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CHAPTER 1 SUPPLY CHAIN MANAGEMENT: AN OVERVIEW

LEARNING OBJECTIVES

The major objectives of this chapter are:

- 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 form implementing supply chain best practices.
- Understand the major supply chain challenges and issues facing organizations currently and in the future.

CHAPTER OVERVIEW

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 rise of Amazon in recent years has represented one of the most pervasive changes ever in the retail sector and is certainly an exceptional example of a disruptive innovation.

Shaping the Supply Chains of the 21st Century: Evolution and Change

The rate of change has accelerated, both in U.S. domestic business and globally. A key to understanding how to respond to this change is to gain a perspective on the forces of change.

Globalization

Many believe that globalization has replaced the "cold war" of the post-World War II era as the driving force for world economics. Beginning in the 1970s, U.S. firms began procuring more globally. Firms started asking:

- Where in the world should they source?

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- Where in the world should they manufacture?
- Where in the world should they market their products?
- From where in the world should they warehouse and distribute?
- What global transportation strategies should they utilize?

Some important issues or challenges for supply chains of the global economy are: (1) more volatility of supply and demand, (2) shorter product life cycles, and (3) 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 in place security measures to protect their global supply chains. Visit the webpages for the Department of Homeland security and Transportation Security Administration to see how their activities can impact the Supply Chain

Natural catastrophes such as hurricanes, floods, earthquakes, etc., have become more problematic because of the scope and extent of global trade; therefore, they pose a significant potential problem.

Longer-run issues of supply and demand also arise with the global competition of sources of supply and markets. The global supply chains of the best companies must be adaptive and resilient to meet the challenges of the global marketplace.

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, with life cycles as short as 18 months.

To maintain their profitability, companies may have to outsource some parts of their operation to another domestic or global company that can provide what they need more efficiently and hopefully maintain the same quality.

Outsourcing has been going on for some time. From a supply chain and logistics perspective, the growth in outsourcing increases the importance of effective and efficient global chains which are more complex and challenging.

Discuss the concept of "Core Business," or concentrating on what the company does best and outsourcing the rest. A brief discussion of 3PLs may be appropriate here as well.

Technology

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.

The speed and availability of information over the Internet has caused consumers to be much more aware of delivery cycles and to have a greater desire for instant gratification.

Social networks such as Facebook or Twitter are playing an ever-increasing role in business organizations and influence supply chain because of their impact on customer demand and the speed of information transfers. Some

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individuals have argued that another relevant mantra for businesses in the 21st 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.

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.

Organizational Consolidation

After World War II, manufacturing became the leading driver of supply chains. As markets became more fragmented and competitive, these manufacturing firms sought advantage through logistics excellence. Retail giants such as Walmart, Sears, Kmart, Home Depot, Target, Kroger, McDonald's, and other Big Box Store chains have become powerful market leaders in driving logistics change.

The importance of the consolidation and power shift is that the large retailers are accorded special consideration from consumer product companies. The value-added services that these retailer demand allows them to operate more efficiently and often more effectively. The scale of the retailers can also provide possible economies (read cost savings) to the producers of the products but may also add complexity.

The Empowered Consumer

The impact of the consumer is much more direct for supply chains because the consumer has placed increased demands at the retail level for an expanded variety of products and services. The implementation of an omni-channel distribution strategy by large retailers is an excellent example of a current strategy made feasible with technology that is having a major impact on marketing sales at the retail level. Today's consumers are more empowered by the information they have at their disposal from the internet and other sources.

The internet enables buyers to expand their buying alternatives and quickly make comparisons before they purchase. The omni-channel distribution option provides additional flexibility.

The demographics of our society with the increase in two-career families and single-parent households have made time a critical factor for many households so demand quicker response times and more convenient offerings according to their schedules.

Government Policy and Regulation

The fifth external change factor is the various levels of government which impact businesses and their supply chains. The deregulation of the 1980s and 1990s included transportation, communications, and financial institutions.

Now that domestic transportation is deregulated, it has become possible for transportation services to be purchased and sold in a much more competitive environment. New carriers

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entered the marketplace while other sectors of transportation underwent consolidation through mergers and acquisition. Many service providers are offering logistics services companies and offer an array of related services that can include order fulfillment, inventory management, warehousing, etc.

The financial sector was also deregulated at the federal level and this has fostered changes in how businesses can operate. The deregulation of financial institutions fostered changes in how businesses can operate with respect to cash flows, purchasing cards and short-term investments. The changes made organizations more cognizant of the role that supply chain management could play with asset efficiency and cash flows. The communications industry was also made more competitive and like the other two industries discussed earlier, the communications industry has undergone much change and has become part of the information revolution with a number of other "players" including cable companies, Internet companies, etc. Communications efficiency and effectiveness have led to dramatic improvements and opportunities in logistics and supply chains. The omni-channel option is a major change in meeting customer needs at the retail level. Supply chain practices have been improved leading to lower cost and better customer service.

Sustainability

A major priority in recent years has been the focus on incorporating sustainability practices in supply chain management. Categorically, the term sustainability includes concerns for society (people), environment (planet), and economy (growth). These three interrelated components are widely known as the "triple bottom line" (TBL). Thus, the conventional economic perspective on business is expanding to a more sustainable business mindset. This includes greater attention directed to being "green, and to address issues relating to social responsibility. Each of these dimensions of sustainability are discussed in greater detail throughout this text.

Supply Chains: Development and Shaping for the 21st Century

Development of the Concept:

The concept started in the 1960s with the development of the idea of physical distribution which focused on the outbound side of a firm's logistics system. The focus of physical distribution was on total systems cost and analyzing tradeoff scenarios to arrive at the best or lowest system cost.

During the 1980s, the logistics or integrated logistics management emerged. In its simplest form, it added inbound logistics to the outbound logistics of physical distribution. This increased coordination between the outbound and inbound logistics systems provided opportunities for increased efficiency and, perhaps, improved customer service.

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International or global sourcing of materials and supplies for inbound systems was growing, which presented some special challenges for production scheduling.

The systems or total cost concept was also a rationale for logistics management. This includes a tool called value chain analysis developed for competitive analysis and strategy purposes.

The potential savings of $30 billion demonstrated in the grocery study showed the power of optimizing the supply chain as opposed to just one individual company or one segment of the supply chain.

A study of "best-in-class" companies showed they spent 7.0 cents of every sales/revenue dollar for supply chain-related costs, while the median company spent 13.1 cents of every sales dollar on supply chain-related costs. For a hypothetical company with $100 million in sales in 1997, being best in class would mean an additional $5.3 million of gross profit to an organization, which frequently would be the equivalent profit from an additional $80–100 million of sales.

Integration across the boundaries of several organizations in essence means that the supply chain needs to function similar to a single organization satisfying the ultimate customer. Products and related services have traditionally been an important focus of logisticians and can be considered the "life blood" of the supply chain. Customers expect their orders to be delivered in a timely, reliable, and damage-free manner. Note that product flow is a two-way flow in today's environment because of the growing importance of reverse logistics systems for returning products that are unacceptable to the buyer, because they are damaged, obsolete, or worn out.

The information flow has become an extremely important factor for success in supply chain management, noting the two-way flow. In a sense, the supply chain is being compressed or shortened through timely information flows back from the marketplace, which leads to a type of supply chain compression or inventory compression. Sharing sales information leads to less demand distortion which is known as the bullwhip effect.

The third flow is financials or, more specifically, cash, and a major impact of supply chain compression and faster order cycle times has been faster cash flow. The faster cash-to-cash cycle or order-to-cash cycle has been a bonanza for companies because of the impact on working capital.

The fourth flow is demand flow. Integrated information systems enable demand signals to be identified early and responded to with appropriate production or delivery quantities.

Best-in-class companies have developed a more flexible production schedule with the opportunity to make adjustments in 24 hours. Production costs may be higher, but the trade-off is the ability to meet spikes in demand or slow production of some SKU's that may not be selling at the level anticipated.

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Supply chain management provides organizations with an opportunity to reduce cost (improve efficiency) and improve customer service (effectiveness). However, certain issues or challenges must be addressed before SCM will be successful.

Major Supply Chain Issues

Supply Chain Networks

The network facilities must be capable and flexible to respond and change with the dynamics of the marketplace whether in the short run or the long run.

Technology companies, for example, may have to move manufacturing operations to a different country in six to nine months because of changes that can occur that affect their cost and/or customer service. At times, the flexibility may be required for a shorter duration—for example, a port strike, floods, hurricanes, etc.

Mitigating the risk from such disruptions is a critical strategy in today's global networks. Private sector companies are placing increased emphasis on strategies to deal with the risk of disruption. Such a level of responsiveness requires information systems to provide as much warning as possible and plans in place on how to respond.

Complexity

Globalization and consolidation in supply chains increase complexity for organizations in terms of SKUs, customer/supplier locations, transportation requirements, trade regulations, taxes, etc. Companies need to take steps to simplify, as much as possible, the various aspects of their supply chains such as rationalizing SKUs, physical locations, and customer service.

Inventory Deployment

SCM provides an opportunity to reduce inventory levels with coordination or integration, which can help reduce inventory levels on horizontal (one firm) and/or vertical (multiple firms) levels in the supply chain.

Information

Today's technology and communication lead to the collection and storage of vast amounts of data unless data is shared horizontally and vertically in the supply chain and used to make better decisions. Information can be a powerful tool if it is timely, accurate, managed, and shared.

Cost and Value

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A challenge for supply chains is the prevention of suboptimization. Global supply chains compete against other global supply chains which accentuates the importance of cost and value at the very end of the chain.

Organizational Relationships

Supply chain management emphasizes a horizontal process orientation that cuts across traditional functional silos within organizations and necessitates collaboration with external vendors, customers, transportation companies, 3PLs, and others in the supply chain. Communication is critical to explain the opportunities for system tradeoffs that will make the supply chain more competitive.

Performance Measurement

Most organizations have measures of performance or metrics in place to analyze and evaluate their efficiency and progress over different time periods. In some instances, metrics are set that appear logical for the subunit of the organization but are suboptimal for the overall organization or supply chain.

Technology

Technology can be viewed as a change driver, but it is also important as a facilitator of change that will lead to improved efficiency and effectiveness. The approach necessary is to analyze and adjust or change processes, educate the people involved, and then select and implement the technology to facilitate the changes in the processes.

Transportation Management

Transportation can be viewed as the glue that unites the supply chain model. The critical outcomes of the supply chain are to deliver the right product, at the right time, in the right quantity and quality, at the right cost, and to the right destination. Economic changes among transportation providers such as shortages of drivers, higher fuel costs, and changes in driver hours of service regulations have led to what some individuals have called a transportation crisis or the "perfect storm," a much greater challenge for users.

Supply Chain Security

Safe reliable delivery of products to customers is expected of the supply chain. In the past, this was often accepted as a given; but today it is a concert and a potential challenge. Globalization has today increased the risk of supply chain disruptions.

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Talent Management

As supply chains have become more complex and comprehensive for reasons explicated in this chapter and subsequent chapters, the criticality of having educated and talented managers involved in supply chains has attracted much more attention in many organizations. The effort to attract, develop and maintain the appropriate pool of talent from entry level to executive level is attracting much more attention.

SUMMARY

- Cash flow has become one of the most important measures of financial viability for business organizations in today's global markets. Supply chains are very important determinant of improved cash flow since they directly impact cost, revenues and asset requirements.
- Supply chains are an important determinant of working capital consumption since they impact inventory, accounts receivable and cash.
- Efficient and effective supply chains can free up valuable resources and improve customer fulfillment to increase return on investment or assets and improve shareholder value.
- The accelerated rate of change in the global economy has increased the necessity of continual changes in supply chains or even transformation of the organization to remain competitive.
- The rate of change has been driven by a set of external forces including but not limited to globalization, technology, organizational consolidation and shifts in power in supply chains, an empowered consumer, and government policy and regulations.
- The conceptual basis of the supply chain is not new. In fact, organizations have evolved from physical distribution management to logistics management to supply chain management which are all based upon effective systems analysis.
- Supply chains are extended enterprises which require managing four flows—products, information, financials (cash) and demand on a collaborative basis.
- Information systems and technology are an important part of successful supply chains.
- Supply chain performances should be measured in terms of overall corporate goals for success and supply chain strategies must be consistent with organizational strategies.
- Supply chains need to focus on the customers at the end of the supply chain and be flexible and responsive.
- Technology is important to facilitate change, but it should follow process change and employee education to address problems and issues appropriately.
- Transportation management, security and sustainability have become increasingly important in the twenty-first century because of the political and economic changes that have occurred.
- Change with the changes, or you will be changed by the changes!

ANSWERS TO STUDY QUESTIONS

1. **Globalization and technology developments have led to some significant changes in the global economy. Discuss the importance of such changes to the United States. What is the impact upon supply chains?**

   Answer: 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

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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 1990's and the first decade of the 21st 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.

Supply and demand have become more volatile for numerous 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.

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 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

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supply chains because of their impact on customer demand and the speed of information transfers.

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.

2. **The consolidation that has developed at the retail end of many supply chains has had an important impact. What changes have occurred in supply chain management because of retail consolidation and the related power shift?**

Answer: During the 1980s and especially the 1990s, a significant change occurred as retail giants such as Wal-Mart, 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 Wal-Mart, 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.

The large retailers were accorded services such as scheduled deliveries, "rainbow" pallets [mixed arrays of products or stock-keeping units (SKUs)], advance shipments 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 a win-win arrangement with savings passed on to the consumer.

As more collaboration is practiced among organizations in the supply chains; they can gain shared cost savings and improved customer service. For example, sharing point-of-sale data is a powerful collaborative tool for mitigating the so-called BULL WHIP EFFECT of inventory in the supply chain which has multiple benefits for supply chain collaborators. Companies that report innovative best practices usually obtain about half of their innovative insights outside their company through collaboration with suppliers and customers. The power of information sharing, and collaboration cannot be overstated.

3. **Consumers are considered to have much more influence in the marketplace today. What factors have led to this "empowered consumer" situation? How has this factor changed supply chains in the last 15 to 20 years? Will this influence continue?**

Answer: 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.

The large retailers were accorded services such as scheduled deliveries, "rainbow" pallets [mixed arrays of products or stock-keeping units (SKUs)], advance shipments notices (ASNs) shrink-wrapped pallets, etc. These services allowed retailers to operate

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more efficiently and often more effectively and provide scale economies to the producers which was a win-win arrangement with savings passed on to the consumer.

Recent expansion of the omni-channel phenomenon results from changing preference from consumers for electronic buying, convenient deliveries, and ease of managing product returns. This influence has already had significant impacts on supply chains in most industries and will further develop into the future.

4. Describe the three phases of the evolution of the supply chain concept

Answer: The first phase started in the 1960s with the development of the **physical distribution** concept that focuses on the outbound side of a firm's logistics system. The system relationships among transportation, inventory requirements, warehousing, exterior packaging, materials handling, and other activities or cost centers were recognized. For example, the selection and use of a mode of transportation, such as rail, affects inventory, warehousing, packaging, customer service, and materials-handling costs, whereas motor carrier service would probably have a different impact on the same cost centers. The decision should be based upon lowest total system cost. The systems perspective is also an important concept underlying supply chain management.

The second phase was during the 1980s, which was a decade of change in the United States with the deregulation of transportation and financial institutions, and the **integrated logistics management** concept which added inbound logistics to the outbound logistics of physical distributions developed in a growing number of organizations. This was logical since deregulation of transportation provided an opportunity to coordinate inbound and outbound transportation movements of large shippers, which could positively impact a carrier's operating cost by minimizing empty backhauls, leading to lower rates for the shipper. Also, international or global sourcing of materials and supplies for inbound systems was growing in importance. Therefore, it became increasingly apparent that coordination between the outbound and inbound logistics system provided opportunities for increased efficiency and improved customer service.

Supply chain management represents the third phase of the evolution of the supply chain concept. This phase was created from the underlying logic of the **systems** or **total cost concept** and was also the rationale for logistics management. Porter's **value chain concept** was developed as a tool for competitive analysis and strategy. The value chain identifies inbound and outbound logistics as primary components of the value chain; that is, they can contribute value for customers and make the company financially viable to increase sales and improve cash flow. The more integrated nature of marketing, sales, and manufacturing with logistics is also an important dimension of the value chain and has become more important with the supply chain management focus.

5. Why should senior executives be concerned about supply chain management in their organizations? How can effective Supply Chain Management improve the financial viability of their companies?

Answer: Supply chain management attracts significant attention among CEOs, CFOs, COOs, CIOs, and other senior executives, and the business case for

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supply chain management demonstrated by two well-known studies in the text provide ample reasons.

The potential savings of $30 billion demonstrated in the grocery study showed the power of optimizing the supply chain as opposed to just one individual company or one segment of the supply chain.

A study of "best-in-class" companies showed they spent 7.0 cents of every sales/revenue dollar for supply chain-related costs, while the median company spent 13.1 cents of every sales dollar on supply chain-related costs. For a hypothetical company with $100 million in sales in 1997, being best in class would mean an additional $5.3 million of gross profit to an organization, which frequently would be the equivalent profit from an additional $80–100 million of sales.

6. **Supply chains encompass four flows. Describe the four flows, and why are they important? How are they related to each other?**
Answer: The four flows--products and services, information, financials and demand --are very important to the success of supply chain management. Integration across the boundaries of several organizations in essence means that the supply chain needs to function similarly to one organization in satisfying the ultimate customer.

Services and products have traditionally been an important focus as customers expect their orders to be delivered in a timely, reliable, and damage-free manner; and transportation is critical to this outcome. The information flow has become an extremely important factor for success in supply chain management, noting the two-way flow. The third flow is financials or, more specifically, cash, and a major impact of supply chain compression and faster order cycle times has been faster cash flow. The fourth flow demand reflects the growth in technology which provides organizations the ability to better synchronize supply and demand by detecting and understanding demand "signals" and making appropriate adjustments to inventory replenishment and order fulfillment.

7. **During the 1980s and 1990s, managing the transportation function in supply chains was recognized as being important but not critical. Has this perspective changed, and if so, how and why? What special challenges does transportation face in the future?**

Answer: Transportation can be viewed as the glue that unites the supply chain model. The critical outcomes of the supply chain are to deliver the right product, at the right time, in the right quantity and quality, at the right cost, and to the right destination. Economic changes among transportation providers, such as shortages of drivers, higher fuel costs, and changes in driver hours of service

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regulations, have led to what some individuals have called a transportation crisis or the "perfect storm," a much greater challenge for users.

Transportation has gone from being a readily available commodity to potential users, especially in the 1990s, to today where transportation service can be scarce in some market areas. A major challenge is the maintenance of the existing transportation infrastructure (roads, bridges, ports, waterways, tracks, and airports) and the need to increase capacity to meet the growth in demand. The transportation infrastructure is a major cause of concern for global supply chains especially for water transportation in the port areas.

8. Collaboration is a very critical ingredient for successful supply chains. Why? What types of collaboration are important? What are some of the challenges and issues that need to be addressed?

Supply chain management emphasizes a horizontal process orientation which cuts across traditional functional silos within organizations and necessitates collaboration with external vendors, customers, transportation companies, 3 PLs, and others in the supply chain. In other words, internal collaboration or cooperation with marketing, sales, operations/manufacturing, and accounting/finance are very important as well as collaboration or cooperation with external organizations. Communication is critical to explain the opportunities for system tradeoffs that will make the supply chain more competitive.

Some of the challenges are optimizing between various entities and ensuring the least cost solution is achieved even if some of those entities have a higher cost.

9. Why is information so important in supply chains? What are the challenges to the successful development and implementation of effective information? What is the role of technology and information management?

The technology and communication systems that are available to organizations today lead to the collection and storage of vast amounts of data. But, interestingly enough, organizations may not be taking advantage of the abundant data to develop information systems to improve decision making. The accumulation and storage of data unless they are shared horizontally and vertically in the supply chain and used to make better decisions about inventory, customer service, transportation, etc., are almost useless. Information can be a powerful tool if it is timely, accurate, managed, and shared. It can be a substitute for inventory because it can reduce uncertainty. The latter is one of the major causes of higher inventory levels because it leads to the accumulation of safety stock. The challenge, frequently, is the sharing of information along the supply chain and the discipline to ensure the integrity of the data collected—a big challenge but one with much potential.

10. Describe the major challenges and issues facing supply chains in the future?

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Answer: The challenge to develop and sustain an efficient and effective supply chain(s) requires organizations to address a number of issues. Several of the more prevalent ones are summarized as follows:

Supply Chain Networks

Network facilities (plants, distribution centers, terminals, etc.) and the supporting transportation services are considered to be very important. However, the network system in a dynamic, global environment is critical. One of the challenges is the rapid changes that can take place. Companies and other organizations need a network system that is capable and flexible to respond and change with the dynamics of the marketplace whether in the short run or the long run.

Complexity

The globalization and consolidation in supply chains have caused an increased complexity for organizations in terms of SKUs, customer and supplier locations, transportation requirements, trade regulations, taxes, and so forth. Companies need to take steps to simplify, as much as possible, the various aspects of their supply chains. For example, the number of SKUs has expanded for many companies, which exacerbates problems for inventory management and order fulfillment. Consequently, companies have been rationalizing SKUs to eliminate the slow movers and items that do not contribute to profitability. Locations also need to be analyzed to eliminate high-cost or duplicative operations. Customer service levels need to be rationalized as do vendors or supplier alternatives. Layers of complexity develop and may seem necessary, but organizations need to continually evaluate those areas of complexity by evaluating processes, training people and exploiting technology.

Inventory Deployment

Two interesting characteristics of supply chains are that inventory is often being duplicated along the chain and the bullwhip effect. Effective SCM usually provides an opportunity to reduce inventory levels. Coordination or integration can help reduce inventory levels on horizontal single-firm) and vertical (multiple-firms) levels in the supply chain. Strategies such as compression and postponement can also have a positive impact. Inventory deployment is an important issue for supply chains because of the associated cost and related opportunities for increased efficiency. However, it is important to remember that inventory is a necessary ingredient for successful supply chains, but inventory levels must be managed carefully to reduce working capital. As discussed in the next section and subsequent chapters, information technology is a key ingredient for efficiency of inventory management.

Information

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data unless it is shared horizontally and vertically in the supply chain and is used to make better decisions about inventory, customer service, transportation, etc., is almost useless. Information can be a powerful tool if it is timely, accurate, managed, and shared. It can be a substitute for inventory because it can reduce uncertainty. The latter is one of the major causes of higher inventory levels because it leads to the accumulation of safety stock. The challenge, frequently, is the sharing of information along the supply chain and the discipline to ensure the integrity of the data collected—a big challenge but one with much potential.

Cost and Value

Frequent reference has been made in this chapter to efficiency (cost) and effectiveness (value). A challenge for supply chains is the prevention of sub-optimization. In today's environment, global supply chains compete against global supply chains, which means that the cost and value at the end of the supply chain are critical. This is another reason why supply chain collaboration is so important. All the members of a supply chain need to appreciate and understand the challenges and issues along the supply chain.

Organizational Relationships

Supply chain management emphasizes a horizontal process orientation that cuts across traditional functional silos within organizations and necessitates collaboration with external vendors, customers, transportation companies, 3PLs, and other service providers in the supply chain. In other words, internal collaboration or cooperation with marketing, sales, operations or manufacturing, and accounting or finance are very important as well as collaboration or cooperation with external organizations.

Communication is critical to explain the opportunities for system tradeoffs that will make the supply chain more competitive. For example, the vice president of manufacturing may present a rationale for operating plants on a 24/7 basis to lower production costs, but what about the cost of warehousing and inventory of goods that have to be stored until sales are finalized? Looking at manufacturing cost in isolation could lead to higher overall system costs.

Performance Measurement

Most organizations have measures of performance or metrics in place to analyze and evaluate their efficiency and progress over different time periods. Sometimes, such measures are used for setting baseline performance objectives or expected outcomes, for example, orders filled and shipped per day. At this juncture, it is important to recognize that lower-level metrics in an organization must connect directly to the high-level performance measures of the organization and the supply chain, which are usually net profit, return on investment, or assets and cash flow. In some instances, metrics are set that appear logical for the subunit of the organization but are suboptimal for the overall organization or supply chain. The previous example of the vice president running the plants 24/7 to achieve the lowest possible unit cost of products could have been saving 3 cents per unit on manufacturing, but the extra expense of holding excess inventory could have cost 4 to 5 cents per unit, thus

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lowering the company's net profit margin. The warehouse manager who is measured by the cost per cubic foot of units stored will be motivated to fill the warehouse to the ceiling (what is the tradeoff cost?). Consequently, the overall financial metrics of an organization should be the "drivers" of the lower level metrics.

Technology

Technology, as indicated previously, can be viewed as a change driver, but it is also important as a facilitator of change that can provide improved efficiency and effectiveness. The challenge is to evaluate and successfully implement the technology to make the improvements desired. Sometimes technology is, figuratively speaking, thrown at a problem, which usually leads to frustration and then failure. The approach necessary is to analyze and then adjust or change processes, educate the people involved, and then select and implement the technology to facilitate the changes in the processes. Skipping the first two steps is analogous to the frequently cited bad approach to strategic planning—ready, fire, aim. The technology available today is almost overwhelming, but analysis and planning are necessary to achieve the expected outcomes. Technology cannot solve or mitigate problems without appropriate up-front analysis and planning.

Transportation Management

Transportation can be viewed as the glue that helps the supply chain system function. The critical outcomes of the supply chain are "TO DELIVER THE RIGHT PRODUCT AT THE RIGHT TIME, IN THE RIGHT QUANTITY AND QUALITY, AT THE RIGHT COST, AND TO THE RIGHT DESTINATION". Transportation plays an important role in making these "rights" happen. Another aspect of the importance of transportation is related to some of the strategies that are being used by companies to remain competitive in today's economy—for example, just-in-time inventory, lean logistics and manufacturing, and scheduled and one-day deliveries, etc. The challenge has been exacerbated by challenges and changes among transportation providers; shortages of drivers, fuel costs, and changes in driver hour regulations, which have led to what some individuals have called a transportation crisis or the "perfect storm." Transportation has gone from being a readily available commodity to potential users, especially in the 1990s, to today where transportation service can be scarce in some market areas. A major challenge is the maintenance of the existing transportation infrastructure (roads, bridges, ports, waterways, tracks, and airports) and the need to increase capacity to meet the growth in demand. The transportation infrastructure is a major cause of concern for global supply chains especially for water transportation in the port areas.

Supply Chain Security

As indicated, safe, reliable delivery of products to customers is expected of the supply chain. In the past, this was often accepted as a given, but today it is a concern and potential challenge. Globalization has obviously increased the risk of supply chain disruptions. Consequently, organizations must be prepared for potential disruption. Terroristic threats have changed some of the planning and preparation for supply chains that now often include some type of scenario analysis that can consider

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possible threats, assess probabilities, and plan for alternatives. This situation is not likely to improve in the near future, and companies need to be prepared. With global supply chains, vulnerability is exacerbated by distance and complexity.

Talent Management

As supply chains have become more complex and comprehensive for reasons explicated in this chapter and subsequent chapters, the criticality of having educated and talented managers involved in supply chains has attracted much more attention in many organizations. The effort to attract, develop and maintain the appropriate pool of talent from entry level to executive level is attracting much more attention. At one time, it was assumed that anyone with experience in another functional area of the organization (marketing, manufacturing, accounting, etc.) could easily transition to a position in logistics and/or supply chain management. While that still does occur, most organizations recognize that the complex and special challenge of 21st century supply chains require experience and expertise in this area. Consequently, active recruiting at universities with supply chain and logistic programs is taking place. In addition, educational programs offered for logistics and supply chain managers are increasing in number and popularity. Those are offered by universities and professional organizations. There are other examples, but all are indicative of the growing importance and need for talented and experienced managers.

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CHAPTER CASE 1.1

LEHIGH VALLEY TRANSPORT AND LOGSTICS SERVICES (LVTLS)

1. **Discuss the Challenges faced by the Pharmaceutical Industry**

   The challenges and issues faced by this industry are reflective of the discussion about the changing economic landscape discussed in Chapter 1. The Pharmaceutical industry is literally under siege with criticism from the government, business and health care organizations, consumers and global competition. This is an industry which has been a mainstay of the U.S. economy for many years providing jobs and good incomes for employees, good returns for investors, and good tax revenues for federal, state and local government and highly regarded by local communities for its economic impact. While still "popular", the industry has attracted a lot of negative publicity in recent years for pricing practices and slow development of new drugs.

   This very good case for beginners because there so much information available on the internet about this industry and their challenges. Students will not encounter any problems finding information and data. Rather their problem may be too much information to sort through. So, you may have to give them some guidance. Their major problems appear to include rising costs, slower development of new drugs, government regulation, global competition, responding to knowledgeable customers, etc. plenty of "food for thought and discussion.

2. **WHICH OF THE CHALLENGES PROVIDE THE BEST OPPORTUNITY FOR LVTLS? WHY?**

   Logistics service companies can offer a variety of beneficial services which will be explored in a later chapter, but after reading Chapter 1 and any related class discussion, the students should understand the reducing cost is especially important for this company. Any improvements that can be offered in terms of customer service would also be beneficial and help to improve their customers' competitive position for the future. LVTLS should be able to help reduce transportation and warehousing related costs since this is their specialty. They would look for opportunities to combine shipments for lower rates and try to improve delivery times to customer locations. Given their location in proximity to several major ports, New York, Philadelphia and Baltimore, they may be able to help with global shipments both pickup and delivery. The basic message is cost savings will be the driver for this relationship initially, but it can develop into a more comprehensive set of services for cost savings and service improvement.

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CHAPTER CASE 1.2

CENTRAL TRANSPORT

1. Why and how has the marketplace changed for SAB in the last five to seven years?

The traditional wholesaler has experienced tremendous pressure from the development of the supersize retailers who have sufficient volume to buy in large quantities from producers of food and related products to gain the lower price traditionally available to the wholesalers. This has a double negative impact on wholesalers like SAB because these large retailers do not need SAB and the smaller retailers are at a disadvantage buying from SAB since SAB would have to "mark-up" their purchase price to maintain their profitability. Therefore SAB has to either offset their higher purchase price improved service to lower the smaller retailers cost of doing business, e.g., inventory cost or help them to stock unique products that the big retailers do not offer such as local fresh produce or meat products.

The other alternative is to provide logistics related services to the large retailers such as warehousing, order fulfillment, delivery, etc. They would have to be careful that that did not put their smaller retail customers at a disadvantage. They could also help the smaller retailers to develop some additional business opportunities like preparing food for pick up and/or delivery via internet sales. In other words, SAB could rethink their services and related options and provide expertise and collaborative service to help the small retailers survive through expansion of what these retailers provide to their customers. These smaller businesses are usually more familiar with their customer needs and can see opportunities that SAB can help them with to retain and increase their market share.

2. WHAT ADVANTAGES MIGHT CENTRAL TRANSPORT EXPERIENCE IN THE PROPOSED NEW VENTURE?

Central Transport has another unique opportunity to help SAB move aggressively into new areas of service for the benefit of both companies. Susan Weber seems to understand the changing dynamics of the current marketplace and the need to be aggressive to avoid a takeover by another company. She is attempting to really change and expand SAB from a traditional wholesaler to an aggressive third-party logistics service company offering their customers the opportunity to not only reduce their logistics related costs but also to improve their service to customers. It appears that they would still provide traditional wholesaler services of buying

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larger quantities from producers to sell to medium and small retailers but also to offer warehousing and transportation services in conjunction with companies like Central Transport. As indicated in Chapter 1, this type of collaboration is the wave of the future, i.e., to operate vertically and horizontally in the channel. They would be helping their customer, SAB, to sustain and grow their business which would be mutually beneficial.

3. WHAT ISSUES WOULD SAB AND CENTRAL FACE IN THE PROPOSED NEW APPROACH?

Their collaborative approach would probably change the nature of their relationship from buyer-seller to collaborators or partners in the supply chain channel. They would have to agree on the parameters of this new relationship and negotiate the pricing in a more collaborative information sharing arrangement. They would be more dependent upon each other to provide the expanded services and sales expertise necessary to serve the smaller retailers but also to offer third party services to the bigger retailers. Central could play the lead role in the latter by providing transportation services and warehousing while SAB could provide the marketing and sales expertise as well as other related services to old and new customers. They would have to rely on their mutual trust and previous experience in forging ahead with these new opportunities. Another possibility would be for SAB to purchase Central and integrate them into a new larger organization with the potential of expanding even more aggressively.

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