

Luis Martín Díaz

Evaluation of Cooperative Planning in Supply Chains

GABLER EDITION WISSENSCHAFT

Produktion und Logistik

Herausgegeben von

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Luis Martín Díaz

Evaluation of Cooperative Planning in Supply Chains

An Empirical Approach of the
European Automotive Industry

With a foreword by Prof. Dr. Peter Buxmann

Deutscher Universitäts-Verlag

Bibliografische Information Der Deutschen Bibliothek
Die Deutsche Bibliothek verzeichnet diese Publikation in der Deutschen Nationalbibliografie;
detaillierte bibliografische Daten sind im Internet über <<http://dnb.ddb.de>> abrufbar.

Dissertation Technische Universität Darmstadt, 2005

D 17

1. Auflage Mai 2006

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Lektorat: Brigitte Siegel / Nicole Schweitzer

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Umschlaggestaltung: Regine Zimmer, Dipl.-Designerin, Frankfurt/Main

Druck und Buchbinder: Rosch-Buch, Scheßlitz

Gedruckt auf säurefreiem und chlorfrei gebleichtem Papier

Printed in Germany

ISBN-10 3-8350-0431-X

ISBN-13 978-3-8350-0431-3

*To my wife Silke, for her all-embracing support,
and to my children Adrián and Fabián,
for requiring only so much time that I could still finish this work.*

Foreword

The acknowledgement that a network of cooperating companies, e.g. a supply chain, could be more successful in achieving competitive advantage than individual businesses, constitutes one of the most significant paradigm shifts in modern business management as it leaves behind the notion of adversarial companies engaged in fierce competition with one another in order to gain a competitive advantage.

The “Survival of the Fittest” in what has been called “The Era of Network Competition” depends on how well companies are able to structure, coordinate, and manage relationships with their business partners. In their search for the best possible place under the sun, companies have redefined their understanding of cooperation and have not only improved the efficiency of cooperation with partners (e.g. suppliers, customers, and complementors) but also discovered the existence of synergies with competitors. The apparently paradoxical situation of cooperating with competitors (or it might be thought of as competing with cooperating partners) shows that collaboration is a widespread approach at all levels of strategic management.

In light of these thoughts, the question arises why there are still companies that neither cooperate with business partners nor with competitors; although it seems obvious that this could be advantageous. This work attempts to offer an answer to this question.

In so doing, it explores the reasons why companies do not engage in cooperation despite the fact that it would appear to be advantageous for them to do so. A very extensive empirical study within the European automotive industry identifies trust and issues of complexity among the significant causes for not cooperating. However, the most important motive for the unwillingness to cooperate is the evaluation of the actual benefits implied in the cooperation. Uncooperative companies seem to be asking themselves if the coordination and integration efforts incurred within cooperation actually correspond to adequate benefits.

In order to provide an answer, Luis Martín Díaz analyzes economic approaches in evaluating alternative forms of cooperation in supply chains. Firstly, the author shows in a case study of Audi AG how existing cooperative environments, such as a supply chain of the automotive industry, can be evaluated using the bullwhip effect as an indicator. The thorough and detailed analysis reveals a considerable bullwhip effect caused by increased transportation times and unequal supply call-off strategies at different stages of the supply chain. Secondly, Luis Martín Díaz presents an innovative software prototype that assesses the benefits of different cooperation forms at the planning level. Towards that end, the prototype evaluates the impact of alternative decision structures in the results of transportation planning and the bullwhip effect. The inventive combination of different decision structures with specific logistics planning methods permits a precise estimate of the potential benefits derived from a collaboration at an early stage of the decision process.

The work of Luis Martín Díaz contains many good and innovative ideas and represents an outstanding contribution to research. I hope that it attains widespread acceptance and that the reader will enjoy it as much as I did.

Professor Dr. Peter Buxmann

Acknowledgements

This dissertation presents economic approaches, quantitative methods, and a software prototype in order to quantify the benefits of cooperation in supply chains. The limits of my analysis become apparent when attempting to quantify the benefits of the help of the people who contributed to the successful completion of this work. This invaluable collaboration can only be addressed in general terms and with great gratitude; thus, making it virtually impossible to put into words. However, I would like to attempt it.

First of all, I would really like to express my deepest gratitude to Professor Dr. Peter Buxmann for being more than the best dissertation supervisor a doctoral candidate could imagine having. He offered me all of his knowledge and experience, made my goals his, and gave me both orientation and freedom in the right dose, providing me with all the resources I needed. I also would like to thank the German Research Foundation (DFG) for supporting my research in the context of the SKILNET research project with the grant BU 1098/1-1/2.

Professor Dr. Wolfgang Domschke deserves my most sincere thanks for his review of my work as well as Professor Dr. Dr. Oskar Betsch, Professor Dr. Volker Caspari, and Professor Dr. Jochen Marly for their participation in the disputation.

I am indebted to Professor Warren B. Powell for making it possible to do part of my research at Princeton University. Many thanks also to the staff members at Castle Laboratory, especially to Hugo Passos Simão for the fantastic collaboration during my stay at Princeton.

Dr. Kai Salzmann deserves many thanks for giving me an insight into the supply chain of Audi AG. Many thanks also to Professor Dr. Axel Kimms for the many hours of prolific discussions on the topic of quantitative analysis and for his excellent suggestions.

I want to also express my great appreciation to Dr. Erik Wüstner for being a fantastic colleague all these years and for contributing with thoroughness and inestimable hints to the success of my work. Special thanks go to Kristina Wolf and Anette von Ahsen for their support within the empirical study, and to Tina Werthmann for her unfailing contribution to the case study. Antje Heidl, Jens Kühner, Michael Meyer, and Andreas Knabe have earned my gratitude for their valuable support in the development process of the software prototype.

Many kind thanks also go to Martina Lohmann-Hinner for carefully reading the manuscript and for her professionalism and generous effort. Thanks also to Nicole Schweitzer at Gabler for the smooth and friendly publication process.

My deepest appreciation goes to my wife Silke for her continuous and affectionate help and for always being the splendid support I needed. I am also very grateful to my parents-in-law Clara and Hartmut Strate for providing a helpful hand at all times and to my parents for their excellent aid during all stages of my education.

Luis Martín Díaz

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Abbreviations

Audi	Audi AG
Audi Hungaria	Audi Hungaria Motor Kft.
Audi Ingolstadt	Audi AG, plant in Ingolstadt
Audi Neckarsulm	Audi AG, plant in Neckarsulm
CAD	Computer aided drawing, also computer aided design
CAE	Computer aided engineering
CAM	Computer aided manufacturing
CEN-COOP	Centralized, cooperative planning
CKD	Completely knocked down
CMI	Co-managed inventory
COFC	Container on a flatcar
CPU	Central processing unit
CRP	Continuous replenishment
DC	Distribution center
DCI	Distribution Centers, Inc.
DEC-COOP	Decentralized, cooperative planning
DMU	Decision-Making Unit
DRAM	Dynamic random access memory
EDI	Electronic data interchange
EDLP	Every-day low price
FAB	Feinabruf (precise supply call-off)
GEKO	Ganzheitliche Ertragsorientierte Kettenoptimierung
GIF	Gewerbe- und Industriepark Friedrichshall
GVZ	Güterverteilzentrum

ICON	ICON Gesellschaft für Supply-Chain-Management mbH
ICT	Information and Communication Technology
JIT	Just-in-time
LAB	Lieferabruf (supply call-off)
LAFES	Lieferabrufverteilungs- und Feinsteuerungssystem
LCL	Lower control limit
LSP	Logistics Service Provider
LTL	Less-than-truckload
MABES	Materialfluss-Bewegungsverarbeitungs- und Bestandsführungs-System
MIS	Management information systems
MIT	Merge-in-transit
MRP I	Material requirements planning
MRP II	Manufacturing resource planning
NON-COOP	Decentralized, non-cooperative planning
NUMMI	New United Motors Manufacturing Incorporated
OEM	Original equipment manufacturer
P	Punishment
P&G	The Procter & Gamble Company
PD	Pumpe/Diesel
PO	Purchase order
POS	Point of sale
R	Reward
R&D	Research and development
ROP	Reorder point
S	Sucker
SCC	Supply Chain Collaboration
SCE	Supply Chain Execution
Schachinger	Schachinger Logistik Holding GmbH & Co KG
SCM	Supply Chain Management
SCMo	Supply Chain Monitoring
SCP	Supply Chain Planning
SKU	Stock keeping unit
SSL	Secure socket layer
T	Temptation
TCE	Transaction cost economics

TCG Group	Trident Components Group
TCG Systemtechnik	TCG Unitech Systemtechnik
TDI	Turbocharged direct injection
TL	Truckload
TOFC	Trailer on a flatcar
UCL	Upper control limit
US	United States
VMI	Vendor managed inventory
VW	Volkswagen
VW Group	Volkswagen Group
VW T	VW Transport GmbH & Co. OHG
Wahler	Gustav Wahler GmbH u. Co. KG
Wal-Mart	Wal-Mart Stores, Inc.
WIP	Work-in-progress