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SUPPLY CHAIN MANAGEMENT

A Logistics Perspective



Coyle • Langley • Novack • Gibson

Supply Chain Management

A LOGISTICS PERSPECTIVE



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Dedication

A very special note of thanks and appreciation is due to our families. John Coyle would like to thank his wife Barbara, their children John and Susan, and their grandchildren Lauren, Matthew, Elizabeth Kate, Emily, Ben, Cathryn, and Zachary. John Langley would like to thank his wife Anne, their children Sarah and Mercer, and their grandchildren Bryson, Molly, and Anna. Bob Novack would like to thank his wife Judith and their children Tom, Elizabeth, and Alex. Brian Gibson would like to thank his wife Marcia, son Andy, and his longtime mentor Dr. Bob Cook (1947–2014).

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The authors of Supply Chain Management: A Logistics Perspective would like to express their sincere appreciation and respect for the many contributions made to this text by Dr. John Coyle, Professor Emeritus of Logistics and Supply Chain Management at The Pennsylvania State University. The first edition was published in 1976 by Dr. Coyle and co-author Dr. Edward J. Bardi. Looking back at the preface to that first edition, the first sentence reads: “Business logistics is a relatively new field of study in business administration.” While this discipline has grown in many ways over many years, we find that excellence today in areas such as supply chain and value chain are heavily dependent on sound planning and execution in the area of logistics. In fact, the subtitle of this text was carefully crafted to underscore the importance of logistics as a key element of supply chain management. It has been a great privilege for the authors of this text to have had the opportunity to work in close quarters with Dr. Coyle to provide a textbook that hopefully has been and will continue to be valuable to students, professors, and industry practitioners who have relied on our book as a useful resource. Also, the authors wish to express special recognition to John’s wife, Barbara, who has had “up close and personal” involvement with these first 10 editions of Supply Chain Management: A Logistics Perspective. In appreciation for her support of our collective writing effort, we would like to bestow on Mrs. Barbara Coyle the title of “Honorary Author” of this 10th edition.

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Preface

The publication of the 10th edition of this text, *Supply Chain Management: A Global Logistics Perspective*, in the spring of 2016 will mark the 40th anniversary of the first edition. While the original edition was titled *THE MANAGEMENT OF BUSINESS LOGISTICS*, the title and content changes made to the original text over the course of that 40 year period reflect the dynamic happenings in the United States and other countries throughout the world. If we had predicted drones making deliveries, 3-D printing replacing inventory, robots filling orders in warehouses and modern mobile phones for shopping in 1976, we may have been committed to an appropriate institution or accused of writing science fiction. Albeit, in this edition these developments plus numerous others are given coverage and acceptance with an explanation of their impact on global economies and specifically the logistics and supply chain systems of many businesses in the twenty-first century. The World has changed dramatically, especially the business environment, which has been described by some pundits as a “white water” world. You had to “fasten your seat belt” and put on your protective “helmet” to survive the tumultuous changes and fast pace of the last 40 years. Through it all, logistics and supply chain management played an increasingly important role to improve organizational efficiency, effectiveness, and competitiveness.

In 1976, some individuals suggested that the United States was destined to become a second class economic power and would be surpassed by Japan, West Germany and others in the highly competitive, global marketplace for producing products and services. The U.S. economy was in the “doldrums,” but the seeds of change were being sowed. The first important change was the deregulation of major elements of the transportation system in the United States that occurred over a several year period in the late 1970s and early 1980s. The net result of deregulation was that the purchase and sale of transportation services became similar to the selling and buying of other goods and services with limited government oversight. The more competitive prices spurred economic activity by lowering the cost of goods sold and helped to make U.S. products more competitive in domestic and global markets. The subsequent deregulation of the financial and communication industries contributed to additional economic vitality in the 1980s as pointed out in Chapter 1.

Globalization, technology, and more informed consumers also influenced and changed the dynamics of the U.S. economy in the 1990s (discussed in more detail in Chapter 1). A critical ingredient for all the changes and the resurgence of the U.S. economy was the development of efficient and effective supply chains by many organizations as well as logistics and supply chain service providers (3PLs) that contributed to the growth of the U.S. economy and its global presence throughout the world. It was an amazing set of changes that we hope have been adequately reflected in the various editions of this text over the previous 40 years (hence the content and title changes noted above). Global organizations learned that lean, fast, agile, and flexible supply chains were a requirement of the twenty-first century where economic swings would likely be quicker and of shorter duration than in the past. Adaptability and readiness were also ingredients for continuing growth and profitability.

Another important lesson for success was a recognition that “finance” had to be a common language for supply chain executives because that was the basic language of the boardroom. EPS, ROA, ROI, cash flow, and shareholder value had to be embraced by supply chain executives in reporting their contributions to the success of the organization. These were the metrics the executive board would use to evaluate performance. While order cycle time, inventory turns and order

fill rates could be used as internal metrics for judging supply chain and logistics performance, they had to be translated into terms that resonated well with executive management.

Recognizing the fast paced change that has continued into the twenty-first century and the criticality of efficient and effective supply chain management, the authors have attempted to reflect these dimensions in the 10th edition of this text with new content and some reordering of the topics to improve the flow of material.

Part I-Supply Chain Foundations

This section of the text provides a framework for an appreciation and understanding of supply chain management as it developed and expanded to meet the challenges of the last 30 years. Chapter 1 provides an overview of the role and importance of supply chain management in the twenty-first century. This is followed by Chapter 2 that has been added to explore the global issues of the twenty-first century among the various countries of the world with an in-depth look at demographics. Chapter 3 explores the important dimensions of logistics management in support of global supply chain challenges. This provides due recognition to the critical role played by logistics as the backbone of supply chains. The final chapter in Part I, Chapter 4 explores the challenges of supply chain design in a traditional sense, as well as in the rapidly-emerging context of omni-channel distribution.

Part II-Supply Chain Fundamentals

The underlying fundamentals of supply chains can be visualized in the so-called SCOR® Model that provides a solid conceptual view of the key ingredients of a supply chain. The content of this section continues in the spirit of the SCOR® model, with each chapter exploring one of the critical components of the model. Strategic sourcing is the topic for Chapter 5 with consideration being given to sourcing materials and services. In this era of outsourcing, the strategic global procurement of goods and services has taken on increased importance and relevance. The focus of Chapter 6 is on operations. Efficient and effective operations in manufacturing and related areas such as maintenance are of great significance in the supply chain. Chapter 7 in this section examines the outbound-to-customer needs and requirements to add value for customers. The fourth and final Chapter 8 in this section considers customer service and order management with emphasis on measurement and financial impact.

Part III-Cross-Chain Logistics Processes

This section takes an in-depth look at the major supply chain process areas that are essential to achieving the objectives of customer order fulfillment. Referred to as “cross-chain logistics processes,” these areas of competency are major contributors to the successfully executing the delivery of raw materials, components, and finished processes, consistent with requirements. To provide useful insight and perspectives on this topic, Chapter 9 focuses on contemporary and futuristic approaches to managing inventory in the supply chain. Chapter 10 highlights the role of distribution as a key supply chain responsibility and Chapter 11 provides broad coverage of the importance of transportation as a key element of overall supply chain success.

Collectively, the successful execution of these processes contribute significantly to achieving the promise of the efficient and effective supply chain by ensuring that customers receive the right product in the right quantities at the right place, right time, and at the right cost. Customers will therefore be satisfied and the order-to-cash flow should be maximized. While seemingly not as “glamorous” to some as other aspects of supply chain management, they are nevertheless an essential components of successful supply chains.

Part IV—Supply Chain Challenges and Future Directions

Part IV examines the strategic issues that face supply chain managers as organizations strive to remain competitive in the global economy. One of the issues is that of supply chain alignment which has been receiving increasing attention by supply chain professionals and academics. Covered in Chapter 12 is the need for alignment on both internal and external perspectives because of the need for collaboration among supply chain participants. Chapter 12 also provides useful information regarding the role of third party providers of logistics services, and how they may contribute to desired degrees of alignment among members of the supply chain. Chapter 13 provides insight into the important areas of performance measurement and financial analysis that are so critical to successfully executing today's supply chain responsibilities. The topic of technology is examined in Chapter 14 because of its increasingly critical role in achieving supply chain success. Not only are supply chain technologies important to the functioning of supply chains and the organizations that are involved, but they have become key contributors to creating customer value and making significant contributions to the success of overall organizations. In short, it has become apparent that the use of capable technologies has become a very important change agent to help deal with the increasing pressures faced by supply chains. Last, Chapter 15 provides an insightful look at some of the governing principles of supply chain management, and how they continue to evolve and remain current in the fast-changing world of supply chain management. This concluding chapter also provides in-depth commentaries on several topics that are of great contemporary and future interest to achieving the goals of supply chain management and overall business success.

Features

- Learning Objectives at the beginning of each chapter provide students with an overall perspective of chapter material and also serve to establish a baseline for a working knowledge of the topics that follow.
- Supply Chain Profiles are the opening vignettes at the beginning of each chapter that introduce students to the chapter's topics through familiar, real-world companies, people, and events.
- On the Line features are applied, concrete examples that provide students with hands-on managerial experience of the chapter topics.
- End-of-chapter summaries and study questions reinforce material presented in each chapter.
- Short cases at the end of each chapter build upon what students have learned. Questions that follow the cases sharpen critical thinking skills.

Ancillaries

- The website contains three essential resources:
- The Instructor's Manual includes chapter outlines, answers to end-of-chapter study questions, commentary on end-of-chapter short cases and end-of-text comprehensive cases, and teaching tips.
- A convenient Test Bank offers a variety of true/false, multiple choice, and essay questions for each chapter.
- PowerPoint slides cover the main chapter topics and contain graphics from the main text.

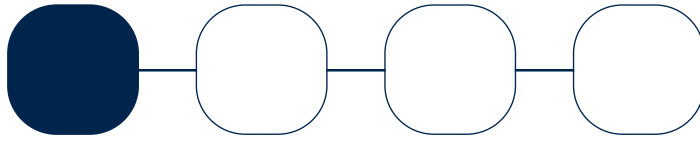
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Part I

This section of the text provides a framework and overview to provide an appreciation, some insights and an understanding of supply chain management as it expanded and developed over the course of the last 30 years. This part of the text has been updated and revised again to better reflect the authors' view of the dynamic happenings of the 21st century for global supply chains. Companies and other organizations will need to navigate the associated challenges to achieve efficiency and effectiveness while executing to meet the expectations of their "customers."

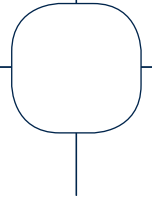
The first chapter provides an overview of the role and increasing importance of supply chain management in today's tumultuous environment. This chapter explores the external forces impacting global supply chains and the major challenges and issues in the 21st century. The chapter also provides an overview of the basic tenets of supply chain management and its development.

The second chapter covering the global dimensions of supply chains has been repositioned in the text and expanded to explicate more fully the complexity of the global demographic and economic issues that will continue to impact global supply chains. Effective response to these global dynamics will be critical for survival.

Chapter 3 discusses and explores the dimensions of logistics management and its importance to the proficiency of global supply chains. The role of logistics as the "backbone" for world class supply chains is examined and explained.

Chapter 4 has been repositioned in Part I and expanded to include an analysis and discussion of omni-channel distribution and the related network design. This is an important issue and growing challenge for many supply chains as they respond to the needs of today's demanding and technology savvy consumers.

Chapter 1



SUPPLY CHAIN MANAGEMENT: AN OVERVIEW

Learning Objectives

After reading this chapter, you should be able to do the following:

- Explain how efficient and effective supply chains can improve customer fulfillment and cash flow.
- Discuss the development and shaping of supply chains in leading organizations and understand their contributions to their financial viability.
- Appreciate the important role of supply chain management among private as well as public or nonprofit organizations.
- Understand the contributions of supply chain management to organizational efficiency and effectiveness for competing successfully in the global marketplace.
- Explain the benefits that can be achieved from implementing supply chain best practices.
- Understand the major supply chain challenges and issues faced by organizations currently and in the future.

Supply Chain Profile

SAB Distribution: The Final Chapter

SAB was established as a classic, middle-of-the-supply chain organization since it purchased consumer products from major manufacturers such as Kraft, Kimberly-Clark, Procter & Gamble (P&G), Unilever, and others and sold them to smaller distributors, wholesalers, and retailers. When Susan Weber assumed the role CEO of SAB in 2010, she knew that in spite of several major changes, its continued survival depended upon the company reexamining its role in various supply chains and making appropriate strategic and tactical changes.

COMPANY BACKGROUND

SAB Distribution was established in 1949 in Harrisburg, Pennsylvania, by three World War II veterans (Skip, Al, and Bob) who had served as navy supply officers. Harrisburg was selected because of its central location in the mid-Atlantic region and because of its access to rail and highways for suppliers and potential customers. The founders of SAB recognized the need for a consumer products wholesaling company to serve medium- and small-size retailers within a 200-mile radius of Harrisburg. The company grew and prospered in subsequent years. The company was incorporated in 1978, and a CEO, Pete Swan, was appointed in 1980 when the founders retired. SAB's market area expanded into nearby states, such as New York, New Jersey, and Delaware, and its product line expanded from nonperishable food products to include perishables and nonfood consumer products. Sue Purdum took over from Pete Swan in 1995 when the company was facing major competitive challenges that could have led to the sale of the company, but she "navigated" the company successfully. Susan Weber assumed the CEO role with the full knowledge that significant change was necessary if SAB was to continue to survive as a profitable organization. Essentially, SAB needed a transformation in the scope of its activities.

CURRENT SITUATION

SAB is faced with a number of challenges to its future existence. First and foremost, many of its customers compete against large retailers like Walmart that can buy directly from the same consumer product manufacturers as SAB, with no "middleman." Walmart's buying advantage had to be offset in some way to keep SAB's customers competitive. In addition, globalization was affecting SAB's business because of an increase in imported products for the more diverse population of the United States and the ongoing search for lower-priced alternatives. The net effect was a much more complex and competitive business environment with more potential volatility.

When Sue Purdum assumed the role of CEO in 1995, she analyzed the competitive environment and understood the need to change to SAB's business practices. She focused upon efficiency in warehouse operations, improved fulfillment, and developed partnerships with a core group of motor carriers. Finally, she invested in information technology. The net effect of these changes lowered the cost of doing business for SAB's customers and enabled them to be more competitive. It was a win-win since SAB also became more efficient and effective as well as more profitable.

Initially, Susan Weber followed the lead of Sue Purdum, but she knew that she had to transform the company to attract large retailers as customers. Their current customers were losing market share to the larger retailers which negatively impacted SAB's profitability.

Susan Weber realized that the large retailers outsourced part of their logistics operations to third-party logistics companies to lower their cost of doing business. Given SAB's proficiency in logistics, she believed that there were opportunities for SAB to eliminate duplicative echelons in those supply chains. For example, between a producer's plant and a retail store, there were often three or more distribution locations where products were stored and handled.

The SAB managers recognized the challenge of Susan Weber's assessment of their competitive market but also the opportunities associated with the changes that she outlined. After five years of Susan Weber's leadership, SAB attracted five large regional retail chains in the Northeast and developed a distribution park for warehousing, a transportation hub, and a call center near Scranton, Pennsylvania.

The new distribution park allowed SAB to expand their value-added services to customers by providing third-party logistics services (warehousing and inventory management, order fulfillment, delivery and special packaging).

SAB hopes to attract additional regional chains such as Wegman's. A focus for their new distribution park is fresh fruits, vegetables, and other perishable food items, commonly referred to as the cold supply chain. SAB's success with their distribution park has caught the attention of several other companies who are planning similar operations along the eastern seaboard.

Recently, Susan was informed by a daughter of one of the founders of SAB that the family had been contacted by a representative of a major investment group that wanted to buy the family's share of the stock (65%) and take the company private. The potential buyout had major implications for Ms. Weber and her valued employees. She felt that SAB could survive in the current environment, but she would have to present a plan to the family owners that would convince them to maintain their current ownership position. As you read this text, consider how SAB could address the challenges of their current environment including: (1) cost pressure; (2) having a responsive/demand driven supply chain; (3) supply chain visibility; (4) more collaborative supply chain relationships; and (5) improved information flow and data analytics.

1-1 Introduction

The first decade of the twenty-first century was a period of rapid change for most organizations, especially businesses. That rate of change has not slowed down, and the second decade has been more volatile than previous years. The external forces of change require organizations to be much more nimble and responsive; that is, organizations need to be able to change and/or transform themselves to survive in the intensely competitive, global environment. The SAB case is a good example of this survivor mode which forces companies to transform. SAB would have been driven out of business in the 1990s if it had not changed, and it now faces an even more daunting challenge, which will necessitate still bigger changes.

Several quotes cited in a previous edition of this book are still apropos. They are as follows:

“Change is inevitable, but growth and improvement are optional.”¹

“When the rate of change outside the organization is faster than inside, the end is near.”²

Susan Weber, CEO of SAB, understands the wisdom of these comments and the need to collaborate with their customers. The rationale for SAB to change can be made by comparing the top retail establishments in 2000, 2010, and 2014 (see Table 1.1). One could argue that most retailers are essentially supply chain companies since they buy products produced by others and sell these same products to their customers. While other factors such as merchandising, pricing, store location, and layout are very important, supply chain management and logistics are key ingredients for success in today's highly competitive global environment.

Table 1.1 Leading Retailers (Sales/Year)

2000	2010	2014
1. Wal-Mart	1. Wal-Mart	1. Wal-Mart
2. Kroger	2. Kroger	2. Kroger
3. The Home Depot	3. Target	3. Costco
4. Sears, Roebuck & Company	4. Walgreen	4. The Home Depot
5. Kmart	5. The Home Depot	5. Walgreen
6. Albertson's	6. Costco	6. Target
7. Target	7. CVS Caremark	7. CVS Caremark
8. JC Penny	8. Lowe's	8. Lowe's
9. Costco	9. Best Buy	9. Amazon.com
10. Safeway	10. Sears Holdings	10. Safeway

Source: National Retail Federation (NRF) <https://nrf.com/resources/annual-retailer-lists/top-100-retailers>

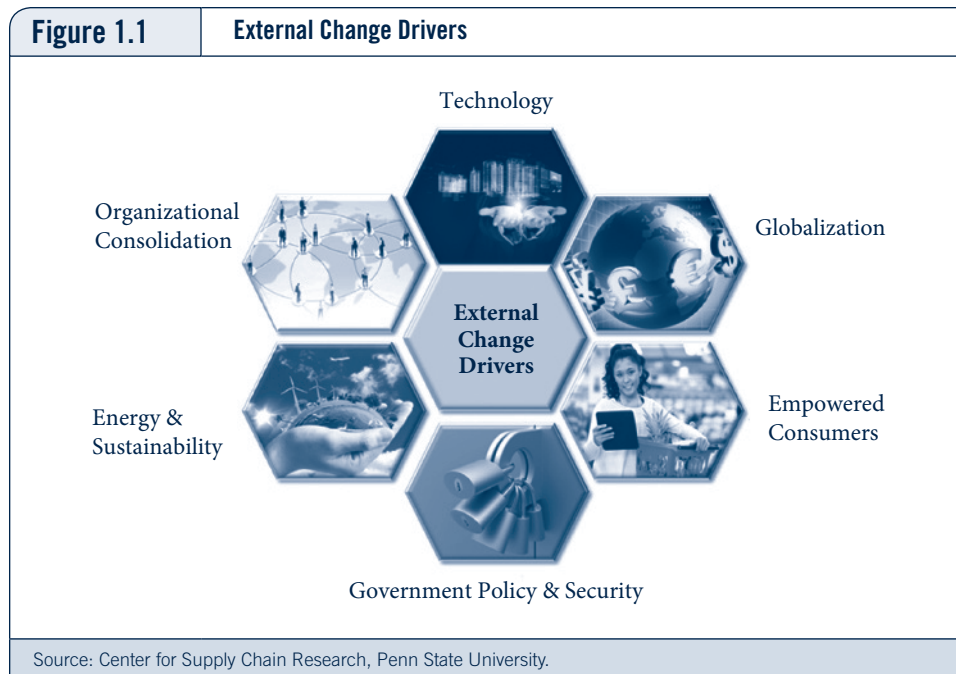
Susan Weber (CEO, SAB) appears to comprehend the potential role that supply chains can play in making retail organizations successful. She also seems to understand that the dynamics of today's global environment requires thinking "out of the box." Table 1.1 demonstrates the forces of change and the need to adapt with the shifts which have occurred. In 2010, five of the top 10 retailers of 2000 are not on the list anymore with the caveat that Sears and Kmart were merged. Note that Sears and Kmart were #4 and #5 in 2000, but after the merger, the combined company was #10. Four new companies were on the 2010 list. In 2014, two new companies (Amazon and Safeway) joined the top 10 while Sears and Best Buy were eliminated. Amazon's appearance on the list is most notable because of their business model with no stores. Amazon's impact will be the basis of discussion in following chapters.

At this juncture, an examination of the major external forces or change drivers shaping supply chains is appropriate to examine their impact on various organizations and their supply chains.

1-2 Shaping the Supply Chains of the Twenty-First Century: Evolution and Change

The dynamics of the global environment changed dramatically during the 1990s, and organizations had to adapt to these changes or perish. Unfortunately, there were a number of casualties along the way. Some previously successful companies did not survive in the more competitive global marketplace because they did not adapt and change. Leading companies such as Westinghouse, Bethlehem Steel, and RCA are no longer in business. Currently successful leaders such as IBM, General Electric, and McDonald's are struggling to survive as they try to make appropriate changes in their business models. Some individuals argue that an appropriate business mantra should be "disrupt or be disrupted" which may be a way of stating an older axiom, "think outside the box".

Five major external forces are driving the rate of change: globalization, technology, organizational consolidation, the empowered consumer, and government policy and



regulation. (See Figure 1.1) The confluence of these factors in the twenty-first century has dramatically changed the economic landscape and provided an opportune business climate for the development of global supply chains and supply chain management.

1-2-1 Globalization

Globalization was the most frequently cited change factor by business leaders, and it replaced the post-World War II Cold War as the dominant driving force in world economics. The concept of the global marketplace or the global economy took on a special meaning for all enterprises (profit and nonprofit; small, medium, and large; products or services) and for individual consumers in the 1990s and the first decade of the twenty-first century. Globalization led to a more competitive economic and geopolitical environment which resulted in opportunities and threats both economic and political. Some individuals have argued that there is no “geography” in the current global environment (figuratively speaking) or, perhaps more aptly, that **time** and **distance** have been compressed. For example, companies seeking to rationalize their global networks ask such questions as: (1) Where in the world should we source our materials and/or services? (2) Where in the world should we manufacture or produce our products or services? (3) Where in the world should we market and sell our products or services? (4) Where in the world should we warehouse and distribute our products? (5) What global transportation and related service alternatives should we consider?

Some important issues or challenges for supply chains in the global economy are more economic and political risk; shorter product life cycles; and the blurring of traditional organizational boundaries. All three deserve some discussion.

Supply and demand have become more volatile for a number of reasons. Acts of terrorism, for example, the ISIS attacks in the Middle East and pirates attacking cargo ships,

have serious implications for the flow of commerce. Companies have put security measures in place to protect their global supply chains and to act quickly to offset challenges to their supply chains which has increased their cost, but the risk is ever present. Natural catastrophes such as hurricanes, floods, typhoons, and earthquakes have become more problematic because of climate changes and because they pose a very significant challenge for global supply chains. Challenges to supply and demand are usually exacerbated in number and severity by the distances involved, which necessitates risk mitigation strategies.

It has been argued that an interruption or disruption to a supply chain that cuts off the flow of information and products is analogous to a “heart attack” that cuts off the flow of blood to the heart. Like a heart attack, supply chain disruption can have lasting effects. The global supply chains of the best companies must be adaptive, resilient, and responsive to meet the challenges of the global economy and develop mitigating strategies for disruptive forces.

Shorter product life cycles are a manifestation of the ability of products and services to be duplicated quickly. Technology companies are particularly vulnerable to the threat of their new products being reengineered. However, almost all products in the highly competitive global environment are faced with this issue. From a supply chain perspective, shorter product life cycles present a challenge for inventory management. Products that are duplicated will most likely face a faster reduction in demand and require new pricing policies, both of which present challenges to effective inventory management. The risk of obsolescence as new products are developed is another challenge for inventory management. It also means continually developing new products or reconfiguring old products to maintain market share. The rate of development and change in technology is particularly disruptive to existing enterprises and has led to the demise of some.

The blurring of traditional organizational boundaries is the result of companies having to adjust or transform their business model or the way that they do business in the more competitive global economy. For example, to maintain financial viability (read profitability), companies may outsource activities and processes to another company that can provide what they need more efficiently and hopefully more effectively. They may also add to their current operations or services to provide additional value for customers. SAB followed this strategy to retain and add customers.

Outsourcing is not new. No organization is completely independent. The competitiveness of the global environment, however, has increased the scope of outsourcing both domestically and globally. As previously mentioned, companies need to analyze how they do business in order to stay competitive and financially viable. Nike, for example, outsources all of its manufacturing and has done so for many years. Many automobile and computer manufacturers outsource components or parts that they need for finished products as well as logistics related services. From a supply chain and logistics perspective, the growth in outsourcing is noteworthy because it increases the importance of effective and efficient supply chain management because supply chains are longer and more complex.

A strong compliment to the growth in the global economy has been the growth and development in the technology related to supply chains. Mention has been made of time and distance being compressed, and technology has certainly played a major role in making this happen. Technology will be discussed as the next external change factor. It should be noted that some organizations think that technology has become a more important driver of change than globalization.

1-2-2 Technology

Technology has had a major impact on supply chains as a facilitator of change as companies have transformed their processes. However, it is also a major force in changing the dynamics of the marketplace. Individuals and organizations are “connected” 24/7 and have access to information on the same basis via the Internet. Search engines, such as Google and others, have made it possible to gather timely information quickly. We no longer have to wait for information to be “pushed out” to us; we can “pull” information as we need it. Vast stores of data and information are virtually at our fingertips. Social networks such as Facebook or Twitter are playing an ever increasing role in business organizations and influence supply chains because of their impact on customer demand and the speed of information transfers. Some individuals have argued that another relevant mantra for businesses in the twenty-first century is “twitter and tweet or retreat.” Many companies see opportunities to “data mine” the social media to uncover demand related information for improved forecasting and marketing. As will be discussed in more detail, “cloud computing”, is more than a “buzz word” and is revolutionizing information systems.

Technology has allowed individuals and smaller organizations to connect to the world’s “knowledge pools” to create and establish opportunities for collaboration in supply chains. Outsourcing to the less-developed countries was enhanced by technology. Collaboration opportunities with individuals and companies throughout the globe have increased which has created market opportunities as employment opportunities increased. Technology has spawned the development of Uber, Airbnb, and other such organizations which have disrupted their respective marketplaces.

Susan Weber, as SAB’s new CEO, will have to more fully exploit the opportunities presented by technology both on the procurement side of business and in marketing products to customers. Her predecessor used technology to improve internal processes, for example, warehouse operations and order fulfillment as well as transportation carrier collaboration. SAB will need to focus more externally with information technology to improve overall supply chain efficiency and effectiveness.

1-2-3 Organizational Consolidation and Power Shifts

After World War II, product manufacturers became the driving force in supply chains. They developed, designed, produced, promoted, and distributed their products. Frequently, they were the largest organizations in the supply chain in terms of sales volume, employees, buying power, locations, and other factors. They typically exerted their influence throughout the supply chain often to their specific economic advantage, especially in the distribution of their products.

During the 1980s and especially the 1990s, a significant change occurred as retail giants such as Walmart, Sears, Kmart, Home Depot, Target, Kroger, McDonald’s, etc., became powerful market leaders and engines for change. While other retailers are not as large as Walmart, their size and economic buying power have also increased significantly. An important aspect of the economic power shift toward the retail end of the supply chain is that many consumer product companies find that 15 to 20 percent of their customers account for 70 to 80 percent of their total sales.

Large retailers were accorded services such as scheduled deliveries, “rainbow” pallets (mixed arrays of products or stock-keeping units [SKUs]), advance shipment notices (ASNs) shrink-wrapped pallets, etc. These services allowed retailers to operate more efficiently and often more effectively and provide scale economies to the producers which was