies, innovation, and technology application to click larger effects with smaller differentiations.

The discussions in this book follow a linear path of cause and effect on various organizational and market-driven factors to analyze the butterfly effect in the marketplace. It is illustrated through logical market behavior analysis how chaos in the market drives tactics among market competitors that cause shifts in consumer preferences and guides their buying behavior. Such shifts in consumer behavior are often radical and face initial resistance; however, consumers' thrust to break out of social conformity drives their adaptability behavior to change over time. Strategies of firms that emerge out of market chaos help these firms in growing their business in local markets and achieve sustainability and global competitiveness. Consequently, every small change emerging out of market chaos contributes to a global and sustainable effect in the market.

This book is divided into ten chapters spread across three sections, which comprise analyzing market chaos, building global–local marketing effects, and unveiling future effects. Chapter 1 discusses the attributes of growing competitiveness in the global marketplace that cause chaos among companies and affects sustainability in the market. The critical issues concerning chaos in markets in reference to complexities of competition, and random and rational choices of consumers are addressed in this chapter. The chapter argues that manifold increase in market competition at the macro, meso, and micro levels creates chaos in the market, while it also seeds many opportunities for companies to grow via differentiation.

Chapter 2 analyzes the reasoned action and planned behavior of consumers toward new and competitively differentiated products, and argues that consumers initially are critical to changes in view of differences in culture, awareness, and socioeconomic positioning, but companies need to maneuver such behavior to develop their marketplace and drive strategic differentiations to spark the butterfly effect. The chapter also maps the mindset of consumers in adopting competitively differentiated products and services. In this context the chapter also addresses how the consumer learning curve and social media deliver a new cognitive push to small competitive differences for large socioeconomic benefits for consumers.

Chapter 3 critically examines the market shifts toward innovation and technology application in products and services for creating competitive differentiation among consumers and various market players. A systematic discussion on interrelated issues on organizational learning, transformation of competitive differentiation and innovation, and managing market uncertainties is presented in this chapter. The market environment for spreading small competitive differentiations for large benefits across the consumer and market segments to optimize the butterfly effect is also discussed. It is argued that emerging firms are aggressive in innovation of products and services, and are competent in managing the dynamics of butterfly effects in global markets.

Most companies invest resources and make efforts to analyze market trends continuously to track consumer preferences and the need for developing competitive differentiations in products, services, and strategies to gain competitive advantage in the marketplace. Chapter 4 focuses discussions from the above perspectives and addresses issues on market trend analysis, behavioral resistance of consumers to change, opportunities and threats in product differentiation, and how small differentiations can drive large benefits, like the butterfly effect in the market. The discussions in this chapter also explain the disruptive tendencies in markets that affect the performance of new or competitively differentiated products at a global scale.

Chapter 5 discusses customer value management in reference to new and differential products by improving organization capabilities and competencies of companies in carrying out competitive innovation and value chain management. While discussing the issues related to managing improvement of products and services, this chapter argues that the most effective way for companies to approach competitive differentiation is through co-creation, involving consumers in the process.

The chaos in the market can also be explained with the Darwinian theory of biological evolution, which states the axioms of the struggle for existence and the survival of the fittest govern the process of evolution. In the global marketplace both axioms appears to fit as multinational companies are moving to bottom-of-the-pyramid segments and regional companies are aspiring to upscale their operations to the global level. Such bidirectional competitive moves cause chaos, and companies in market competitions lean on differentiation to establish their unique posture in the market. Chapter 6 accordingly discusses evolution and growth in business, marketing competition, and managing low-end differentiation. One of the salient features of the discussion is the differentiation and chaos matrix, which analyzes the effect of differentiation in reference to advertising and communication, price, quality and perceived value, and technology.

Chapter 7 addresses business growth and local effects on competitive differentiation, and discusses five key drivers of competitive differentiation. The chapter explains the complexity grid that companies face in reference to strategic, marketplace, tactical, and cognitive complexities. This chapter also analyzes the causes of differentiation failures and risk factors.

Chapter 8 explores sustainable marketing, considering business growth and the factors driving marketing decisions. It is identified that consumer value, environmental issues, decision-making, competition management, business governance, organizational culture, and understanding the market are key factors in determining business sustainability and company growth. This chapter also addresses issues of market competition and corporate sustainability, and argues that companies should refrain from short-run, myopic strategies if they want to grow sustainably in the marketplace.

The social psychology of consumers as an attitudinal environment in consumers developing perceptions of competitive differentiations is discussed in Chapter 9. Consumer culture and associated ethnographic factors are also addressed by laying emphasis on cultural shifts, changing psychographic paradigms, and demographic congregations.

The final chapter of the book, Chapter 10, addresses issues related to the dynamics and challenges associated with the competitive differentiation process and examines how companies can make small changes for large benefits in the global market using technology and innovations. This chapter argues that this phenomenon in global markets drives the butterfly effect as competitive differentiations move boundaries in global markets from a niche to larger markets and vice versa.

This book provides a comprehensive introduction to the concept of market transitions and radical business management. It covers complex elements of market management by analyzing behavioral theories such as chaos theory, the theory of reasoned action and planned behavior, the theory of change, resistance theory, and the theory of acceptance and diffusion from the perspectives of business growth, sustainability, and market competitiveness causing butterfly effects in the market. A broad foundation of this subject beginning with a discussion of the concept of market dynamics followed by analysis of change behavior of markets and its components form the core discussion in this book. The arguments on butterfly effect in markets delineate critical insights on the significance of leadership, building consumer value through innovation, tracking the external environment for organizational change, and relevant general factors as well as important emerging trends toward building an innovative venture.

Various perspectives of market growth and development of emerging firms in the global context are addressed in this book in reference to the impact of market chaos, change behavior, and consumer preferences on growth of firms and competitiveness. The content and coverage of the book range from chaos theory to managing global competitiveness. In reference to the butterfly effect on market competitiveness this book argues that technological innovations, which are triggering changes in niche markets, are driving market competition at local and global levels. Policymakers and business strategists are examining new theoretical frameworks to understand the underlying dynamics of this global reshuffling of production and marketing activities of firms, and how small changes cause large effects in business. This book examines the butterfly effect in reference to innovation, competitiveness, and shifts in business strategies in regional and global perspective, and discusses the impact of globalization on innovation, production, and marketing activities. The book reviews categorically behavioral theories on marketing and previous researches, and analyzes the strategic and tactical stewardship of firms in business for sustainable growth in the global marketplace. The book discusses new concepts related to market efficiency and co-creation approaches to manage recurring changes in the market in reference to innovation, technology, and disruptive behavior. This book significantly contributes to the existing literature and will serve as a learning post and a think-tank for students, researchers, and business managers.

The principal audience of this book lies among corporate managers, including CEOs, and students of undergraduate and graduate management studies, research scholars and academics in different business-related disciplines. The book has also been developed to serve as a principal text for undergraduate and graduate students who are pursuing studies in international management, marketing, and administrative studies. Hence, undergraduate and graduate students of major business and economics schools on the American continent and across Europe and Asia are the potential audience for this book. Besides serving as a textbook in undergraduate and graduate courses, this would also be an inspiring book for managers, market analysts, and business consultants to explore various solutions related to product management.

There were several brainstorming sessions with students and peer researchers on innovation and technology management by emerging and large existing firms in the global marketplace that supported the framing of new ideas for discussion in this book. Such discussions brought new insights on redefining the significance of innovation and technology in a competitive marketplace, highlighting the role of disruptive practices in the market by new entrants. The discussion in the book also surveys several consumer-centric strategies to associate consumers as pivots in driving new products and technologies by companies in the market. Initially, I worked out a teaching agenda on developing innovation and technology process, and diffusion and adoption models for global companies, and discussed them at length in the classroom, encouraging open discussions on the subject. These helped in developing new conceptual frameworks on the subject. Some of my research papers on the services innovation process and customer-centric marketing in the emerging markets were published in international refereed journals that had driven new insights on the subject. Such refined work has been presented in this book, endorsed with applied illustrations and updated research on innovation, technology, and management of market competition in order to architect enterprises.

I hope this book will contribute to the existing literature and deliver new concepts to students and researchers to pursue the subject further. Reading this book, working managers may also realize how to converge innovation and technology with market competition in emerging global business.

Rajagopal
Mexico City
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He has been listed with a biography in various international directories including *Who's Who in the World* since 2008, and *2000 Outstanding Intellectual of the 21*st *Century* published in 2009 by International Biographical Center, Cambridge, UK. He offers courses on Competitor Analysis, Marketing Strategy, Advance Selling Systems, International Marketing, Services Marketing, New Product Development, and other subjects of contemporary interest to the students of undergraduate, graduate, and doctoral programs. He has imparted training to senior executives and to date has conducted 55 management development programs.

Dr Rajagopal holds postgraduate and doctoral degrees in Economics and Marketing, respectively, from Ravishankar University in India. His specialization is in the fields of Marketing Management, Rural Economic Linkages and Development Economics. He has to his credit 42 books on marketing management and rural development themes, and over 400 research contributions, which include published research papers in national and international refereed journals. He is Editor-in-Chief of *International Journal of Leisure and Tourism Marketing*, *International Journal of Business Competition and Growth*, and *International Journal of Built Environment and Asset Management*. Dr Rajagopal is also Regional Editor of Emerald Emerging Markets Case Studies, published by Emerald Publishers, UK. He is on the editorial board of various journals of international repute.

His research contributions have been recognized by the National Council of Science and Technology (CONACyT), Government of Mexico by awarding him the status of National Researcher-SNI Level-II during 2004–2012. Currently Dr Rajagopal has been conferred the highest level of National Researcher-SNI Level-III (2013–2017).