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# Transportation

## A Global Supply Chain Perspective

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# Transportation

## A Global Supply Chain Perspective



**Novack/Gibson/Suzuki**



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*A very special note of thanks and appreciation is due to our families.  
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to express our deep appreciation of their many contributions not only to  
the continuing development of this text but also to the supply chain management text.*

*The authors would like to dedicate this edition to John Coyle. John was the first author on this text since the first edition in the 1970s. Dr. Coyle passed away on January 16th of this year. He will be remembered as being on the forefront of the supply chain discipline. He was a mentor and friend to all of us. He will be missed.*

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# Preface



This textbook is recommended by APICS® as a valuable study resource for the Certified in Logistics, Transportation, and Distribution professional certification program. For details, go to <http://www.apics.org/credentials-education/credentials/cltd>.

Transportation is the critical link in successful supply chains. It is a key facilitator of global economic development, quality of life improvement, and enterprise success. Effective transportation processes ensure the rapid flow of essential goods across complex global supply chains. Efficient transportation operations keep delivery costs in check to ensure that products are affordable in multiple markets.

Transportation professionals are tasked with balancing these effectiveness and efficiency goals. They must also manage complex transportation networks and minimize disruptions of cross-border product flows to meet the ever-increasing service demands of the 21st century customer. While these are not easy tasks, high-quality work by dedicated transportation professionals is essential for global trade to thrive.

In this book, *Transportation: A Global Supply Chain Perspective*, Tenth Edition, we continue to focus on the widespread impact of commercial transportation on worldwide commerce. We believe that the contents of this book will help future transportation professionals prepare for successful careers in this dynamic field. Our text follows the format of the previous edition with three sections and thirteen chapters. Substantive additions and revisions have been made to enhance the content and organization. In particular, the critical role of technology in global transportation receives special attention in this edition.

Part I provides the foundation for the overall text. Chapter 1 explores the nature, importance, and critical issues in the global economy, which are important to understand for the current and future transportation systems. Chapter 2 provides the economic foundation and rationale for the role of transportation as well as its political and social importance. Chapter 3 highlights the expanding role of technology in transportation, addressing both software and equipment innovations that drive greater service and lower costs. Chapter 4 offers a discussion of transportation costing and pricing in a market-based economy.

Part II provides an overview of the major transportation alternatives available to individual and organizational users. Chapters 5 through 8 discuss and examine the key features and issues of the five basic modes of transportation, namely, motor (5), rail (6), airline (7), water and pipeline (8). Each of the basic modes offers inherent advantages for shippers of particular commodities or locations that need to be appreciated and understood to gain the economic benefits they offer. The dynamic market environment that exists in many economies demands continuous improvement of modal capabilities if they are to remain relevant.

The chapters in Part III cover a variety of important issues related to the successful management of transportation flows. Each of the five chapters in this section have been updated and revised to further improve their value to the readers. Chapter 9 supplements the information provided in Part II with a detailed discussion of logistics service providers that support the transportation industry. These organizations improve the efficiency, effectiveness, and execution of global supply chain flows. Chapter 10 discusses the topic of risk management, a key concern for many organizations because of the increasing threat of supply chain disruptions in the global economy. Strategies, methods, and outcomes for risk management are explored as well as overall security enhancement. Chapter 11 provides an in-depth discussion of the planning and execution of global transportation with emphasis on trade facilitation, product flows, and information sharing. Chapter 12 covers the all-important role of government policy, regulation, and promotion in fostering a strong transportation network. Finally, Chapter 13 explores some of the major challenges for transportation in the 21st century, namely, infrastructure funding needs, talent management gaps, environmental sustainability, and fuel management. Each issue threatens to disrupt transportation flows, reduce competitiveness, and increase costs if not managed proactively.

Overall, we are convinced that transportation is a critical engine for business growth and societal advancement but is often taken for granted until a crisis arises. As stated previously, it may be the most important industry for all economies regardless of their stage of development. Such recognition needs to be accorded to transportation in the future.

## Features

1. Learning Objectives in the beginning of each chapter provide students with an overall perspective of chapter material and serve to establish a baseline for a working knowledge of the topics that follow.
2. Transportation Profile boxes are the opening vignettes at the beginning of each chapter that introduce students to the chapter's topics through familiar, real-world examples.
3. On The Line features are applied, concrete examples that provide students with hands-on managerial experience of the chapter topics.
4. Transportation Technology boxes help students relate technological developments to transportation management concepts.
5. Global Perspectives boxes highlight the activities and importance of transportation outside of the United States.
6. End-of-chapter Summaries and Study Questions reinforce material presented in each chapter.
7. Cases at the end of each chapter build on what students have learned. Questions that follow the cases sharpen critical thinking skills.

## Supplements

1. Additional instructor resources for this product are available online. Instructor assets include an Instructor's Manual, PowerPoint® slides, and a test bank powered by Cognero®. Sign up or sign in at [www.cengage.com](http://www.cengage.com) to search for and access this product and its online resources.

## Acknowledgments

The authors are indebted to many individuals at our respective academic institutions as well as other individuals with whom we have had contact in a variety of venues. Our university students and our executive program students have provided an important sounding board for the many concepts, techniques, metrics, and strategies presented in the book. Our faculty and corporate colleagues have provided invaluable insights and appropriate criticism of our ideas. Some individuals deserve special consideration: Mackenzie Brannon (Penn State) for her work on updating all of the tables and figures in the text, Ms. Tracie Shannon (Penn State) for providing assistance through Penn State's Center for Supply Chain Research, and Garrett Callenberger (Penn State) for updating all of the relevant readings. Finally, we would like to thank Michael Levans, Group Editorial Director of Logistics Management magazine, for his support in allowing us to use material from his publication in this text.

# About the Authors

**Robert A. Novack** is currently an Associate Professor of Supply Chain Management and Associate Director in the Center for Supply Chain Research at Penn State. Dr. Novack worked in operations management and planning for the Yellow Freight Corporation and in planning and operations for the Drackett Company. He received his bachelor's and MBA degrees from Penn State and a PhD from the University of Tennessee in Knoxville. Dr. Novack has numerous articles published in the *Journal of Business Logistics*, the *Transportation Journal*, and the *International Journal of Physical Distribution and Logistics Management*. He is also the coauthor of three textbooks: *Creating Logistics Value: Themes for the Future*, *Supply Chain Management: A Logistics Perspective* (11e), and *Transportation*. He is on the editorial review board for the *Journal of Business Logistics and Transportation Journal* and is an area editor for the *Journal of Supply Chain Management*. Dr. Novack is very active in the Council for Supply Chain Management Professionals, having served as overall program chair for the annual conference, as a track chair, and as a session speaker. In addition, he has served on numerous committees with this organization. Dr. Novack holds the CTL designation from the American Society of Transportation and Logistics. His current research interest is on the development and use of metrics in managing supply chains. In 2009, he received the Atherton Teaching Award from Penn State, the highest award given for teaching at that university.

**Brian J. Gibson** is the Wilson Family Professor of Supply Chain Management and Executive Director of the Center for Supply Chain Innovation at Auburn University. Previously, he served on the faculty of Georgia Southern University and as director of the Southern Center for Logistics and Intermodal Transportation. Dr. Gibson also served as a logistics manager for two major retailers. He is an accomplished faculty member who has received multiple awards for outstanding teaching, research, and outreach. Dr. Gibson has coauthored numerous articles in the *Journal of Business Logistics*, *CSCMP's Supply Chain Quarterly*, *Supply Chain Management Review*, *International Journal of Logistics Management*, and other leading industry publications. He is also the coauthor of three textbooks: *Supply Chain Management: A Logistics Perspective* (11e), *The Definitive Guide to Integrated Supply Chain Management*, and *Transportation*. He is actively engaged in executive education, seminar development, and consulting with leading organizations. Dr. Gibson recently served as Chairman of the Board for the Council for Supply Chain Management Professionals and is a Supply Chain Steering Committee Member for the Retail Industry Leaders Association. Dr. Gibson earned a BSBA from Central Michigan University, an MBA from Wayne State University, and a PhD in logistics and transportation from the University of Tennessee.

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Transportation is the most overlooked but yet most critical component of global supply chains. This has been brought to light by the Covid-19 “Black Swan” event over the last two years. When the virus first emerged in the United States during early 2020, consumers started hoarding certain necessities and demand far exceeded consumption. This caused suppliers to increase output which put transportation in a tight capacity situation. Then China and the United States went into lockdown so exports to the United States went down significantly but online shopping in the United States increased dramatically. This resulted in there being excess capacity in the ocean, air, less-than-truckload (LTL), and truckload (TL) sectors of the transportation industry. However, the small parcel network (UPS, FedEx, FedEx Ground, and the United States Postal Service) saw significant increases in volume.

When the pandemic eased and imports to the United States started to arrive from China in large volumes, the West Coast ports of Los Angeles and Long Beach were overwhelmed and dwell times for container ships were longer than 60 days. At one point there was over 80 ships waiting to be unloaded off the west coast. On some freight lanes between China and the United States, the cost of a 20-foot-equivalent (TEU) container went from \$2,200 to \$28,000.

Today, the congestion is easing on the West Coast but China is in lockdown again because of their “zero-tolerance” policy because of a resurgence of Covid cases in that country. So, imports to the United States have gone down again. The dramatic increases and decreases in global and domestic demand for products have played havoc on global transportation networks. These volume swings have had impacts on transportation capacity and rates that have fueled rising consumer prices in the United States and across the world.

Global transportation systems have also been seriously challenged in the twenty-first century by high fuel costs (\$3.22 per gallon of diesel nationally in May 2021 versus \$5.57 in May 2022), changing capacity, and government regulation. In addition, the transportation infrastructure, namely seaports, airports, highways, and so on, is not sufficient to accommodate the flow of global commerce in many countries, thus stymying the economic progress of these regions. Many parts of the infrastructure require government or public funding because of the different users. The public coffers are frequently financially strained because of the many alternative demands for these somewhat limited resources. Transportation infrastructure has to “compete” for an allocation of public funds, and the benefits, while real, are more in the long run in terms of outcome and value. Consequently, such needed resources might not be allocated in a timely manner. Transportation and the related logistics systems are a necessary requirement for all economies, developed and underdeveloped, but the public investment in social capital necessary to not only improve but also sustain the infrastructure has not been forthcoming in many countries. Hopefully, one of the outcomes of this text will be a better understanding and appreciation for the criticality of efficient and effective transportation systems for economic development and social welfare.

Part I will provide an overview and foundation for the role and importance of improved transportation from a micro and macro perspective in global supply chains.

The discussion will cover economic and managerial dimensions of transportation in the global economy. Part I is designed to provide the framework for the analysis and discussion for the following sections of the book.

**Chapter 1** examines the nature, importance, and critical issues in the global economy, which are important to understand for the current and future transportation systems that will provide the needed service for the diverse requirements of the various regions and countries. This chapter will also discuss the special nature of transportation demand and how transportation adds value to products. There is also an overview of the concept of supply chain management and the important role of transportation in supply chains of various organizations.

**Chapter 2** examines the role of transportation from a macro and micro perspective. The chapter adds to the discussion in Chapter 1 but explores more broadly the special significance of improved transportation systems. The analysis includes not only the economic impact but also the political and social impact of transportation. Current and historical perspectives are provided in the discussion to help the reader appreciate and better understand the contribution of improved transportation in an economy. The discussion also examines the impact of improved transportation upon land values and prices of products and services.

**Chapter 3** provides an overview of the technology and systems currently in use and planned for execution in the transportation sector. Special attention is given to the technology used in the various modes, including On-Board Recorders (OBRs) and driverless vehicles in the motor carrier industry and Positive Train Control (PTC) in the railroad industry. The discussion also emphasizes the impact the various technologies have had on transportation efficiency.

**Chapter 4** extends the discussion of costing and pricing introduced in Chapters 1 and 2. Given the importance of transportation on a micro and macro level to the cost and value of products and services, costing and pricing deserves a more detailed examination. There are unique dimensions to transportation services in general and between the basic modes that need to be understood by managers and public officials. Chapter 4 also provides an analysis of the differences and unique dimensions of transportation services.

## Chapter

# 1

# Global Supply Chains: The Role and Importance of Transportation

## Learning Objectives

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

- › Appreciate why efficient transportation systems are so critical to advance the growth and development of regions and countries, and how they contribute to social and political systems as well as national defense
- › Discuss the importance of transportation to globalization and how it contributes to the effective flow of commerce among close and distant regions
- › Understand how global supply chains can contribute to the competitive position of countries and allow them to penetrate global markets
- › Appreciate the dynamic nature of the global economy, which can impact and change the competitive position of a region or country in a relatively short period of time
- › Explain the underlying economic basis for international exchange of goods and services for the overall benefit of two or more countries or regions and gain some perspective on the volume and overall importance of the more advanced countries of the world
- › Discuss the size and age distribution of the population and the growth rate of the major countries of the world and understand how the size of the population can impact a country positively or negatively
- › Understand the challenges and opportunities associated with the world-wide growth in urbanization and why there has been such a major shift from rural to urban areas
- › Appreciate the importance and impact of land and resources to the economic advancement and development of the various countries of the world and how they can be exploited to their advantage
- › Explain why technology has become such an important ingredient for the economic progress of companies and countries in today's global economy and understand the need for and types of technology

- Discuss the overall characteristics and importance of globalization and supply chains in the highly competitive world economies of the twenty-first century

## Transportation Profile

### Time for Contingency Plans

The 2021 logistics nightmare has forced shippers to react to problems and to try to divert shipments to alternative ports of entry, alternative transport modes (air freight, cross-border rail) and alternative providers (“premium rate” NVOs). Such moves, however, have left them with no time to pause and contingency plan.

Consequently, it’s now more important than ever for shippers to work with the right logistics providers and strengthen carrier relationships and business continuity plans. “This will help shippers deal with ‘the next crisis’ as and when it happens,” advises Philip Damas, managing director and head of supply chain advisors at Drewry.

This means reviewing your supply chain and transportation networks to reduce exposure to the super-inflated container shipping costs that are expected to remain at least through the midterm.

“Many members of the Drewry Benchmarking Club are already looking at sourcing products from alternative locations to avoid spending 5-digit freight rates per container from Asia to the West,” Damas reveals. “Others are looking at warehouses closer to the port instead of using those located near congested rail hubs such as Chicago, for example.”

Based on recent and current consultancy work carried out for shipper customers, Drewry suggests that shippers optimize internal operations. This means improving minimum quantity commitments (MQC) management processes as well as volume forecasting and communication of forecasts to carriers, etc. In essence, control better what you can control.

Source: Karen E. Thuermer, *Logistics Management*, February 2022, p. 28. Reprinted with permission of Peerless Media, LLC.

## Introduction

In previous editions of this text, transportation was referred to as the “glue” that holds the supply chain together and an enabler of the underlying tactics and strategies that have catapulted supply chain management to the level of acceptance, which it now enjoys in many organizations, both private and public. For example, transportation management systems technology along with complimentary software is used by many organizations to improve logistics and supply chain efficiency, effectiveness, and execution. Transportation has moved from playing a reactive or supporting role to a role that is more proactive and enabling. In other words, transportation has become much more strategic for organizations in determining their ability to compete in the growing and complex global marketplace.

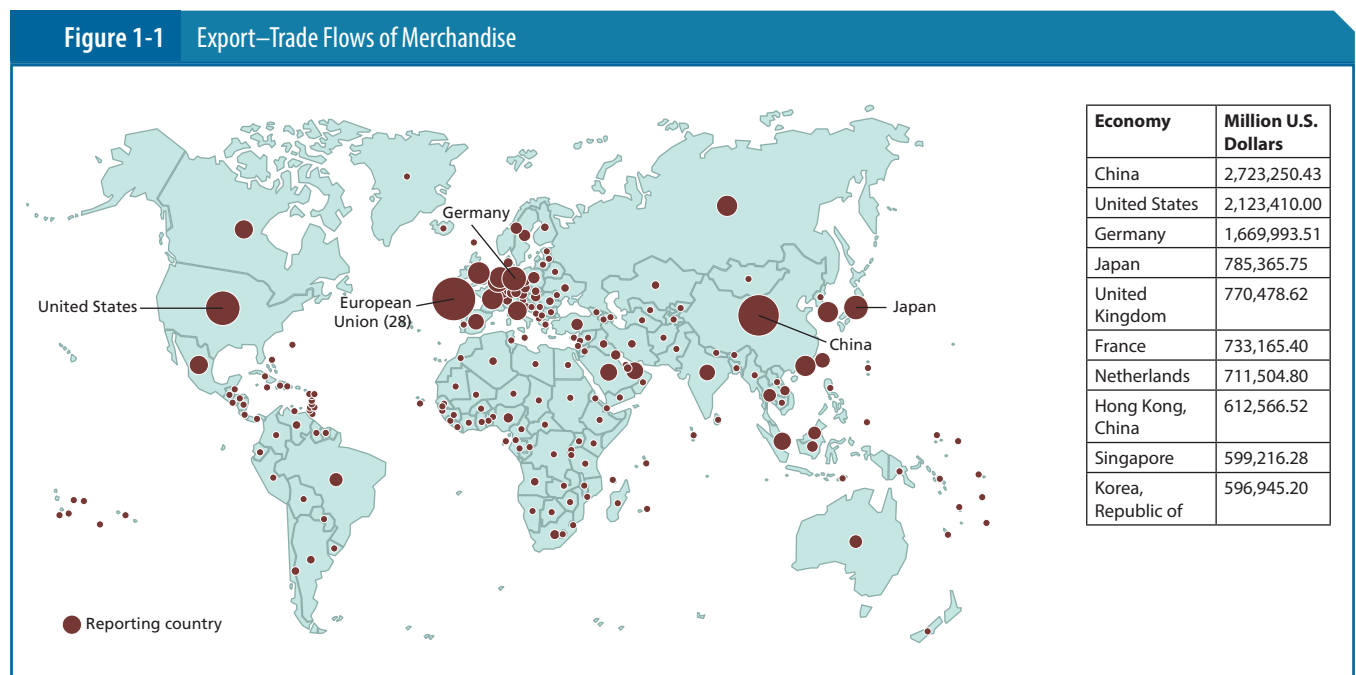
The global marketplace is also changing on a continuing basis, that is, it has become very dynamic, and is buffeted by economic, political, social, and natural forces, which can impact a country or region negatively or positively in the short or long run. For example, the high cost of fuel has impacted the rates charged by transportation service providers, which in turn impacts the distance that it is economically feasible to transport goods. The cost and availability of labor can change over time to the disadvantage of some geographic areas and to the benefit of others. For example, the labor cost advantage that China enjoyed, along with low rates for ocean carrier movement, had a positive impact on their ability to sell products on a global basis. These advantages have diminished somewhat allowing other countries to develop an improved competitive position because of market proximity, labor costs, or other factors. These changes in turn impact global supply chains and their associated flow of goods.

In this chapter, the initial focus will be upon developing an overview of the flow of global commerce and trade overtime on a worldwide basis not only to understand the importance and magnitude of global supply chain flows but also to gain some perspective on important changes that have occurred. A variety of economic data will be used to illustrate the impact of the overall changes that have occurred. The next section will examine the underlying rationale and economics of global flows of goods and services. In other words, the “why” of global flows will be discussed to understand the advantages of international trade to countries and consumers in contrast to the “what” of the first section of this chapter. The third section will provide additional insights into the factors that can contribute to the economic advancement and development of countries. The final section of the chapter will provide an overview of the supply chain concept including its development, key characteristics, and major activities.

## Global Supply Chain Flows

Early in the twenty-first century, frequent reference was made to acronyms such as the BRIC (Brazil, Russia, India, and China) or VISTA (Vietnam, Indonesia, South Africa, Turkey, and Argentina) countries. The former were identified as the top emerging economies and the latter as those developing at a fast pace. The development of the BRIC and VISTA countries was seen an indication of opportunities for “sourcing” of materials, products, and services and the identification of potential markets for the more developed economies such as the United States, the European Union (EU), and Japan. Also, they were a sign of a more economic balance in the world and continued growth. Consequently, one noted author<sup>1</sup> declared that the world was really flat because of the developing economies. Interestingly, there have been some economic shifts already with respect to these countries, and the future importance of some of the VISTA countries is not clear. For example, South Africa has been added to the first group, BRICS, by some economic pundits. Nevertheless, all of this supports the observation made earlier about the dynamic and competitive nature of world markets. An important caveat is the potential for disruption caused by political instability, associated acts of terrorism, and military actions, which can cause a major disruption in global trade flows.

Figure 1-1 and Table 1-1 indicate export trade flows of merchandise from various country or region origins. In Figure 1-1, the size of the circle indicates the importance and volume of exports on a worldwide basis. It is interesting to note the large number of exporting countries and the big





differences in the volume. Table 1-1 shows the value of world exports in U.S. dollars. China is clearly number one for exports of merchandise and the United States is second, but what may be surprising is Germany being third. They are relatively close to the United States in terms of the value of their exports. If we added up the value of exports for all the EU countries, it would by far exceed the United States. The EU also compares favorably to the Asian bloc of countries in terms of exports.

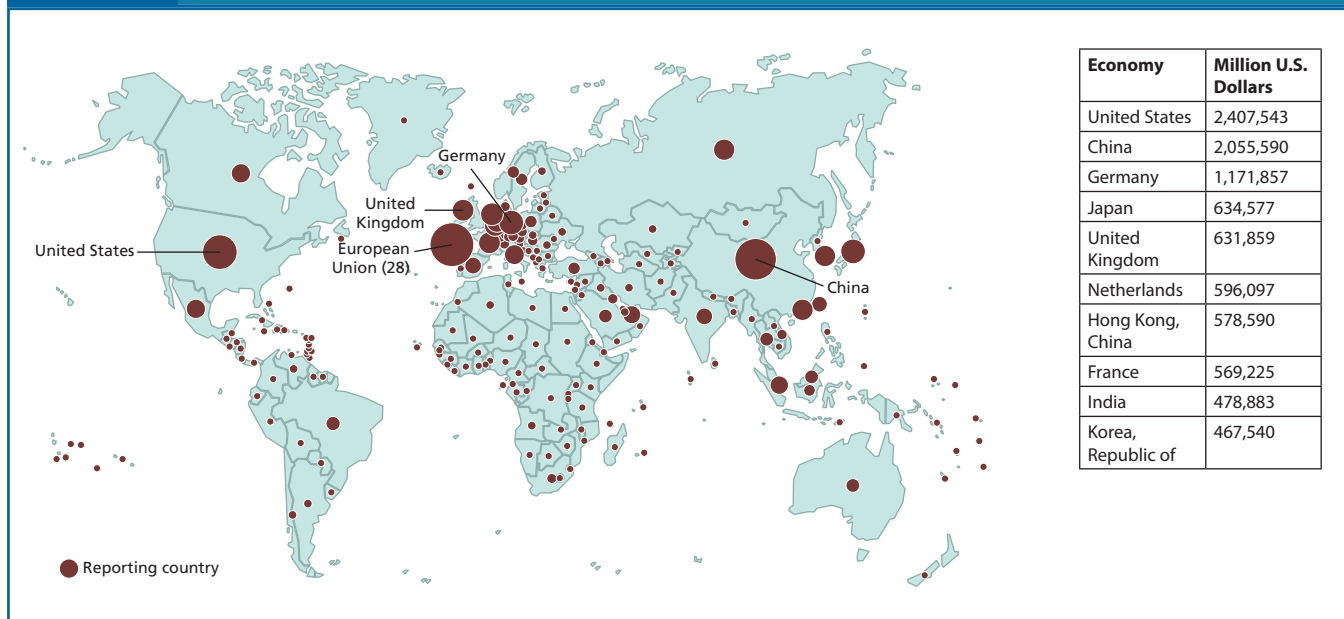
Figure 1-2 and Table 1-2 show the import trade flows of merchandise into various countries and regions. Figure 1-2 is interesting because it is a visual representation of the magnitude of the value of imports and provides some perspective of the differences in the world markets. In terms of regions, Figure 1-2 indicates that Asia is the largest importing region and is followed by the EU. North America is third in terms of the value of imports. Among individual countries, the United States is the largest importer, followed by China and then Germany.

A comparison of relative shares of imports and exports provides some additional perspectives. China's share of global exports in terms of value is 14.7 percent and their share of imports is 11.5 percent making them a net exporter, whereas the United States by comparison is a net importer with 8.1 percent of merchandise exports and 13.5 percent of the global imports. Germany is also a net exporter with exports representing 7.8 percent of the global total with imports of 6.6 percent of the total. There are economic implications associated with these differences, but the merchandise flows do not provide a complete economic picture because the value of services imported and exported are also important for the balance of payments of individual countries. However, the focus of this text is obviously upon merchandise flows.

The importance of the so-called developed countries/economies is evident from the information presented earlier, but additional insight can be gained by summarizing the impact of the top countries in each category (see Tables 1-1 and 1-2). In 2020, the top 30 exporting countries accounted for 86.9 percent of the world's exports (\$17.070 trillion), but the top three (China, the United States, and Germany) accounted for about 31.7 percent of the total exports. The top 30 importing countries accounted for 85.3 percent of the total imports (\$17.376 trillion), but the top three (the United States, China, and Germany) accounted for 32.4 percent of the total imports. The data presented in Tables 1-1 and 1-2 substantiate the observation about the important role of developed economies made earlier.

Additional insight can be gained by examining the growth in the volume of global trade and gross domestic product (GDP) from 2014 to 2020 (see Table 1-3). From 2014 to 2018, both trade and

Figure 1-2 Import–Trade Flows of Merchandise



Rank	Exporters	Value	Share	Annual % Change
1	China	2,591	14.7	4
2	United States	1,432	8.1	-13
3	Germany	1,380	7.8	-7
4	Netherlands	674	3.8	-5
5	Japan	641	3.6	-9
6	Hong Kong, China	549	3.1	3
7	Korea, Republic of	512	2.9	-5
8	Italy	496	2.8	-8
9	France	488	2.8	-14
10	Belgium	419	2.4	-6
11	Mexico	418	2.4	-9
12	United Kingdom	403	2.3	-14
13	Canada	391	2.2	-13
14	Singapore	363	2.1	-7
15	Chinese Taipei	347	2.0	5
16	Russian Federation	332	1.9	-21
17	Switzerland	319	1.8	2
18	Spain	307	1.7	-8
19	United Arab Emirates	306	1.7	-21
20	Vietnam	283	1.6	7
21	India	276	1.6	-15
22	Poland	271	1.5	2
23	Australia	250	1.4	-8
24	Malaysia	234	1.3	-2
25	Thailand	231	1.3	-6
26	Brazil	210	1.2	-7
27	Czech Republic	192	1.1	-4
28	Ireland	179	1.0	5
29	Saudi Arabia, Kingdom of	173	1.0	-34
30	Turkey	169	1.0	-6
	<b>Top 30 Countries</b>	<b>14,836</b>	<b>100.0</b>	<b>-</b>

Source: World Trade Organization.

GDP grew at a fairly constant rate. The impacts of the global pandemic can be seen by the decrease in both global trade and GDP in 2020. A number of factors came into play to explain the pre-pandemic increased growth rate including trade agreements among countries along with a reduction in tariffs, which promoted global trade and its associated benefits. There was also greater acceptance of importing finished products that were manufactured in foreign countries.

Traditionally, many countries imported raw materials that were scarce or not available in the importing country, and they then produced finished products mostly for domestic consumption. The raw materials were much lower in value than the finished products that contributed to the imbalance of trade among developing and developed economies. However, that situation has changed, countries that previously imported materials for domestic production and consumption are exporting more

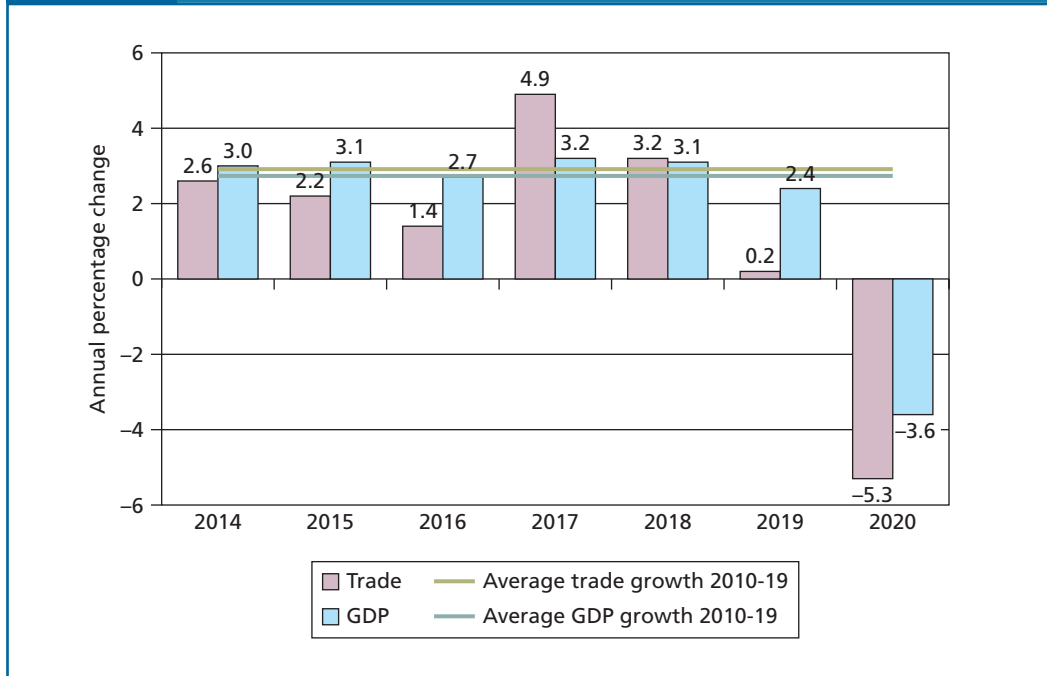
**Table 1-2** Top 30 Importers In World Merchandise Trade, 2020

Rank	Importers	Value	Share	Annual % Change
1	United States	2,408	13.5	-6
2	China	2,056	11.5	-1
3	Germany	1,171	6.6	-5
4	United Kingdom	635	3.6	-9
5	Japan	635	3.6	-12
6	Netherlands	597	3.4	-6
7	France	582	3.3	-11
8	Hong Kong, China	570	3.2	-1
9	Korea, Republic of	468	2.6	-7
10	Italy	423	2.4	-11
11	Canada	414	2.3	-11
12	Belgium	395	2.2	-8
13	Mexico	393	2.2	-16
14	India	372	2.1	-23
15	Singapore	330	1.9	-8
16	Spain	325	1.8	-13
17	Switzerland	291	1.6	5
18	Chinese Taipei	288	1.6	0
19	Vietnam	263	1.5	4
20	Poland	257	1.4	-3
21	Russian Federation	240	1.3	-6
22	United Arab Emirates	226	1.3	-16
23	Turkey	219	1.2	4
24	Australia	208	1.2	-6
25	Thailand	207	1.2	-12
26	Malaysia	190	1.1	-7
27	Austria	172	1.0	-7
28	Czech Republic	170	1.0	-5
29	Brazil	166	0.9	-10
30	Sweden	149	0.8	-6
	<b>Top 30 Countries</b>	<b>14,820</b>	<b>100.0</b>	<b>-</b>

Source: World Trade Organization.

finished products while so-called underdeveloped countries are participating more in manufacturing, especially of parts of a finished product. A very good example is the automobile industry. The typical automobile of today has over 10,000 parts, which can be manufactured in many different countries. Furthermore, the individual parts may be exported and put together into subassemblies that are frequently shipped to an assembly plant in another location. So, a Ford assembled in Detroit may have less U.S.-made parts than a Toyota assembled in Mexico. The efficiency of global supply chains and especially the transportation systems afford these more complex operations as compared to an earlier era when the auto parts were produced in locations which were more contiguous to the assembly plants. This is also an excellent example of companies using logistics systems analysis to evaluate the trade-offs among production costs, transportation services, and inventory carrying costs to arrive at the overall best location for efficiency and effectiveness.

**Table 1-3** Volume of World Merchandise Trade and Gross Domestic Product, 2014–2020  
(Annual Percentage Change)



Source: World Trade Organization.

As indicated earlier, the global supply chains of today allow production of products with parts being produced in several countries before the final finished product is assembled. A major contributing factor to the global supply chains and the economics of production is the efficiency and effectiveness of global transportation and associated services. The improved global supply chains with faster transit times and lower rates help promote global trade. Consumers received not only lower prices but also in many instances better quality food and manufactured products. In the next section, we will examine the economic basis and complimentary logic for global trade.

## The Economic Basis and Logic of Improved Global Trade

International trade is not a post–World War II phenomenon. During the Middle Ages, it was not uncommon for “traders” to cross regional and country borders by land or sea to buy, sell, or trade selected commodities. Even the Bible references traders from other regions. The exploits of European explorers studied in high school and college history books were often rationalized upon finding high value or exotic products to bring back to their home country in exchange for their domestic products or valued items. The discovery of foreign lands for future settlement was also a motive but with the recognition of the potential trade opportunities. Obviously, the trading was inefficient and slow because of the bartering required and the transportation.

### Absolute and Comparative Advantage

As the European countries advanced economically in the eighteenth century, there was a growing recognition of the value and potential of international trade. Adam Smith in his 1776 book, *The Wealth of Nations*,<sup>2</sup> not only provided a rational basis for a market economy based upon open or free competition, but also advanced the so-called Theory of Absolute Advantage that provided an economic basis for “free trade” among countries. Essentially, he stated that if two regions or countries produced and consumed the same two products—for example, eggs and butter—but had