

Make Your Publications Visible.

A Service of



Leibniz-Informationszentrum Wirtschaft Leibniz Information Centre

Maric, Josip; Rodhain, Florence; Barlette, Yves

Conference Paper

Information Systems and Reverse Logistics: Examining Drivers of Implementation on Multiple Case Study Scenario

Provided in Cooperation with:

Hamburg University of Technology (TUHH), Institute of Business Logistics and General Management

Suggested Citation: Maric, Josip; Rodhain, Florence; Barlette, Yves (2014): Information Systems and Reverse Logistics: Examining Drivers of Implementation on Multiple Case Study Scenario, In: Kersten, Wolfgang Blecker, Thorsten Ringle, Christian M. (Ed.): Next Generation Supply Chains: Trends and Opportunities. Proceedings of the Hamburg International Conference of Logistics (HICL), Vol. 18, ISBN 978-3-7375-0339-6, epubli GmbH, Berlin, pp. 211-221

This Version is available at: https://hdl.handle.net/10419/209208

${\bf Standard\text{-}Nutzungsbedingungen:}$

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.



https://creativecommons.org/licenses/by-sa/4.0/

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



Information Systems and Reverse Logistics: Examining Drivers of Implementation on Multiple Case Study Scenario

Josip Maric, Florence Rodhain and Yves Barlette

Abstract

Sustainability is becoming increasingly significant for business researchers and practicioners, where Information Systems (IS) and sustainable development open up a new field of interesting issues to be addressed by scholars. In this paper we present research in progress regarding IS and reverse logistics. Information Systems, in cohesion with closed loop Supply Chain Management (SCM) process, and human resources capability development, produce an innovative service developed to increase efficiency in sustainability efforts and gain increased market value. Our research tends to focus on relationship between IS and closed loop Supply Chains, examining sustainability impact of the reverse logistics and examining organizational competitive advantage gained through sustainability goals. Empirical, rather than theoretical, research and practice regarding this concept is still in its infancy, and with our research we tend to make a contribution to the field. Research model, tools of assessment, in depth description of case studies and preliminary results are presented in the paper as latter.

Keywords: management, information systems, sustainability, reverse logistics

1. Introduction

Sustainability is increasingly becoming mainstream within management studies and practices over the past several decades. Since its definition in Bruntland report as "development that meets the needs and aspirations of the present generation without compromising the ability of future generations to meet their own needs" (WCED 1987, p. 43), sustainability found itself in the focus of research studies with an increased awareness of the global threats.

Although the term is well introduced among business practitioners and researchers, business-as-usual logic has still somehow drifted away from the principles of sustainability. Some of the leading scholars presented us facts justifying this claim. Sandel (2013), Harvard University professor in political philosophy, elaborated the degradation of our modern society from marketbased economies into market societies. Market-based thinking has permeated all aspects of society, affecting societal norms in areas of life not traditionally influenced by markets. Hence, Mintzberg et al. (2002) in their paper presented us thoughts on the raising problem of corporations operating on a series of halftrusts which result in a sole focus of profit increase for their shareholders. Porter and Kramer (2011) elaborate a certain siege of capitalism system in recent years. Business has been seen as a major cause of social, environmental and economic problems. Companies are widely perceived to be prospering at the expense of the broader community. Presented findings give us the necessity of a shift of our modern business concept in order to allow business to harness its true potential. This would, according to Porter and Kramer (2011), drive next wave of innovation and productivity growth, as well as thinking about new leadership and managerial skills that need to be developed.

Specifically, there is a need for rethinking our business-as-usual logic in a more sustainable manner. John Elkington (1994) defined sustainability in three components – environmental, societal and economic performance (generally referred as *triple-bottom-line*). Since then, it is argued that corporation's long-

term profitability and existence are best served by balancing them with social and environmental goals (Porter and Kramer, 2006). Growing number of companies embarked these efforts.

IBM, known for its hard-nosed approach to business, is one example where their business practice in France, at their site in Montpellier, not only meets broader society and economic needs, but also offers interesting new business model which encompasses good business logic with environmental needs. Strategic thinking, imposed during the market fluctuations in the '90s, about their value chain configuration allowed them to gain competitive advantage. In other words, they embraced the transformation of their activities. IBM Montpellier case study performed by Keh et al. (2012), conducted in our laboratory for four years, has shown the benefits of reverse logistics business practice. We extend this study examining IBM aftermath with contributions for other business practitioners and by focusing on IS as well.

Hence, our research specifically is focused on examining drivers of reverse logistics implementation, presenting ethical, legal and societal implications for companies, as well as answering what is the role of IS in the process?

Paper is organized as follows: next section presents closed-loop Supply Chains. Hence, a brief discussion about the role of IS in the process follows. Research methods, research techniques of assessment and modes of analyzing and interpreting data are presented in section 3. Limitations and future work perspectives are defined in section 4. Conclusion is presented in section 5.

2. Theory Development

2.1 Reverse Logistics

Academic and corporate interest in Sustainable Supply Chain Management (SSCM) has risen considerably in recent decades. Reverse Logistics Management (RLM) is, thus, one of the research directions attracting business

attention. Interests for implementation differ, either because of the potential profitability (in USA) or legislation (in European Union) (Guide et al., 2003).

Reverse logistics is a process in which manufacturer manages product return for possible reuse, revalorization or recycling (Keh et al., 2012). Reverse logistics deals with the *end-of-life* phase of products life cycle, in a closed-loop Supply Chain. Therefore, closed-loop Supply Chains include traditional forward Supply Chain Management, adding extra activities of the reverse supply chain, in order to manage the flow of secondhand products aimed to be recycled (Dowlatshahi, 2000). It is characterized with five main disposal options: remanufacturing, repair, reuse, recycling and disposal (see Fig. 1). Although it becomes essential for suppliers who have to act in accordance with environmental laws, reverse logistics is often considered as expensive and difficult to implement.

Keh et al. (2012) in their article, based on an IBM Montpellier case study, examined how an integrated reverse logistics model can enable companies to meet three main objectives: (1) provide economic opportunities through the resale or reuse of machines and parts, (2) successfully deal with environmental challenges such as waste management and legislation compliance, and (3) achieve an important social challenge in terms of local job preservation.

Although this case study reveals that reverse logistics is likely to present economic, environmental and social benefits, it still leaves opened a question of harmonious balance among economic, environmental and social components of the process. This offers scholars directions for future research. Research has shown that for sustainability to be truly effective, entire supply chains, not just individual partners, must operate in a sustainable manner (Carter and Rogers, 2008). Empirical, rather than theoretical, work regarding this concept is still in its infancy. Lack of empirical evidence is the major obstacle in grounding of studies which state that reverse logistics could be an opportunity for sustainable development. This gives scholars opportunity to examine the various issues as well as finer analyses, especially deepening research in the

context of environmental, economical measurement impacts and social benefits on a global scale.

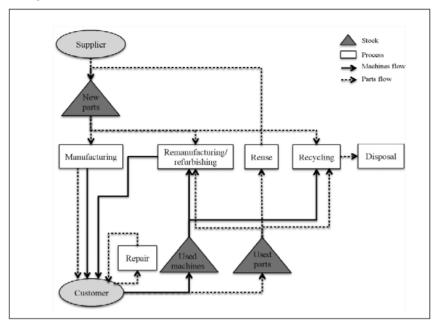


Fig. 1: The closed-loop supply chain. Keh et al. (2012)

2.2 Information Systems

Information Technologies (IT), with a radical technological breakthrough in short period of time, led to many changes and vaste spreading in the '90s. Recent studies have revealed that competition in the business market has heightened since the mid '90s, revealing that one of the main reasons is significant increase in investments and application of IT (McAfee and Brynjolfsson, 2008).

The IT sector itself contributes, by the latest figures, towards 16 percent of global GDP growth during a period from 2002 to 2007, with expectations to reach 10 percent rise for the period from 2007 to 2020 (The Climate Group

report, 2008). IT industry, besides having positive GDP growth impact, has a fastest growing global footprint (GeSI report, 2010). Considering this fact, greening of IT industry proposes one of the largest economic opportunities of the 21st century.

There is an increase in the greener use and application of IT and system design. Various studies have investigated and acknowledged a link between IT and sustainable development. Researchers adopt bidirectional approaches, defining either direct and indirect (Jenkin et al., 2011), first and second order impacts under *green IT* and *IT for green* perspective (Faucheux and Nicolai, 2011) or positive and negative influence (Rodhain and Fallery, 2011). Harmon et al. (2012) defined strategic planning technology roadmaps, green IT and sustainable IT services (SITS).

Malhotra et al. (2013) presented us a study of information systems for environmental sustainability in two research streams, classifying *green IS* and *green IT*. They present green IS as the larger of both streams, referring to the study of the design, implementation and impact of information systems that contribute to sustainable business processes. Green IT, on the other hand, refers to the study of technology energy efficiency and equipment utilization. Barlette (2013) also presents Green IT (Fr. Eco-TIC), a term which overspans the initiatives for greening of IT industry and aims to reduce the ecological, economic and social footprint of IT. The goal is to reduce the nuisance related to IT manufacturing, usage and recycling.

But it is evident, after browsing through the scholar literature, that there is still a lack of assessment for IT's impact regarding sustainability beyond energy consumption or waste management. Studies have also shown various approaches in describing the role of IS in organizational context. Transformative power in modern business logic is argued in the latest work of Porter and Kramer (2011) about *shared value* concept. They also open discussion about the necessary changes in the skills and knowledge of leaders and managers. Shift in managerial thinking and decision making is becoming,

and will continue to be, largely affected by innovations, introduction of new technologies, operating methods and different management approaches.

Numerous and diverse lead authors and theories in IS underline an interplay within different management discipline fields and IS research. We propose, as our secondary set of questions, to examine the role of IS resources and its integration within closed-loop Supply Chains. Determining whether green IS plays a role within reverse logistics, and "should we innovate in terms of IS for reverse logistics?" presents meaningful contribution to theory and business practices.

3. Research Methodology

Since data related to our work are rather scarce, we chose for this specific research to conduct a qualitative research. Qualitative research methods are considered more favourable since they are rooted in social sciences and seem appropriate with scarce business examples to observe (AIS, 2013). Our qualitative research would involve the use of qualitative data to understand and explain phenomena. Qualitative research also enables us to use a variety of approaches, methods and techniques, which aligned along with sustainability assessment tools, would offer an integrated framework for the research.

Phenomena which we plan to investigate would be based on case studies, and would include sources like interviews and questionnaires, reviews of documents and texts, observations (based on fieldwork) and impressions and reactions. Grounded theory would be used as a mode for data analysis.

Tools and methods of assessment of sustainability impact which have been developed differ and they also include various protocols and international standards, incorporated into monitoring, reporting and planning processes. Environmental Management Systems (EMS), ISO standards, Corporate Social Responsibility (CSR) reports, Total Quality Management (TQM), Sustainability indicators, Global Reporting Initiative's (GRI), Environmental-Society-Governance performance (ESG), integrated reporting, impact assessment,

reputation and compliance measurement, Dow Jones Sustainability Index - are just some out of plenty. In general, existing assessment tools propose a vast pallet to serve the broader purpose for organizations, since "it cannot be expected that there will be one universal model of organizational effectiveness: it is more likely that one might expect that 'effectiveness' involves trade-offs and management of paradoxes" (Stoeglehner et al., 2009, p. 113).

Studying past examples of transformational innovations can be important to help develop analogies and frameworks for understanding and anticipating societal response to new innovations.

4. Planed activities, limitations and perspectives for future research

Our *research-in-progress* has planned activities to obtain concrete research findings cannot as follows:

- Designed time frame to carry out the research activities would be scheduled for the upcoming second year of our research, with consensus of the industry partners.
- Two preliminary meetings were conducted in IBM offices (with IBM supply chain managers), where they expressed their support and cooperation in the research, as well as their willingness to identify several other companies to serve as study cases, thus expanding the research pool.
- Identification of case studies is upcoming activity, where classification of the cases would be based on the process sole.

One of the research perspectives, as brought by Carter and Easton (2011), implies selection of individual industries, contrary to multi-industry studies, with the goal of identifying specific types of sustainability activities. One troubling gap, representing both limitation and perspective for future work, would be the lack of laboratory or field experiments. Performing a pilot test to compare effectiveness of the IS would be interesting for the future.

Future perspective of the research is also seen in expansion of the research on a bigger pool of companies, possibly covering different goals of reverse logistics management among European, North American and Asian companies.

5. Conclusion

Technology showed its potential to solve many of the problems human kind encountered in the past. It helped shaping the world in which we are living today and it needs to retake its position in our understanding as a tool to serve broader social purposes. We have to think about its proper place in our society. This is why an organization with socio-economic transformed business model could contribute to positive changes and be used as a prime example to show that a business which is sustainable from a social and ecological perspective can be sustainable from a profit perspective as well.

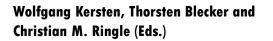
Acknowledgements

The research work is supported through European Commission EACEA (Education, Audiovisual and Culture Executive Agency) Erasmus Mundus Action Plan 2 External Cooperation Window.

References

- Association for Information Systems (2013). Qualitative research in Information Systems. Accessed online in February 2014. www.qual.auckland.ac.nz
- Barlette, Y. (2013). Environment & Green IT. Working paper. Montpellier Business School. Retrieved in November 2013.
- Carter, C.R., Easton P.L. (2011). Sustainable supply chain management: evolution and future directions. International Journal of Physical Distribution & Logistics Management, 41 (1), pp. 46-62.
- Carter, C.R., Rogers, D.S. (2008). A framework of sustainable supply chain management: moving toward new theory. International Journal of Physical Distribution & Logistics Management, 38 (5), pp. 360-387.
- Dowlatshahi, S. (2000). Developing a theory of reverse logistics. Interfaces, 20 (2), pp. 143-155.
- Elkington, J. (1994). Towards the sustainable corporation. California Management Review, pp. 90-100.
- Faucheux, S., Nicolai, I. (2011). IT for green and green IT: A proposed typology of ecoinnovation. Journal of Ecological Economics. 70, pp. 2020-2027.
- GeSI (2010). Evaluating the Carbon-Reducing Impacts of ICT: An Assessment Methodology. Accessed November 2013. www.gesi.org.
- Guide, V.D., Harrison, T.P., van Wassenhove, L.N. (2003). The Challenge of Closed-loop Supply Chains. Interfaces, 33 (6), pp. 3-6.
- Harmon, R.R., Demirkan, H., Raffo, D. (2012). Roadmapping the next wave of sustainable IT. Emerald, 14, pp. 121-138.
- Jenkin, T., Webster, L., Mc Shane, L. (2011). An Agenda for Green Information Technology and Systems Research. Information and Organization, 21 (1), pp. 17-40.
- Keh, P., Rodhain, F., Meissonier, R., Llorca, V. (2012). Financial performance, Environmental Compliance, and Social Outcomes: The Three Challenges of Reverse Logistics - Case study of IBM Montpellier. Supply Chain Forum: An International Journal, pp. 26-38.
- Malhotra, A., Melville, N. P., Watson, R. (2013). Spurring Impactful Research on Information Systems for Environmental Sustainability. MIS Quarterly Special Issue: IS & Environmental Sustainability, 37 (4), pp. 1265-1274.
- McAfee, A., Brynjolfsson, E. (2008). Investigating in the IT that makes a competitive difference. Harvard Business Review, 86 (7), pp. 98-107.
- Mintzberg, H., Simons, R., Basu, K. (2002). Beyond selfishness. MIT Sloan Management Review, Winter, pp. 67-74.

- Porter, M.E., Kramer, M.R. (2006). Strategy and society: the link between competitive advantage and corporate social responsibility. Harvard Business Review, 89 (2), pp. 62-77.
- Porter, M.E., Kramer, M.R. (2011). The big idea Creating Shared Value. Harvard Business Review, Vol. 89, No. 2, pp. 62-77.
- Rodhain, F., Fallery, B. (2011). ICT and Environment: Bad Assumptions and Recent Hypotheses. (pp.1-18), in Towards Managerial Excellence: Challenges and Choices, Edited by P.D.Jawahar, Macmillan, 270 p.
- Sandel, M. (2013). Why we shouldn't trust markets with our civic life. Professor in political philosophy at Harvard University. TED conference talk in Edinburgh (Scotland). www.ted.com
- Stoeglehner, G., Brown, A.L., Kornov L.B. (2009). SEA and planning: 'ownership' of strategic environmental assessment by the planners is the key to its effectiveness. Impact Assessment and Project Appraisal, 27 (2), pp. 111–120.
- The Climate Group (2008). SMART 2020: Enabling the low carbon economy in the information age. Accessed November 2013. www.smart2020.org
- WCED, Bruntland, G.H., (1987). Our common Future. In: Report of the World Commission on Environment and Development. Oxford: Oxford University Press.



Next Generation



Prof. Dr. h. c. Wolfgang Kersten Prof. Dr. Thorsten Blecker Prof. Dr. Christian M. Ringle (Editors)

Next Generation Supply Chains

Trends and Opportunities

Edition 1st pdf edition, August 2014

Publisher epubli GmbH, Berlin, www.epubli.de

Editors Wolfgang Kersten, Thorsten Blecker and Christian M. Ringle

Coverdesign Frederik Duchâteau, Moritz Petersen

Coverphoto Viktor Rosenfeld / flic.kr/p/e7ujK3 (CC BY-SA 2.0)

ISBN 978-3-7375-0339-6

Copyright:

This book are licensed under the Creative Common Attribution-ShareAlike 4.0 International License.

This book can be downloaded at HICL (<u>hicl.org</u>) or at the TUBdok – Publication Server of the Hamburg University of Technology (<u>doku.b.tu-harburg.de</u>) – ISBN: 978-3-7375-0339-6

A printed version of this is available in your library or book store – ISBN 978-3-8442-9879-6

An alternate version for your ebook reader is available through online ebook stores – ISBN: 978-3-7375-0340-2

Preface

Today's business environment is undergoing significant changes. Demand patterns constantly claim for greener products from more sustainable supply chains. Handling these customer needs, embedded in a sophisticated and complex supply chain environment, are putting the players under a constant pressure: Ecological and social issues arise additionally to challenges like technology management and efficiency enhancement. Concurrently each of these holds incredible opportunities to separate from competitors, yet also increases chain complexity and risks.

This book addresses the hot spots of discussion for future supply chain solutions. It contains manuscripts by international authors providing comprehensive insights into topics like sustainability, supply chain risk management and provides future outlooks to the field of supply chain management. All manuscripts contribute to theory development and verification in their respective area of research.

We would like to thank the authors for their excellent contributions, which advance the logistics research progress. Without their support and hard work, the creation of this volume would not have been possible. We would also like to thank Sara Kheiravar, Tabea Tressin, Matthias Ehni and Niels Hackius for their efforts to prepare, structure and finalize this book.

Hamburg, August 2014

Prof. Dr. h. c. Wolfgang Kersten Prof. Dr. Thorsten Blecker Prof. Dr. Christian Ringle

Table of Contents

I. A Look Into the Future - Opportunities and Threats	
Identification of Megatrends Affecting Complexity in Logistics Systems Wolfgang Kersten, Birgit von See and Henning Skirde	3
Planning Approach for Robust Manufacturing Footprint Decisions	29
Future Problems in Logistics Due to Demographic Change	51
Logistics Trends 2020: A National Delphi Study Concerning the German Logistics Sector	69
Stephan Zelewski, Alessa Münchow-Küster and René Föhring	
Vision of a Service Value Network in Maritime Container Logistics	87
II. Sustainability Efforts Within the Supply Chain	
Logistics Performance Measurement for Sustainability in the Fast Fashion Industry1	13
Anna Corinna Cagliano, Muhammad Salman Mustafa, Carlo Rafele and Giovanni Zenezini	
Design of Sustainable Transportation Networks1	37
Wendelin Gross and Christian Butz	
Exploring Sustainability in Construction Supply Chains1	61
Margherita Pero, Eleonora Bottani and Barbara Bigliardi	

Is Money Really Green? - An Investigation Into Environmental Supply Chain Practices, with a Cost Focus183
John Bancroft
Relevant Purchase Criteria or Basic Requirement: Customer Perspectives on Green Logistics195
Matthias Klumpp, Julia Naskrent and Nikolaus A. D. Hohl
Information Systems and Reverse Logistics: Examining Drivers of Implementation on Multiple Case Study Scenario211
Josip Maric, Florence Rodhain and Yves Barlette
Analysing the Role of Rail in Urban Freight Distribution223
Katrien De Langhe
Truck Loading Dock Process – Investigating Integration of Sustainability245
Niels Hackius and Wolfgang Kersten
How to Attract Air Freight Business: Defining Critical Success Factors for Regional Airports273
David M. Herold, Simon Wilde and Natalie Wojtarowicz
Early Supplier Integration in Cast Product Development Partnerships – A Multiple Case Study of Environmental and Cost Effects in the German Foundry Value Chain289
Robert Christian Fandl, Tobias Held and Wolfgang Kersten
Sustainable Logistic Scenarios in the NSR Region311
Jacob Kronbak, Angela Münch, Liping Jiang and Lisbeth Brøde Jepsen
III. Handling Risk - Concepts Towards Robust SCM
A Service Production Planning Model Integrating Human Risk Factors345
Nguyen Vi Cao and Emmanuel Fragniere

Agility, Robustness, Resilience, Continuity and Anti-Fragility in Supply Chains
Immanuel Zitzmann
Flexible Supply Chain Design under Stochastic Catastrophic Risks379
Yingjie Fan, Frank Schwartz and Stefan Voß
A Risk Management Approach for the Pre-Series Logistics in Production Ramp-Up407
Patrick Filla and Katja Klingebiel
The Imbalance of Supply Risk and Risk Management Activities in Supply Chains: Developing Metrics to Enable Network Analysis in the Context of Supply Chain Risk Management
Christian Zuber, Hans-Christian Pfohl and Ulrich Berbner
Risk Assessment in Managing the Blood Supply Chain447
Phongchai Jittamai and Wijai Boonyanusith
Supply Chain Risk Management in International Trade Operations Between Germany and Brazil469
Meike Schroeder and Renato Barata Gomes
The Forest Supply Chain Management: An Entropic Perspective487
Tarik Saikouk, Ismail Badraoui and Alain Spalanzani
A Multi-Agent Based Approach for Risk Management in a Port Container Terminal515
Lorena Bearzotti and Rosa Gonzalez
Authors

About HICL

Since 2006 the annual conference Hamburg International Conference of Logistics (HICL) at Hamburg University of Technology (TUHH) is dedicated to facilitate the exchange of ideas and contribute to the improved understanding and practice of Logistics and SCM. HICL creates a creative environment which attracts researchers, practitioners, and industry thinkers from all around the world.



Innovation is increasingly considered as an enabler of business competitive advantage. More and more organizations focus on satisfying their consumer's demand of innovative and qualitative products and services by applying both technology-supported and non technology-supported innovative methods in their supply chain practices. Due to its very characteristic i.e. novelty, innovation is double-edged sword; capturing value from innovative methods in supply chain practices has been one of the important topics among practitioners as well as researchers of the field.

This volume, edited by Thorsten Blecker, Wolfgang Kersten and Christian Ringle, provides valuable insights into:

- Innovative and technology-based solutions
- Supply chain security management
- Cooperation and performance practices in supply chain management

ISBN: 978-3-7375-0339-6