

# **APICS CSCP** EXAM SUCCESS

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A GUIDE TO ACHIEVING  
CERTIFICATION  
ON YOUR FIRST ATTEMPT

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**HOWARD FORMAN**  
**DAVID FORMAN**



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## PREFACE

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We want to thank you for purchasing our *APICS CSCP Exam Success: A Guide to Achieving Certification Success on Your First Attempt*. Our study guide provides information on concepts, terms, relationships, and calculations needed to help you prepare to pass the CSCP certification exam. If you follow the information in this guide, it will help improve your probability of earning your CSCP certification.

The objective of this study guide is to present the various supply-chain-related concepts in a simple and user-friendly fashion. In order to do this we provided numerous examples to help the reader better understand how to apply learned concepts. It's our intent to increase your knowledge to better prepare you to take and pass the CSCP exam on your first attempt. Our study guide is designed for both the novice and the experienced supply chain professional who are searching for a user-friendly study guide and for any individual who did not earn their CSCP certification on their first try.

The beginning section provides useful information to help prepare you for the exam. Remember that your first step is to develop and follow a CSCP study plan. Once you develop your plan, you can begin to read the material in this study guide. We have segmented the concepts into sections to help you perform calculations and to learn key concepts, terms, and relationships.

We made a number of assumptions that you: have purchased and read (or will) at least the 2016, 2017, or the 2018 version of the APICS CSCP Learning System; reviewed the APICS CSCP Exam Content Manual course outline; and studied the key terminology list to identify key concepts, terms, relationships, and calculations. We also assume that you have access to and are using the online APICS CSCP Learning System as a study tool. If not, this reduces your probability of passing the exam. Our study guide is not meant to be a replacement for the APICS courseware. However, if you don't have the latest revision of the courseware, you might find it beneficial since we've incorporated the latest revisions in our study guide.

Inside this study guide, we have arranged the material into a number of chapters. Each chapter is broken down into different sections where we have identified key concepts, terms, relationships, and calculations. We have also provided a comprehensive list of key terms found in that chapter along with a number of exercises and practices to enhance your learning.

Chapter 1 provides an overview and an understanding of supply chain management—its objectives, how to make it more efficient and responsive, and the different integration types. It also provides an understanding of the value chain, value stream, and value stream mapping.

Chapter 2 discusses the importance of the Supply Chain Reference Model (SCOR)—its background, the various types of supply chain structures, SCOR Level 1 and 2 metrics, plus the various manufacturing environments and their attributes.

Chapter 3 deals with logistic fundamentals, supply chain integration, logistics service providers, substituting information for inventory, reverse logistics, and the waste hierarchy.

Chapter 4 covers the functions of logistics, warehousing activities and their functions, ownership versus leasing, the impact of adding or removing warehouses, temporary material storage, intermodal types, line haul shipping costs, value and packaging density, transportation stakeholder goals, carrier types and selection, transportation modes, shipping, pickup and delivery conflicts, and mechanized systems and equipment type attributes.

Chapter 5 addresses import/export logistics, its participants, global order flow air participants, import/export financial consideration terms, Incoterms, multicountry strategy, intellectual property, software, and technology licensing.

Chapter 6 deals with sustainability, regulatory, and security procedures; risk standards; the committee of sponsoring Organizations of the Treadway Commission (COSO) enterprise risk management framework components; the International Organization for Standardization (ISO); and sustainability and regulatory compliance.

Chapter 7 covers marketing and their processes, the four P's attributes, business plan, supply chain network modeling, operations research, identification of segments, marketing management, voice of the customer, communication and its processes, and measuring customer service.

Chapter 8 discusses demand management, demand, forecast processes, and its required information; basic time-series forecasting methods; historical sales data; simple and multiple regression; seasonal index; forecast error measurements (including the mean absolute deviation calculation); and the demand manager's role.

Chapter 9 deals with customer relationship management strategy, the differences between a transactional marketing strategy and customer relationship management, its implementation process and strategy by customer type, technology tools, the four levels of customer relationship management implementation, successful customer relationship management implementation key activities, customer lifetime value, customer relationship management implementation challenges, cultural issues impacting customer relationship management, and supplier relationship management.

Chapter 10 covers product design, its impact, product life cycle stages, and the various product design approaches.

Chapter 11 focuses on manufacturing and planning control, master planning, the planning hierarchy, sales and operations planning and its process flow, process steps, process ownership, aggregate strategies including level and chase, the sales and operations planning communications process, and manufacturing environments delivery lead times.

Chapter 12 extends the discussion to strategic and business strategy, organizational strategy, business strategy types, the five competitive cost strategies, functional versus innovative products, the balanced scorecard, organizational design, and the different supply chain management evolution stages.

Chapter 13 focuses on master scheduling, master schedule disaggregation, the differences between sales and operations planning and master scheduling, time fences and zones, commitment decision points, the projected available balance calculation, master scheduling time-phased records, the available-to-promise calculation, and rough cut capacity planning.

Chapter 14 demonstrates material requirements planning and distribution requirements planning, including the calculation process, and planning changes. It also discusses bills of material, single and multi-level bills of material, and distribution push and pull systems.

Chapter 15 deals with production activity control and capacity management, capacity management attributes and its hierarchy, the capacity requirements planning process, validation methods, resource planning process, capacity strategic objectives, input/output control, load profile, work center capacity versus load, capacity corrective action, and the various capacity calculations.

Chapter 16 focuses on continuous process improvement, lean, just-in-time philosophy, the Toyota Production System, Six Sigma, DMAIC, DMADV, the takt time calculation, Theory of Constraints, total quality management, total productive maintenance, various improvement tools, and the cost of quality.

Chapter 17 covers supplier relationship management and purchasing, their functions and benefits, the make-versus-buy cost analysis, total cost of ownership, offshoring, buyer-supplier relationship types, tactical and strategic sourcing, understanding the differences between single, sole, and multisourcing suppliers, supplier selection strategy, hard and soft negotiations, creating alliances with suppliers, alliance development steps, the supplier certification process, portals, trade exchanges, horizontal marketplace, auctions, and measuring suppliers.

Chapter 18 discusses synchronizing demand and supply, their principles, implementation challenges, supply chain integration, and inventory synchronization between trading partners.

Chapter 19 covers inventory management and types; independent and dependent demand; inventory ordering systems including order point, economic order quantity, safety stock, and safety lead time; inventory locations and echelons; Pareto analysis; inventory policy; periodic inventory versus cycle counting; aggregation inventory management; inventory types and functional types; inventory-related costs; and storage locations.

Chapter 20 deals with financial and managerial accounting concepts such as financial statements and financial analysis; financial report components; standard and overhead costs; *first-in, first-out* and *last-in, last-out* calculations; tax impact; financial metrics; and benefit-cost and net present value analysis and calculations.

Chapter 21 addresses the concept of economics, microeconomics, macroeconomics, the economic business cycle, aggregate demand-aggregate supply, understanding of the aggregate demand-aggregate supply model curve shift, economic attributes, and marginal analysis and cost calculations.

Chapter 22 addresses risk management in the supply chain, managing the supply chain risk process, the risk register, the risk response plan, risk probability and impact assessment, risk level categories, risk cost estimate table, expected monetary value, net impact expected monetary value, decision tree, sensitivity analysis and simulation, the four basic risk response types, supply chain risks, and business continuity and plan implementation.

Chapter 23 focuses on technology, its architecture, the evolution from material requirements planning to enterprise resources planning, software selection considerations, other software applications, and middleware.

Chapter 24 addresses data acquisition, storage, communication tools, the capture of timely and accurate data, static and dynamic data, data collection, data integrity and accuracy, big data, data mining, scanners and bar codes, automatic identification system, automatic identification and data capture, and radio frequency identification tags.

Chapter 25 focuses on understanding electronic business and commerce and its various types, traditional versus electronic business, the different business-to-business and business-to-consumer e-commerce layers.

Chapter 26 covers project management, the various process group activities, variance analysis, and its calculations.

The final chapters include sections on test readiness, a practice exam, a discussion on the CSCP Exam sign-up, the exam process, how to segment the exam, and potential mistakes to avoid when taking the exam. It discusses what to do at the conclusion if you pass or don't pass the exam.

We have also included a master listing of over 1,000 terms which you will find very beneficial to learn. Knowledge of all of these terms will aid the test taker to identify the correct answer. We have also included a listing of over 100 calculations found in the CSCP Learning System with samples of actual calculations to further aid your learning.

If you find any errors in this study guide, if you think something is missing, or if you desire an additional example or exercise, please let us know. We will promptly respond to you and make a correction, if needed. We will reference your name and contribution in an acknowledgment section if you find an error. E-mails should be addressed to [pimassociates@yahoo.com](mailto:pimassociates@yahoo.com).



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# INTRODUCTION

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If you are reading this sentence right now, you are in one of two groups of supply chain professionals. If you are in the first group, then you have already made that important decision to improve your career by earning an APICS Certified Supply Chain Professional (CSCP) certification. You may have already purchased the CSCP Learning System, sat through an instructor-led course, taken an online course or performed self-study, and are now looking for a study guide to help you prepare for the exam.

If you are in the second group, you are just beginning the process of understanding how a CSCP certification can improve your career, help you earn more money, jump-start a stagnant job, or switch careers. You may have spoken with a CSCP certified individual or coworker, read information on the value of earning your CSCP certification, and/or attended an APICS chapter professional development meeting. However, before making the final decision to earn your certification, you want to ensure yourself that it will benefit your future.

As the need for global supply chain professionals continues to expand in the marketplace, the desire for individuals who have earned their CSCP certification becomes a key employer requirement and differentiator. To validate this need, we suggest you look at employment search engines, want ads, or recruiter sheets to notice the numerous companies that are looking for CSCP certified individuals. We also suggest you perform a search for supply chain or operational employment positions in your area, and see if this presents an opportunity for you. If the answer is yes, make it your goal to obtain your CSCP certification and see how far it can take you!

Before we start to examine what's in this study guide, it's important to note that this book isn't a replacement for reading the CSCP Learning System, using the APICS CSCP online practice questions, reading supplementary materials, studying, or attending an instructor-led or online CSCP course. Its main purpose is to highlight and emphasize the contents of the CSCP Learning System with our own thoughts, descriptions, suggestions, examples, and comments. It's designed to help you identify and resolve your CSCP body of knowledge gaps, and to better learn and understand the various concepts, calculations, and relationships. Reading this study guide will aid you in getting the maximum benefit out of the CSCP courseware.

In order to get the full benefit from this study guide, it's imperative that you have completely read the current version of the CSCP Learning System. Our study guide reflects the latest revision, which was rewritten in January 2016 and most-recently updated in January 2018. It includes the added and enhanced topics of risk management, economics, communications, and project management that weren't included in earlier versions. If you have studied from an earlier CSCP version, these chapters will help you to learn

these key concepts. However, we do highly recommend that you obtain the latest version of the CSCP Learning System to increase your probability of passing the exam.

Not only does this book help to explain key concepts and provide additional examples, it also includes:

- Free 45-day online access to over 700 practice questions, enabling readers to perform practice tests by CSCP group and/or simulate actual full exams, with feedback on incorrect answers (see the inside front cover for the link to the test bank and your unique serial number)
- Test-taking tips
- How to read and analyze exam questions
- Over 40 exercises to help you learn and reinforce concepts
- Downloadable content such as CSCP acronym lists (see WAV page xxvii for more details)
- Over 100 calculations shown with working examples to help you better understand the logic behind the math
- Over 400 practice questions to help identify APICS CSCP body of knowledge gaps
- A comprehensive list of key terminology used throughout the CSCP Learning System

Our review of key terminology found in the CSCP Learning System identified approximately 1,100 terms. This far exceeds what APICS has highlighted in the exam content manual, and we believe that having knowledge of these additional terms will help you to be better prepared to answer exam questions. We have always stressed to our students that learning vocabulary is a key step in their exam preparation.

*Feeling motivated? Let's get started on earning your CSCP certification!*

## **PREPARATION**

We recommend that your first step toward becoming certified is to download the APICS CSCP Examination Procedures Bulletin for either North America or outside of North America. This bulletin will provide information on the CSCP eligibility form, how to schedule the exam, the Authorization to Test (ATT) process, the cost of the exam, and other terms and conditions as established by APICS.

### **CSCP Eligibility Form**

After downloading and reading your bulletin, submit your online CSCP eligibility form. Don't delay in performing this activity—it will determine if you are eligible to take the exam. Remember, you can't register for the CSCP exam unless APICS has approved your eligibility application.

## **APICS Membership**

The third preparation step we recommend is to join APICS as a Plus member. Selecting the APICS Plus membership option will allow you to obtain discounts on ordering the CSCP Learning System, taking the exam, and on any other reference materials you may elect to purchase from APICS. The decision to join will have an immediate return on investment. While we believe that APICS membership has great value, this is your decision. You don't need to be an APICS member to take the CSCP exam.

## **CSCP Learning System**

By purchasing the latest version of the CSCP Learning System, you will be provided with courseware that includes the CSCP Exam Content Manual (ECM) as well as one year of access to the CSCP online practice questions. The CSCP Learning System can also be ordered through the APICS Tappan Zee Chapter, if you live in the United States. Go to [www.apicstz.org](http://www.apicstz.org) to place your order. If you order it this way, you will be provided with an extra 100-question practice test at no extra cost in addition to the practice questions in our book. Remember that APICS Plus members can obtain a discount on this material, so consider joining before you order.

Once you receive your CSCP Learning System, start by reading and reviewing the ECM to help you to better understand what will be on the exam. The ECM is found in the front of Module 1, Book 1. It will help you focus your studying to key areas.

## **APICS Dictionary App**

If you have a smartphone, we suggest you download the free APICS Dictionary App to help you learn the CSCP key terminology. If you don't have a smartphone but are an APICS member, you can request a free copy of the APICS Dictionary. Nonmembers can purchase a copy from APICS—and it's worth the investment. Highlight the key terms found in the APICS CSCP Learning System ECM in your copy of the APICS Dictionary, and make sure to learn those terms. We also suggest you learn all of the terms found in our extended list. This step will help you to be better able to answer test questions by eliminating those terms that you know are wrong.

## **Authorization to Test (ATT)**

Sign into the APICS website and go to My APICS where you can either purchase an exam credit or use an existing one to schedule your exam.

APICS requires a test taker to request and receive an ATT e-mail before scheduling their exam. This process validates a person's CSCP eligibility status and the existence of an APICS identification number. You need to validate that the name that appears next to your APICS identification number matches the stated member name on your primary and secondary identification documents. If you have discrepancies in your APICS documentation, or lack an APICS identification number, contact APICS customer service

and request assistance. You won't be permitted to take the CSCP exam unless your documents match your APICS record.

The APICS computerized system will ask if you want to take the test in North America or outside of North America. Select your option and follow the APICS instructions to register for the exam. The CSCP exam is offered worldwide, only in a computer-based testing (CBT) format, and is scheduled through Pearson VUE.

Once you have logged into the APICS website, you can proceed to register. Select a test site using a chapter-supplied exam credit or pay for the exam with a credit or debit card. This site also permits you to reschedule or cancel your exam.

## CSCP Study Plan

The use of a study and time management plan will provide a road map to help you prepare for the CSCP exam. We suggest you perform the following steps to determine your study start and end dates:

- Determine your desired CSCP exam date.
- Back schedule from your desired exam date to determine the number of available reading/study days.
- Leave at least ten days for your final review before your expected test date.
- Divide the number of CSCP Learning System pages by the number of days before the exam to determine the number of pages you must read each day/week.
- Plan to spend at least one hour per day reading the courseware and answering the questions found throughout the session. You will also need additional time to read our study guide.
- You should spend at least one to two hours (maybe more) per week answering the CSCP practice questions found in the online CSCP Learning System and our study guide and online test bank.
- You should spend at least one to two hours per week on body of knowledge gap analysis to help you better understand why you answered a practice test question incorrectly.
- You should spend at least one hour per week reviewing CSCP flash card/dictionary terms and doing some supplemental reading. The flash cards can be downloaded from the APICS CSCP online website or you can use the APICS Dictionary App.

We suggest you spend at least 10–15 hours per week on reading, taking practice tests, and resolving your CSCP body of knowledge gaps. Keeping up with the reading can be challenging, so establish milestones and track your progress. If you find you can't achieve your planned milestones, move out your exam test date. Don't take the exam if you haven't completely read the APICS CSCP Learning System, our study guide, and taken the online CSCP practice tests.

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## ACKNOWLEDGMENTS

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We would like to take a moment to thank a number of people who assisted us in making this study guide possible.

First, we would like to thank our spouses, Harriet and Michelle, for their ongoing encouragement, support, faith, and love. Also, a special thanks to Joshua and Andrew for bringing love and joy into our lives.

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Third, we would like to thank the APICS Tappan Zee and Mid-Hudson Chapters for permitting us to teach APICS CSCP, CLTD, CIRM, and CPIM certification courses for them for the past 20 years. We also want to thank the hundreds of students who have attended our certification courses and tutorials. Their questions and feedback made us better instructors, which led us to write this study guide.

Fourth, a special thanks to Drew Gierman, Stephen Buda, and the team at J. Ross Publishing for their editorial guidance, technical knowledge, understanding, and patience—and for giving us the opportunity to write this study guide and prepare it for publication.

Finally, we also would like to thank all of the individuals who reviewed various sections of this study guide. We appreciated your encouragement and feedback.



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## ABOUT THE AUTHORS

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### HOWARD FORMAN

Howard Forman is president of PIM Associates Inc., a leading provider of operations and supply chain consulting, education, and training. He has over 35 years of experience in operations and supply chain management as a practitioner, consultant, and educator. His industry experience includes aerospace and defense, automotive, chemical, consumer, electrical/mechanical, financial, food, medical, pharmaceutical, remanufacturing, and service companies. Howard worked as a management consultant for Coopers & Lybrand, KPMG, Grant Thornton, and J.H. Cohn. He specializes in aiding companies who desire to reduce their inventory levels; make operations, warehouse, and process improvements; enhance cycle counting processes; optimize enterprise resources planning implementation systems; and improve demand management processes.

Howard has been a member of APICS since 1977. He has held numerous chapter board positions at the APICS Tappan Zee and the APICS Northern New Jersey Chapter, including Chapter President. He served the APICS Society as a member of its board of directors and Region 2 VP and as a member of its Chapter Development and its Voice of the Customer Committees. Howard was a section author for the APICS Operations Management Body of Knowledge Framework and a contributor to the CPIM Basics of Supply Chain Management and Master Planning of Resources courseware. He also participated in APICS CPIM and CIRM test question development sessions.

Howard has been recognized as a leading provider of APICS CSCP, CLTD, and CPIM certification courses, the APICS Lean Enterprise Workshop, APICS Principles courses, and the Basics of Supply Chain Management course. He has taught approximately 60 APICS CSCP and CLTD courses and over 175 CPIM certification courses for numerous APICS Chapters and the APICS Society. He has also developed and delivered tailored educational and training classes at over 85 companies in numerous industries.

Howard presented the first CSCP instructor webinar for the APICS Society and taught the first public CSCP certification and Lean Enterprise Workshop Series course in the country. He has presented the APICS Master Planning of Resources and the Detailed Scheduling and Planning CPIM certification tutorials at APICS International Conferences. He has also developed and freely shared numerous study aids and exercises to students worldwide.

Howard frequently speaks at APICS chapter dinner meetings, workshops, and seminars. He has also been a frequent speaker at the 6-Packed Conference, Seminar1, and Congress for Progress. He has presented at the DC Expo, BAAN, and American Software User Conferences as well as multiple APICS Volunteer Leadership Workshops held at APICS International Conferences and numerous APICS region and district meetings. He was honored at the 2012 APICS International Conference as the APICS Volunteer of the Year. He has also been honored by the APICS Tappan Zee Chapter, the APICS Mid-Hudson Chapter, and the APICS Northern New Jersey Chapter as their instructor of the year numerous times. The APICS Northern New Jersey Chapter has also recognized Howard twice with its Lifetime Member of the Year award.

Howard is a graduate of Fairleigh Dickinson University with a BS and MBA in Business Management and has had the privilege of teaching an operations management course there. He previously earned his APICS CSCP, CLTD, CIRM, and CFPIM certifications. Howard has also had articles published in Manufacturing Systems and Plant Maintenance magazines.

## **DAVID FORMAN**

David Forman is a graduate of Johnson and Wales University with a BS in Business Management. He is currently the Senior Manager of Business Projects at a leading manufacturer of residential and commercial electronics. David is also a senior associate with PIM Associates Inc., a leading provider of operations and supply chain consulting, education, and training. He has over 15 years of experience in operations and supply chain management as a practitioner, educator, and consultant. His industry experience includes SAP project management and internal consulting in SAP customer relationship management and R/3, as well as being a subject matter expert in material management, production planning, material requirements planning, sales and distribution variant configuration, supply chain management, demand management and forecasting, and operations and business process improvement. David also specializes in global supply chain management, global enterprise resources planning implementation, warehouse management systems, customer relations management, supplier relations management, service and repair, and logistics management. His experience includes industries such as electrical/mechanical products, consumer products, food products, finance, remanufacturing, and service.

David earned his APICS CSCP and CLTD certifications and has taught courses for the APICS Tappan Zee and Mid-Hudson Chapters since 2014. He has also developed and delivered tailored educational and training classes at numerous companies. These courses have included such topics as inventory management, material requirements planning, sales and operations planning, master scheduling, cycle counting, and supply chain analytics.

David has held numerous chapter board positions at the APICS Northern New Jersey Chapter, including chapter president. He was honored by the APICS Northern New Jersey Chapter as their member of the year in 2012. He currently serves on the board of directors of the APICS Tappan Zee Chapter and teaches the APICS CSCP and CLTD certification courses.



## **PIM ASSOCIATES INC.**

PIM Associates Inc. has been a nationally known provider of consulting and education services since 2000. They specialize in providing APICS CSCP, CLTD, and CPIM certification courses, as well as generic and tailored education and training. In addition, they also provide consulting services to help reduce inventory levels, improve inventory accuracy, help implement or improve cycle counting, take physical inventory, and improve MRP systems.

PIM Associates Inc. is dedicated to providing exceptional consulting and education services to emerging, mid market, or Fortune 100 companies. Their experience is based on many years of improving operational performance, reducing costs, improving customer service, and increasing company profit. They are able to quickly review operations and make recommendations to improve operational and financial performances. They have developed and delivered supply chain management, lean, S&OP, MRP, inventory improvement, and process improvement workshops along with APICS CSCP, CLTD, and CPIM classes to thousands of managers and employees.





This book has free material available for download from the Web Added Value™ resource center at [www.jrosspub.com](http://www.jrosspub.com)

At J. Ross Publishing we are committed to providing today's professional with practical, hands-on tools that enhance the learning experience and give readers an opportunity to apply what they have learned. That is why we offer free ancillary materials available for download on this book and all participating Web Added Value™ publications. These online resources may include interactive versions of material that appears in the book or supplemental templates, worksheets, models, plans, case studies, proposals, spreadsheets and assessment tools, among other things. Whenever you see the WAV™ symbol in any of our publications, it means bonus materials accompany the book and are available from the Web Added Value Download Resource Center at [www.jrosspub.com](http://www.jrosspub.com).

Downloads for *APICS CSCP Exam Success* include answers to the 25 exercises found throughout the book and the 75 question practice exam presented in Chapter 27, and a table that will help test the reader's understanding and recall of key terms and concepts.

## **J. ROSS PUBLISHING TESTING CENTER ACCESS**

If you have purchased a new physical copy of this book, please check out the inside front cover for the link and serial number you will need to gain 45 days of free access to the CSCP online test bank. Happy studying!



# 1

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## SUPPLY CHAIN MANAGEMENT

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This chapter focuses on the importance of supply chain management (SCM) to an organization. It examines how supply chains add value, the differences between an efficient and responsive supply chain, and vertical and horizontal integration. It also explores value chains, value streams, and value stream mapping.

### SUPPLY CHAIN OVERVIEW

A *supply chain* is a network of participating entities, linked together, that is used to manage resources and materials, transform materials into a product, move and store products, and pass information from suppliers to their customers. Each organization seems to have its own unique definition of *SCM*. They range from improving supply chain related activities, to helping create customer value, planning and managing the movement of materials, and coordinating and integrating supply and demand management to plan, source, make, and deliver a product across all channels. One thing that all of the definitions have in common is that SCM helps to create net value, has value-creating activities, balances competing internal and external organizational interests, and manages the group dynamics of states, countries, and cultures to improve the overall process flow. This results in lower costs, improved delivery performances, visibility, and velocity—leading to enhanced customer value.

### SUPPLY CHAIN OBJECTIVES

Companies strive to achieve five primary supply chain objectives in order to create value and gain financial benefits. The five objectives are adding value for customers and stakeholders, improving customer service, effectively using system-wide resources, efficiently using system-wide resources, and leveraging partner strengths.

*Customer service* supports customers before, during, and after the sales process and adds value to the customer experience. It can involve face-to-face, computer, phone, mail, or self-service interactions. The goal of customer service is to support, measure, and improve customer satisfaction.

*Value* is defined by the customer—and it's more than the monetary worth of an asset, item sold, or service rendered. The customers compare their perception against perceived cost benefits. This value comparison process can be quite subjective as customers perceive value differently based on cost, brand name, usage, and image in the marketplace. The process of adding value for customers and stakeholders is all about making supply chain investments that create customer service value while managing self-defeating internal and external tradeoffs and conflicts. Value ensures that the risk of extreme cost cutting is avoided because it can negatively impact customer service. Finally, adding value guarantees supply chain financial gains among all stakeholders so that everyone benefits.

A *stakeholder* is anyone who has an interest or concern regarding an organization's objectives, goals, actions, or policies. Examples of stakeholders include customers, employees, investors, suppliers, the government, and the community at large. Each group has a different definition of value, and companies need to consider how increasing the value for one stakeholder may impact the others. This requires carefully balancing the needs of one party against others so that everyone can benefit. A *primary stakeholder* is usually an internal stakeholder (employee, supplier, customer, or creditor) who is engaged in an economic business activity within the business itself. *External stakeholders* are those outside of the business who are affected by the business (investors, lenders, communities, and government).

The process of excellence in customer service addresses customer wants and needs. Common customer service metrics include on-time customer product delivery, reliability, availability, customer satisfaction, and operational performance. Companies target underperforming measurements and then implement supply chain improvement programs to correct areas in which they are weak.

The process of the effective use of system-wide resources refers to how well companies handle their own resources. Resources can be labor, equipment, material, or even money. The process measures resources against planned capacity. The process of efficient use of system-wide resources compares actual output to expected standard output in order to track performance. This metric is inward-focused, as it measures the efficiency of supply chain velocity, visibility, costs, and resources. It tracks a company's process in producing and distributing the right product, at the right time, to the right place, and at the right cost to meet customer service requirements. *Velocity* refers to speed. It's the rate at which products move through a supply chain, order process, manufacturing process, or get delivered to a customer. *Visibility* is the ability to see from one end of the supply chain to the other. Enhanced visibility improves velocity throughout the supply chain. Companies have learned that focusing on operational efficiency alone may lead to poor quality, which results in no additional gains. They have also learned that in order to be successful, they not only have to be efficient, they must also be effective.

Leveraging partner strengths is a supply chain objective that allows a company to focus on their core competencies or core capabilities. It leads to improved sales, design improvements, productivity gains, cost reductions, access to new markets and customers, new product ideas, and enhanced competitiveness. *Core competencies* or *core capabilities* are activities that are performed by companies and have been defined as being critical to their success. They consist of a number of different areas that help gain competitive advantages, enhanced strategic growth, and added value to products. Core competencies/core capabilities involve improving market access for their products, economies of scale, resource

advantages (utilization or access), improved communications, improved organizational skills, technology advantages (software, data usage, or processes), financial strength, and geographic expertise or capacity advantages (global reach). Core competencies/core capabilities can be further broken down into decision making (planning and enabling) and execution activities (sourcing, making, delivering, and returning). Economies of scale are the competitive advantages that a company may have over its competition. Examples include high manufacturing volume, bulk purchases, or operating a warehouse seven days a week for three shifts per day.

## EFFICIENT SUPPLY CHAIN

The *efficient supply chain* is driven by forecasts for make-to-stock (MTS) products that have stable customer demand and low forecast error. These products have a long product life cycle (PLC), limited market changes, and infrequent product introduction. The efficient supply chain permits a company to focus on high volume with low variety. This helps drive down operational costs and improve customer service. Examples that require an efficient supply chain are commodity products such as tomato soup, salt, or underwear.

Efficient supply chains focus on minimizing their cost structures. Companies using this method maintain a high equipment utilization and efficiency rate. They maintain minimal inventory levels that are sufficient to achieve desired customer service levels and select suppliers based on their ability to quickly deliver low-cost, reliable, and quality products. Products are forecasted based on historical demand.

## RESPONSIVE SUPPLY CHAIN

The *responsive supply chain* is driven by customer orders and has low demand predictability. Products in this supply chain have a short PLC with frequent market changes and new product introduction. They are higher-margin make-to-order (MTO) or assemble-to-order (ATO) products *pulled* against customer orders. These products are desired by their customers but have low volume, high variety, and higher operational costs. *Supply chain resilience* is the ability to quickly adjust and restore supply chain operations back to their original state after a disruption.

A responsive supply chain manufacturing strategy focuses on delivery speed, agility, and higher profits. The company maintains flexibility with their operating facility and equipment and they keep excess capacity available to meet ever-changing customer demands. They also maintain higher raw material and component inventory levels, keep buffer (safety stock) inventory levels, and select their suppliers based on the ability to quickly deliver inventory. In the responsive supply chain strategy, products are forecasted based on qualitative techniques, and the forecast error can be quite high. The transportation strategy focuses on speedy delivery to meet customer requested lead times.

The key attributes and differences between the two forms of supply chains are displayed in Exhibit 1.1.

**Exhibit 1.1** Efficient and responsive supply chain comparison

Efficient Supply Chain Stable or Functional Products	Attribute	Responsive Supply Chain Innovative or Reactive Products
Higher ←	Volume	→ Lower
Lower ←	Variety	→ Higher
Shorter ←	Lead time	→ Longer
Higher ←	Forecast accuracy	→ Lower
Longer ←	Product life cycle	→ Shorter
Lower ←	Demand uncertainty	→ Higher

## SUPPLY CHAIN VERTICAL INTEGRATION

*Vertical integration* is when a company owns and controls all aspects of its upstream and downstream supply chain. It provides a stronger foundation for future growth by permitting the company to bring new products to market more quickly. A good example of vertical integration is the Ford Model T. Ford controlled its entire supply chain starting with the downstream iron mines, ships to move the iron ore, iron smelters, stamping presses, machine shops, and the upstream assembly areas. Although vertical integration gives a company strong internal control, it lacks the flexibility to incorporate product variability.

## SUPPLY CHAIN HORIZONTAL OR LATERAL INTEGRATION

*Horizontal or lateral integration* creates a leaner, more agile business model in which a company focuses on its core competencies and outsources non-core activities. A good example of this is Apple, which performs its own sales and marketing, product design, and the operation of its retail stores. However, they outsource their manufacturing processes to third parties. A *business model* is a conceptual picture of an organization's strategy that is developed to project a future view of the business. It gets included in the business plan and includes attributes such as speed, quality, financial goals and objectives, market share, sustainability, resource management, and employee welfare. A business model focuses on satisfying customers.

## SUPPLY CHAIN KEIRETSU INTEGRATION

*Keiretsu* is an intermediate form of integration that is used by Japanese companies. It's a business group in which member companies own small portions of each other's companies, have interlocking business relationships, buy and sell products and services to each other, and is centered on a core bank that provides funding.

Exercise 1.1 will test your knowledge and understanding of the three supply chain integration types—vertical, horizontal, and Keiretsu. Read each question and write in the answer that best applies. The answers to this exercise are available from the Web Added Value™ Download Resource Center at [www.jrosspub.com](http://www.jrosspub.com).



**Exercise 1.1** Supply chain integration types—vertical, horizontal, or Keiretsu

Attribute	Answer
1. Which type applies with a supply chain that has an agile business focus?	
2. Which type controls the entire supply chain?	
3. Which type focuses on a core competency?	
4. Which type focuses on economies of scale?	
5. Which type focuses on improving visibility?	
6. Which type is best for improving the income and cash flow statement?	
7. Which type is centered around a core bank?	
8. Which type is focused on backward integration?	
9. Which type is focused on long-term planning?	
10. Which type is focused on outsourcing?	
11. Which type is focused on interlocking business relationships?	

**SUPPLY CHAIN VALUE CHAIN**

A *value chain* identifies *value-added activities* within a company. These are high-level, primary, and support functional activities that a company considers its core competencies. Companies believe these activities are their strengths and add value in the eyes of the customer. A non-value activity is to be eliminated or outsourced. Examples of supply chain activities that can be outsourced include manufacturing, warehousing, transportation, and purchasing.

**SUPPLY CHAIN VALUE STREAM**

A *value stream* looks at processes or activities that are required to satisfy a customer need. It starts with an internal customer, such as a distribution center, and moves across functional departments including order entry, purchasing, and operations. It then ends at the external customer. A value stream examines each activity to determine its worth. The goal is to eliminate non-value process activities—resulting in reduced costs and improved velocity and visibility. An example of a supply chain value stream activity that can be eliminated is paying the supplier's invoice by check when it can be replaced by an electronic funds transfer.

**SUPPLY CHAIN VALUE STREAM MAPPING**

*Value stream mapping* (VSM) is a lean technique used to document a product or service value stream by using a one-page visual process picture. VSM starts with the customer and ends at the supplier. It encompasses various order processing, operational, inventory, and technology functions and activities. VSM begins with a one-page visual conceptual picture of the current *as-is* process and ends with a future *to-be* state that is used to identify supply chain process improvement opportunities.

Exercise 1.2 will test your knowledge and understanding of where to apply value chain, value stream, or value stream mapping. Read each question and write in all answers that apply. The answers to the exercise are available from the Web Added Value™ Download Resource Center at [www.jrosspub.com](http://www.jrosspub.com).

**Exercise 1.2** Understanding value chain, value stream, and value stream mapping

Question	Answer
1. Which are used to display a strategic business process model?	
2. Which are used to identify wasteful activities?	
3. Which best creates a future activity view?	
4. Which best displays delivery activity processes for a product and service organization?	
5. Which best displays process metrics?	
6. Which best shows a functional collaboration view?	
7. Which displays all information with a one page view?	
8. Which is a lean tool?	
9. Which is focused on showing a core competency view?	
10. Which shows an end-to-end supply chain view?	

## KEY TERMINOLOGY

Understanding key terms and the concepts they represent is key to passing the Certified Supply Chain Professional (CSCP) exam. In this chapter, the following important terms are identified in Table 1.1.

**Table 1.1** SCM key terminology

Business model
Core capability
Core competency
Customer service
Efficient supply chain
External stakeholder
Horizontal integration
Keiretsu*
Lateral integration
Primary stakeholder
Responsive supply chain
Stakeholder
Supply chain
Supply chain management (SCM)*
Supply chain resilience*
Value
Value chain*
Value stream*
Value stream mapping (VSM)*
Value-added activities
Velocity
Vertical integration
Visibility

\* Key term found in the CSCP Exam Content Manual (ECM)

## CSCP EXAM PRACTICE QUESTIONS ON SCM

The questions shown in Table 1.2a cover the concepts presented in this chapter on SCM. They are examples of what to expect on the actual exam.

**Table 1.2a** CSCP exam practice questions on SCM

No.	Questions
1	Henry Ford's flow production process lacked a critical concept found in today's more customer responsive supply chain environment. What was it missing? a) Velocity b) Flexibility c) Quality standards d) Flexible workforce
2	A product which has little need for real-time information and uses a simple connectivity technology is best described by which supply chain strategy type? a) Stable b) Unstable c) Reactive d) Efficient reactive
3	The practice of bringing the supply chain inside one organization refers to: a) Chase integration b) Lateral integration c) Vertical integration d) Horizontal integration
4	A form of integration in which suppliers and customers aren't completely independent, but instead own limited stakes in one another, is best called: a) Cartel b) Kanban c) Keiretsu d) Poka yoka
5	Which of the following may hamper a lateral supply chain? a) Focus b) Control c) Expertise d) Economics of scale
6	Supply chain management is about creating: a) Net value b) Cost reduction c) Leaner supply chain d) Process improvements

*Continued*

7	What is the real challenge in developing a value stream? a) Seeing it from the customer's perspective b) Seeing it from the supplier's perspective c) Eliminating non-value-added activities d) Seeing it from the producer's perspective
8	What will most likely increase in a traditional manufacturing business if driven by economies-of-scale thinking? a) Agility b) Velocity c) Flexibility d) Inventory
9	Which of the following isn't the best indication of a company using a responsive strategy? a) Faster delivery speed b) Quicker order fulfillment c) Higher customer satisfaction d) Higher work center efficiency and utilization
10	Zara, a global manufacturer and retailer of clothing, has a supply chain strategy that is best based on: a) Cost efficiency b) Speed to market c) Configure to order d) Outsourcing manufacturing
11	The MIP Company decided to pursue cost efficiencies and increase velocity due to changes in market conditions, but not at the exclusion of: a) Speed b) Flexibility c) Process flow d) Product volume
12	A company that has a relatively stable demand and a high level of forecast accuracy will focus primarily on: a) Agility b) Efficiency c) Reliability d) Responsiveness
13	Which of the following isn't an attribute of a response-focused supply chain? a) Fixed capacity b) High forecast errors c) Multiple warehouses d) Short product life cycle (PLC)

## ANSWERS TO CSCP EXAM PRACTICE QUESTIONS ON SCM

The answers to the practice questions on SCM are shown in Table 1.2b. Any question you answer incorrectly indicates a gap in your body of knowledge and encourages the need for additional study time.

**Table 1.2b** Answers to CSCP exam practice questions on SCM

No.	Answers
1	Answer: B Flexibility was missing in the Ford flow production process. The company built only black model Ts which increased volume, but limited product mix flexibility.
2	Answer: A A stable product has a stable demand pattern and doesn't require real-time information.
3	Answer: C This question requires knowledge of the APICS Dictionary definition of vertical integration. Vertical integration means that the company does everything themselves. Horizontal and lateral are the same term, and chase integration is a made-up term.
4	Answer: C This question requires knowledge of the APICS Dictionary definition of Keiretsu. Keiretsu is a Japanese network of integrated companies with interlocking business relationships and cross-ownerships.
5	Answer: B A lateral supply chain doesn't have direct control over functional activities because they are being performed by other parties.
6	Answer: A Supply chain management is about creating net value, not cost reduction. Creating net value includes answers B, C, and D within it.
7	Answer: A This question requires knowledge of the APICS Dictionary definition of value stream. It's hard to view a value stream from the customer perspective because it may be in conflict with internal objectives.
8	Answer: D Traditionally, economies-of-scale thinking drives a company to produce large production quantities which result in increased inventory levels.
9	Answer: D Higher work-center efficiency and utilization means that a company is making longer and larger production runs. Customer service is impacted as the company focuses on a forecast or low-cost strategy, rather than a responsive strategy.
10	Answer: B Zara considers speed to market (velocity) as their strategic order winner, as described in the CSCP courseware.
11	Answer: B The company must still be flexible even if it impacts cost so that it can increase product delivery when and where it's required.
12	Answer: B A company that has relatively stable demand and a high level of forecast accuracy will focus on efficiency. This permits it to lower costs as pricing becomes the key market driver.
13	Answer: A Fixed capacity restricts the amount of products a company can produce and limits the flexibility to respond to customer needs. This then limits the response-focused supply chain as the company needs flexibility to respond quickly to customers. For this reason, fixed capacity cannot be an attribute for a response-focused supply chain.