GLOBAL MACROTRENDS AND THEIR IMPACT ON SUPPLY CHAIN MANAGEMENT

STRATEGIES FOR GAINING COMPETITIVE ADVANTAGE

CHAD W. AUTRY | THOMAS J. GOLDSBY | JOHN E. BELL

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Chad:
To Bill, Jennifer, and Todd Autry, who gave me my start; to Anna Kate, Drew, and Alex, who lift me to greater heights every single day; and to my life's love, Kari, who makes everything I do worthwhile.

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Preface

"To India!" With over a billion people consuming goods and services, India has represented a potential bonanza for many global companies since the end of the 20th century. The former British colony, independent since 1947, has vast natural resources and a large English-speaking population and is currently the world's fourth-largest economy. However, for many potential market entrants, India remains an uncharted and mysterious opportunity. Though ripe with potential, it brings a vast array of unfamiliar challenges for outsiders. With 28 state governments, over 1,500 native languages, and a primarily Hindu population, India's cultural and demographic differences yield a unique and somewhat incomprehensible frontier for foreign business to penetrate. Western companies often admit that they know they "need to be there" but are unsure exactly how to enter the market and how their offerings would be received there. Above all, they struggle to understand who the Indian customer really is, given the heterogeneity of India's multiple and diverse subcultures.

Most companies seeking to enter the Indian marketplace are also poorly prepared to do business there from a logistical standpoint. The Indian transportation system is quite challenged in many respects, primarily due to the relative lack of infrastructure and ensuing traffic congestion. The country's road network is primitive by modern standards, with many underdeveloped roads, and less than 3% of the road network consisting of passable highways. Indian seaports serve as logistical chokepoints, where as many as 30 container ships can be backed up at any given time, waiting to offload their cargo. It is not uncommon for delivery lead times from U.S. producers to Indian consumers to range from 20 to 30 days.[1] In addition, the country

[1] Jeffress, Conrad. Head, Automotive-North America, Panelpina Inc. "Logistics Challenges in India" Online interview, November 2008, Globalindustry.com.

suffers from serious basic commodity shortages and imbalances that inhibit economic development, the most pressing of which is the lack of freshwater delivery systems and wastewater treatment facilities. As an illustration, the city of Delhi has the capacity to treat only 40% of its own wastewater supply, and it is in constant conflict with neighboring regions that refuse to supply it with more fresh supply. The local groundwater is unfit for consumption due to metals pollution, and a local river in the Delhi area has essentially been turned into an above-ground sewage system.[2] As these issues illustrate, India is a forum of extremes for doing business. The massive marketplace is most certainly enticing for outsiders, but securing and transporting supplies, manufacturing products, and executing final delivery can present enormous challenges.

In spite of India's logistical complexities, the Coca-Cola Company has a long history of doing business there. From 1970 to 2000, Coke established itself as a leading Indian brand. In attempting to secure a permanent foothold, by 2005 it had established over 70 India-based bottling plants, and the country had been designated its largest growth market.[3] Often recognized as the most valuable brand in the world, Coke is no newcomer to global expansion. It has long displayed great expertise at entering foreign markets. (It has often been remarked that Coke contains more nations in its portfolio than the United Nations.)[4] However, in 1998, a Coke subsidiary opened a new soft drink plant in the village of Plachimada that remains a monumental headache for the company almost 15 years later.[5] Plachimada is in the state of Kerala, in southwestern India. Though the region receives a

[2] Sahni, Diksha. (21 June 2012). "Why Is Delhi Running Out of Water?" *Wall Street Journal India*.

[3] Stecklow, Steve. (7 June 2005). "Virtual Battle: How a Global Web of Activists Gives Coke Problems in India." *Wall Street Journal*.

[4] "Coke in the Cross Hairs: Water, India, and the University of Michigan." Case 1-429-098, 25 July 2010, the ERB Institute and William Davidson Institute at the University of Michigan.

[5] "Call for presidential assent to Plachimada Bill."(5 June 2012). *The Hindu*.

large amount of monsoon rain each year, it has been suffering from freshwater scarcity since at least the 1980s due to deforestation, high population density, fast runoff of rains to the ocean, and water mismanagement issues.[6] Water scarcity thus has emerged as an existential threat to the Indian economy and public health, given that nearly 90% of new water extraction goes to agricultural purposes.[7] For Coke, access to potable water for its bottling production plants is a critical market success factor. By some estimates, it uses over 294.5 billion liters of water annually, with 2.26 liters required to produce 1 liter of cola.[8] In some locations, this would prove to be a great challenge in the Indian marketplace.

When making network design decisions and determining where to locate plants, warehouses, and other facilities, a company may not always consider factors such as water scarcity. Since transporting water from wells and streams to factories has never been considered economically viable, bottling facilities are often located near large populations. Or bottled products are first delivered as concentrates to demand locations, where water is added as a final processing step before sale (as with orange juice). The extent to which Coke considered the potential for water scarcity in its Kerala market analysis prior to building the Plachimada plant remains unknown. Regardless, the company decided to locate the bottler where the stability of the water supply needed to make its products represented a significant supply chain risk.

The outcomes were unfortunate, but predictable. Within two years of the Plachimada plant's establishment, local farmers and villagers were accusing the Coke plant of lowering the local water table and polluting both surface and groundwater near and around the

[6] Venugopal, P.N. (31 March 2006). "Kerala: rain-blessed and short of water." www.indiatogether.org.

[7] "For Want of a Drink." (20 May 2010). *The Economist*.

[8] "Water Stewardship." 2010/2011 GRI Report, the Coca-Cola Company, www.thecoca-colacompany.com/sustainabilityreport.

plant site. Farmers complained of decreased crop yields as a result of the shortages, and many nearby wells ran dry or were contaminated, plausibly due to Coke's overuse and alleged misuse of the local water supply.[9] Local protestors began picketing the plant in April 2002 and continued throughout 2003. Finally, following a Kerala court ruling in March 2004, the $16 million Plachimada Coca-Cola plant was shut down.[10] Throughout the protests and hearings, Coke continually denied that it was in any way contaminating or polluting the Kerala water system. It claimed that many of the tests conducted in the area were unscientific and that officials could not substantiate that the plant was the cause of the water issues. In fact, Kerala's courts later rejected similar claims against Coke when, in April 2005, the wells continued to dry up after the Coke plant in Plachimada had stopped operating. The judges believed that the more significant inhibitor of water quality and supply was lack of rainfall in the area.[11] Nonetheless, the damage was done, and the company was forced to permanently close the Plachimada plant due to political and legal pressure. In fairness to Coke, its chief rival, Pepsi, has also suffered from allegations of water misuse in India,[12-13] while Coke has made great strides in the last several years to more wisely manage water use and resource scarcity in its supply chains.[14]

What can managers of other enterprises, large and small, global and domestic, take from this story? Why did Coke's new plant in southern India fail? Was this just a simple mistake made during a plant location decision, for just one of Coke's 70 Indian plants? On its

[9] "Indians force Coca-Cola Bottling Facility in Plachimada to shut down 2001-2006." Global Nonviolent Action Database, Swarthmore College, http://nvdatabase.swarthmore.edu.

[10] Stecklow, Steve. (7 June 2005). "Virtual Battle: How a Global Web of Activists Gives Coke Problems in India." *Wall Street Journal*, A1.

[11] Ibid.

[12] Rai, Saritha. (21 May, 2003). "Protests in India Deplore Soda Makers' Water Use. *The New York Times.*

[13] "Kerala assembly panel moots curbs on Pepsi plant." (17 March 2010). *The Hindu*.

[14] "2010/2011 GRI Report." The Coca-Cola Company, 16 December 2011.

face, it could simply appear that Coke, in India, has found itself seeking growth while a critical input (water) was unavailable, and thereby created risk to its brand, reputation, and profits. But taking a broader perspective, the example also shows that the world we live in is changing, and is doing so in some ways that undermine the basic assumptions many of us have long held about business. Global companies can no longer afford to assume that they will have unlimited access to a natural resource, either when establishing new market ventures or perpetuating old successes. Social and physical scientists alike point to numerous exogenous factors that are intertwined and rapidly evolving and that have great potential for disrupting business conducted in the old familiar ways. In this book we call these global phenomena *macrotrends*. Based on our research, we believe they have the potential to substantially impact—and disrupt—modern business practices, leading to great frustration for modern supply chains and the managers who administer them. These new and disruptive macroeconomic factors include the following:

- **Continued population growth and migration.** Although some countries in the world are seeing declining population growth rates, other areas such as many in Africa and Southeast Asia continue to see population growth. World population levels of 9 to 10 billion people are expected in the decades ahead.
- **Rising economies and buying power.** The economies in nations such as Brazil, Russia, India, and China are continuing to escalate. Their populations are gaining increasing levels of buying power and associated quality of life and consumption desires.
- **Global connectivity.** Communications and computer system advances, as implemented through the pervasiveness of the Internet around the world, make it easy for global markets to find and demand modern products and services from global companies.

- **Increased geopolitical activity.** The governments around the world seek to ensure access to scarce natural resources. In addition, they intervene in the marketplace activities of global businesses when the safety or security of their nation's interests seems threatened.
- **Environmental and climate change.** The Earth's climatological environment is in flux. Issues such as changing ocean temperatures, global warming, and the movement of the jet stream have resulted in climate changes around the planet.

The question we attempt to provoke in our readers is, "What is your company doing to identify and manage the impacts of a transforming world on your supply chain?" In other words, are you looking to adapt and make changes to your supply chains today that will ensure a sustainable future for your company? It is in supply chain execution that business strategy becomes a reality. Supply chain management involves far-reaching implications for your organization's success, such as determining the following:

- Which goods and services to offer the market
- How to design product and service bundles that meet the market's needs and the company's financial expectations
- Which customers and suppliers to work with closely
- When to walk away from business and when to proceed
- How to structure activity within the company and with supply chain members for concerted action

We believe that the challenges presented to future supply chains and supply chain managers will continue to increase in frequency and severity over the next three decades (and longer). We also believe these will have serious implications for business and operations. Managers must prepare. As Coca-Cola discovered, the macrotrends that characterize our transforming world will require proactive solution seeking. Therefore, we not only explore the threats brought about

by change to the global commercial environment, but also provide general directions for how to prepare for these challenges and turn them into opportunities that can be exploited compared to competitors' efforts. The sustainable long-term success of your company may depend on it, just as the strength of the future global economy will depend on the thought leadership and innovation of today's supply chain leaders.

Part I

Global Macrotrends Impacting the Supply Chain Environment

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1

Supply Chain Management in the 21st Century

The world is changing and growing at rates and in ways unrivaled throughout history. These changes will test how far humans can push the Earth's limits. Businesses and their supply chains will similarly struggle under the strain of skyrocketing demand and erratic supply. This book illustrates that the companies most poised to handle these pressures in the future will be the ones best positioned to service customers—and turn a profit in the process.

In early 1983, 30 short years ago, China became the first nation on Earth to surpass one billion inhabitants. However, the Chinese automobile market at the time was disproportionately tiny in terms of both production and sales. Less than 1% of Chinese citizens owned a car, and most of those owned were old and dilapidated. Very few were purchased new, and the nation's domestic auto-manufacturing sector was essentially inconsequential in the scope of the global industry. At the time, owning an automobile was considered a status symbol for Chinese consumers, and the average citizen had little hope of ever having one of his or her own.

Halfway through the 1980s, though, China's new-vehicle demand exploded. Sales increased by over 600% in just 24 months as both the Chinese population and its rate of participation in world commerce grew exponentially. With dollar signs in their eyes, automakers scrambled to meet the nascent market's needs, but their attempts to supply the massive—and suddenly very enthusiastic—market were unexpectedly frustrating. In reacting to their own demand forecasts, which had always indicated little need to invest in Chinese distribution infrastructure, foreign automakers found themselves trapped in a relative state of helplessness. The makers' demand planners and decision

makers had long since decided that there was little market viability to be had within the foreseeable future. Their apathy, combined with an inadequate understanding of the Chinese market's financial and physical complexities, left the automakers totally unprepared.

Fast-forward to today: One in ten Chinese citizens owns a personal-use vehicle. Though low by world standards, this ownership rate represents a huge unitary increase in demand over the past three decades for manufacturers—and the growth continues to accelerate. China's auto demand has more than doubled since 2009. Manufacturers like Ford Motor Company are realizing that they must do business in China just to remain internationally competitive. Ford has found that its 400 Chinese dealerships aren't enough to even approach the current market potential. While the company's current strategic decision is to attempt to open two dealerships a week, the company struggles to fulfill consumer needs in the car-hungry Chinese market. The Chinese middle class is growing at never before anticipated rates, and demand for products like automobiles remains problematic due to difficulties in matching demand with supply. Such complexities can prevent foreign automakers like Ford from capturing Chinese demand while sustaining a profit.[1]

Half a world away, for a 53-hour period in 2011, the most populous county in the United States—Los Angeles—closed the world's most heavily traveled highway—the I-405—to add another lane. The move was part of a civil engineering initiative intended to dramatically alleviate highly congested and rapidly deteriorating road conditions in southern California. The construction project's forecasted impact on local life led to the dubious moniker "Carmageddon," reflecting a time when enormous traffic volumes would, if expectations were accurate, come to a grinding halt. Experts predicted the event would greatly impact both individual and commercial life. The 48-foot trucks carrying important supplies to California businesses, as well as the cars that were to carry customers to those businesses to shop, were expected to be delayed for up to a week or more, depending on how the construction project progressed.

[1] Priddle, Alisa. (6 May 2012). "Middle class eager to buy cars in congested China; automakers try to keep up with demand." *Detroit Free Press.*

In this instance, though, some companies were ready for the anticipated chaos, and a few actually thrived during the period of expected gridlock. Forward-thinking restaurants like Spumoni,[2] an Italian-style pizzeria in Newbury Park, anticipated that more residents would dine locally and overstocked its key inventories ahead of time. Showing similar farsightedness and heeding the California Trucking Association's advice, carrier Liberty Linehaul West ordered its truckers to leave 5 hours earlier than normal to make deliveries.[3] Though the expected nightmarish traffic conditions never really materialized, these companies' innovative and insightful leaders were able to adjust on the fly for the I-405 closure due to supply chain awareness. In this instance, by thoughtfully considering possible supply infrastructure failure and executing deliberately devised contingency plans, forward-thinking companies were ready for the commotion if it had occurred.

With proper precaution, most companies can survive an occasional, short-term disruption within their business ecosystem. But what happens if the cost and service implications of disruptions are more frequent or long-lasting? As booming populations continue to strain commercial infrastructures globally, Los Angeles may not be the only city forced to routinely address "Carmageddon"-like disturbances. In fact, many civil planners envision a day when road congestion and deteriorated conditions become the norm in even the wealthiest nations. Skyrocketing populations in countries like India and on continents like Africa mean that intricate demand fulfillment won't be limited to products like automobiles in countries like China. What Ford, Spumoni, Liberty Linehaul West, and even Coca-Cola illustrate is the importance of managing well-planned and effective supply chains in a rapidly transforming world. Due to abnormally accelerated, macro-level social and economic changes (macrotrends), many companies are struggling to align supply with demand. They cannot provide consumers with the necessary goods and services for affordable living.

[2] Khouri, Andrew. (28 June 2011). "Westside and Valley businesses are preparing for Carmageddon." *Los Angeles Times.*

[3] "Truckers cope with I-405 shutdown - Overdrive Magazine." (15 July 2011). *Supply Chain Review.*

We wrote this book for anyone interested in understanding how a collection of such macrotrends will impact industry over the next two decades and how modern supply chains will help stymie their side effects. We want to provoke future business leaders to think about critical supply chain issues beyond just the immediate opportunities and problems. Supply chain leaders need to consider future modifications to the global business environment that will affect their ability to provide end users with goods and services. Our collective experiences lead us to believe that far too often, modern companies' productivity measures force managers to obsess over issues that are imminently important but distract them from the type of visionary, futuristic thinking that leads to long-term, sustained marketplace advantages. A periodic approach is of course necessary to achieve the immediate objectives that propagate organizational survivability. But companies and managers who have greater prescience—whether their vision is of the next week, year, or decade—will be those best positioned to prosper *ad infinitum*.

Though we devised this book to be a thought-provoking primer for anyone concerned with how global trends will impact businesses and their supply chains, it has three primary audiences. The first consists of senior managers and executives who, through their visions and strategies, will set the course for how their businesses prepare for the challenges and opportunities the macrotrends will offer. A second audience consists of early-to-mid-career professionals who execute an organization's financial and strategic missions. These are the managers best positioned to keep our advice in mind within their natural career life cycles. The final audience is policy makers, because supply chain issues do and will influence cities', states', and even nations' competitiveness in the changing global marketplace. A wide range of readers interested in studying these macrotrends, and how they will impact society in unprecedented ways, should enjoy this book.

Our value proposition is simple: We compile and discuss cutting-edge research and reasons related to some hyper-accelerated transformations currently acting on our planet and its citizens. Most of this content draws on the most modern scholarship in fields such as economics, sociology, ecology, engineering, and hard sciences. We then integrate these viewpoints and connect their implications to what we

believe will be the most pressing issues businesses will face over the coming years. Particular emphasis is placed on how business processes that operationally balance supply with demand will be affected. Finally, we offer some concrete strategies that help companies mitigate the hindrances, if they are willing and ready to adopt a supply-chain-oriented perspective to the opportunities and challenges to be faced.

Our efforts concentrate most prominently on the global economic consequences of societal changes that will directly impact organizations as they strive to serve customers with optimal efficiency and effectiveness. The strategies presented here are drawn from many real-world examples, experienced firsthand or otherwise, to illustrate key points. We hope our shared experiences will stimulate actionable thoughts for professionals to act on as their careers progress. We also hope that a general awareness of these issues will motivate business leaders and citizens alike to rally around common solutions.

A Note on Futurism

Before proceeding, we want to provide an advisory note related to our subject matter's forward-looking perspective. While conducting our research, we became well acquainted with the emerging collection of event-forecasting quasi-sciences that can be colloquially called "futurism." Futurism can best be described as the use of science-based processes to predict future occurrences, usually by extrapolating past and present data and/or trends into the future. This led us to examine various progressive social and physical scientists' works within peer-reviewed journals. These works span many fields of interest and often are disseminated by prediction-focused organizations such as the World Future Society. Published critical evaluations of futurism have concluded that extrapolating past/current trends into the future, when done thoughtfully, yields generally reliable results. However, this is true only in proportion to the likelihood that the trends themselves are unlikely to deviate radically from established patterns.

By way of analogy, consider two props used in a popular science fiction TV show and movie decades ago. On the 1966 program *Star Trek*, producer Gene Roddenberry's depiction of a portable 21st century interstellar communication device is hauntingly similar to the Motorola cellular flip phone of the mid-1990s. Similarly, the holographic technology used to project Princess Leia's three-dimensional warning message in George Lucas's *Star Wars* must have seemed farfetched to contemporary viewers. Yet such communicative imagery has been demonstrated in lab settings in recent years. The original props were developed based on contemporary futurists' technological projections. The actualized objects, which appeared in the last two decades, emerged in slightly different configurations and were intended for somewhat different uses than the futurists had imagined, but they have in fact appeared. In fact, based on their most recent exhibitions, it would seem that the key distinguishing factors separating the movie and TV producers' projections of the future, and the eventual reality, were the specific form and time.

Our observations lead us to believe that many futurists are very good at what they do, and their predictions are often closer to "right" than "wrong" if enough time is allowed to elapse. Nevertheless, the science is somewhat inexact, and in concluding the analogy, our predictions made here indicate as much. Whenever possible, the calculations made herein to produce forecasts of the future were made based on simple "straight-line" extensions of current trend data. As a result of this technique, many of our predictions may seem to have nonsensical or perhaps even somewhat shocking implications. Our point is, you should understand that we did not assume that any of the relevant phenomena would accelerate, slow, shrink, or grow at a rate different from the current trend, unless there was a compelling and identifiable reason to believe otherwise. As is true for all forecasting models, such as those used to make meteorological and stock market predictions, some errors are expected. This problem has the potential to compromise or even someday invalidate our own estimations.

However, we also believe that our systematic analyses lead to some compelling conclusions that are both valid when approached in the right context and worthy of managerial consideration. By grounding our future business predictions in current scientific reality, we seek to minimize conjecture and try to focus on broad issues taking

place over more extended time frames. This keeps us from becoming mired in specific details related to when, where, and how while maintaining significant managerial relevance.

The Underpinnings of Supply Chain Management

If we were to ask a pool of business managers to define the term supply chain management (SCM), we would likely receive many different definitions. All too often SCM is confused with the notion of logistics, or mistakenly juxtaposed with an organization's procurement function.[4] In some companies, the supply chain is visualized and operated as a "chain" of companies that extends from the receiving dock's door back to the sources of raw materials. They think of it as an upstream pipeline through which the internal production process's necessary supplies flow. To such companies, SCM is simply a collection of company initiatives designed to influence these inbound material flows. Unfortunately, this definition proves to be overly limiting, for it fails to accurately describe the end-to-end, source-to-customer processes that lead to shareholder value and customer satisfaction. To remedy this issue, the Council of Supply Chain Management Professionals (CSCMP) has derived a "consensus" definition of SCM:

> Supply Chain Management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. In essence, SCM integrates supply and demand management within and across companies.

As can be deduced from this definition, supply chain management spans a broader domain than simply a single business's procurement

[4] For a clear distinction between "logistics" and "supply chain management," see Cooper, Martha C., Douglas M. Lambert, and Janus D. Pagh (1997). "Supply Chain Management: More Than a New Name for Logistics," *International Journal of Logistics Management*, Vol. 8, No. 1, 1–14.

or logistics functions, or the physical path from a firm's raw-materials providers to its inbound loading dock. In fact, limiting the organization's view of SCM to these functions and physical spaces has become a dangerous impediment to firm value maximization. Because of the confusion, many companies have failed to give SCM the attention in the boardroom that it often deserves. Considering the importance of supply chain management to solving tomorrow's problems, companies cannot continue to view it as a low-priority business function or simply a cost of doing business. Supply chain management offers a broader, more impactful means for navigating the major challenges and creating advantage for businesses that learn to leverage their muscle and influence.

In the lagging companies' defense, cutting-edge SCM thinkers understand that handling the supply chain is a complex endeavor that requires both cross-functional processes as well as managing relationships within and across the organizations that make up the source-to-consumer network. In top-flight companies, supply chain management simultaneously incorporates all the organization's business functions with the functions within partner organizations. The ability to maximize shareholder returns hinges on the focal organization's ability to put forward a comprehensive and integrated offering to customers dependent on fully coordinated, interfunctional activity. As the supply chain leaders of best-in-class companies such as Apple, Nike, Procter & Gamble, and Walmart often publicly attest, it is likely that no other business discipline will play as critical a role in the success or failure of companies throughout the remainder of this century.

In other words, we are entering an "*age of supply chain management*," where seamlessly integrated groups of organizations are uniting multiple functional efforts around a singular goal of delivering optimum value at the entire system's lowest landed costs. This proposition begs two questions. Why do such well-established companies view SCM as being so critical for future successes? Equally important, where the rubber meets the road, how are firms and functions integrated throughout the supply chain for SCM initiatives to deliver value?

To answer these questions, we rely on two conceptual frameworks that provide the foundation for our SCM views. The University of Tennessee's Demand-Supply Integration (DSI) framework, shown in Figure 1.1, addresses the "why." It proposes that the best supply chain companies, both now and in the future, are those whose driving mission is to perfectly balance customer demand with product and service supply. They do so through internal planning, external planning, and integrated processes. Anything less is viewed as either ineffective, creating customer dissatisfaction, or inefficient, creating waste. Adopting a DSI philosophy implies that businesses recognize that they must address what management guru Peter Drucker called the "great operational divide." This is the philosophical and operational chasm that often exists between the business enterprise's demand-fulfilling and supply-provisioning functions. Each of these traditionally has operated autonomously and with limited regard for the planning, goals, and structures of the other.

As shown in Figure 1.1, by uniting supply and demand planning efforts within and across organizations, relevant business function groups can share an aligned view of the necessary steps of creating shareholder value. On the supply side, DSI implies that companies must do a better job of identifying supply sources, with a focus on meeting customer requirements at an acceptable cost. On the demand side, the philosophy requires that demand must be "shaped," wherever possible, to coincide with supply market realities and opportunities. Furthermore, identifying a subset of customers—"customers of choice"—who can best be served profitably becomes paramount.

One electronics company executive indicated the following during a DSI interview session: "We make 110% of our profits on the first 40% of our customers." Thus, he is implying that the remaining 60% of the firm's customer base was actually served at a loss. Taking this statistic into account, it may have been better for the company not to serve them at all. Another electronics company found that it derived 90% of its profits from just 15% of its customers, indicating a more persuasive argument for selective engagement than even the 80/20 Pareto Rule. This rule suggests that 80% of revenues come from 20% of customers or products.

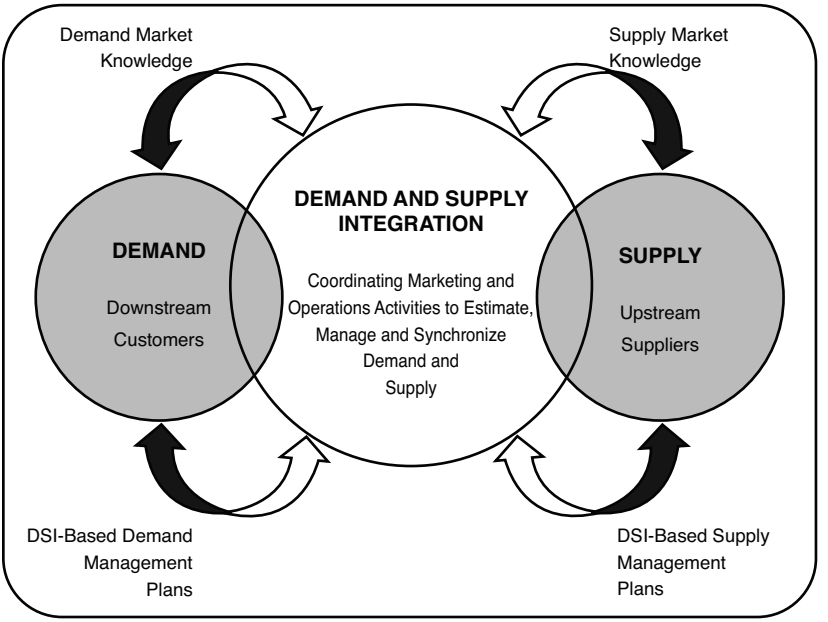

Figure 1.1 Demand-supply integration framework

What the DSI framework tells us, then, is that balancing demand with supply is the most critical philosophical direction a company can take when intertwining the goals of maximizing shareholder value and optimizing customer outcomes. This can happen only through fully integrated supply chain management that considers both sets of functional elements within and across formal organizations. It is reasonable to conclude, then, that the future of supply chain management hinges on demand and supply integration.

To address *how* firms integrate supply chain processes to attain maximum value, we rely on the Global Supply Chain Forum (GSCF) framework developed by researchers at The Ohio State University (see Figure 1.2). By collaborating with executives from leading global companies, the GSCF devised the architecture for managing supply chains. The GSCF framework breaks supply chain management into eight critical business processes that span an organization's functions. A multifirm, cross-functional team manages each of the processes, with input from all business functions, including procurement, production, finance, logistics, marketing, and research and development (R&D). As such, SCM is not a function, but rather an orientation for

managing the business and its relationships with external customers and suppliers. The eight business processes are as follows:[5]

- **Customer relationship management** (CRM) provides structure for how the relationships with customers are developed and maintained.
- **Supplier relationship management** (SRM) provides structure for how relationships with suppliers are developed and maintained.
- **Customer service management** (CSM) is the firm's face to the customer. It seeks to proactively address potential disruptions and service failures.
- **Demand management** (DM) balances demand and supply through planning and flexible accommodation.
- **Order fulfillment** (OF) includes all activities to design a supply chain network, plan for the delivery of orders, and execute logistics activities.
- **Manufacturing flow management** (MFM) includes all activities necessary to obtain, implement, and manage manufacturing flexibility and move products through the plants.

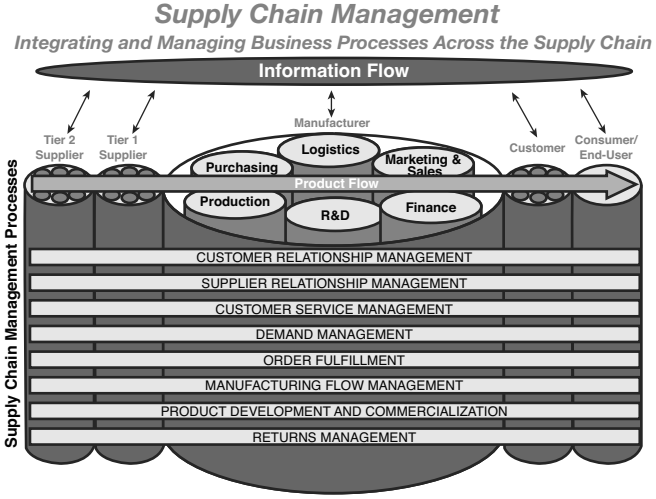

Figure 1.2 Global Supply Chain Forum framework

[5] Adapted from *Supply Chain Management: Processes, Partnerships, Performance*, 3rd Edition. D.M. Lambert (Ed.). (2008). Sarasota, FL. Supply Chain Management Institute.

- **Product development and commercialization** (PD&C) facilitates developing and bringing products to market jointly with customers and suppliers.
- **Returns management** (RM) facilitates the activities associated with returns, reverse logistics, gatekeeping, and avoidance such that customer complaints are reduced as problems with products and services are identified and remedied.

By integrating these processes across functional areas and organizational boundaries, firms optimize their ability to integrate supply and demand. For example, one major pet products manufacturer had been making and distributing a certain dog care product through a prominent retail chain when new circumstances forced the manufacturer to recall the product. Because the supply chain's manufacturing flow management and returns management processes were integrated across both the retailer's and manufacturer's business interface, the recalled goods were replaced almost immediately by the same manufacturer's secondary brand, which was deemed safe for animal consumption. Though the particular product was rightfully removed from store shelves, the incident resulted in nominal consumer impact and only minor losses in sales for the manufacturer and retailer. Such examples of cooperation and value creation across company lines underscore the value of a supply chain orientation, where companies effectively team up to address major opportunities and challenges.

The processes defined in the GSCF framework represent the methodology and processes that leading supply chain companies use to generate heightened value for the involved companies and the end customers they collectively serve. The driving theory of supply chain management is that working effectively as a team maximizes the profits and market capitalizations of the participating companies.[6] In essence, supply chain management is a "team sport." The macrotrends identified in this book are simply too big and complex for any single company to address on its own. The upcoming chapters

[6] Lambert, Douglas M. in *Supply Chain Management: Processes, Partnerships, Performance*, 3rd Edition. D.M. Lambert (Ed.). (2008). Sarasota, FL. Supply Chain Management Institute.

illustrate how the macrotrends will differentially impact the eight key business processes, as well as the supply chain as a whole.

What You Will Learn from This Book

The remainder of this chapter sketches the mission, methods, and roles of supply chain management in the modern business organization. Then it explains how the supply chain should react to leverage opportunities and countermeasure risks. We do so by integrating the DSI and GSCF concepts to achieve the best outcomes for companies seeking to compete in the transforming world. We juxtapose the two theoretical bases with our research predictions addressing the future of the business environment. The result takes the form of an organizing framework, as shown in Figure 1.3.

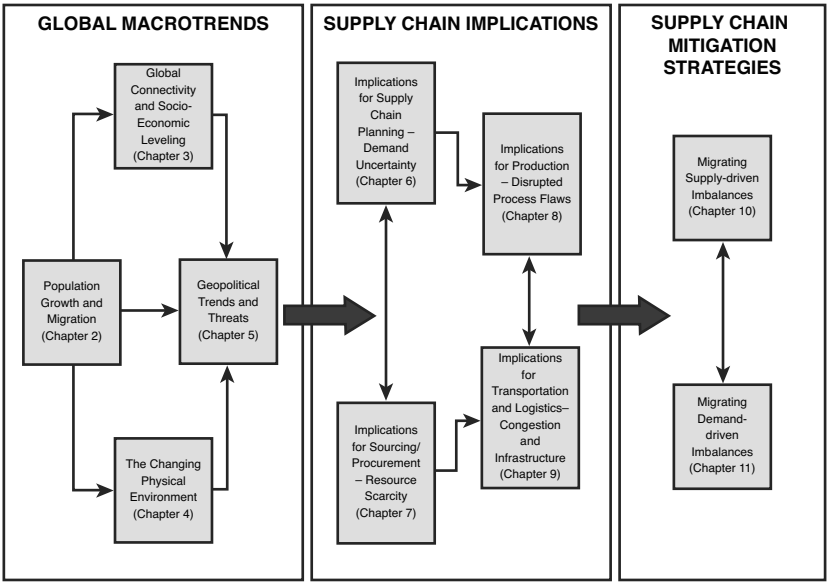

Figure 1.3 Organizing framework

Part I outlines four sets of intertwined macrotrends that are shaping supply chain management theory and practice. These forces are currently challenging business leaders' commonly held assumptions

related to both consumer demand patterns and companies' and industries' supply capabilities. Thus, our macrotrends framework emanates from the rapid and somewhat unpredictable sociological and economic changes presently occurring. These changes influence the demand for products and services that supply chains are designed to fulfill and, in addition, inhibit supply-side systems capabilities. We believe that ignorance of these factors will lead to great risk of failure in the future if the forecasted changes reach fruition and are not proactively addressed. We begin our analysis in Chapter 2, which focuses on how some identifiable changes in population growth and human migration are rapidly affecting global demand. There are more people on Earth than ever before, and they are relocating at an unprecedented pace, creating potential chaos for mostly static supply chain processes. This chapter unpacks the reasons for our current population dynamics and illustrates several common problems companies will face if they fail to proactively design their supply chains to accommodate such changes.

The immediate outcomes of population change are, of course, a primary concern for future business leaders and policy makers. Each of three subsequent forces represents a unique macrotrend in its own right, although it emanates from population change itself. Chapter 3 looks at the global population's increased interconnectedness and the economic leveling it will soon stimulate across world regions. The Information Age has spurred many great innovations and benefits for society, but the changes it has brought are also undermining the assumptions firms have traditionally made about demand market—the same assumptions that enable cost control in the supply chain. Likewise, Chapter 4 addresses the environmental, climatological, and sustainability-related issues that are already beginning to impact global demand and supply as more humans consume more resources. The environment has been damaged during the harvesting and collection of these resources. Not only are new consumer tastes swiftly beginning to reflect environmental conscientiousness, but these issues also are impacting the supply. Weather, climate, and their human reactions have already started to affect worldwide logistics practices. Chapter 5 concludes Part I by approaching a handful of political and governmental issues that may adversely impact demand and supply in the coming years. Here we focus on the potential regulations, market controls, conflicts, and interregional disputes that are projected

to impact global market competition. Such issues have the potential to create great supply chain inefficiencies for companies that fail to account for them in planning and supply chain operations.

Part II turns to the implications of the aforementioned forces on four selected, critical areas of supply chain functionality. Chapter 6 examines the effect of the macrotrends on the supply chain planning function. The four forces of interest can greatly disrupt supply chain planning by obscuring important information related to supply and demand quantities and assortments. They also can increase variation both geographically and in terms of rote quantity. Chapter 7 addresses the potential disruptions presented to firms' sourcing and procurement functions as a result of the combined macrotrends. Summarily, we anticipate that sourcing will become more complex as populations with different but homogenizing product expectations increase. This also will happen as the world's supplies of many key commodities become strained due to overuse and/or suboptimal location versus established supply networks. Chapter 8 considers the macrotrends' collective implications for production of goods and services. The diversity and migratory nature of populations, combined with geopolitical strains and leveling of purchasing power, could yield a confusing, complex, and disaggregated production process, such that ubiquitously favored lean strategies may not suffice. Alternative strategies are presented that should allow for more effective matching of customer needs to production outputs. Finally, Chapter 9 is concerned with the impacts on firms' transportation and logistics functions. A key focus is managing more complex networks with scarce assets and addressing the implications of issues such as fuel shortages and congestion on supply chain logistics costs and customer-facing metrics.

Part III describes strategies for mitigating the aforementioned problems' effects. Chapters 10 and 11 present two unique and compelling frameworks for analyzing and mitigating the resultant issues that will influence supply chains in the 2020s and beyond. Included within these chapters are strategies for allaying the risks of both supply- and demand-driven imbalances. We also discuss how failing to address these macrotrends holistically and proactively will influence the company's services, customers, financials, and, ultimately, vitality. We conclude with actionable initiatives for each set of imbalances so

that managers may begin to enact our recommendations immediately and be ready for the more distant issues on the horizon. The proposed initiatives should allow firms to develop a set of interconnected resource utilization and supply chain sustainability strategies that specifically address the problems we all will soon face.

Our message should resonate with managers and executives alike. When considered together, the identified macrotrends imperil world commerce, but it isn't too late to prevent such chaos; today's supply chains need to be adapted to take into account and prepare for tomorrow's issues. Our book aims to assist forward-thinking managers seeking to do just that.

Managing the Supply Chain to Mitigate Macrotrend Risks

Our primary mission is to illustrate how future supply chain managers need to address the growing risks associated with complex environmental factors that will impact future business. The good news? Modern managers are already getting better at dealing with supply chain risk as it occurs. What the Spumoni and Liberty Linehaul West stories tell us is that proactive companies can turn a potentially disastrous situation into a market opportunity with proper forethought and action. The story of Nokia offers another classic example. Nokia's supply chain managers were able to quickly bounce back in late 2000 after a fire damaged wafer inventory at their supplier's factory—which just so happened to fulfill rival Ericsson's demand as well. Nokia's fast action relative to Ericsson positioned it to grow at Ericsson's expense. Similarly, Toyota was able to recover relatively quickly in the aftermath of the 2011 Japanese tsunami and continue producing with only moderate hiccups. Nearly a decade ago, one major study found that a supply chain disruption could drop share prices by as much as 15%.[7]

[7] Hendricks, Kevin B. and Vinod R. Singhal. (2005). "An Empirical Analysis of the Effect of Supply Chain Disruptions on Long-Run Stock Price Performance and Equity Risk of the Firm," *Production and Operations Management*, Vol. 14, No. 1, 35–52.

With today's supply chains more visible than ever before to investors, it's hard to see how a company can afford to ignore potential disruptions we foresee on the horizon.

The differences between these examples and future outcomes are couched in orders of magnitude and event expectancies. The risks that supply chain managers face today pose only temporary threats that are relatively minor in magnitude (with a few exceptions). However, the future's "new norm" appears to encompass the permanent and systemic occurrence of what we would today classify as major threats. "Carmageddon" may soon spread through cities like the plague, and China won't be the only country that automakers struggle to service. These incidents are isolated today. Tomorrow, they will not be.

We believe that only firms that have painstakingly prepared for the macrotrends' long-term impacts will be sustainable. Effective supply chain management can save companies from the megatrends heating up in the global landscape, facing challenges with the help of models like DSI and GSCF as ways to separate from the pack of competitors. This will require attentive management of the eight GSCF processes, with consideration given to the shifts in the business environment we describe. Even those who have been successful in the past must realize that the rules are constantly changing. New threats will call for shifts in supply chain strategies and practices. The remainder of this book outlines the future of supply chain management as we see it. It also provides details on how to develop the necessary strategies for your organization to flourish in light of unprecedented global business transformation.

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