

# Mastering the Supply Chain

Principles, practice and real-life applications

Ed Weenk

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# ABOUT THE AUTHOR

Ed Weenk founded QuSL at the beginning of 2004 in Barcelona, where he was living at the time. Currently based out of Maastricht (Netherlands), Ed has had extensive experience since the mid-1990s in managing international logistics and distribution projects at strategic and operational level.

He gained an MSc in Business Administration from Erasmus University/Rotterdam School of Management and a Professional Doctorate in Engineering (PDEng) focused on supply chain management from Eindhoven University of Technology. Ed also works as a Senior Associate Professor at different business schools, such as EADA Barcelona (Spain), Maastricht School of Management (Netherlands), Antwerp Management School (Belgium) and Centrum Graduate School of Business (Lima, Peru), on the topics of operations and supply chain, project management and intra- and entrepreneurship.

A strong believer in the principles of experiential learning based on methodologies such as the case method as championed by Harvard Business School, in-class teamwork and serious gaming, Ed is delivery partner and authorized trainer in the business simulation games of Inchainge of The Netherlands and the Palatine Group of New York.

Ed has previously written a management book titled *The Perfect Pass: What the manager can learn from the football trainer*, published in English, Spanish and Dutch, about the importance of seeing the *big picture*, having good internal and external *alignment* and achieving *coherence* at all levels.

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# ABOUT THE CONTRIBUTORS

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Chuck Nemer is a trainer/consultant with 40 years of experience in supply chain management, lean, leadership and APICS. He also teaches operations management at an urban university in St Paul, Minnesota (USA). He is active both locally and nationally in his APICS professional society as well, in the areas of instructor development and curriculum development. Chuck works with many schools on various business simulations, such as The Fresh Connection. He has a Bachelor's degree in Accounting from the University of Minnesota, a Master's degree in Leadership from Augsburg College in Minneapolis, MN, CPIM and CLTD certification from APICS, and online curriculum development certification from the Wisconsin Technical College System.

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# BACKGROUND

## Egge Haak – Partner at Inchange

Inchange is a Dutch company fully dedicated to experiential learning in supply chain management based on business simulations. We constantly create new simulations and training programmes as well as enhance our existing ones, so that learners in the industry and around the world can be supported in their learning journeys. Being a small and compact organization, we take great care in developing and maintaining a large network of both professional trainers and educational teachers and professors around the globe.

The volatile and uncertain world we currently live in creates enormous challenges for companies and their supply chains. Change is the only certainty in business every day, and in order to adapt supply chains successfully, a thorough understanding of its dynamics and interdependencies is necessary. But just understanding the system as a whole will not be enough; constant adaptation also calls for leadership skills in collaboration and teamwork.

At Inchange, we believe that such understanding and the corresponding skills can only be acquired through active experience, by which I mean the full experience of managing a supply chain with a team, of handling all dimensions in an integral way, of exploring how everything is connected, of working effectively together as a team. On top of this, our mission is to help students and companies create alignment between strategy and execution, between departments in a company and between business partners in the value chain.

We have designed and built all of our business simulations with these objectives in mind, starting with The Fresh Connection in 2008: to help learners understand relevant concepts and to provide them with a platform to experience these in a virtual company setting and thus acquire the necessary skills in order to better deal with the complexities of alignment in the competitive and fun setting of a game. But we don't stop there: we also have a wide diversity of materials to support teachers, trainers and learners in their usage of our simulations and to enrich their experience with meaningful content.

That is also where this book fits in. Apart from our existing simulations and supporting materials, we were looking for a way to further bridge the gap between theoretical supply chain concepts and their direct application, and that is precisely what you will find here. The book starts with an overview of many critical supply chain concepts, and then invites their practical application using The Fresh

Connection as an interactive case. In Part Three the book goes beyond the pure context of the simulation, providing learners with a wealth of additional supply chain challenges to think about. I therefore believe the book will be extremely useful to both learners and their instructors, be it in business or in the educational world.

At Inchainge we trust that this book will set a new standard and bring the integral experience of The Fresh Connection to a higher level.

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# PREFACE:

## SIMPLE BUT NOT EASY (1)

*Many students learn best when they are actively doing things and not only studying ideas in the abstract: when their curiosity is aroused, when they are asking questions, discovering new ideas, and feeling for themselves the excitement of these disciplines.*

KEN ROBINSON AND LOU ARONICA (2015)

Truth be told, there are already many books about supply chain management and very good ones too, but it has not been our objective to add yet another textbook to the list. On the contrary, we wanted to create a textbook with a clear and strong focus on practical application by students. Albert Einstein supposedly used to say that instead of focusing on teaching and explaining theories and concepts, he preferred to put emphasis on providing the conditions in which students can practise and learn. Following suit, this book wants to provide a solid basis for students to practice and learn how to master the supply chain. *Mastering the Supply Chain* is written for people studying supply chain management. It can be used as part of courses within specialized supply chain or logistics programmes, but also links well to courses within programmes of a more generalist nature, from Bachelor level up to (Executive) MBA, as well as in-company training courses.

There are three main desires behind the topics chosen for the book and the strong emphasis on practical application:

- 1** The desire to put the increasing need for developing *21st-century skills* such as critical thinking, complex problem solving and coordinating with others into the practical context of supply chain management.
- 2** The desire to actively address the recurring theme of *simple but not easy*, ie to provide a way to make students feel first-hand the many complexities of actually applying the often relatively straightforward concepts and frameworks in supply chain management.
- 3** The desire to combine the *multiple dimensions of supply chain management* into one coherent and holistic view on the topic, focusing in particular on the business, technical and leadership dimensions and the way these interact.

## Simple but not easy

The phrase ‘simple but not easy’ is one of the central threads running through the book. It refers to the fact that many of the underlying concepts and frameworks in supply chain management are relatively straightforward and therefore ‘simple’ to understand, but that there are a number of reasons why their application in practice is ‘not easy’.

First, the supply chain area is full of concepts that describe the elements at play in certain topics. For example, when talking about outsourcing, there are frameworks that highlight the factors to be taken into consideration when a company wants to decide whether or not to outsource a particular activity. Application of such a framework will lead to a list of arguments in favour of, or against, outsourcing. Some of those arguments are quantifiable, but there are also some parts which are more qualitative in nature, and this combination of quantitative and qualitative arguments brings in the (subjective) dimension of judgement. In other words, the elements of the framework are simple to understand, but making a concrete decision on the basis of applying the framework might not always be that easy and straightforward.

Second, even though the individual concepts might be simple to understand, it is the sheer number of those at play at once and with an infinite number of interdependencies between them that makes it a very challenging area to manage, especially from a global holistic perspective. For example, we can speak about the main considerations of inventories, or the physical aspects of warehousing, or developments in transportation, all relatively straightforward at the conceptual level, but when we have to come up with an integral distribution network solution for a particular company, suddenly the puzzle becomes quite a lot more complex because we need to bring all of those aspects into the equation.

Add to this the very realistic dimension of incomplete information, assumptions, ambiguity, time pressure, different opinions and a world around us which is moving on continuously, and we get an even more complex picture.

So, in the book, ‘simple but not easy’ is a recurring theme. Many of the individual concepts of supply chain management are dealt with, but always with the objective of finally arriving at the point of specific and explicit decision making within a global holistic context. Indeed, mastering supply chain management is complex, but in my opinion, that’s precisely what makes it such a fascinating area to work in.

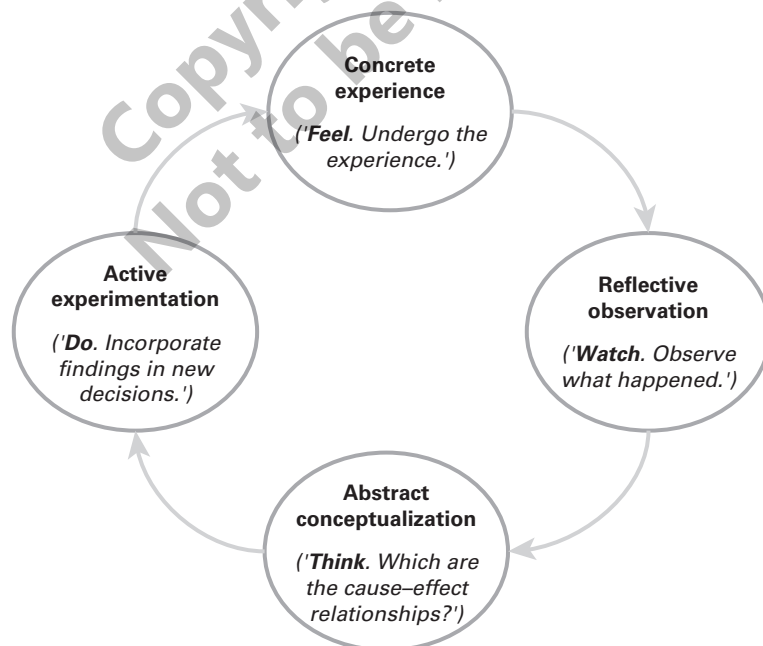
## The age of acceleration, 21st-century skills and experiential learning

Although, given its relevance, a slightly more extensive description of the age of acceleration, 21st-century skills and experiential learning can be found in the Appendix, a brief introduction seems appropriate here. We live in the age of acceleration; the world is changing faster and faster, calling for different skills from those that were valid in the past (Friedman, 2016). In this context, people also speak about the need for training 21st-century skills (World Economic Forum, 2016; Robinson and Aronica, 2015).

Experiential learning seems to be a very appropriate way of training such skills. I'd like to reference in particular the work of David Kolb, whose book *Experiential Learning* is a classic on the topic. Among other important contributions, for example the concept of individual learning styles, Kolb is well known for what is called the learning cycle (Figure 0.1).

The main idea behind the learning cycle is that 'knowledge results from the combination of grasping and transforming experience. Grasping experience refers to the process of taking in information, and transforming experience is how individuals

**Figure 0.1** The learning cycle



**SOURCE** after McLeod (2017), based on Kolb (2015)

interpret and act on that information. [...] This process is portrayed as an idealized learning cycle or spiral where the learner “touches all the bases” (Kolb, 2015).

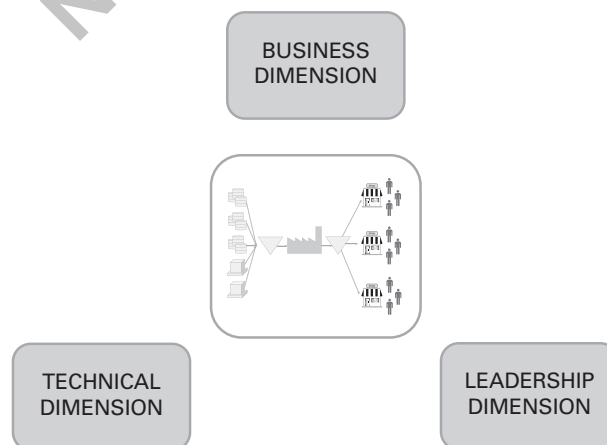
In experiential learning, the focus is on undergoing an experience first-hand, which allows for reflection on what happened and why, leading to forming a conceptual view of the situation, potentially reinforced by existing theories and/or frameworks. This combination will then be the basis for an improved view of the situation, which can be applied in the next experience, either in class or in another study environment, or directly in a real-world situation. In the book we will use a business simulation game called The Fresh Connection as an important tool for facilitating this experiential learning.

## The multiple dimensions of supply chain management

Supply chain management has many faces and it covers a wide array of activities as far as scope is concerned. But it does have very distinct dimensions, which are very different in nature.

First, supply chain management has a clear strategic or *business* dimension. In the end, the supply chain is an integral part of a company, contributing together with the other areas and departments to overall business success. This implies that decision making within the supply chain must fit with the overall direction that the company has defined for the future. Here we speak more about the vital and direct links between the supply chain and corporate strategy and competitive positioning. Or, for example, the impact of market segmentation and value propositions on supply chain

**Figure 0.2** The three dimensions of supply chain at the core of the book





strategy and the relationships between the supply chain and the financials of the company, as expressed, for example, in return on investment (ROI).

Second, supply chain has a clear *technical* dimension, for example when dealing with aspects of manufacturing and distribution infrastructure, technology, forecasting and planning models, or supporting IT systems. This is the part that relates more to the engineering face of the supply chain.

And third, supply chain management has a clear *leadership* or people dimension. Because of its cross-functional nature, spanning activities from purchasing all the way down to sales and after-sales, there are many interrelationships with other functional areas in the company. In practice, many of the functional areas might have different objectives, leading to potential conflicts which need to be aligned and managed somehow. In this part, we speak about topics such as decision-making processes, key performance indicators (KPIs), team dynamics and stakeholder management.

Because of their importance and because of their differences, these three distinct dimensions of the supply chain, technical, business and leadership, will be dealt with explicitly and separately in the book. In fact, together they form the backbone of the structure of the book (Figure 0.2).

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# STRUCTURE OF THE BOOK

In line with the desires behind the book as explained in the preface, the objective of this book is to fully facilitate the ‘*learner touching all the bases*’, using the principles of experiential learning, training 21st-century skills, while going through the first-hand experience of supply chain being simple but not easy and working with the distinct dimensions of the topic.

Parts Two and Three are supported by the Fresh Connection simulation game. This book gives free access to the entry level of the game. See p 32 for details. In subsequent steps, the business simulation serves as a vehicle for grasping experience, as well as transforming experience, by offering the possibility for the simulation of rounds of gameplay complemented by conceptual frameworks, as well as active reflecting by the student, leading into a new round of simulation, creating a steep learning curve based on first-hand experience. In addition, fields of direct application outside the simulation tool will be touched upon, to widen the student’s perspective even further.

To break down the complexity of the topic of supply chain into manageable parts, the book consists of three sections, each dealing with the three aforementioned dimensions of the supply chain in a different way.

In *Part One: Exploring the fundamentals* we present a helicopter view of the main important *principles*, that is, the theories, frameworks and concepts, of supply chain management, which can be found in most books on the topic. Although the list itself is quite extensive, we want to keep it as simple as possible for this book, and that is why, instead of going into much detail, we limit ourselves to brief and to-the-point introductions. Wherever relevant, reference will be made to leading textbooks from the supply chain area, as well as the most important areas touching the supply chain, such as strategy and marketing. Most of the topics covered are accompanied by some initial exercises to get the student actively working with them in order to become acquainted with them. These exercises serve to *explore* the topics at hand. This first section thus sets the scene for *practice* and *real-life application* of the principles in Parts Two and Three.

*Part Two: Mastering the fundamentals* focuses on applying the fundamental concepts from Part One in practice. Here, The Fresh Connection business simulation is the main vehicle that enables the application of the individual concepts that were introduced in Part One. The basic setup of the simulation used in this second part presents a relatively stable environment in which to make a wide variety of basic supply-chain-related decisions, in order to make the supply chain run smoothly and the company profitable. In this way, the student gets the first-hand experience of *analysing real company data* from different functional areas in order to *make good decisions*. Reflections and exercises in this section are thus structured in two steps:

*analyse* and *decide*. By running the simulation, there will be a clear and visible link between cause and effect (decisions and results).

*Part Three: Imagining beyond the fundamentals* elaborates on what happens if we start ‘imagining beyond the fundamentals’, if the status quo of a supply chain is challenged. For example, what are the implications when new products or sales channels are introduced, new geographies explored, or major supply chain risks are being taken into consideration? Reflections and exercises in the third part fall under the umbrella of *imagining the impact* of certain internal corporate directions, or external trends and developments. All aspects covered in Part Three are related to the company at the heart of the gameplay in Part Two, so, wherever possible, real company data from the simulation will be used.

In each of the three parts, the three dimensions of the supply chain (technical, business, leadership) are dealt with. This gives the book its overall structure (Figure 0.3).

**Figure 0.3** Overall structure of the book

Preface: simple but not easy (1)		
PART ONE: <b>EXPLORING</b> THE FUNDAMENTALS	PART TWO: <b>MASTERING</b> THE FUNDAMENTALS	PART THREE: <b>IMAGINING BEYOND</b> THE FUNDAMENTALS
<b>1 General introduction</b>	<b>6 Knowledge in action</b>	<b>11 SC in a VUCA world</b>
<b>2 Business dimension</b> Competitive strategies Customers and value propositions Competitive advantages Supply chain and finance Business models and supply chain External environment Risk management	<b>7 Business dimension</b> Competitive strategies Customers and value propositions  Supply chain and finance	<b>12 Business dimension</b> Competitive strategies Customers and value propositions Competitive advantages  Business models and supply chain External environment Risk management
<b>3 Technical dimension</b> Supply chain strategy Physical infrastructure: <i>Product and push/pull</i> <i>Facilities and transportation</i> <i>Outsourcing and collaboration</i> <i>Network design</i> Planning & control <i>Uncertainty, forecasting, capacity</i> <i>Planning &amp; scheduling,</i> <i>production &amp; quality</i> <i>Inventories</i> <i>Payment terms &amp; incoterms</i> Information & systems, organization	<b>8 Technical dimension</b> Supply chain strategy Physical infrastructure: <i>Product and push/pull (given)</i> <i>Facilities and transportation</i> <i>Outsourcing and collaboration</i> <i>Network design</i> Planning & control <i>Uncertainty, forecasting, capacity</i> <i>Planning &amp; scheduling,</i> <i>production &amp; quality</i> <i>Inventories</i> <i>Payment terms &amp; incoterms</i> Information & systems, organization	<b>13 Technical dimension</b> Supply chain strategy Physical infrastructure: <i>Product and push/pull (challenged)</i> <i>Facilities and transportation</i> <i>Outsourcing and collaboration</i> <i>Network design</i> Planning & control <i>Uncertainty, forecasting, capacity</i>  Information & systems, organization
<b>4 Leadership dimension</b> Performance measurement & targets Stakeholder management Team roles and team dynamics Trust and coordination	<b>9 Leadership dimension</b> Performance measurement & targets Stakeholder management Team roles and team dynamics Trust and coordination: external collaboration	<b>14 Leadership dimension</b>  Stakeholder management  Trust and coordination: bullwhip
<b>5 Simple but not easy (2)</b> Trade-offs and S&OP	<b>10 Simple but not easy (3)</b> Trade-offs and S&OP	<b>15 Conclusion: simple but not easy (4)</b> Final reflections

In addition, the content of the book is supported by a number of web resources containing, for example, more detailed information about The Fresh Connection business simulation, as well as some templates, supporting videos and so on.

## Guided tour, web resources and business simulation game

### Guided tour

In order to facilitate optimal learning, chapters in the book all have the following structure besides the content relating to each of them individually:

- Introduction and bullet-point overview of topics at the beginning of each chapter.
- In total, 80+ numbered exercises of different types, which can be done individually or as part of lecture plans:
  - ✓ Chapters of Part One: *'explore'*, for example by investigating internet resources;
  - ✓ Chapters of Part Two: *'analyse'* and *'decide'*, using The Fresh Connection business simulation game as an interactive case, analysing detailed data from the simulation, allowing for gameplay and seeing cause and effect relationships;
  - ✓ Chapters of Part Three: *'imagine'*, using the virtual company from The Fresh Connection business simulation game as a reference and challenging its status quo.
- Summary at the end of each chapter, bridging current and next chapter.

### Companion web resources

*Mastering the Supply Chain* is supported by companion web resources for students and for lecturers. You can visit [www.inchainge.com/products/masteringthesupply-chain](http://www.inchainge.com/products/masteringthesupply-chain) to see to which additional resources you can have access.

Examples of resources for lecturers:

- examples of course outlines and lecture plans;
- supporting PowerPoint slides;
- supporting videos;
- templates going with the book's exercises.

Examples of resources for students:

- reading lists;
- supporting videos;
- overview of relevant industry associations;

## ***Access to The Fresh Connection business simulation game***

In order to get access to The Fresh Connection and be able to use it as an interactive case with the book, you first need to register at the game portal via <https://my.inchange.com>, by choosing the option 'No account yet? Register as a new user', and follow the steps indicated, including the instructions you get in the confirmation e-mail. After finalizing the registration process you can enter the game portal with your newly created credentials and look for the field where you can enter a so-called *course code*.

If you are going to play as part of a course in school or university, you will most likely receive this course code through your teacher. If you are working through the book individually, you have a number of different access options to choose from, ranging from a free entry-level option to premium professional access. You can choose the option that best suits your learning objectives and budget. With this book you get free entry level (watch only, free of charge). Use course code: MSC\_Free. Includes full visibility of all screens and access to the Information Support Centre inside the game, thus allowing you to work through all of the exercises in the book.

Information about the pricing of the various packages, as well as the entire step-by-step process to register and enter the simulation, can be found on the following webpage: [www.inchange.com/products/masteringthesupplychain](http://www.inchange.com/products/masteringthesupplychain).

- *Basic level (Trial gameplay)*. Course code: MSC\_Basic. Includes the same as the entry level, plus two rounds of gameplay with basic complexity, as well as Inbox explanations inside the game and the possibility of getting e-mail support during gameplay.
- *Plus level (Academic)*. Course code: MSC\_Plus. Includes the same as Basic, but with extended complexity and four rounds of gameplay.
- *Full level (professional)*. Course code: MSC\_Full. Includes the same as Plus, but with six rounds of gameplay and the option to participate in a professional competition based on the game.
- *Premium level (master)*. Course code: MSC\_Premium. Includes the same as Full level, but with two elements of additional feedback by a certified trainer, as well as the option to do an exam and obtain an official certificate.