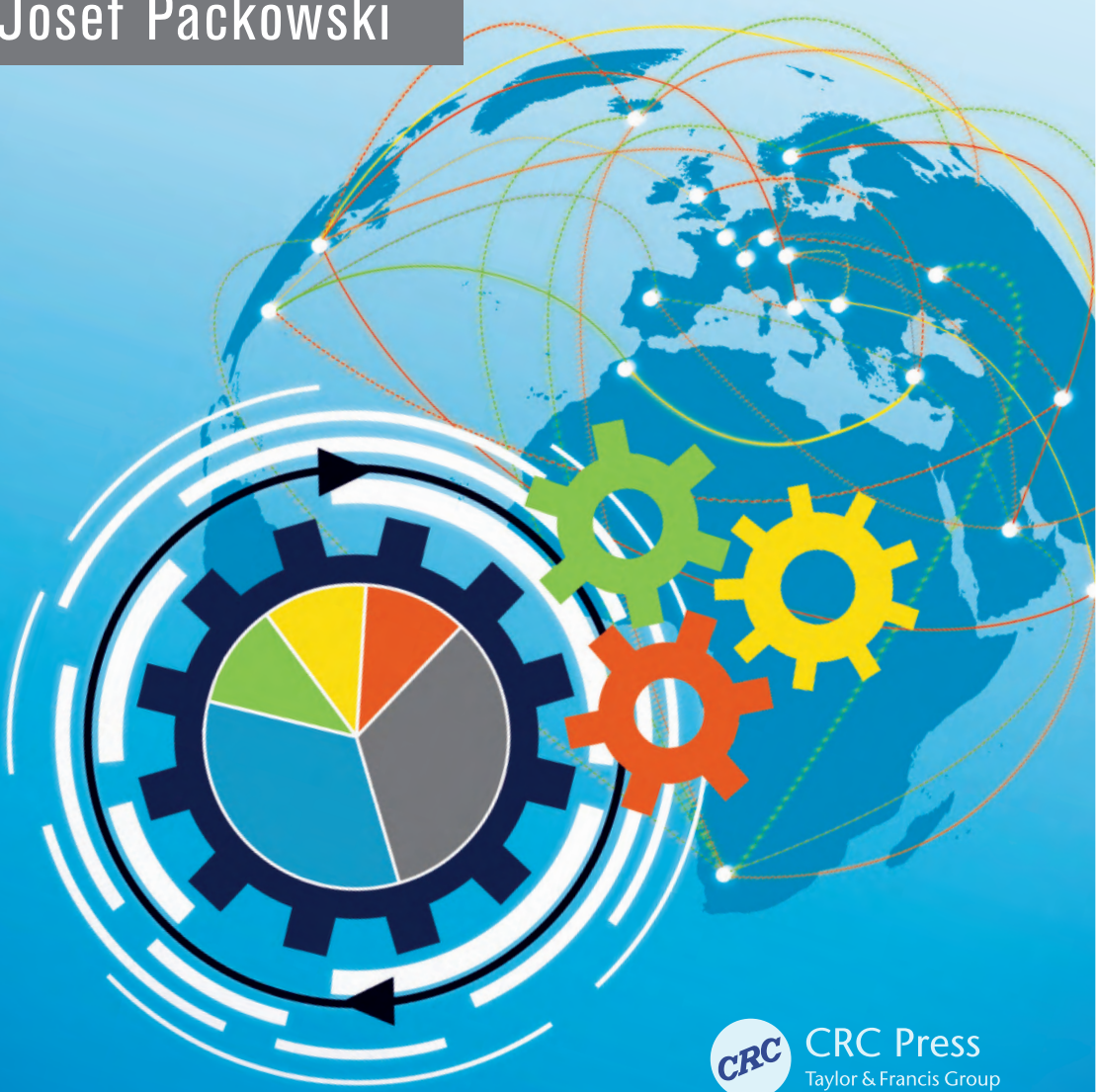
LEAN Supply Chain Planning

The New Supply Chain Management Paradigm for Process Industries to Master Today's VUCA World

Josef Packowski



CRC Press
Taylor & Francis Group
A PRODUCTIVITY PRESS BOOK

LEAN Supply Chain Planning

The New Supply Chain Management Paradigm for Process Industries to Master Today's VUCA World

Josef Packowski

CRC Press
Taylor & Francis Group
Boca Raton London New York

CRC Press is an imprint of the
Taylor & Francis Group, an **informa** business

A PRODUCTIVITY PRESS BOOK

CRC Press
Taylor & Francis Group
6000 Broken Sound Parkway NW, Suite 300
Boca Raton, FL 33487-2742

Printed on acid-free paper
Version Date: 20130830

International Standard Book Number-13: 978-1-4822-0533-6 (Hardback)

Library of Congress Cataloging-in-Publication Data

Packowski, Josef.
LEAN supply chain planning : the new supply chain management paradigm for process industries to master today's vuca world / Josef Packowski.
pages cm
Includes bibliographical references and index.
ISBN 978-1-4822-0533-6 (hardcover)
1. Business logistics. 2. Lean manufacturing. I. Title.

HD38.5.P33 2014
658.701--dc23 2013031214

Visit the Taylor & Francis Web site at
http://www.taylorandfrancis.com

and the CRC Press Web site at
http://www.crcpress.com

Contents

Introduction: What the Book Is All About

Today, many global supply chains in process industries are neither equipped nor orchestrated to cope effectively with the new VUCA world we are facing. VUCA—volatility, uncertainty, complexity, and ambiguity—is an acronym that originated in the military back in the late 1990s and was quickly adapted to the business environment. It describes precisely the conditions of increasing variability and uncertainty of demand, and the complexity and ambiguity of product portfolios and supply chain networks in which companies operate today.

Facing the threat of increasing VUCA challenges, manufacturers are left grasping for what it means to build a superior supply chain management (SCM) organization that is capable of managing these challenges effectively. Which enablers for agility are required to manage future VUCA dynamics? Those in global network structures (the network footprint) or others in the extended supplier relationship configuration (contract manufacturers, service providers, or suppliers)? Which aspects of today's operational and organizational lean initiatives are delivering tangible cost and efficiency results? How can supply chain organizations sustain reliable supply in an era of ever-widening virtualization of supply networks and increasing exposure to global risk? Finally, where can supply chain managers turn for the answers to these questions?

In response to these challenges, CAMELOT Consulting Group has worked jointly with leading research institutes and key global industry players to come up with a "*New Supply Chain Planning Paradigm*" to face the VUCA challenges in SCM in a new way. The paradigm change in orchestrating supply chains is best explained by laying out a new approach to managing variability, uncertainty, and complexity in today's planning processes and systems.

A few pioneering supply chain organizations in the process industry have already embraced the new way of coordinating and synchronizing their global networks. The reports and industry cases included in this book (see Figure 0.1).

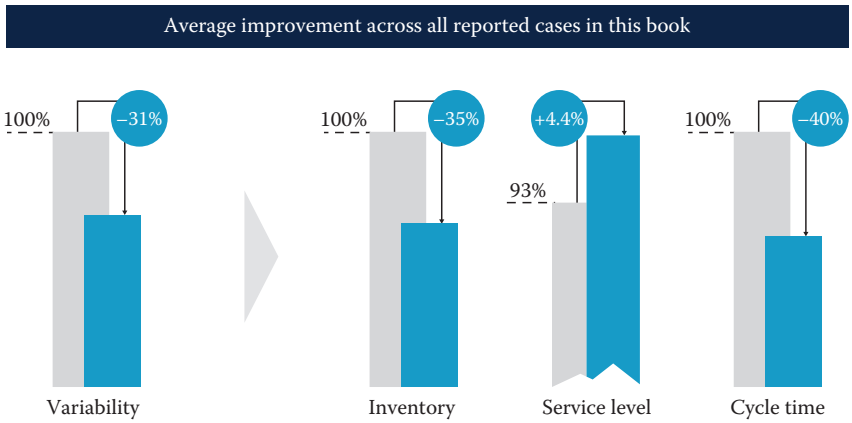


FIGURE 0.1
A step change in variability management improves key supply chain metrics.

Before we move on to present this new supply chain planning approach, we want you to clearly understand the need for a paradigm shift first. In process industries, today's usual supply chain planning practices aim to determine manufacturing decisions up to 12 months prior to delivering actual products to the customers. To do so, planners reach out to their sales and marketing colleagues and ask them for forecasts—preferably as detailed and accurate as possible at the SKU (stock-keeping unit) level. It is obvious that the supply chain performance resulting from such a forecast-based SCM approach is directly linked to the quality of sales forecasts. Therefore, it is understandable that all excellence initiatives in the past have started inevitably by attempting to improve on forecast accuracy, establishing the forecast myth that all activities could be perfectly planned and which still dominates corporate practices. However, ask yourself if we do not all experience difficulty in determining our own personal futures 12 months out, even regarding the subjects we ought to know most about. How then can we expect our sales organizations to know what the future holds for our products in volatile marketplaces at this detailed level of granularity?

So the real issue in SCM is not about improving the accuracy of the sales forecast and reducing the amount of uncertainty in the future, it is rather about *eliminating the need for certainty* in operational planning. We have therefore anchored our LEAN SCM Planning approach in freeing supply chain planners from the need for certainty, ushering in a paradigm change for most planning practices.

A major change that accompanies our *LEAN SCM Planning paradigm* is the management of demand variability. In traditional planning concepts, this is solved in a one-sided way, through planning and scheduling of manufacturing capacities only. This is because in today's supply chain practices, and in the ERP or APS systems that support them, safety stock levels are used as fixed planning parameters and not touched from a planning perspective to buffer variability. This has negative consequences for operational performance and the way in which companies react to demand fluctuations in planning. In this way, the traditional planning approaches represent a conceptual dead-end for today's variability management problems.

Within the new LEAN SCM Planning paradigm, we are *mastering variability with a two-sided approach*. We manage the demand variability in supply chain planning now on both sides, on manufacturing capacities and in inventories. To be more precise, the safety stock elements in all SKU-based inventories are now actively used in planning runs, as they have been designed for, to level replenishment signals and keep market noise out of manufacturing to the extent possible. To make this happen, we have developed a disciplined approach to the *dynamic adaptation of inventory target levels* to changing conditions along the supply chain. This allows SCM to keep a key component of demand variability—demand peaks—out of manufacturing, smoothing capacity utilization, and spending less time resolving production planning and schedule problems. This might sound intuitive, but represents a paradigm shift in the operation of today's planning processes and systems.

The conceptual foundation for managing variability and leveling capacity utilization in local manufacturing sites is the *cyclic scheduling* with "product wheels." Industry experts such as Ian F. Glenday, Peter L. King, and Raymond C. Floyd have already been able to connect the general lean (manufacturing) concepts, and the underlying elements of simplicity, flow and pull, with physical restrictions that are typical in process industries. These concepts have already been influential in many process manufacturing organizations. We have built on these experiences but needed to go further to apply product wheels in a high-product-mix and high-volatility environment—which we named "*Breathing*" and "*High-Mix*" *Rhythm Wheels*. They are built around optimal product sequences and cycle times. But the most valuable conceptual advancement we have incorporated is our approach to manage variability with two control parameters: the cycle time boundaries. With these new conceptual elements, we are providing

appropriate flexibility in manufacturing to enable companies to manage increasing market volatility, and we also hold the key for smoothing variability and volatility propagation upstream along the supply chain in our hands.

The LEAN SCM Planning concepts we present here have been worked out in light of and for the purpose of *end-to-end supply chain synchronization*. So the central question is how to manage multi-echelon synchronization along supply chains in process industries, with typically long lead times starting, for example, with chemical conversion processes and moving downstream to shorter physical bulk production and packaging processes? In particular, how should supply chain organizations apply cyclic planning at manufacturing sites while aiming for real consumption-based pull replenishment?

In response, we have formalized a "*global takt*" *for synchronization* and achieving end-to-end flow. In a stable supply chain environment, this might seem easy, but not in situations characterized by high demand volatility and high product mixes in manufacturing portfolios. We have to make the Rhythm Wheel approach more flexible, to "breathe" in sync with cycle times, but in a well-structured, disciplined way, within the defined variability control parameters. The key is to "funnel" variability with the Rhythm Wheel cycle time boundaries along the supply chain and in this way actively counteracting the infamous bullwhip effect and achieve a step change in supply chain performance.

With traditional supply chain concepts, the line between planning parameterization (configuration) and the planning run (execution) is blurred. In contrast to this classical planning approach, in LEAN SCM Planning, we have sliced the given planning complexity precisely. We slice the planning task horizontally into global tactical *pre-parameterization* (conditioning) and local planning run areas. Having done so, we have devised a *new LEAN SCM Planning Framework* to better cope with global synchronization needs.

While working with industry pioneers on this new supply chain planning approach, we were confronted almost immediately with additional questions when we stepped into the first implementations:

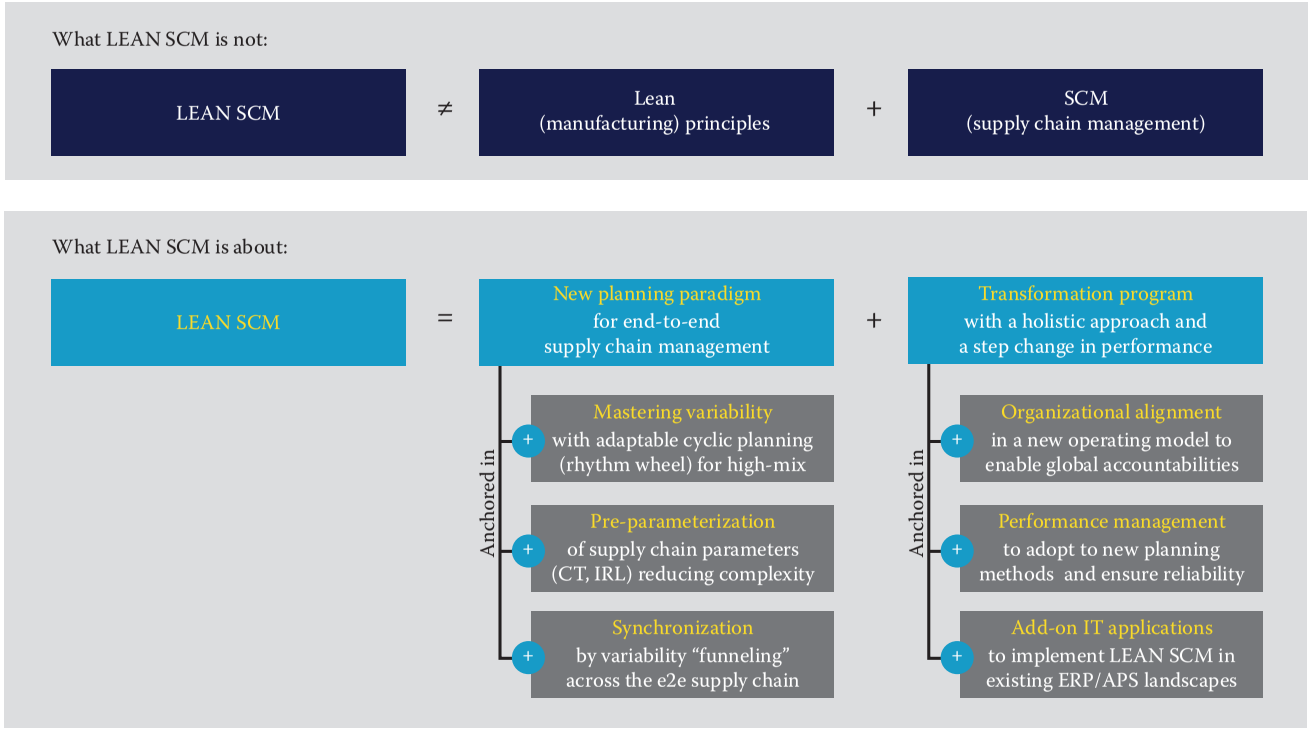
- How should the organizational model be adapted to the significant change in supply chain planning?
- What are the new roles and responsibilities required in the global supply chain community?

- Which factors should be aligned in corporate performance management to the new planning principles?
- What system gaps can be closed without discarding prior IT (information technology) investments?
- How can this new planning paradigm be implemented to achieve a step change in performance?

To answer these questions, we have consolidated all our conceptual research results and organizational project experience in this book, developed new IT add-on solutions to complement the existing SCM systems for implementation, and given a name to the holistic transformation approach—*LEAN SCM*. This new planning paradigm answers the VUCA challenges in process industries and overcomes the insufficiencies of traditional planning approaches. To highlight the distinction between lean (in small letters)—with its focus on manufacturing objectives—and LEAN—with its focus on end-to-end supply chain synchronization—we coined the all-capitalized term "LEAN" (see Figure 0.2).

Our implementation experience shows that there are three major obstacles to managing a *LEAN SCM transformation* program. First, a company's executive leadership must understand that this is not a single-project initiative, but rather a journey—in other words, sticking to LEAN SCM once the journey has started is crucial for success. Introducing the new paradigm of integrated supply chain planning and variability management requires a *new SCM operating model* with clear end-to-end accountabilities. This will make end-to-end integration possible between, for example, global inventory and local asset management. It is a new way of coordinating and synchronizing operations and throughput in a multi-step value chain. Top management support, training (and incentives) for all stakeholders, and strong commitment to the paradigm change are the preconditions for successful transformation. But bear in mind that you are aiming for nothing less than a step change in supply chain performance.

Second, aligned *performance management* is a critical success factor in the LEAN SCM transformation. The new conceptual elements and the new planning processes require new process performance indicators, such as Rhythm Wheel cycle time attainment and cycle time variation, to be monitored carefully. Therefore, an effectively adapted and well-designed performance management system is fundamental. But this typically does not imply the need to reinvent current performance management systems.



CT = cycle time, IRL = inventory replenishment level, ERP = enterprise resource planning, APS = advanced planning systems.

FIGURE 0.2
What lean SCM and LEAN SCM are about.

We will provide a set of meaningful metrics on the basis of which to generate improved supply chain performance through LEAN SCM. Finally, we depict a pragmatic way of creating the right accountabilities within performance management and show you how to anchor it in your planning organization.

Third, technology is instrumental in helping LEAN SCM create sustainable results. Many lean improvement initiatives depend on few individuals and manual techniques—and if those individuals change positions, much of the planning knowledge, enthusiasm, and leadership are lost. In this light, IT applications are even more critical to capture and standardize processes sustainably in a global end-to-end transformation. These additional *IT technologies* are also supposed to institutionalize LEAN SCM Planning. Applications such as the "Rhythm Wheel Designer" or the "Dynamic Target Stock Planner" provide interlocks with concepts such as cyclic planning and balanced variability management in supply chain organizations, ensuring that common LEAN SCM Planning techniques and best practices have staying power in your SCM organization.

You are holding the results of our LEAN SCM work in your hands right now: it is a holistic practitioner's guide to mastering variability, uncertainty, complexity, and ambiguity in process industry supply chains. It also includes detailed concept descriptions and process explanations. To make it even more practical and valuable for your own reflection, we have enriched all topics with relevant industry cases. We believe that the performance improvements achieved through LEAN SCM initiatives are best described by your industry pioneers themselves. You can therefore also find in this book accounts of how your peers have already lived the LEAN SCM paradigm, used the relevant instruments successfully, and gained:

- Improved customer service and increased supply chain agility through reduced cycle times for Rhythm Wheel-managed products.
- Significant improvements in overall equipment effectiveness (OEE) through leveled and takted material flows that are synchronized to customer demand.
- Significant reductions in working capital through actionable supply chain analytics on variability and risk allocation of stocks across the end-to-end supply network.

I am certain you will enjoy the same outstanding results along your company's supply chain by reading this book and adopting LEAN SCM—because now you are targeting nothing less than a quantum leap in your operations and supply chain performance.

Dr. Josef Packowski
Mannheim, Germany