

Perspectives in Business Culture

For further volumes:
<http://www.springer.com/series/10441>

Andrea Chiarini

Lean Organization: from the Tools of the Toyota Production System to Lean Office

 Springer

Andrea Chiarini
Chiarini & Associates
Bologna
Italy

ISSN 2280-1464 ISSN 2280-2088 (electronic)
ISBN 978-88-470-2509-7 ISBN 978-88-470-2510-3 (eBook)
DOI 10.1007/978-88-470-2510-3
Springer Milan Heidelberg New York Dordrecht London

Library of Congress Control Number: 2012935549

© Springer-Verlag Italia 2013

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed. Exempted from this legal reservation are brief excerpts in connection with reviews or scholarly analysis or material supplied specifically for the purpose of being entered and executed on a computer system, for exclusive use by the purchaser of the work. Duplication of this publication or parts thereof is permitted only under the provisions of the Copyright Law of the Publisher's location, in its current version, and permission for use must always be obtained from Springer. Permissions for use may be obtained through RightsLink at the Copyright Clearance Center. Violations are liable to prosecution under the respective Copyright Law.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

While the advice and information in this book are believed to be true and accurate at the date of publication, neither the authors nor the editors nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

*For my wife and my children, Rosita,
Anna Laura, Pier Francesco and Gian
Mattia*

Preface

This is a book about the so-called Lean Thinking derived from the Toyota Production System. Nowadays many books and papers deal with the subject, especially books concerning the operative tools of the Toyota Production System. So how will this book try to bring more knowledge to its readers? The book presents a complete journey, top-down and bottom-up, for implementing Lean inside an organization with the scope of achieving economic and financial results. The title of this book, *From the Tools of the Toyota Production System to Lean Office*, indicates that the book intends to propose a complete pattern, starting from the strategic objectives to the production. The pattern includes service processes such as marketing, accounting, design and can be applied in service industry as well.

In this way, the book presents a model developed using an inductive approach based on multiple case studies. The author has taken into account more than 200 companies based in the European Union and Asia, many of which are clients of Chiarini & Associates. This latter is a consulting firm that provides Lean Six Sigma consultancy. Chiarini & Associates has managed projects for companies such as ABB, Barilla, Bulgari, Bridgestone, Continental, Donaldson, Ducati, Ferrari, Fiat Power Train, *Praxair*, Sitel, Technip, Tetrapak, Tyco, Usag Stanley, Vaillant and many others. Projects have also been managed for public administrations. The proposed model in this book has been compared with many practitioners' point of view. Besides it has been compared with papers from international peer-reviewed journals and conferences.

The first chapter is dedicated to the historical evolution of the Toyota Production System. The second chapter discusses the so-called seven wastes and the value-added concept. The strategic system *Hoshin Kanri* is explained in the fourth chapter as the real starting point of the Lean Organization. Hoshin Kanri is the expression of the thoughts of senior management and sets the precise direction for the Lean ship.

The strategic objectives deployed by the means of Hoshin Kanri are matched in the fourth chapter with the wastes found through the *value stream map*. After having mapped the processes and defined the strategic objectives, an organization can launch quick and intensive improvement projects called *Kaizen workshops*. The fifth chapter discusses how to manage these quick projects and their teams. *Kaizen*

teams in this chapter are compared to other kinds of teams such as Six Sigma teams, and the reader will understand why the roles and rules are very peculiar. Kaizen teams can use several tools inherited from the Toyota Production System. The sixth chapter takes into account the most important tools from the basic *5S*, through *one-piece-flow*, *Kanban* and *SMED* to *TPM*. After dealing with the tools of the Toyota Production System, a case study applying some of the tools is presented. The famous Italian motorbike manufacturer *Ducati*, owned by *Volkswagen – Audi*, discloses how Lean tools are applied in its shop-floor through some examples.

The results achieved through Kaizen workshops can be measured day by day and managed by the introduced *visual control and management* system. The seventh chapter describes *lean metrics* as well as the accounting systems to measure economic and financial improvements. *Traditional accounting*, *activity-based costing* and *value stream accounting* are compared in order to understand which is better for the Lean Organization.

Last but not least the eighth chapter deals with *lean office* and a new tool for mapping transactional processes, the *Makigami*. Lean Office is the way to reduce wastes and consequently the lead time for processes such as marketing, engineering, accounting, quality management and supply chains as well as processes inside public administrations.¹

¹ You can contact Andrea Chiarini by e-mail at: andrea.chiarini@chiarini.it

Contents

1	From Mass Production to the Lean Six Sigma	1
1.1	Once Upon a Time There was Mass Production (and Sometimes Still There Is)	1
1.2	The Organizational and Productive Model of Mass Production . . .	2
1.3	The Birth of the Toyota Production System	2
1.4	The Relentless Decline of Mass Production	3
1.5	The Recovery of the USA in the 1980s–1990s and the Proclamation of the Toyota Production System	4
1.6	The American Model of Six Sigma	5
1.7	Lean Six Sigma	7
1.8	The Necessity of Applying Business Excellence Models	11
	Bibliography	13
2	The Seven Wastes of Lean Organization	15
2.1	Introduction	15
2.2	Value Added and Waste	16
2.3	Classifying the Types of Waste	17
2.3.1	The 3 MU	18
2.3.2	The 4 M	18
2.3.3	The Seven Relevant Wastes According to Toyota Production System	19
2.3.4	Defectiveness	24
2.4	Removing Waste	30
3	Using Value Stream Mapping to Visualize Value Added	31
3.1	Introduction	31
3.2	Managing Value Stream for Lean Organization	32
3.3	Compilation of VSM as-is	34
3.4	Mapping the Future State	44
3.5	Mapping at Process Level	46
	Bibliography	48

4	Strategic Planning: Hoshin Kanri	51
4.1	Introduction	51
4.2	Lean: A First Warning	51
4.2.1	Examples of Mission in Lean	54
4.2.2	Examples of Value Guides in Lean	54
4.2.3	Examples of Vision in Lean	55
5	Kaizen Workshops and How to Run Them	63
5.1	Introduction	63
5.2	Introducing Lean Kaizen Workshops	63
5.2.1	Programming and Preparing the Event	66
5.2.2	Choosing Team Leaders and Team Members	67
5.2.3	Carrying Out a Workshop	69
5.3	Gathering Data	71
5.4	Analyzing the Data Gathered and Implementing Solutions	73
5.5	Final Check, Results Presentation and Team Celebration	78
	Bibliography	80
6	The Main Methods of Lean Organization: Kanban, Cellular Manufacturing, SMED and TPM	81
6.1	Introduction	81
6.2	Pull Versus Push	81
6.3	5S Order and Cleanliness, the First Step Towards Introducing Visual Management	82
6.3.1	Seiri	84
6.3.2	Seiton	85
6.3.3	Seiso	86
6.3.4	Seiketsu	87
6.3.5	Shitsuke	88
6.4	The <i>Kanban</i> System	88
6.4.1	Different Types of Kanban and Application Methods	90
6.4.2	Calculating the Number of Kanbans	93
6.4.3	The Kanban Operating Principle	94
6.4.4	Using the “Milk-Run”	96
6.5	Balancing the Process	97
6.6	Cellular Manufacturing and One-Piece-Flow	100
6.6.1	Designing Cellular Management	100
6.6.2	P-Q Analysis	100
6.7	Heijunka Board	104
6.8	Quick Changeover and Single Minute Exchange of Die	106
6.8.1	The Four Stages of SMED	106
6.8.2	Identifying Internal and Outer Set-Ups and Preparation	107
6.8.3	Converting Internal Set-Ups to Outer Ones	110
6.8.4	Improving Internal and Outer Set-Up Activities	110

6.9	TPM	111
6.9.1	The TPM Campaign: First Step, 5S	112
6.9.2	Self-Maintenance: Maintenance Carried Out by Workers	113
6.9.3	Preventive Maintenance	113
	Bibliography	115
7	Lean Metric, Lean Accounting and Value Stream Accounting	117
7.1	Introduction	117
7.2	Defining Lean KPIs: Lean Metric	118
7.3	Measuring Cell/Process Performance Bottom-Up	120
7.4	OEE and the Six Big Equipment Losses	125
7.5	Other Cell/Process Key Indicators	126
7.6	Strategic and Lean Organization Value Stream Indicators	127
7.7	Activity Based Costing versus Traditional Accounting	130
7.8	Lean Accounting and Value Stream Accounting	137
7.9	Value Stream Accounting	138
	Bibliography	140
8	Lean Office	141
8.1	Introduction	141
8.2	What is Lean Office?	141
8.3	Waste in Transactional Processes	143
8.4	Mapping Service Flow and Identifying Waste	143
8.5	Indicators and Metrics for Lean Office	150
	Bibliography	153
9	Management of a Kaizen Workshop Carried Out in Ducati Motor Holding	155
9.1	Workshop Preparation and Targets	155
9.2	Code and Sales Figures Analysis	156
9.3	Current State Flow	156
9.4	Definition of Inventories Between Processes	158
9.5	Introducing Kanban in the Driveshaft Process	159
9.6	Managing Camshaft Production	159
9.7	Calculating the Amount of Kanbans	162
9.8	WIP Areas	163
9.9	Inspection and Workshop Results Presentation	164

