PONTIFÍCIA UNIVERSIDADE CATÓLICA DO PARANÁ
ESCOLA POLITÉCNICA
PÓS-GRADUAÇÃO EM ENGENHARIA DE PRODUÇÃO E SISTEMAS

PAMELA MOCELIN MANFRIN

OPERATIONS MANAGEMENT AND SUSTAINABILITY
FROM LITERATURE TO A PRACTICAL PERSPECTIVE

CURITIBA
2012

PAMELA MOCELIN MANFRIN

OPERATIONS MANAGEMENT AND SUSTAINABILITY
FROM LITERATURE TO A PRACTICAL PERSPECTIVE

Dissertação apresentada ao Programa de Pós-Graduação em Engenharia de Produção e Sistemas da Pontifícia Universidade Católica do Paraná, como requisito parcial para obtenção do título de mestre em engenharia de produção e sistemas.

Orientador: Prof. Dr. Edson Pinheiro de Lima

CURITIBA

2012

PAMELA MOCELIN MANFRIN

OPERATIONS MANAGEMENT AND SUSTAINABILITY
FROM LITERATURE TO A PRACTICAL PERSPECTIVE

Dissertação apresentada ao Programa de Pós-Graduação em Engenharia de Produção e Sistemas da Pontifícia Universidade Católica do Paraná, como requisito parcial para obtenção do título de mestre em engenharia de produção e sistemas.

COMISSÃO EXAMINADORA

_____

Edson Pinheiro de Lima
Pontifícia Universidade Católica do Paraná - PUCPR

_____

Sérgio Eduardo Gouvêa da Costa
Pontifícia Universidade Católica do Paraná - PUCPR

_____

Miriam Borchardt
Universidade do Vale do Rio dos Sinos - Unisinos

Curitiba, 04 de Abril de 2012

AGRADECIMENTOS

Agradeço a todos que compartilharam dessa experiência única.
Obrigada a Deus, pela constante presença em minha vida.
Obrigada a minha família que é minha base para todas as realizações.
Obrigada aos amigos que me deram apoio ao longo da caminhada.
Obrigada ao meu orientador pela oportunidade.

ABSTRACT

Given the rapid growth of the global economy, much has been discussed about the importance of sustainable development. To this end, some organizations have inserted sustainable management practices in their operations strategies. In parallel, the concept of sustainability has been widely discussed in the literature. To develop this work, it is considered the triple bottom line concept which refers to social requirements, economic and environmental issues within the context of operations. The main objective of this dissertation is to develop a model comparison between the theoretical concepts in the literature and the organizational practices. The study is based on a literature review consisting of 496 articles which allows the interpretation of the theme evolution in the global scenario as well as main authors, discussion topics and suggested approaches for the management of sustainable operations. A conceptual/theoretical model was established to expresses the content of this literature. In order to evaluate practices and organizational performance criteria considered relevant for sustainable organizations, the study describes the stages of construction of the questionnaire to be applied in the context of sustainability and operations management, including tools for testing the instrument. The questionnaire application, the sample selection and inferences of the results are presented in order to describe the methods and criteria used by the authors. The comparison between the theoretical model about conceptual paradigms presented in the literature in contrast to organizational sustainability practices identified through the survey analysis, resulted in the development of a descriptive framework, which allows the assessment of gaps between theory and practice of sustainable organizations.

Keywords: Sustainability. Operations Management. Sustainable Development.

RESUMO

Diante do crescimento acelerado da economia global, muito tem sido discutido sobre da importância do desenvolvimento sustentável. Para tanto, algumas organizações têm inserido práticas de gestão sustentável em suas estratégias de operações. Em paralelo, o conceito de sustentabilidade vem sendo amplamente discutido na literatura. Para o desenvolvimento desse trabalho, tomaremos como base o *triple bottom line* que remete o termo a quesitos sociais, econômicos e ambientais inseridos no contexto de operações. O objetivo principal dessa dissertação é desenvolver um modelo comparativo entre os conceitos teóricos presentes na literatura e as práticas organizacionais, para tanto, o estudo tem como base uma revisão da literatura composta por 496 artigos a qual possibilita a interpretação da evolução do tema no cenário global, bem como os principais autores, temas de discussão e abordagens sugeridas para a gestão de operações sustentáveis. A partir disso, foi constituído um modelo teórico conceitual que expressa o conteúdo presente de na literatura. A fim de avaliar as práticas organizacionais e os critérios de desempenho considerados relevantes por organizações sustentáveis, o estudo descreve as etapas de construção do questionário a ser aplicado no contexto de sustentabilidade e gestão de operações, incluindo ferramentas de validação do instrumento. As fases de aplicação do questionário, bem como as de seleção da amostra e inferências dos resultados são apresentadas de forma a descrever os métodos e critérios considerados pelos autores. A comparação entre o modelo teórico conceitual acerca dos paradigmas presentes na literatura em contraponto às práticas organizacionais de sustentabilidade identificadas por meio do *survey* resultou na elaboração de um framework de caráter descritivo, o qual permite avaliar os *gaps* existentes entre teorias de sustentabilidade e o exercício das organizações sustentáveis.

Palavras-chave: Sustentabilidade. Gestão de Operações. Desenvolvimento Sustentável.

LISTA DE ILUSTRAÇÕES

LISTA DE TABELAS

SUMÁRIO

1 INTRODUCTION

The development of the global economy since the Industrial Revolution accelerated the use of natural resources. In parallel, it triggered consumption and consequently the industrial demand. Over the years, organizations have been forced to adapt their production systems, increasingly driven by the economic growth, continuously degrading the environment. The resulting automation of technological advances also followed capitalist characteristics enabling greater effectiveness and speed in industrial processes, requiring flexible and capable manpower. Large industrial centers began leading the growth of commercial centers and educational institutions, trade and services forming the urban areas, moving successively to the economy, forming a cycle of consumption. In recent decades, both large and small corporations have undergone radical changes in their structures in response to competitive levels. According to Handfield (1997), waste reduction, process improvement initiatives such as Total Quality Management (TQM), Business Process Reengineering (BPR) and Supply Chain Management (SCM) were identified as critical success factors in the 1990s. The author states that environmental strategies or "green movements" are the main topics at the meetings of corporate strategic planning. A survey by Pilkington and Fitzgerald (2006) pointed out that since 1999, one of the themes associated with the Operations Management is Sustainable Resource-Based View, showing the increasing insertion of the topic in the literature.

The term sustainable development was first used in the 1987 report of the United Nations (UN) known as the Brundtland Report. This document states that sustainable development aims to meet current needs, worrying about the ability of future generations to meet their needs. The concept of sustainability is widely discussed. For many organizations, it refers exclusively to environmental issues such as eco-efficiency (DYLLICK; HOCKERTS, 2002), eco-design (PALMER, 2009), among other "eco-products." Although environmental issues are paramount in the literature, social dimension is equally important (MEEHA; BRYDE, 2010). These three pillars of sustainability form the triple bottom line (TBL) (ELKINGTON, 1999, TÖPFER, 2000). This concept was widely distributed by the Global Reporting Initiative (GRI), established in 1997 through partnerships between non-governmental

organizations, which aim the use of indicators described in reports so that companies disclose their sustainability practices and results (GRI, 2011).

Other measurement systems are designed to evaluate the performance of organizations such as the ISO 14000 family (BAXTER, 2001). Veleva and Ellenbecker (2001) described a series of indicators and methods for sustainability implementation. In 2005, the ISE - Business Sustainability Index developed by the BM&FBOVESPA was structured aiming to integrate the financial market to companies with a recognized commitment to social responsibility and corporate sustainability, resulting in economic advantages (BM&FBOVESPA, 2011).

The present research in structure in 3 main phases: Introduction, Proposed Papers and Conclusion. The section Proposed Papers is divided in 3 papers delimitating the development of the research, going through literature review, methodology and appliance. From the literature review, it can be seen an increasing number of paper containing issues relating sustainability applied in the context of operations. The first step of this research describes an exploratory bibliometric research that identified 496 articles published in specific databases. Thus, it was possible to structure networks of main authors, keywords, identify the major journals of publication, the evolution of the topic in a timeline and various data that characterize the academic setting of the theme proposed. Furthermore, it was possible to describe a research agenda such as the study proposed by Angell and Klassen (1999), identifying emerging issues and opportunities for future studies. These propositions originated the dissertation topic and the following stages of the research.

The conceptual model based on issues raised in the literature review, statements and variables proposed, instrument of data collection and all the testing methodology is developed and described in Paper 2 of this study,

The application and analysis of the variables are contained in Paper 3. This step includes the selection of the sample surveyed, the description of the administration of research, methods of approach to the interviews, and all descriptive statistics from the data collected by the instrument. In conclusion, the article proposes a conceptual framework that describes the relationship between the main topics discussed in the literature and the organizational practices, which allows

inferences on some convergences and divergences between theoretical paradigms and sustainable development organizations.

1.1 THEME AND OBJECTIVES

The theme of this study includes a comparison of the key concepts emerging in the literature on sustainable operations and sustainable practices of organizations considering social, economic and environmental perspectives. This theme is seen in the context of production engineering with a focus on Sustainability and Operations Management.

Thus, the main objective of this work is to develop a model comparison between the theoretical concepts prominent in the literature and organizational practices.

The breakdown of the main objective, describe this research intend to achieve the following specific objectives:

a) Identify elements highlighted in the literature of operations management and sustainability, providing a structured map of authors networks, themes being approached, it's evolution in the literature, and other relevant information which enable to frame the status of the theme in the literature and identify opportunities to the construction of future research agenda;
b) Develop and validate a research questionnaire to collect information to be applied in organizations that have recognized sustainability practice, and propose a conceptual model to compile the questionnaire variables;
c) Apply a questionnaire aiming to gather information regarding the adoption of sustainable practices in Brazilian companies;
d) Analyze and propose inferences regarding results.

1.2 JUSTIFICATION

A major challenge for operations management is the achievement of sustainable development concepts associated with organizational performance by creating a set of clear and assertive boundaries in the literature. The literature review presented in Section 1 shows that sustainability research has grown significantly in

recent years, increasing the integration of sub-themes of operations management. Despite this growth, the study also shows that there is a long way to go to the consolidation of this research agenda.

Angell (2000) states that internal and external pressures force operations managers to weave sustainable decisions and operational even though little is known about how environmental issues affect operating decisions or vice versa, confirming the fact that regardless of academic setting, the need for implementation of sustainable practices is a fact that should be considered by companies.

Thus, this project has as its main justification the need to contribute to the structuring academic and operational setting, in order to highlight the links and gaps between theoretical concepts and organizational practices.

1.3 STUDY DESIGN

In order to clearly guide the execution of this work, it is necessary the design of the strategy of how objectives will be achieved, which is the research method chosen and the research structure to be followed. Moreover, it is essential to specify a central question that drives efforts of knowledge:

Is there a significant correlation between the theoretical concepts proposed in the literature and sustainable operations?

Method

The beginning of the study took place from the identification of the macro theme - sustainability and operations management. Once defined the context, it was conducted an extensive literature research available in 9 databases using the words of the theme that resulted in 496 papers gathered. Publication dates were collected separately as much as keywords, authors, citations and journals, permitting citation and bibliometric analyzes presented in Paper 1. The results guided the choice of the main theme of the present study, as well as their goals and contributions.

Paper 2 refers to the proposition of an exploratory survey, which aims to diagnose the actions taken by companies that have sustainable development practices, as much as a proposition of a conceptual framework based on the literature review. This information is led to the next stage of the study.

Paper 3 presents three stages of sample selection, deployment and collection of data from the questionnaires, analysis of information and propose a conceptual model that represents the links and gaps between the perspectives approached.

Finally, the thesis is completed describing the results obtained from the research and also identify research opportunities for future contributions.

Research Methodology

According to Miguel (2007), the research methods commonly used in production engineering are: survey methods, modeling and simulation, action research and case study.

This work is known primarily as an exploratory study that employs mainly survey methodology in order to achieve its goals. This methodology is an oriented investigation guided by a specific method in order to raise, explore and analyze data for the creation, formalization or renewal of knowledge areas. Miguel (2007) sets the survey type survey as "a collection of sample data about the problem so that, by means of quantitative analysis, conclusions are obtained." Also emphasizes that this type of research helps to increase knowledge in specific areas and to strengthen of new theories.

Structure

This study is structured into three main chapters in order to present the subject of study, develop and complete research about its findings. To facilitate understanding of the steps proposed, Figure 1 shows the structure diagram of the research:

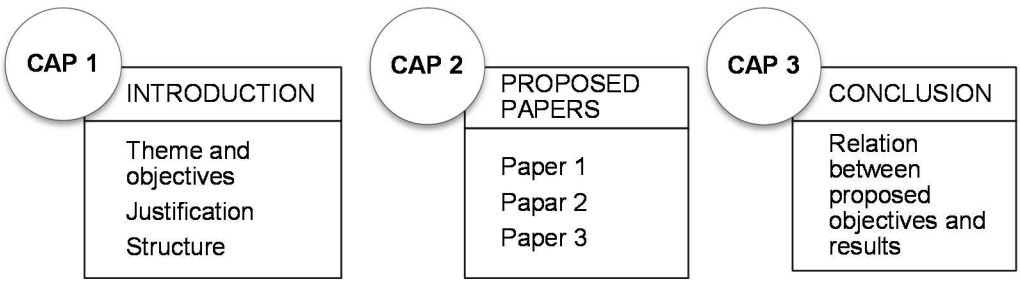

Figure 1 – Research structure
Source: Authors, 2012

The stages of development resulted in three major items:

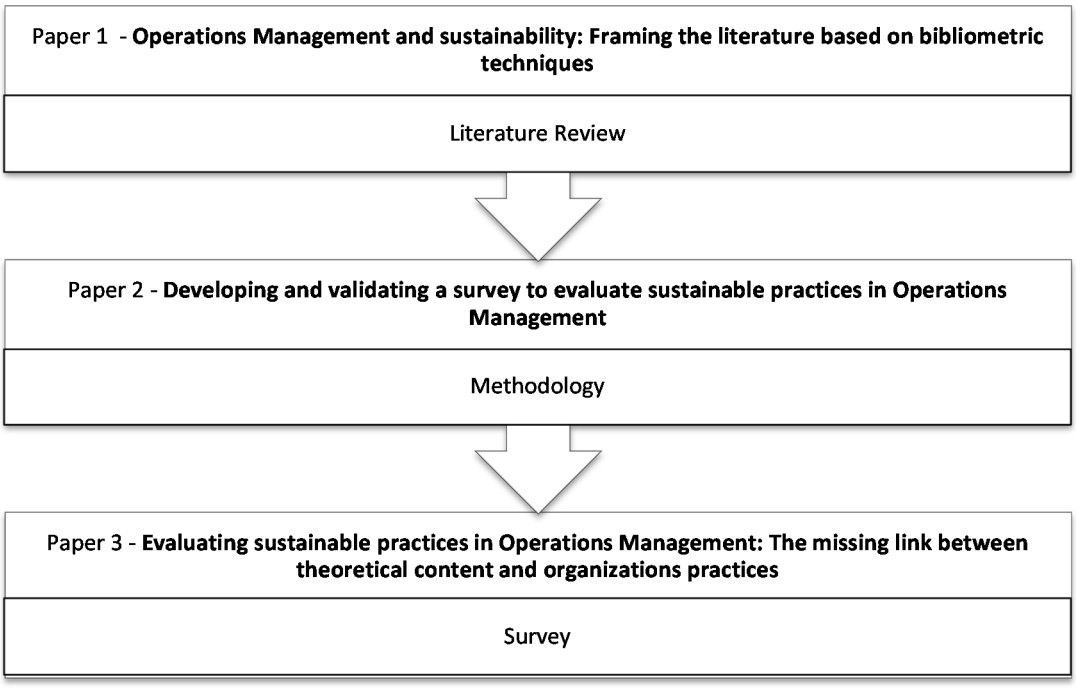

Figure 2 – Structure of research steps
Source: Authors, 2012

1.4 STUDY LIMITATIONS

This study aims to analyze the convergence of the proposed themes in the literature on sustainable operations and organizational practices.

Inferences obtained through the steps are restricted to the period of theoretical coverage of the documents, and the sample of respondents.

2 PROPOSED PAPERS

2.1 **PAPER 1** - Operations Management and sustainability: Framing the literature based on bibliometric techniques

2.2 **PAPER 2** - Developing and validating a survey to evaluate sustainable practices in Operations Management

2.3 **PAPER 3** - Evaluating sustainable practices in Operations Management: The missing link between theoretical content and organizations practices

3 PAPER 1

OPERATIONS MANAGEMENT AND SUSTAINABILITY: FRAMING LITERATURE BASED ON BIBLIOMETRIC TECHNIQUES

Pamela Mocelin Manfrin1, Edson Pinheiro de Lima2, Sérgio Eduardo Gouvêa da Costa3, Carla Gonçalves Machado4

1 Industrial and Systems Engineering Graduate Program – PPGEPS, Pontifical Catholic University of Parana – PUCPR, pamela.manfrin@pucpr.br; 2 Industrial and Systems Engineering Graduate Program – PPGEPS, Pontifical Catholic University of Parana – PUCPR, e.pinheiro@pucpr.br; 3Industrial and Systems Engineering Graduate Program – PPGEPS, Pontifical Catholic University of Parana – PUCPR, s.gouvea@pucpr.br; 4 Industrial and Systems Engineering Graduate Program – PPGEPS, Pontifical Catholic University of Parana – PUCPR,carlagmachado@hotmail.com

ABSTRACT

Sustainable development has become one of the dominant global discourses among organizations and academic community, involving social, environmental and economic issues. In order to understand this scenario through OM lens, a literature review is conducted to identify sustainability issues in OM research. The main objective of this study is to identify elements highlighted in the literature of operations management and sustainability, providing a structured map of authors networks, themes being approached, it's evolution in the literature, and other relevant information which enable to frame the actual status of the theme in the literature and identify opportunities to the construction of future research agenda. Results were obtained from a set of categories provided by 496 articles available at specific databases and reveal an increase in the number of publications in recent years and a set of other inferences. Furthermore, authors propose a list of opportunities for futures studies, along with research questions and suggested reading.

Keywords: operations management, sustainable operations, sustainability

3.1 INTRODUCTION

In earlier decades, the term Operations Management (OM) referred primarily to manufacturing production. However, the field has expanded to include service systems as well. Since an operations based approach could permeate every organization's functional area ranging from marketing, accounting, purchasing/ logistics, information management to engineering and human resources; it could represent a methodology to study value creation.

Pilkington and Liston-Heyes (1999) analyzed OM literature and identified five main sub-categories which they named: “Manufacturing Strategy Proposers, Manufacturing Strategy Developers, Japanese Manufacturing, Performance Measures, and Best Practices”. With all these concerns, managers have been learning to play by broad set of rules. According to Porter (1996), companies must be flexible to respond rapidly to competitive and market changes. They must benchmark continuously to achieve best practice and outsource hard to gain efficiencies. Obviously, companies must define core competences and needs in the race to stay ahead. The author also emphasizes that although the resulting operational improvements have often been highlighted; many companies have been frustrated by their inability to translate those gains into sustainable profitability. It was necessary to align operational efficiency with strategy and more over, to sustainable thinking.

Pilkington and Fitzgerald (2006) conducted a co-citation analysis and described the evolution of OM’s sub-themes in *IJOPM* publications grouping the topics chronologically. The data sets from 1999 to 2003 identified “Sustainable resource view” as one of the major topics related to OM, proving the introduction of sustainable issues into the OM literature context. Hart (1995) suggests that resource bases theory takes the perspective that valuable firm resources and capabilities provide the key sources of sustainable competitive advantages aligning resource based perspective to sustainable resource view, revealing the openness of OM to emerging debates in the subject of strategic management. Isaksson and Steimle (2009) observe that sustainable development is not only an issue for nations but also for companies. They highlight the importance of big corporation’s in driving sustainable development. Gold *et al*. (2010) argue that supply-chain-level competition and the challenges of designing sustainable operations reflect worldwide growing environmental and ethical awareness.

All these concerns indicate increasing emphasis on sustainability studies being tracked.

In order to monitor the development of the theme in the literature, this paper proposes a systematic review of the existing publications in Operations Management and sustainability.

According to Fink (1998), “a literature review is the systematic, explicit and reproducible design for identifying, evaluation and interpreting the existing body

of recorded documents", thus this study aims to analyze the main academic settings forward sustainability issues in operations management, the development trend of the subject and its interaction with several research areas, thus contributing to identification key authors and journals associated. This analysis is done by interpreting graphs of social networks and bibliometric data collected from articles in specific databases. The content analysis follows Seuring and Muller (2008) and Neely (2005) in which they propose citation and social network analysis in OM context.

3.2 THEORETICAL BACKGROUND

Research in Operations Management indicates over the last ten years a growing interest in themes related to operations sustainability and its implications for supply chain management, operations strategy, performance measurement, and lean systems (TAYLOR; TAYLOR, 2009, PILKINGTON; MEREDITH 2009, PILKINGTON; FITZGERALD, 2006). OM academic agenda and OM professional decision models are considering sustainability variables based on Triple Bottom Line framework for developing their research and day to day operations network design and management (UEDA *ET AL.*, 2009, HUTCHINS; SUTHERLAND, 2008, PORTER; KRAMER, 2006, WILKINSON *et al*., 2001).

A value proposition is required for developing the theoretical foundations of a sustainable operations strategic management system. Porter and Kramer (2006) state that companies should conceive a value proposition that integrates sustainability models and concepts to their business strategy, creating a real proposition of corporate social integration. Seliger (2007) proposes a value evaluation for sustainable development based essentially in enhancing human living standards.

According to Kleindorfer *et al*. (2005), sustainable OM is defined as the set of skills and concepts that allow companies to structure and manage their business processes to obtain competitive returns on its capital assets without sacrificing the legitimate needs of internal and external stakeholders and with due regard for the impact of its operations on people and the environment.

According to the Global Reporting Initiative, “the environmental dimension of sustainability concerns an organization’s impacts on living and non-living natural systems, including ecosystems, land, air and water”. This dimension is the most addressed when referenced to sustainability and it has achieved the highest level of consensus in the literature and business practices with many organizations publishing sustainable reports every year. As it follows, “the social dimension of sustainability concerns an organization’s impacts on the social systems within which it operates” and the economic dimension “concerns an organization’s impacts on the economic circumstances of its stakeholders and on economic systems at the local, national and global levels” (GRI, 2011).

A sustainable OM is defined as the sum of abilities and concepts which allow companies for structuring and managing its business processes in order to acquire some competitive return in its capital assets, without compromising the genuine needs of the inner and outer interested parties, in addition to taking into account the impact of their operations on people and environment (KLEINDORFER *ET AL*, 2005). "The future operation models will include a set of additional measures based on environmental and political criteria, as well as agility and sustainability by the company, in the future and efficient utilization of scarce resources” (BAYRAKTAR *ET AL*, 2007).

It is important to figure how sustainability is being approached by OM scholars, showing its connections to operations network framed by product and processes visions. Research conducted by Gold et al. (2010), Seuring and Muller (2008), Linton et al. (2007), Corbett and Klassen (2006) and Kleindorfer et al. (2005) started to organize and to frame the relationship between sustainability and operations management through systematic reviews and bibliometric analysis. These articles propose sustainable OM models, particularly related to supply chain management and started to create a maturity-based model for OM evolution based on sustainability recommendations.

3.3 METHODOLOGY – DATA COLLECTION AND DATA ANALYSIS

It is possible to observe the development of a specific study field by the scientific production attributed to it. The social relationship between authors in a

certain network is a relevant factor in the development of the scientific knowledge and in the consolidation of a discipline. These relations contribute to map the knowledge base in research fields (LEIDESDORFF, 2007).

Actually, it can be accomplished by means of bibliometric data analysis a broad number of categories: author, title, date, quotations and keywords – among other terms directly related to the extension of knowledge (MCINTIRE, 2006). The use of bibliometric analysis allows the assessment of contribution in specific scenarios and the behavior developed in social networks created by authors.

Information shared in a group tends to be validated as it is replicated. Through quotations, papers converge into a knowledge network (PINHEIRO; SILVA, 2008). Bibliometric study is a contribution to the evaluation of a study field development, for its evolution is processed among local, national and mainly international researchers (VAN RAAN; VAN LEEUWEN, 2002). Results obtained from social network analysis may indicate how the (direct or indirect) contacts are related to the scientific production and the intellectual mapping of a specific discipline (ROSSONI; HOCAYEN, 2008).

For Guedes (2005), bibliometrics is a quantitative instrument that minimizes the subjectivity inherent in the indexing and retrieval of information, producing knowledge in a particular subject area.

According to the bibliometric analysis definition, this paper suggest a framework methodology in order to categorize data collection in a very simple structure and stimulate future researches to follow a systematic review based on validated search methodology, as can be seen in Figure 3.

After delineating the research scope, the framework suggests tree important steps happening simultaneously: a) Select bibliometric categories, b) Select Keywords, c) Select data sources. Dotted blocks are information proposed by the authors to facilitate steps comprehension. This paper described its bibliometric analysis focused on 6 categories: authors, keywords, publication year, research methodologies, main journals and main databases. Two keywords were used to complete gathering papers from databases: “Operations Management” and “Sustainability”, restricting our findings into the very specific theme proposed in this research. To increase the reliability of the research, a refinement was made by checking the relevance of each paper, its content and linkage between sustainability

and operations management, the main focus and key words of this discussion, so articles which focused only in environmental sustainability not associated with OM were not considered, as well as any other specific theme not strictly related to OM. Sample was reviewed and storage using a digital library software. Excel® database was important in order to organize data in categories and for future descriptive deployments.

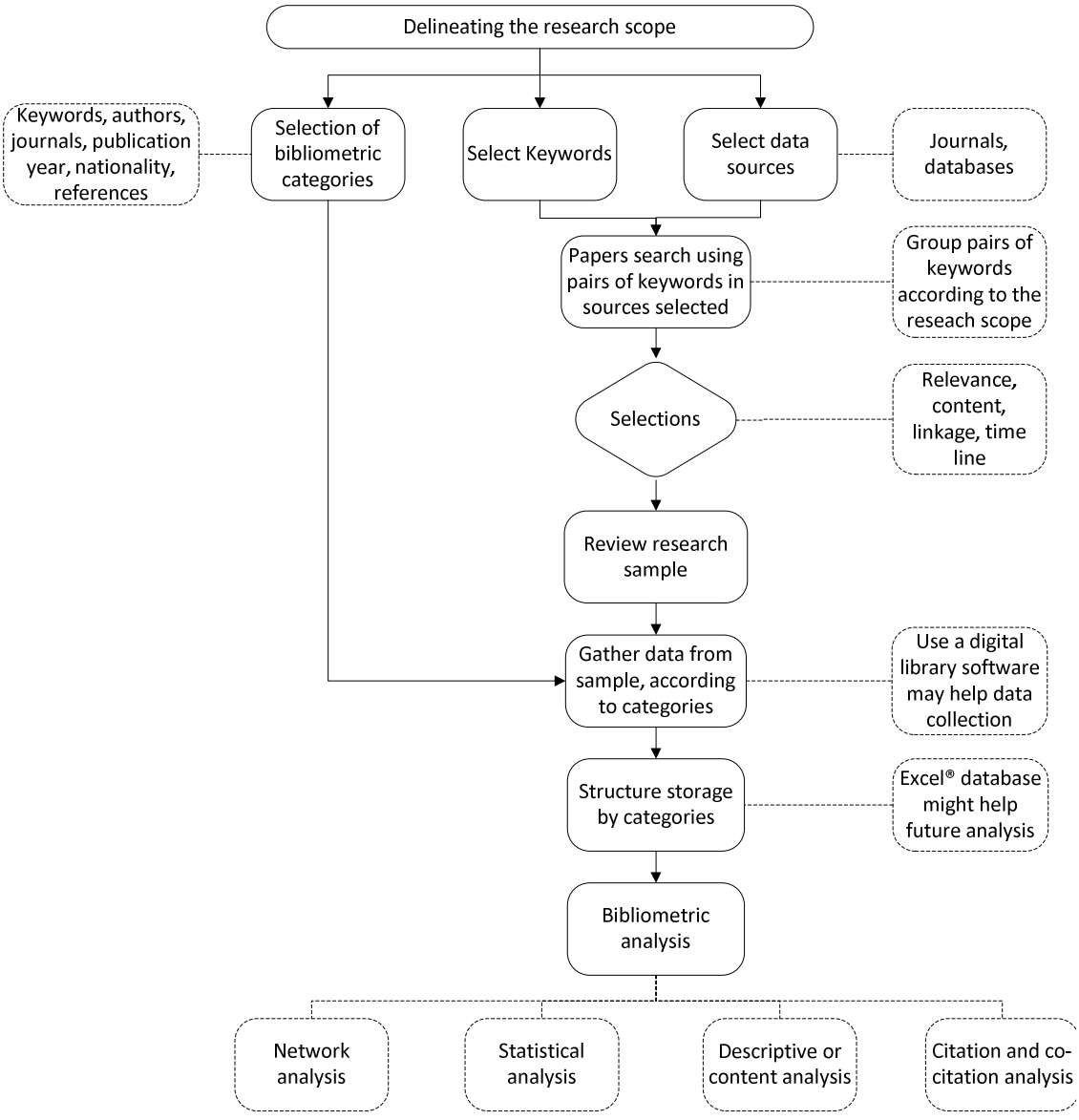

Figure 3: Bibliometric analysis framework

Further analysis might apply network analysis, statistical analysis, descriptive or content analysis, citation and co-citation analysis, depending on what results are expected. All these terms are directly related to the measure of knowledge. Thus, the use of bibliometric indicators allows the identification of scientific contribution in specific scenarios and analysis of their behavior (SENGUPTA, 1992).

Taking the state delimitations into account, a total of 496 papers were identified and submitted to a bibliometric analysis.

3.4 OM & SUSTAINABILITY SYSTEMATIC LITERATURE REVIEW

In a first step, the content of the papers was assessed by means of a descriptive review: (a) how is the distribution of publications across the time period? (b) In which journals are these articles published? (c) In which areas is sustainability being developed associated with OM? (d) Who are the main authors of this group of papers?

The descriptive analyses focus on dimensions and questions previously proposed.

Publications derived from the data collection, features articles ranging from 1995 to 2011, although no timeline was stipulate to gather the studied sample. The oldest paper proposed by Gupta (1995) and the second one, from Newman and Hanna (1996), both suggesting the interaction between manufacturing strategy and environmental practices.

Between 1997 and 2000 the number of publications ranged in 4 and 8 publications and did not expressed significant increase. From 1995 to 1999, 19 address sustainability and OM under an environmental perspective. In 2000, the first Sustainability Reporting Guidelines was released and guided several organizations in their sustainable initiatives focused on environmental, social and economic dimensions spreading the triple bottom line concept (GRI, 2011). Also in 2000, Jute Gutberlet published his article named “Sustainability: a new paradigm for industrial production” relating not only environmental practices but also social practices to the organizations sustainable policies.

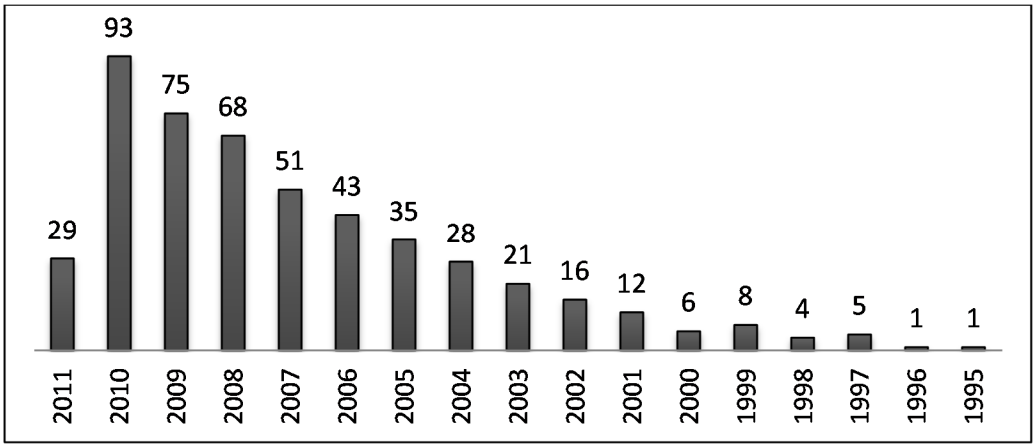

Figure 4: Publications timeline
Source: Authors, 2012

According to Figure 4 in which there is a timeline and number of publications for each year, since 2001, there is a continuous growth in the number of publications that extends until 2007. But it was in 2008 that the number skyrocketed. In the same year, Stefan Seuring and Martin Muller published a similar study of a literature review based on sustainability and supply chain management. This growth can be observed between 2008 and 2010, when the number of publications represents about 49% of the total.

The last year covered in this research demonstrates a substantial drop in numbers of publications. It is believed that most authors have focused their efforts on specific topics related to OM and sustainability, leaving behind the generality presented so far. Along with the publications time distribution, there was a wide sharing among the different areas of Operations Management; hotels process improvements (AZORIN *et. al.,* 2009), automotive industries (KOPLIN *et al*., 2007), etc.

It is remarkable the continuous interest in the sustainable theme and its future growth for the next decades, spreading the broad concept behind sustainability applications in OM context.

In order to examine specifically the use of sustainability in several areas of operations management, this study proposes an investigation of the most influential Journals found during the research and data collection. They are presented in Table 1. This category offered 139 different journals and nine of them represent about 40% of the total number. The systematic review shows that Journal of Cleaner Production

is the most important periodic when it comes to OM and sustainability themes. Followed by International Journal of Sustainability in Higher Education, and International Journal of Operations & Production Management.

Table 1: Main Journals

Journal	Papers	%
Journal of Cleaner Production	58	11,69%
International Journal of Sustainability in Higher Education	27	5,44%
International Journal of Operations & Production Management	26	5,24%
Business Strategy and the Environment	24	4,84%
Supply Chain Management: An International Journal	14	2,82%
Benchmarking: An International Journal	13	2,62%
Corporate Social Responsibility and Environmental Management	13	2,62%
International Journal of Physical Distribution & Logistics Management	11	2,22%
International Journal of Production Economics	11	2,22%

Source: Authors, 2012

Journals can be divided into two groups according to the editorial scope:

- Sustainability focused: Journal of Cleaner Production, Business Strategy and the Environment, Corporate Social Responsibility and Environmental Management, International Journal of Sustainability in Higher Education.

In this first group, could be highlighted several knowledge areas addressing sustainable themes. Pollock *et al.* (2009) suggests the engagement of higher education in sustainable practices as a manner of achieving universities progress.

- Management focused: International Journal of Operations and Productions Management, International Journal of Production Economics, Supply Chain Management: An international Journal, Benchmarking: An International Journal, International Journal of Physical Distribution and Logistics Management.

This second group could be also subdivided in other 3 groups which are Manufacturing, Business and Logistics.

All the multidisciplinary diagnosed through the Journals analysis, allows the understanding that across the years the theme of sustainability is going over the boundaries, promoting sustainable development practices in various areas of operations management. It also increases the possibility of firming these policies into the culture of organizations, independently on what is the major business as

researches improves and highlights its results, also enlarging the applicability and validation limits of this subtopic in scientific communities.

Research methods discussed have origins both quantitative and qualitative; the choice should be associated with the research objectives, possessing natural advantages and disadvantages. Through the variety of methods presented, it is possible to observe that there is not only one type of scientific methodology that applies to research in OM and sustainability. Nevertheless, some of them stand out in our sample.

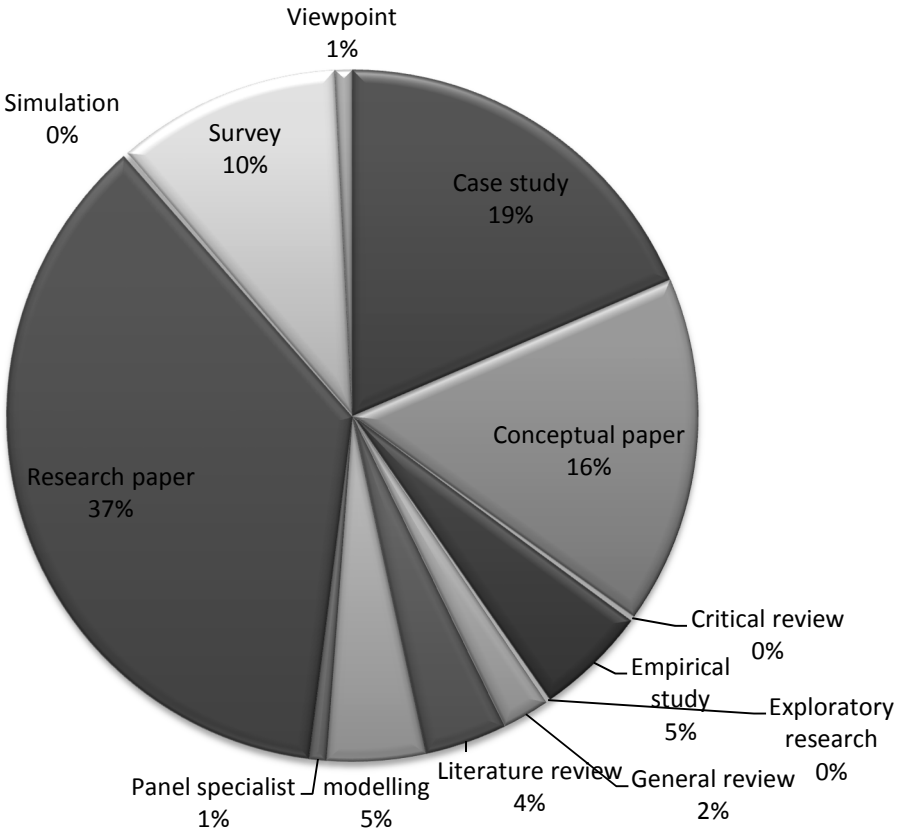

Figure 5: Methodology
Source: Authors, 2012

As it can be seen in Figure 5, there are 13 different methodologies approached in this sample. Research paper and case study are the most used methods demonstrating that although the research in OM and sustainability is not a consolidated research topic it has already passed the exploratory chapter and upgraded its analysis to a practical perspective.

To identify which type of method was used, each paper was read until the point it was stated the methodology. The percentage referred to Research Papers

contained on its methodology description this terminology and it was not changed nor explored in details.

For a literature review, it is particularly important to define clear boundaries and frontiers to delimitate the research. According to the methodology previously proposed, data sources were selected through its relations with OM context. This analysis aimed papers published in 9 different databases related to OM, most of them providing full papers to be downloaded.

Numbers of the top 5 databases can be seen in Figure 6.

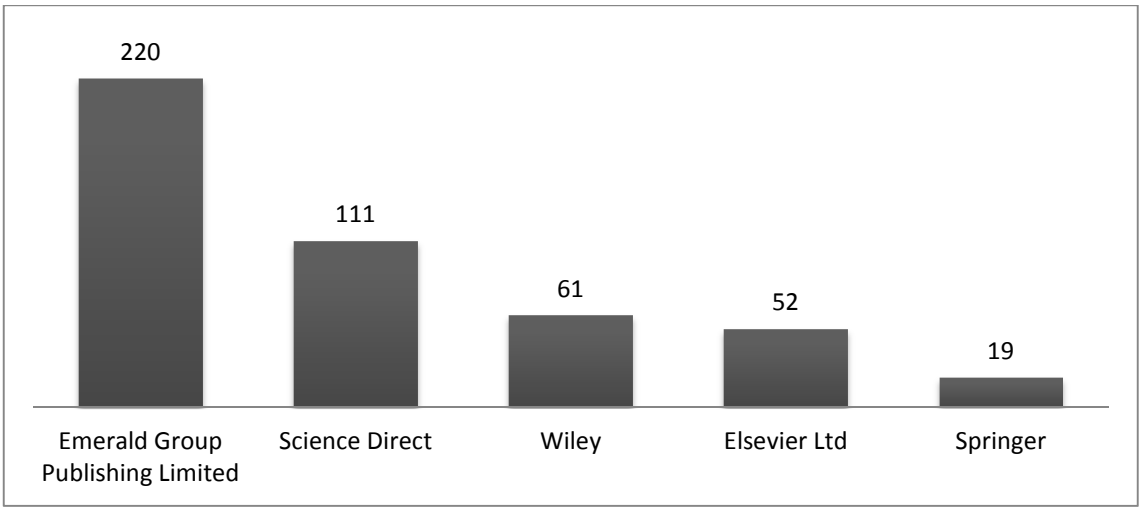

Figure 6: Main databases
Source: Authors, 2012

Following the methodology proposed, this paper now focuses on the author's analysis aiming to answer what are the main authors of sustainability and operations management and in which areas they are involved. Social network techniques were used to analyze this category.

The selection of the network measures was based on previewed studies (HANNEMAN; RIDDLE, 2011, GARFIELD, 1997, BURT, 1992, KLEINBERG et al., 2008). There are other ways to classify the nodes in a network or the position of an author into a specific scenario, however, they were not considered in this study. The selected network indicators were:

Degree – actors with a higher degree centrality measure have, consequently, a greater number of connections and tend to be at a privileged position. Therefore, they tend to have a greater influence in the network;

Closeness – the shorter the distance of an actor from another actors, the more accessible he/she is to 'reference points', that is, he/she can reach other network participants by shortest paths, and those who have a more powerful representation;

Betweenness – an actor / connector between two other network actors has a structurally more favored position, because if one actor wants to contact another, he/she has to do it through the connector;

Regarding author's analysis, as Garfield (1997) highlights, basing inferences on the first author rather than all authors may interfere in important contributions resulting in a weakness of the research. In order to bypass these limitations, all authors were considered as important as the lead author.

Author's social network can be seen in Figure 7.

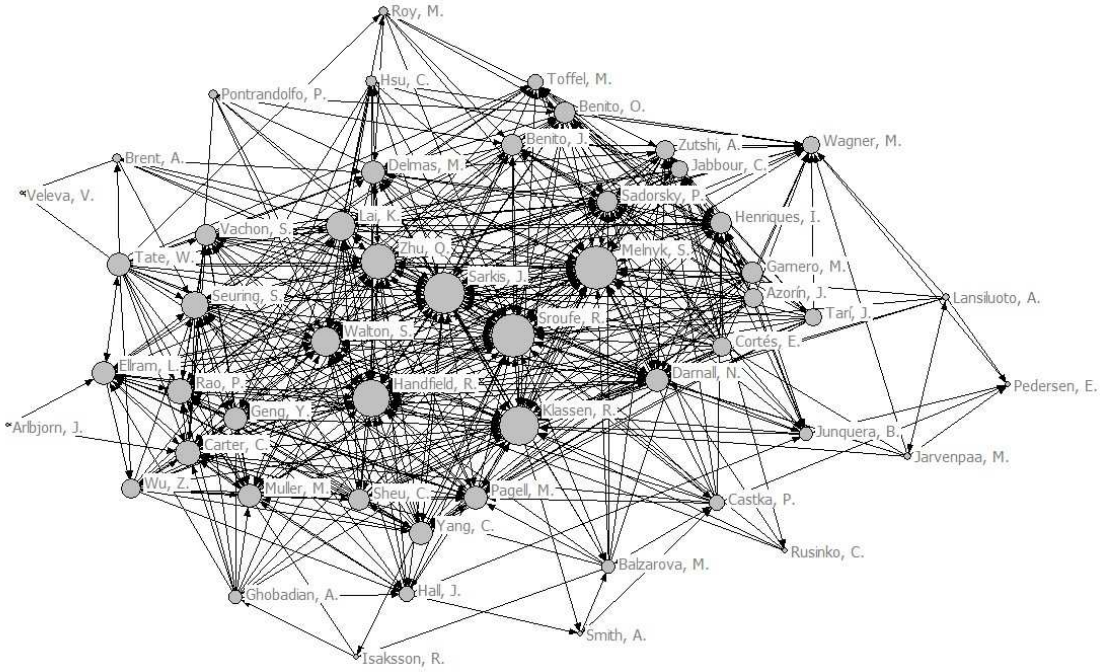

Figure 7: Authors Social Network
Source: Authors, 2012

Selecting the list to generate the citation matrix the criteria established by the author was defined as a minimum of 3 publications. Crossed data inputs created the network described in Figure 7 and indicators provided in Table 3.

According to Hanneman and Riddle (2011) when an actor has a privileged position in a certain network, he/she can obtain advantages from exchanging information, in addition to having more influence and higher recognition compared to other network components in less favorable positions. In Figure 7, Sroufe, R., Sarkis,

J., Melnyk, S. and Klassen, R. are located in a central position in the network, indicating their representativeness among all authors in this context. Concerning to publications, they have respectively 4, 18, 5, 7 papers in the sample. Even though Sarkis, J. have a high number of papers published elevating its value in the sample, Sroufe, R. and Melnyk, S. are cited by many other authors, what confirms their importance and influence in the academic community yet with less publications. Periphery located authors are also important and might represent a new group of knowledge being formed. This relationship may be represented by Brent, A., who has 4 recent publications in OM and sustainability themes. Relationships between authors can be formed by common interest in particular themes or scholarly fields. The direction of arrows associated with each actor on the network indicates whether an author is citing or being cited by other network nodes. The 496 papers sample resulted in 1181 different authors and 51 actors listed in Table 3 and graphically represented in Figure 7 sum about 20% of total authoring.

Through the network and analyzing the relationship indicators, it is possible to identify the ranking position of each author and its relationship to every single node. Table 2 presents the top five authors, their respective institutions and research areas.

Table 2: Authors, institutions and research areas

Author	Institution	Research Areas
Joseph Sarkis	Graduate School of Management, Clark University, USA.	Management of Manufacturing Technology; Agility and Agile Manufacturing; Environmentally Conscious Manufacturing; Supply Chain Management; Multicriteria; Green Supply Management; Decision Making Performance Measurement
Robert Klassen	Richard Ivey School of Business, University of Western Ontario, CA.	Operations Management; Business Administration; Sustainable Development; Management of Technology
Steven A. Melnyk	Department of Marketing and Supply Chain Management, Michigan State University, USA.	Environmentally Responsible Manufacturing; Process Management; Performance Measurement and Metrics; Supply Management; Time-based competition
Robert Sroufe	Donahue Graduate School of Business, USA.	Operations and Supply Chains; Environmental Management Systems; Technology integration; Global Manufacturing
Robert Handfield	North Carolina State University	Supply chain management, Strategic Sourcing

Source: Authors, 2012

Authors with the highest degree are dedicated to different research areas, and are all connected to the business schools. The topics “Supply Chain Management”

and “Environmental Management” are common, explaining the significant number of papers related to these topics, in addition to representing common interests among the researchers, making co-authorships possible.

Table 3: Indicators of author’s social network

Author	Degree	Closeness	Betweenness
Sroufe, R.	86.000	87.719	9.645
Melnyk, S.	84.000	86.207	7.451
Sarkis, J.	82.000	84.746	5.387
Klassen, R.	78.000	81.967	7.582
Handfield, R.	72.000	78.125	3.566
Zhu, Q.	68.000	75.758	2.369
Walton, S.	56.000	68.493	1.256
Lai, K.	56.000	67.568	1.794
Seuring, S.	52.000	67.568	1.259
Carter, C.	50.000	66.667	3.068
Rao, P.	48.000	64.935	1.350
Darnall, N.	46.000	63.291	1.219
Pagell, M.	46.000	64.935	0.791
Geng, Y.	46.000	64.935	0.682
Delmas, M.	44.000	64.103	1.183
Ellram, L.	44.000	63.291	2.128
Muller, M.	44.000	64.103	0.536
Tate, W.	44.000	63.291	3.710
Yang, C.	44.000	62.500	0.410
Henriques, I.	42.000	61.728	0.771
Sadorsky, P.	42.000	61.728	0.771
Sheu, C.	42.000	61.728	0.372
Benito, J.	40.000	60.976	0.705
Benito, O.	40.000	60.976	0.705
Gamero, M.	40.000	60.976	0.568
Vachon, S.	40.000	61.728	0.351
Azorín, J.	38.000	60.241	0.534
Cortés, E.	38.000	60.241	0.534
Zutshi, A.	38.000	60.241	0.724
Wu, Z.	36.000	60.241	0.081
Jabbour, C.	32.000	58.140	0.461
Tarí, J.	32.000	58.140	0.330
Wagner, M.	32.000	56.180	1.907

Hall, J.	30.000	58.140	0.712
Castka, P.	28.000	57.471	1.585
Toffel, M.	28.000	56.818	0.315
Balzarova, M.	26.000	56.818	0.849
Ghobadian, A.	26.000	55.556	0.508
Junquera, B.	26.000	56.180	0.936
Hsu, C.	22.000	54.348	0.092
Brent, A.	16.000	52.632	0.914
Pontrandolfo, P.	16.000	52.632	0.024
Roy, M.	16.000	52.083	0.055
Jarvenpaa, M.	14.000	52.632	0.312
Lansiluoto, A.	14.000	52.632	0.312
Pedersen, E.	10.000	43.860	0.139
Rusinko, C.	10.000	50.505	0.000
Isaksson, R.	8.000	49.505	0.035
Smith, A.	8.000	48.077	0.032
Arlbjorn, J.	4.000	41.322	0.000
Veleva, V.	4.000	39.370	0.000

Source: Authors, 2012

As presented above, Table 3 provides indicators associated to each author, containing information about Degree, Closeness and Betweenness given by the social network software reports.

Another way to explore OM and sustainability issues is to explore keywords using social networks. As every other stage of the research, data was manually collected and reviewed resulting in a group of 1974 keywords. They were all submitted to a descriptive analysis and 30 different keywords were selected representing 46,7% of total list. A minimum of 9 appearances was established to gather the keyword population. 367 words appeared only once among the total percentage. They may indicate a research continuity gap and disparity from the main study focus. After the descriptive analysis, a square matrix (30 x30) was generated using the final keywords.

As in the analysis of authors, words located in the center of the network are considered important influences and have a high level of representativeness. The network shown in Figure 8 shows Sustainable Development, Environmental Management, Supply Chain Management, Sustainability and Corporate social

responsibility as important areas of knowledge related to Operations Management and Sustainability, as a result they are graphically represented in the network center.

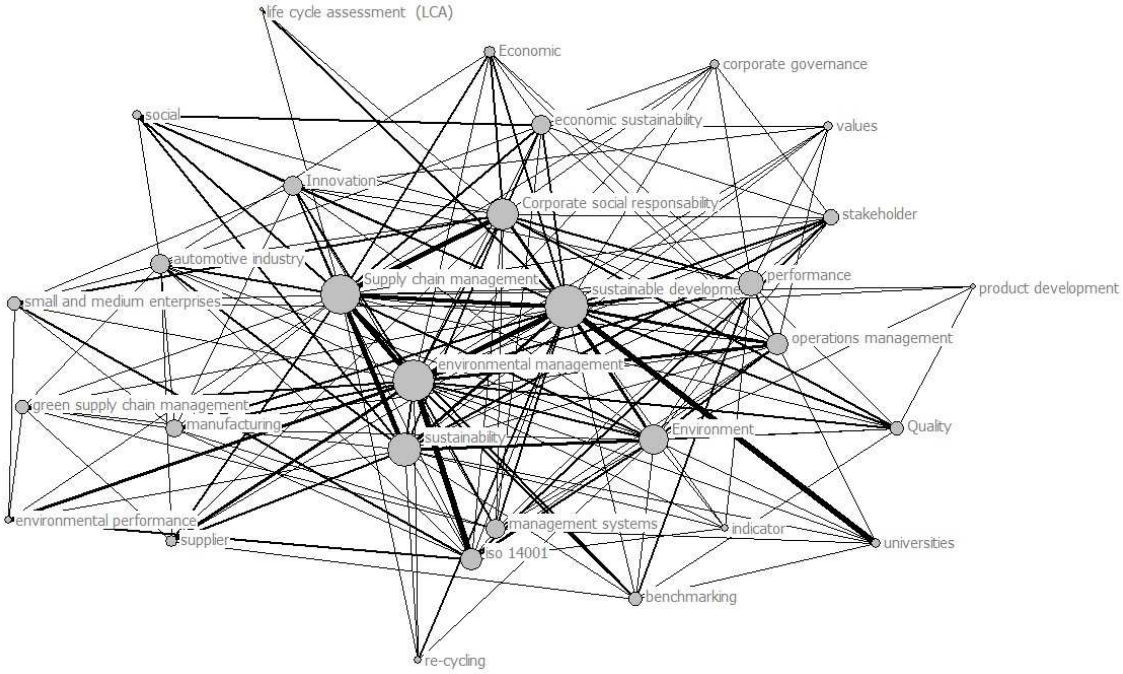

Figure 8: Keywords Social Network
Source: Authors, 2012

It must be considerate that the software used to create networks (UCINET Software and Netdraw app.) was configured to generate graphics by the method of centrality degree, but it also allows a number of other reviews from different layouts that are not addressed in this study.

As can be seen through the connector lines, some nodes have tight integration between them; Universities and Sustainable development, Environmental Management and ISO 14001, Supply chain management and Corporate social responsibility are some examples.

Words placed on the periphery of the network may indicate emerging issues related to sustainability and OM, or support issues to the main themes. It is also observed in the literature, the importance of performance measurement systems and indicators, product development issues, innovation and others, demonstrating the strong possibility of accomplishment in several areas of management operations knowledge, not only in large organizations but also in small and medium enterprises.

Table 4 provides indicators related to main keywords confirming the graphic of social through numbers.

Table 4: Indicators of keyword's social network

Keywords	Degree	Closeness	Betweenness
Sustainable development	93.103	93.548	14.187
Environmental management	89.655	90.625	10.231
Supply chain management	86.207	87.879	11.274
Sustainability	72.414	78.378	6.205
Corporate social responsability	68.966	76.316	4.705
Environment	65.517	74.359	4.222
Performance	55.172	69.048	2.230
Operations management	48.276	65.909	1.253
Iso 14001	48.276	65.909	1.469
Automotive industry	44.828	64.444	1.426
Economic sustainability	41.379	63.043	1.198
Management systems	41.379	63.043	0.920
Innovation	41.379	63.043	0.942
Manufacturing	37.931	61.702	0.489
Stakeholder	34.483	60.417	0.270
Quality	31.034	59.184	0.339
Small and medium enterprises	31.034	59.184	0.344
Green supply chain management	31.034	59.184	0.514
Benchmarking	31.034	59.184	0.304
Supplier	27.586	58.000	0.183
Economic	27.586	58.000	0.112
Social	24.138	56.863	0.112
Corporate governance	24.138	56.863	0.025
Universities	24.138	56.863	0.109
Values	24.138	56.863	0.112
Environmental performance	20.690	55.769	0.103
Indicator	20.690	55.769	0.025
Re-cycling	17.241	54.717	0.000
Product development	13.793	53.704	0.000
Life cycle assessment (LCA)	10.345	52.727	0.000

Source: Authors, 2012

From the indicators and networking for keywords, it is possible to identify clusters taking up key words shown in Table 4 and highlighted in network of Figure 8. Isolating the nodes by Ego Network Software analysis using UCINET can be seen knowledge groups outlined below:

Cluster 1 – Sustainable Development: life cycle assessment (LCA), management systems, re-cycling, universities, stakeholder

Cluster 2 – Environmental Management: environmental performance, operations management, supplier, manufacturing, ISO 14001

Cluster 3 – Supply Chain Management: benchmarking, automotive industry, economic

Cluster 4 – Sustainability: economic sustainability, innovation, environment, performance, social

Cluster 5 – Corporate social responsibility: quality, small and medium enterprises

3.5 RESEARCH AGENDA

There are many questions to be answered when developing a sustainable approach for operations management. The worldwide concept of “sustainable development” represents the concern with meeting current demands, but at the same time, with responsibility for the future. This trade-off challenges not only organizations but also the academic community.

In order to contribute with this goal, authors and keywords analysis were crossed establishing groups of knowledge as shown in Table 5. For this analysis, each author was positioned according to its publications and keyword citations.

Table 5 – Authors versus groups of knowledge

Cluster 1	Klassen, R. Vachon, S. Jabbour, C. Wagner, M. Hall, J. Rusinko, C. Isaksson, R. Arlbjorn, J.	*Sustainable Development*
Cluster 2	Sroufe, R. Melnyk, S. Darnall, N. Pagell, M. Delmas, M. Ellram, L.	*Environmental Management*
Cluster 3	Sarkis, J. Handfield, R. Zhu, Q. Walton, S. Lai, K. Seuring, S. Rao, P. Geng, Y. Muller, M. Hsu, C.	*Supply Chain Management*
Cluster 4	Carter, C. Gamero, M. Azorín, J. Cortés, E.	*Sustainability*

	Tate, W.		
	Yang, C.		
	Henriques, I.		
	Sadorsky, P.		
	Sheu, C.		
	Benito, J.		
	Benito, O.		
	Zutshi, A.		
	Wu, Z.		
	Toffel, M.		
	Junquera, B.		
	Jarvenpaa, M.		
	Lansiluoto, A.		
	Tarí, J.		
	Pontrandolfo, P.		
	Roy, M.		
	Veleva, V.		
Cluster 5	Castka, P.	*Corporate Social Responsibility*	
	Balzarova, M.		
	Ghobadian, A.		
	Brent, A.		
	Pedersen, E.		
	Smith, A.		

Source: Authors, 2012

It is evident how authors are positioned in each knowledge area. Through these results, were verified what areas have less emphasis or research gaps, counting contributions that each cluster has made for every specific research area identified based on counting keywords citations. These data is presented in Table 6.

Table 6 – Emphasis and Gaps in OM and Sustainability literature

	Sustainable Development	*Environmental Management*	*Supply Chain Management*	*Sustainability*	*Corporate Social Responsibility*
Cluster 1	22	8	10	3	2
Cluster 2	27	32	12	4	2
Cluster 3	7	11	40	3	3
Cluster 4	7	13	2	10	1
Cluster 5	2	4	5	2	11
Total	65	68	69	22	19

Source: Authors, 2012

Going trough results obtained from 496 papers, it is remarkable the convergence of information. Clusters 1, 2 and 3 include authors with high number of publications, being representative in citations and co-citations. Cluster 5 presents a small number of contributions compared to others, based on the number of publications of its authors. The total sum of the theme “Corporate Social Responsibility” demonstrated that even though the theme is considered one of the most relevant in OM and Sustainability literature, there is a lot of study opportunities in this area. The same summary occurs to Sustainability in Cluster 4, which

associates themes related to innovation, performance and economic aspects of sustainability.

Aiming to contribute for future research, authors proposed themes and research questions to guide future research according to OM and Sustainability agenda. Suggestions are categorized in Table 7.

Table 7: Proposed themes and research questions for future inquiries

Proposed Themes	Research questions	Keywords
Development of models for sustainable operations management and its legal framework and regulatory milestones	How the reference models contained in different norms and standards, influence the practices of sustainable operations?	standards, sustainable development, sustainable models
	How International Standards (ISO) determine references to sustainable management systems?	standards, sustainable development, sustainable management systems
Practices adopted in the process industry and its supply chain networks and the development of sustainable operations	What environmental practices are adopted by the process industries in the pursuit of sustainable development of their operations?	supply chain, sustainable operations, environmental practices
	How practices contained in SMS (safety, environment and health) are related to models based on sustainable operations?	SMS, sustainable operations, models
Corporate responsibility as a determining factor in the balance of operations management and reasons for the development of management models for sustainable operations	How social responsibility strategies relate to the sustainable development of network operations?	sustainable development, social responsibility, operations management
	What is the level of relationship between the practices proposed in the literature and the real motivation of businesses to sustainable development actions?	sustainable development, corporate responsibility, operations management
	What are the benefits from the practice of corporate social responsibility to sustainability of operations? What are the best practices adopted by the automotive industry regarding sustainable development of its operations?	sustainable operations, automotive industry, sustainable development
Sustainability of production models: the challenge of adequacy of production systems for sustainable development	What are the metrics that define the economic dimension of the Triple Bottom Line model? What are the dimensions of performance associated with the value creation in production of goods and services?	production systems, sustainable development, metrics
	How does innovation might contribute to sustainability in organizations?	Innovation, production models, sustainable operations

	Innovation can be considered as a determining factor for the sustainability of operations?	Production models, innovation, sustainable operations

Source: Author, 2012

The content analysis presented in this paper also contributes to the literature establishing important references regarding sustainability issues in operations management. Focusing on the development of the research agenda, some papers and documents are being highlighted in references and are suggested as recommended reading:

- SARKIS, J., 2001, Manufacturing's role in corporate environmental sustainability. International Journal of Operations & Production Management 21 (5/6), 666–686
- WALTON, S., HANDFIELD, R., MELNYK, S., 1998, The green supply chain: Integrating suppliers into environmental management processes. Purchasing Materials Management 34(2) 2–11.
- HENRIQUES, I., SADORSKY, P., 1999. The relationship between environmental commitment and managerial perceptions of stakeholder importance, Academy of Management Journal, Vol. 42 No. 1, pp. 87-99.
- PORTER, M., LINDE, C., 1995. Green and competitive: ending the stalemate. Harvard Business Review 73 (5), 120 - 134.

Non-governmental and governmental agencies reports are also listed as it follows:

- WCED - World Commission on Environment and Development, published in 1987.
- GRI - Global Report Initiative, reference document published in 2001.
- WBCSD - World Business Council for Sustainable Development, document published in 1997.
- UNESCO - United Nations Educational, Scientific and Cultural Organization, report published in 2004.
- OECD - Organization for Economic Cooperation and Development, report published in 2001.

Main standards were also referenced and comprise ISO 9001, ISO 14001, ISO 26000 and Social AccountAbility 8000.

3.6 CONCLUSION

This study addresses a wide literature publication about sustainability and operations management. Even though, all its results are limited in 496 papers and its content, this analysis are very significant to the academic community. Some of the paper did not have all the information to be categorized and this data was excluded from the indicators. Besides, the inability to completely capture, quantify and display entirely every data collected unable a full interpretation.

In a content and citation analysis, different journal citations policies may provide different information to the same journal or author's name due to abbreviation, initials or multiple initials presented. Therefore, every information was carefully screened looking for a pattern.

There is also the problem of including negative citations such as a bad example of practices, self citations and non relevant publication to a certain theme. In this paper, data was equally distributed and did not appear to have relevance in final inferences.

In order to reduce the impact of these limitations, process and criteria were strictly followed as well as the methodology.

During the research development, many considerations have been made. A structured methodology was proposed in Figure 3, aiming to organize and facilitate the literature review. It resulted in 6 main categories analyzed. According to Figure 4, there is a growing perspective in the literature when it comes to sustainability and operations management subtopics, raising discussion levels and spreading the theme into several knowledge areas. This multidisciplinary issue is also confirmed by Journal analysis, indicating that sustainability is being mentioned in important Journals of different contexts of Operations Management. Through research methodologies, might be stated that the theme is passing the boundary of exploratory methods and going over empirical studies.

Some authors were identified as important pieces of sustainability puzzle, interfering and delimitating operations scope regarding to sustainable development. Keywords were analyzed through networks and considerations about gaps and explored themes could be stated.

Finally authors conclude that although it was possible to identify the growth of research studies related to sustainability and operations management, there is still a lot of room for future research.

REFERENCES

AZORÍN J, CORTÉS E, MOLINER C, TARÍ J. Environmental practices and firm performance: an empirical analysis in the Spanish hotel industry. **Journal of Cleaner Production.;**17(5):516-524. 2009

BAYRAKTAR, E., JOTHISHANKAR, M.C., TATOGLU, E., WU, T, Evolution of operations management: past, present and future, **Management Research News**, 30(11), 843-71. 2007

BORGATTI, S.P., EVERETT, M.G. AND FREEMAN, L.C.. Ucinet for Windows: Software for Social Network Analysis. **Harvard, MA: Analytic Technologies**. 2002

BURT, S.R.,Structural holes: the social structure of competition, **Cambridge, MA London: Harvard University**. 1992

FINK, A., Conducing research literature review: from paper to the internet. **Thousand Oaks: Sage.** 1998

GARFIELD, E., Citation indexing – Its Theory and Application in Science. Technology and Humanitied. **Institute of Scientific Information. ISI Press Philadelphia.** 1997

GOLD, S., SEURING, S. AND BESKE, P., Sustainable supply chain management and inter-organizational resources: a literature review, **Corporate Social Responsibility and Environmental Management**, 17(4), 230-245. 2010

GRI – GLOBAL REPORTING INITIATIVE., 2011 Available at: **www.globalreporting.org**. Accessed in: 5 nov. 2011.

GUEDES, V.; BORSCHIVER, S., Bibliometria: uma ferramenta estatística para a gestão da informação e do conhecimento, em sistemas de informação, de comunicação e de avaliação científica e tecnológica. In: CINFORM – **ENCONTRO NACIONAL DE CIÊNCIA DA INFORMAÇÃO**, 6., Salvador, Brazil. 2005

GUPTA, M., Environmental management and its impact on the operations function. **International Journal of Operations & Production Management**, 15(8), pp.34-51,1995

GUTBERLET, J., Sustainability : a new paradigm for industrial production. **International Journal of sustainability in higher education,** 1(3), pp.225-236. 2000

HANNEMAN, R. A., RIDDLE, M., Introduction to social network methods, **Riverside: University of California**, 2011

HENRIQUES, I., SADORSKY, P., The relationship between environmental commitment and managerial perceptions of stakeholder importance, **Academy of Management Journal,** Vol. 42 No. 1, pp. 87-99. 1999.

HUTCHINS, M. AND SUTHERLAND, J., An exploration of measures of social sustainability and their application to supply chain decisions, **Journal of Cleaner Production**, 16(15), 1688-1698. 2008

ISAKSSON, R. AND STEIMLE, U., What does GRI-reporting tell us about corporate sustainability?, **The TQM Journal**, 21(2), 168-181. 2009

KLEINBERG, J., SURI, S., TARDOS, E., WEXLER, T., Strategic network formation with structural holes, **ACM SIGecom Exchanges**, 7(3). 2008

KLEINDORFER, P. R., SINGHAL, K. AND VAN WASSENHOVE, L. N.,. Sustainable Operations Management, **Production and Operations Management**, 14(4), 482-492. 2005

KOPLIN, J., SEURING, S. AND MESTERHARM, M., Incorporating sustainability into supply management in the automotive industry – the case of the Volkswagen AG. **Journal of Cleaner Production**, 15(11-12), 1053-1062, 2007.

LEIDESDORFF, L., , Scientific communication and cognitive codification: social systems theory and the sociology os scientific knowledge, **European Journal of Social Theory**, 10(3), 1-22. 2007

MCINTIRE, J.S., The clothing and textile research base: an author co-citation study, Master Degree dissertation, Faculty of the Graduate School, **University of Missouri**. 2006

NEELY, A., The evolution of performance measurement research decade and a research agenda for the next, **International Journal of Operations & Production Management**, 25(12), 1264-1277. 2005

NEWMAN, W. & HANNA, M., An empirical exploration of the relationship between manufacturing strategy and environmental management: Two complementary models. **International Journal of Operations & Production Management,** 16(4), pp.69-87,1996

PILKINGTON, A. AND FITZGERALD, R., Operations management themes, concepts and relationships: a forward retrospective of **IJOPM, International Journal of Operations & Production Management**, 26(11), 1255-1275. 2006

PILKINGTON, A. AND LISTON-HEYES, C., Is production and operations management a discipline? A citation/co-citation study, **International Journal of Operations & Production Management**, 19(1), 7-20. 1999.

PILKINGTON, A. AND MEREDITH, J.,. The evolution of the intellectual structure of operations management—1980–2006: A citation/co-citation analysis, **Journal of Operations Management**, 27(3), 185-202. 2009

PINHEIRO, L.V., SILVA, E.L., As redes cognitivas na ciência da informação brasileira: um estudo nos artigos científicos publicados nos periódicos da área, **Ciência da Informação**, 37(3), 38-50. 2008

POLLOCK, N. ET AL., Envisioning helps promote sustainability in academia: a case study at the university of vermont**. International journal of sustainability in higher education,** 10(4), pp.343-353, 2009

PORTER, M. E. AND KRAMER, M. R.,.The link between competitive advantage and corporate social responsibility, **Harvard Business Review,** 84(12), 1-14. 2006

PORTER, M., LINDE, C., Green and competitive: ending the stalemate. **Harvard Business Review** 73 (5), 120 - 134. 1995.

PORTER, M.,. What's strategy. **Harvard Business Review**, p.61-78, Nov. /Dec. 1996

ROSSONI, L., HOCAYEN-DA-SILVA, A.J., "Cooperação entre pesquisadores da área de administração da informação: evidências estruturais de fragmentação das relações no campo científico", **Revista de Administração**, 43(2), 138-151. 2008

SARKIS, J., Manufacturing's role in corporate environmental sustainability. **International Journal of Operations & Production Management** 21 (5/6), 666–686, 2001

SELIGER G., Sustainability in manufacturing, recovery of resources in product and material cycles. **Springer: New York**, 2007

SENGUPTA, J.N., Bibliometrics, infometrics, scientometrics and librametrics: an overview. Libri, **International Journal of Libraries and Information Systems,** Munchen, v. 42, n.2, p. 75-98, 1992.

SEURING, S. AND MULLER, M., From a literature review to a conceptual framework for sustainable supply chain management, **Journal of Cleaner Production**, 16(15), 1699-1710. 2008.

TAYLOR, A. AND TAYLOR, M., Operations management research: contemporary themes, trends and potential future directions, **International Journal of Operations & Production Management,** 29(12), 1316-1340. 2009.

UEDA, K., TAKENAKA, T., VÁNCZA, J. AND MONOSTORI, L., 'Value creation and decision-making in sustainable society', **CIRP Annals - Manufacturing Technology**, 58(2), 681-700, 2009.

VAN RAAN, A.F.J., VAN LEEUWEN, A.N., Assessment of the scientific basis of interdisciplinary, applied research: application of bibliometric methods in nutrition and food research, Research Policy, 31, 611–632. 2002

WALTON, S., HANDFIELD, R., MELNYK, S., The green supply chain: Integrating suppliers into environmental management processes. **Purchasing Materials Management** 34(2) 2–11. 1998

WCED - World Commission on Environment and Development, Our Common Future , **Oxford University Press**, Oxford. 1987

WILKINSON, A., HILL, M. AND GOLLAN, P., The sustainability debate, **International Journal of Operations & Production Management**, 21(12), 1492-1502. 2001.

4 PAPER 2

OPERATIONS MANAGEMENT AND SUSTAINABILITY: FRAMING LITERATURE BASED ON BIBLIOMETRIC TECHNIQUES

Pamela Mocelin Manfrin1, Edson Pinheiro de Lima2, Sérgio Eduardo Gouvêa da Costa3

1 Industrial and Systems Engineering Graduate Program – PPGEPS, Pontifical Catholic University of Parana – PUCPR, pamela.manfrin@pucpr.br; 2 Industrial and Systems Engineering Graduate Program – PPGEPS, Pontifical Catholic University of Parana – PUCPR, e.pinheiro@pucpr.br; 3Industrial and Systems Engineering Graduate Program – PPGEPS, Pontifical Catholic University of Parana – PUCPR, s.gouvea@pucpr.br;

ABSTRACT

The evolution of sustainability issues in operations management is increasingly evident in the literature. Several studies promote the inclusion of the theme as a determinant factor for the success of operations and propose models for implementation and evaluation of sustainable practices for organizations that consider sustainability as a competitive decisive feature. But, how companies have absorbed this demand prominent in the literature? Sustainability is a competitive criterion for the future of business or can already be considered a current need for competitiveness? Is there any consonance between models proposed in the literature and practices of organizations? These questions challenge researchers to understand the current situation and assess the gap between theory and practice. In order to understand these issues, this study proposes to develop and validate an instrument to collect information to be applied in organizations that have recognized sustainability practices as much as to propose a conceptual model to analyze the questionnaire variables. The exploratory descriptive survey presents three sets of questions that appraise institutional information, competitive criteria and practices of sustainability. The acceptability, reliability, and interpretability of the instrument were shown to be adequate due to its validation.

Keywords: operations management, sustainable practices, survey

4.1 INTRODUCTION

For decades, organizations have been increasingly concerned with improvements in operational processes, operational efficiency, management tools, resource optimization, customer satisfaction and other ways to achieve best practice. Thus, they hoped to ensure high productivity and long-term gains. For many years this was the main objective to Operations Management (OM).

However, the rapid growth of the global economy, coupled with inaccurate use of natural resources triggered the need for social and environmental policies that allow growth in a sustainable manner. Comparing contemporary research in Operations Management with that conduced in early 1980's, it is possible to realize several subfields emerging in the literature.

Pilkington and Fitzgerald (2006) conduced co-citation analysis and described the evolution of POM's sub-themes in *IJOPM* publications, grouping the topics in earlier and later data set as indicated in Table 8.

Table 8: IJOPM sub-field comparison: earlier data set (1994-1998) versus later data set (1999-2003)

Factors identified in the earlier data set	**Factors identified in the later data set**
1. Manufacturing strategy	1. Manufacturing strategy
2. Japanese manufacturing	2. Resource-based view
3. Processes and BPR	3. Measures: Balanced Score Cards
4. Measures: focus and choice	4. Methods: theory making from quantitative data
5. Time as competitive advantage	5. Lean systems
6. Theory and selection of research methods	6. Qualitative methods and case research
7. Logistics and strategic sourcing: SCM	7. JIT transfer as best practice
8. Fast NPD: simultaneous engineering	8. Process design and control
9. Simulation	9. Sustainable resource view
10. Inventory planning and MRP	

Source: Pilkington and Fitzgerald (2006)

Not surprisingly sustainability topics are highlighted. Hart (1995) suggests that resource bases theory takes the perspective that valuable firm resources and capabilities provide the key sources of sustainable competitive advantages aligning resource based perspective to sustainable resource view, revealing the openness of OM to emerging debates in the subject of strategic management. In 1999, Angel and Klassen also proposed a research agenda in operations management and according to the authors, the general public and business sector, as well as government and international agencies have begun to embrace the broad concept of sustainable development opening opportunities sources to practice concepts recently discussed in the literature. They also provide a foundation as the field moves forward through four major research streams: Sustainable development and industrial ecology, Corporate strategy and social performance, Environmental technology and innovation and, Total quality environmental management. Later, sustainable operations were

described through the “triple bottom line” concept, covering three aspects of sustainability: environmental issues, social responsibility and economic management (KRAJNC; GLAVIC, 2005). The triple bottom line approach emphasizes that companies are responsible for multiple impacts in the whole set of values, issues and processes and it must be addressed to sustainable practices in order to maximize the positive impacts of their activities and generate added economic, social and environmental value (ELKINGTON, 1999).

It is remarkable that the literature presents a wide range of publications in OM and Sustainability; but, how companies have absorbed this demand prominent in the literature? Sustainability is a competitive criterion for the future of business or can already be considered a current need for competitiveness? Is there any consonance between models proposed in the literature and practices of organizations? In order to investigate these issues, this paper aims to develop and validate a questionnaire (Appendix A) based on literature previous bibliometric and content analysis to be applied in companies considered references in sustainability in Brazil. The paper also proposes a conceptual framework compiling information proposed in the questionnaire.

According to Forza (2002), many authors have called for this type of research regarding to OM, since it enlarged fields of study, aiming to reduce the gap between theory and practice, to increase the usefulness of OM research to practitioners and also to increase the scientific recognition of the OM context. The author emphasizes that empirical research based articles accounted for approximately 30 per cent of research in main OM outlets and more over, survey-based articles accounted for 60 per cent of the empirical subset. Regarding to sustainability and OM, from 1995 to 2011, 10 per cent of publications are composed of survey analysis, demonstrating that although the research in OM and sustainability is not a consolidated research topic it has already passed some of the exploratory chapter and upgraded its analysis to a practical perspective (MANFRIN; PINHEIRO DE LIMA, 2012 work in process).

The spreading of empirical and survey methodology raises the concern about quality and appropriate use of survey research. Forza and Vinelli (1998) conducted a research gathering opinions and perceptions of 89 OM scholars and reported that:

- There is a need for greater clarity and explicitness in reporting information on the survey execution;

- An agreement of terminologies is necessary concerning the meaning of variables and their operationalisation;
- It is necessary the use of scientific reliable and valid measurement system and an explicit, clear and strong theoretical background;
- The discussion of results in terms of generalization also needs to be improved.

The implementation process of the survey methodology involves the choice of a research instrument impersonal and generalized. In most cases, the instrument used is the questionnaire or interview. One of the initial challenges for the development of the survey is the preparation of this measuring instrument to test the research constructs and hypotheses.

Saris and Gallofer (2007) and Malhotra and Grover (1998) point out that when there is a greater attention to the development of survey instruments, this effort (which may be cooperative) allows a confirmatory study using an instrument effectively tested. Therefore, one should also consider the validation of the instrument, also called pilot-test. This step represents an important process in the application of a survey, this is when occurs the refinement of the instrument and its structure is defined, collection method, vocabulary, comprehension level, among other things are also delineated. Only after this step, the instrument is ready, in order to initiate the process of data collection.

4.2 SURVEY IN OPERATIONS MANAGEMENT AND SUSTAINABILITY

In general, exploratory research involves a literature review, interviews with people who had contact with the problem or the object searched and analyzed case studies to stimulate the understanding. A descriptive study aims to characterize a certain population, a phenomenon or establishment of relations between variables. Exploratory or descriptive analysis aims to better define a particular problem, providing insights on the subject. Through this research, it is still possible to describe behaviors, defining and classifying facts or variables. Accordingly, this study discusses a descriptive survey.

For Bryman (1989), the survey is a survey of data from a group of units, restricted to a period of time, aimed at systematic collection of data on certain

variables, in order to obtain information from a group of individuals. The descriptive survey research is aimed at understanding the relevance of a certain phenomenon and describing the distribution of the phenomenon in a population. Even though the facts described can provide useful hints for theory building and for theory refinement, descriptive survey primary aims in not theory development.

In OM, as in other fields of business, research can be undertaken to solve an existing problem in the work setting (FORZA, 2002). Some established OM sub-topics have been deeply explored through survey analysis. Pannirselvam *et al.* (1999) conducted a literature review aiming to examine the state of operations management research in the 1990s from the standpoint of topics and methodologies to look for trends, and to determine implications for future research. Authors examined a subset of seven academic journals that are representative of publications in operations management research and its results applied in survey investigation are described in Table 9. Another research confirms the growth and citation analysis and co-citation made by Pilkington and Meredith (2009), covering 26 years of publishing articles in former journals in the operations management (JOM, POM and IJOPM) area, it was stated that the work on the statistical methodology, which includes surveys, were those with higher numbers of citations from the year 2000, together with the operations strategy and supply chain management.

As can be seen, survey research in being widely approached in order to explore, confirm or describe specific topics among OM subfields.

With the introduction of sustainability issues in OM, the evolution of survey research among these subthemes also happened to be explored. Recent studies demonstrate a steady increase in number of publications on sustainability and operations management. Manfrin and Pinheiro de Lima (2012 work in process) show that between 1995 and 2011, 496 articles were published addressing the three pillars of sustainability in OM, in which 10% use the survey method, mostly applied to the environmental approach. Like much of the previous survey-based literature on environmental management (JOHNSTONE *et al.,* 2004, KLASSEN, 2001, MADSEN; ULHØI, 2003), Beske (2008) presents a survey aiming to evaluate whether and to what degree environmental and social standards have been implemented in the German car industry. The overall goal of the survey was to gain insight into whether suppliers today use environmental and/or social standards, and whether they

demand them from their own suppliers. The exploratory study was chosen to gain first insights into 378 companies in Germany, gathering returning rate of 29%. At the same year, Brito (2008) proposed a questionnaire aiming of gathering input on the fashion supply chain challenges and trends. The descriptive study involved 100 stakeholders of the fashion industry.

Table 9: Survey research in OM Sub-fields

OM Subfields	Survey	Modeling and Survey	Theoretical conceptual and survey	Case study and survey	Simulation and Survey	Total survey	Total topic	Survey
Strategy	77	3	6	2		88	213	41%
Quality	51	2	5			58	222	26%
Process design	33	3	2			38	221	17%
Inventory control	16		1	1		18	317	6%
Purchasing	15					15	39	38%
Scheduling	13	1				14	500	3%
Services	11	1		1		13	53	25%
Distribution	7					7	61	11%
Facility layout	2	3			1	6	149	4%
Project management	3					3	34	9%
Aggregate planning	3					3	13	23%
Work measurement	3					3	10	30%
Quality work life	3					3	4	75%
Maintenance	2					2	40	5%
Facility location		1				1	21	5%
Forecasting	1					1	20	5%
Capacity planning						0	41	0%
Count total	240	14	14	4	1	273	1958	14%
Article total	206	11	10	3	1	231	1754	13%
Double count number	34	3	4	1	0	42	204	21%

Note: Journals considered: *JOM, MS, IIE, DS, IJPR, IJOPM, POM*. Period considered 1992 - 1997

Source: Adapted from Pannirselvam *et al.* (1999)

Not far, Brust (2010) gathered information of 536 Argentinean firms on the relationship between environmental paradigms and environmental behavior by incorporating popular environmental ‘story-lines’ into semi-structured questions using in majority the Likert Scale. In order to explore the concept of sustainability in accordance with its three perspectives (social, economic and environmental), this study proposes the development and validation of a questionnaire for a survey that addresses the three aspects of the triple bottom line.

4.3 DEVELOPMENT OF OPERATIONAL DEFINITIONS

Hair *et al.* (2005) states that before using constructs for analysis, the researcher must ensure that the variables selected to measure the concept is accurate and consistent. The accuracy is related to the validity and consistency to the term reliability. From this to ensure reliability and validity of the constructs to be proposed, it was used as the basis of literature studies in sustainability management and operations.

Forza (2002) streamlines the process for carrying out a survey which presupposes the existence of a theoretical model, through a scheme which shows the steps necessary for an inquiry of this nature, ranging from the relationship with the theory to the analysis of data and reporting results. Figure 9 below illustrates the process. It is observed that the first three steps (link to the theoretical level, design and pilot testing) represent the stages of survey design, implementation and success of which means that research is properly planned and structured.

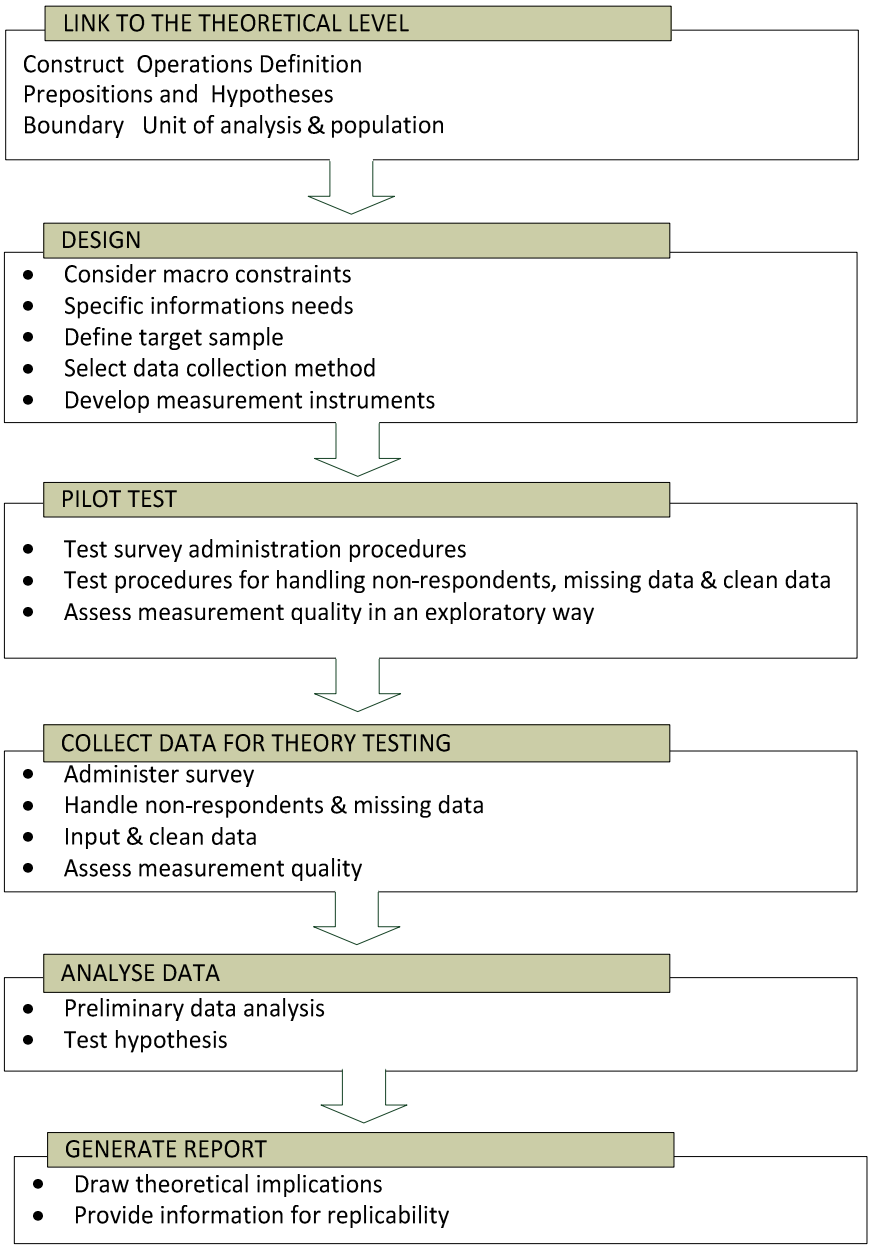

Figure 9: The theory-testing survey research process
Source: Forza (2002)

Manfrin and Pinheiro de Lima (2012 work in process) conducted an exploratory bibliometric study to outline the scenario of sustainability and operations management, and define a research agenda. In this study, the authors identified a set of keywords highlighted in 496 articles found in literature. These words are described in Figure 10 and are grouped into six categories:

- *Economic sustainability*: Includes words that refer to the economic pillar of the triple bottom line, including the word "Economic Sustainability" that the name of the category.

- Environmental sustainability: This group of words includes keywords related to the environmental aspects of the triple bottom line.
- *Social sustainability:* Similarly, the third group of words referring to the column addresses issues of sustainability.
- *Sector:* number of words that characterize economic sectors highlighted in the literature of sustainability and operations management. As can be seen in Figure 10, it highlights the academic and automotive sectors.
- *Sustainability:* is a generic group involving key words that comprise the whole concept of sustainability.
- *Operations management:* encompasses the largest number of words in the other categories. It refers to the set of sub-themes highlighted in the OM literature in conjunction with sustainability.

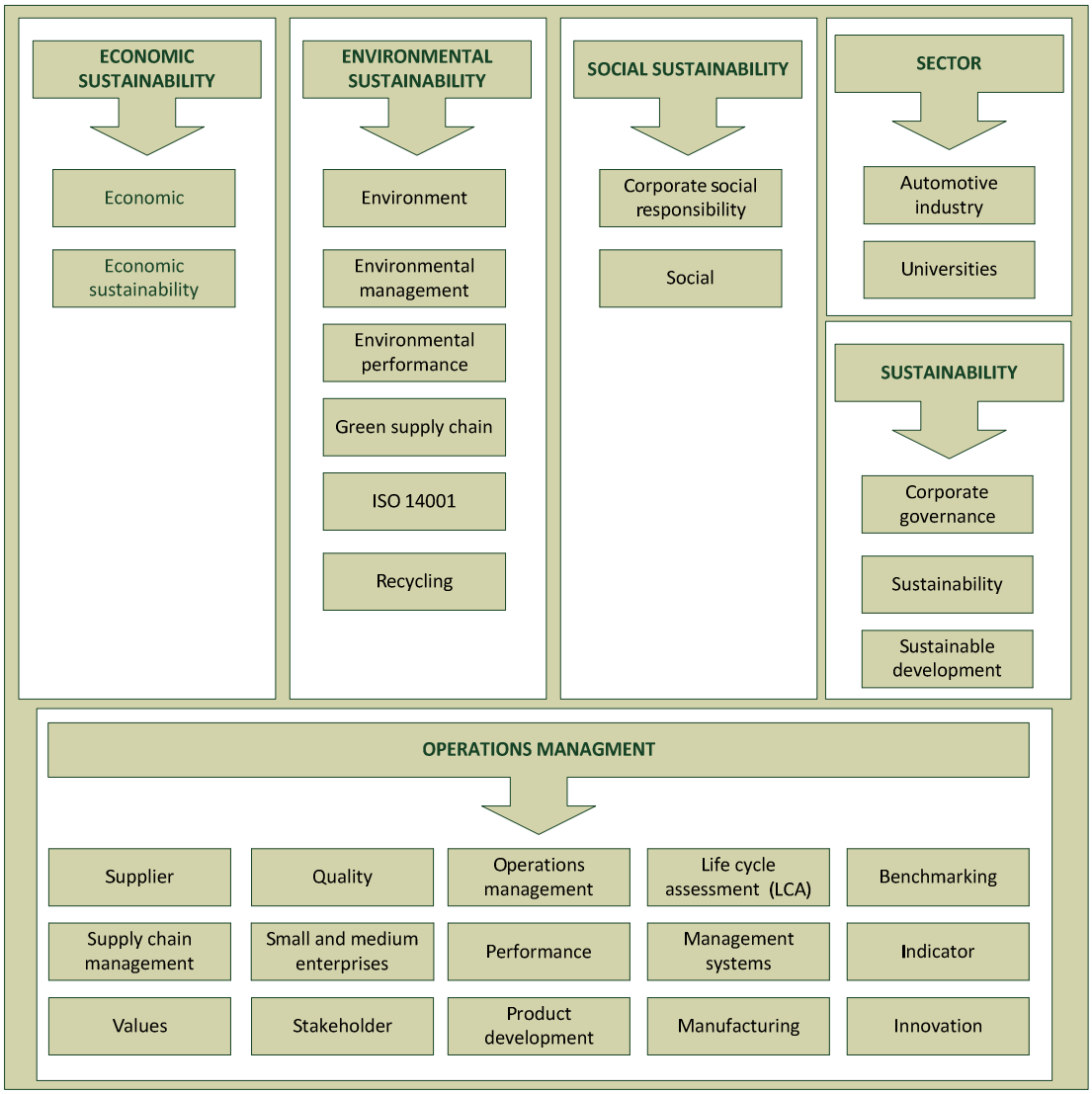

Figure 10: Grouping categories of OM and sustainability main keywords
Source: Authors, 2012

According to Dubin (1978), before starting theory testing survey research, the researcher has to establish a conceptual model. Thus, from the set of words available in the literature and their groupings, authors proposed a framework integrating categories together and combining sustainability practices, competitive criteria and categories of operations that stood out in the context of sustainability and operations management.

The conceptual model proposed in Figure 11, enables clear identification, labels and definition of all variables in question and also provides the linkage between them vertically and horizontally.

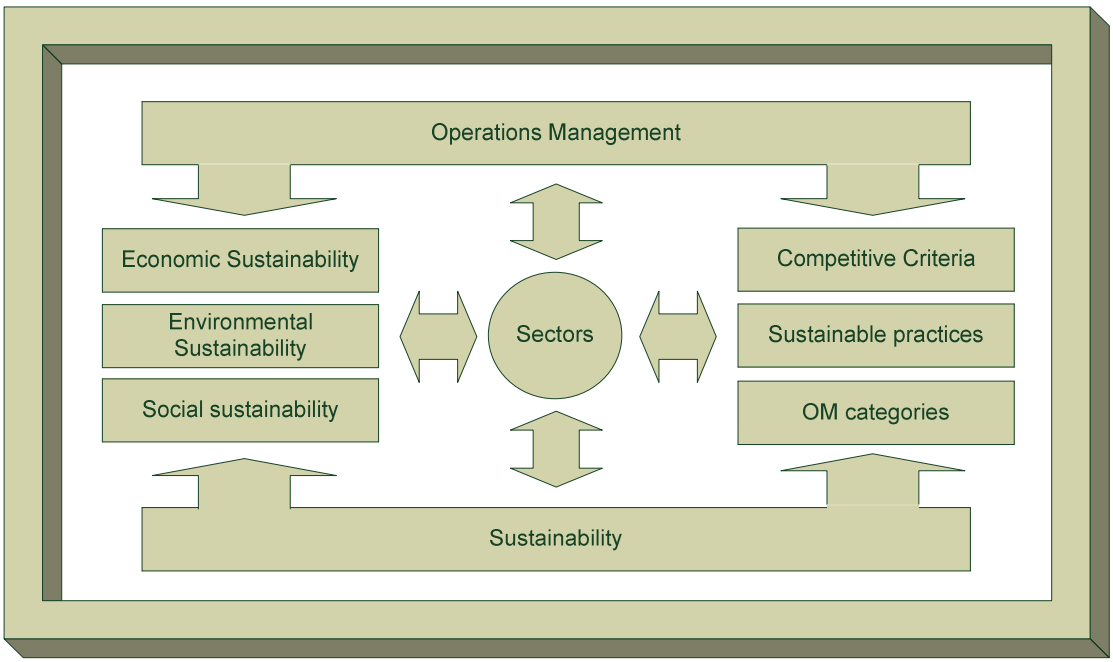

Figure 11: Conceptual framework
Source: Authors, 2012

For many years OM has developed implicit theories but the lack of explicitness has prevented the testing of these theories (FORZA, 2002). Aiming to clarify the framework relationship propositions, this research suggests a group of statements to be descriptively tested through survey analysis:

S1. The quality dimension is positively considered relevant in companies with sustainable initiatives as well as to its stakeholders.

S2. The dimension flexibility is positively considered relevant in companies with sustainable initiatives as well as to its stakeholders.

S3. The dimension reliability is positively considered relevant in companies with sustainable initiatives as well as to its stakeholders.

S4. The dimension cost is positively considered relevant in companies with sustainable initiatives as well as to its stakeholders.

S5. The dimension innovation is positively considered relevant in companies with sustainable initiatives as well as to its stakeholders.

S6. Economic sustainability can be considered positively as competitive criteria in companies that have sustainable initiatives as well as to its stakeholders.

S7. Social sustainability can be considered positively as competitive criteria in companies that have sustainable initiatives as well as to its stakeholders.

S8. Environmental sustainability can be considered positively as competitive criteria in companies that have sustainable initiatives as well as to its stakeholders.

S9. Sustainability practices are reflected on strategic planning and organizational management

S10. Organizations incorporate performance measurement models using sustainable criteria to evaluate the organization sustainable performance in operations management

S11. The value chain is enclosed by organization's sustainable practices and operational processes

S12. Programs, laws, rules and negotiations are decisive practices for sustainable development in organizations

The proposals suggested are not considered exhaustive, but express the relationships defined in the model and translate feasible so what was found in the literature. The hypotheses can be characterized as directional, when used in the declaration of a relationship between two variables or comparisons between two groups and thus, use terms like "positive" and "negative". In the statements above (1-8), only positive relationships were described. There may also be no indication of the direction of the relationship or differences between variables (9-14), it is called non-directional hypotheses. Once the conceptual framework and a group of statements were proposed, it is necessary to transform the theoretical concepts into observable and measurable elements as much as its units of analysis.

That is when all contingencies and difficulties should be raised to avoid subsequent problems. Therefore, it is worth reporting the selection process of the survey instrument, the method of data collection chosen, in addition to the drafting of

the instrument and choice of variables to be measured by the survey. The instrument can be a questionnaire or an interview.

According to Forza (2002), it is necessary to take into account the alignment between the theoretical concepts and the empirical measures, the choice for objective or percentual questions, or the selection of one or more questions for the same construct. The author also suggests that while some constructs lend themselves to objective and precise measurement, others are more nebulous and do not lend themselves to such precise measurement, especially when approaching people's perceptions. When constructs such as consumer's behavior have multiple facets it is highly recommended using operational definitions which include multiple elements (MALHOTRA; GROVER, 1998). In these cases, the present study proposes the Likert scale in order to specify the respondent perception on some variables. Due to its considerations, the present study proposes the use of web-based questionnaire before their significant advantages (time, cost, scope). Nevertheless, such surveys have historically a return rate lower than other methods (FLYNN *et al.,* 1990). In this case, access is made through a link on a web page by e-mail sent to potential respondents. The design of the questionnaire was done by the LimeSurvey software, which allows flexibility to the respondent, to be answered online, and confidentiality of information. In preparing the questionnaire, the software allows grouping and coding issues and presentation of various options to respond to questions, enabling respondents assign multiple choice answers, scales, ranking, among other types, as well as texts for the presentation and filing instructions for viewing. It consists of 18 questions divided into three groups.

Group 1: Respondent's personal information (name and current position) and institutional identification (area, number of employees, sales, size in square meters, nature, origin). The first two questions are not open and not mandatory. The remaining questions of the questionnaire are required and provided objective and relevant information for understanding the organizational profile.

Group 2: is on the importance/ performance matrix enables the perception of the respondent with the importance he/her considers to the criteria evaluated in relation to the client (2.1) and suppliers (2.2), enabling the analysis of several variables in the chain value. This block is organized by the 5-point Likert scale inverted, i.e., the lower the value accepted by the respondent, the greater its perceived importance.

Group 3: comprises eight objective questions that are intended to identify the company's initiatives that incorporate the social, environmental and the economic management system in accordance with the guidelines of the value chain, government and community.

Table 10: Relationship among Groups, Statements and Questions

		STATEMENTS	QUESTION
Group 2	S1.	The quality dimension is positively considered relevant in companies with sustainable initiatives as well as to its stakeholders.	2.1 2.2
	S2.	The dimension flexibility is positively considered relevant in companies with sustainable initiatives as well as to its stakeholders.	2.1 2.2
	S3.	The dimension reliability is positively considered relevant in companies with sustainable initiatives as well as to its stakeholders.	2.1 2.2
	S4.	The dimension cost is positively considered relevant in companies with sustainable initiatives as well as to its stakeholders.	2.1 2.2
	S5.	The dimension innovation is positively considered relevant in companies with sustainable initiatives as well as to its stakeholders.	2.1 2.2
	S6.	Economic sustainability can be considered positively as competitive criteria in companies that have sustainable initiatives as well as to its stakeholders.	2.1 2.2
	S7.	Environmental sustainability can be considered positively as competitive criteria in companies that have sustainable initiatives as well as to its stakeholders.	2.1 2.2
	S8.	Social sustainability can be considered positively as competitive criteria in companies that have sustainable initiatives as well as to its stakeholders.	2.1 2.2
Group 3	S9.	Sustainability practices are reflected on strategic planning and organizational management	3.1 3.6
	S10.	Organizations incorporate performance measurement models using sustainable criteria to evaluate the organization sustainable performance in operations management	3.2 3.3
	S11.	The value chain is enclosed by organization's sustainable practices and operational processes	3.4 3.5 3.6
	S12.	Programs, laws, rules and negotiations are decisive practices for sustainable development in organizations	3.7

Source: Authors, 2012

The issues contained in the blocks show the unfolding of the proposed statements, so that the wording of these questions and sub reflect the relationships contained in the model. To illustrate these relationships, Table 10 shows the grouping of statements and questions associated with them.

4.4 QUESTIONNAIRE TEST

The companies that comprise the population to be researched were selected based on their participation in at least one of following criteria:

- Being signatory of the Global Compact;
- Be linked to the ISE / Bovespa;
- Companies that publish GRI reports (Global Reporting Initiative).

“The United Nations Global Compact is a strategic policy initiative for businesses that are committed to aligning their operations and strategies with ten universally accepted principles in the areas of human rights, labor, environment and anti-corruption. By doing so, business, as a primary driver of globalization, can help ensure that markets, commerce, technology and finance advance in ways that benefit economies and societies everywhere” (UNITED NATIONS GLOBAL COMPACT, 2011). In summary, Global Compact aims to assist the private sector in the management of increasingly complex risks and opportunities in the environmental, social and governance realms, seeking to embed markets and societies with universal principles and values.

Going forward the same perspective, the Sustainability Reporting Guidelines (GRI, 2011) consist of principles for defining report content regarding to sustainability issues and ensuring the quality of reported information. It also includes standard disclosures made up of performance indicators and other disclosure items, as well as guidance on specific technical topics in reporting economic, social and environmental practices in organizations.

From the global tendency of investors seeking socially responsible, sustainable and profitable to invest their funds, it is considered that companies that have a "socially responsible investment" ("SRI") generate value for shareholders over the long term because they are better prepared to face economic risks, social and environmental. This demand is rising over time and today is widely attended by many financial instruments in the international market. According to BM&FBOVESPA (2011), the ISE aims to reflect the return of a portfolio composed of shares of companies highly committed to social responsibility and corporate sustainability, and also to promote good practices in the Brazilian business.

Considering this criteria, it is believed that participating companies have acceptable levels of sustainable practices to contribute to this research. Thus, the

population being studied includes participants of the three vehicles defined. The purpose of this study is the questionnaire, thus, does not discuss the formatting of the survey sample. However, Forza (2002) agrees that in planning research activities, the decisions made during the early steps affect the choices remaining at later steps. For these reason the populations is previously proposed considering that it refers to the entire group of elements that the research might to investigate in future considerations.

Once the questionnaire is defined, the researcher has to examine the measurement properties of the research. In other words, the researcher must test what has been designed in previews steps. This paper proposes the test with a group of executives from any one company that is part of the population proposed. The test was conducted in two stages, following the proposition of Forza (2002):

At first, the questionnaire developed was presented to three managers (operational, marketing and financial) of a service company signatory of the Global Compact. Meanwhile the respondents completed the questionnaire, authors observed their reaction and subsequently asked about clarity of instructions, questions, and problems in understanding what king of answers were expected. Time was also observed during this phase. Responders had some arguments considering the questionnaire:

- The questionnaire proved to be objective and quick to respond (18 minutes);
- Issues compiled are part of the routine of employees, thus facilitating the understanding and analysis of pertinent questions to answer. But some business groups may have difficulties in evaluating certain requirements being not part of the context of operations management;
- Questions regarding the perception of respondents may vary, influencing the level of convergence response of the pilot test and research effectively.

Considering the submissions, it is proposed to analyze the development of criteria that do not compromise the final outcome of the research taking into account the areas of the company and its respondents. Focusing on the direction of the questionnaires to companies involved in the context of operations management, and subsequently trusting the questionnaire to people with knowledge of sustainable

practices of the organization. The questionnaire itself has not changed at this stage of research.

In the second phase, a small pre-test sample was administered to gather data to perform an exploratory assessment of measurement quality regarding to convergence of answers, comprehension, adequacy and if the content of answers are according to what expected. The pre-test was conducted using the online instrument through the Lime survey software. It also enabled verifying the instrument operationalisation. The link was sent to 12 managers in different decision areas (Operations Manager, Manager of Production Planning and Control, Controller, Commercial Manager, Marketing Manager, Financial Manager, Design Manager, Project Manager, Human Resources Manager, Quality Manager, Development Executive, Operational Executive) of the same company as the phase 1. The three respondents in phase 1 also participate at this level. There was a return of 100% of respondents completing the research. Assuming all respondents are part of the same organization, it was expected a high level of convergence. To confirm this hypothesis, we verified the internal consistency of the data, which measures the equivalence, homogeneity and correlation of the items used in a measure. This means that items of a measure should align and be able to independently measure the same construct (FORZA, 2002). The consistency was used as the alpha (α) Cronbach's coefficient corresponding to a correlation of an item with another (Cronbach, 1951). The Cronbach's alpha is expressed in terms of ρ, the average correlation between "n" items in the instrument of measurement. The calculation of the coefficients is performed according to the following formula:

$$\alpha = \frac{n\rho}{1 + (n-1) * \rho}$$

The values of the Cronbach's α exceeded the recommended threshold of .70 (NUNNALLY, 1978, HOYT *et. al*, 2007, HORA *et. al*, 2010), for each of the constructs, reaching .90 in many of them confirming the reliability of the questionnaire and variables proposed. According to Kerlinger (1986), reliability indicates dependability, stability, predictability, consistency and accuracy, and refers to the extent to which a measuring procedure yields the same results on repeated trials.

According Miguel (2010), this step does not bring any results concerning the objectives of the research being used in order to ensure that the questionnaire was

answered correctly. If there are difficulties in completing the respondents in the test, it must make the necessary adjustments in the questionnaires for future application. Considering the convergence between measures of the same construct, the reliability confirmed by the Cronbach's and no observations against the instrument proposed by responders, the measurement instrument and administration methods are validated.

4.5 CONCLUSION

The present study addresses the development of a questionnaire and its validation as well as the steps for its development in the context of strategic management of operations and sustainability. The theoretical model proposed by Manfrin and Pinheiro de Lima (2012) considers the literature search was undertaken to establish causal relationships between literature and practice of sustainability criteria and OM competitive categories. From the model, a set of statements have been proposed in order to be validated by means of information gathering. The instrument selected was the online questionnaire for its speed, flexibility, low cost and comprehensiveness. As a result, the next stages of the research methods should be defined in order to address specific approach to the potential respondents and satisfactory guarantee a minimum number of usable questionnaires.

The construction of the instrument is a critical stage of research where the questions were defined and how they played the unfolding of the hypotheses. In addition, the encoding issues associated with proposed statements are an important point for future interpretation and tabulation of results. The previous selection of the population being studied contributes to the direction and validation of the proposed questionnaire. Thus, it is proposed to carry out further studies to understand this stage of the research.

Having defined the concepts of the initial questionnaire, a test was performed with two validation steps. The first consisted of the application face of the questionnaire so researchers could evaluate in a more perceptive understanding of the survey. At this stage, important considerations were made by three respondents that should influence the way as the sample of participating companies is selected, and the respondents. The second step was to conduct a pilot test with 12 managers from the same company in order to obtain experimentally the understanding of the

issues, response time, the presentation of the questionnaire, the level of convergence of responses and usage of the proposed software. At this stage, it was possible to measure the reliability of the questionnaire through Cronbach's alpha.

It is understood that as the survey methodology has been increasingly addressed in several subfields of OM, this paper contributes to the maturity of this type of research in studies related to sustainability. It also contributes to understand the literature context by providing a conceptual framework which integrates categories together and combine sustainability practices, competitive criteria and categories of operations highlighted in the context of sustainability and operations management.

REFERENCES

ANGELL, L. & KLASSEN, R., Integrating environmental issues into the mainstream: an agenda for research in operations management. **Journal of Operations Management,** 17(5), pp.575-598. 1999

BESKE, P., KOPLIN, J. & SEURING, S., The Use of Environmental and Social Standards by German First-Tier Suppliers of the Volkswagen AG. **Corporate Social Responsibility and Environmental Management,** 75(December 2006), pp.63-75. 2008

BRITO, M., CARBONE, V. & BLANQUART, C., Towards a sustainable fashion retail supply chain in Europe: Organization and performance. **International Journal of Production Economics,** 114(2), pp.534-553. 2008

BRUST, D. & HEYES, C., Environmental management intentions: an empirical investigation of Argentina's polluting firms. **Journal of environmental management,** 91(5), pp.1111-22. 2010

BRYMAN, A. Research methods and Organization studies. **London: Unwin Hyman**, 1989

DUBIN, R. Theory building, The Free Press**, New York, NY**, 1978

ELKINGTON, J., Cannibals with forks: the triple bottom line of 21st century business. **Capstone, Oxford**, 1999

FLYNN B.B., SAKAKIBARA S., SCHROEDER R.G., BATES K.A. AND FLYNN E.J. Empirical research methods in operations management. **Journal of Operations Management**, v. 9, n. 2, pp. 250-284, 1990

FORZA, C., Survey research in operations management: a process-based perspective. **International Journal of Operations & Production Management,** 22(2), pp.152-194. 2002

GRI – GLOBAL REPORTING INITIATIVE., Available at: **www.globalreporting.org**. Accessed in : 5 apr.2011

HAIR, J.; BABIN, B.; MONEY, A.; SAMOUEL, P. Fundamentos de Métodos de Pesquisa em Administração. **Porto Alegre: Bookman**, 2005

HART, S., A natural-resource-based view of the firm, **Academy of Management Review,** Vol. 25 No. 4, pp. 986-1114. 1995

JOHNSTONE N, SCAPECCHI P, YITERHUS B, WOLFF R. The firm, environmental management and environ- mental measures: lessons from a survey of European manufacturing firms. **Journal of Environmental Planning and Management** 47(5): 685–707. 2004

KERLINGER, F.N., Foundations of behavioral research, 3rd ed. **Harcourt Brace Jovanovich College Publishers,** New York, NY, 1986

KLASSEN RD. Plant-level environmental management orientation: the influence of management views and plant characteristics. **Production and Operations Management** 10(3): 257–275. 2001

KRAJNC, D.; GLAVIČ, P., A model for integrated assessment of sustainable development. **Resources, Conservation and Recycling**, v. 43, n. 2, p. 189-208, Jan. 2005

MADSEN H, ULHØI JP. Have trends in corporate environmental management influenced companies' competitiveness? **Greener Management International** 44: (Winter): 75–88. 2003

MALHOTRA, M. J.; GROVER, V. An assessment of survey research in POM: from constructs to theory. **Journal of Operations Management**, v. 16, n. 4, pp. 407-425, 1998

MANFRIN, P. AND PINHEIRO DE LIMA, E., Operations Management and sustainability: Framing the literature based on bibliometric techniques**. Industrial and Systems Engineering Graduate Program** – PPGEPS, 2012a, work in progress

MIGUEL, P.P.A.C. (Org.) and Collaborators. Research Methodology in Production Engineering and Operations Management. **São Paulo: Elsevier, 2010.**

NUNNALLY, J.C., Psychonometric Theory. **McGraw-Hill, New York**. 1978

PANNIRSELVAM, A., ZEITHAML, V.A. AND BERYY, L.L., "SERVQUAL": a multiple-item scale for measuring consumer perceptions of service quality", **Journal of retailing**, Vol. 64 No.1, 1988

PILKINGTON, A. & FITZGERALD, R., Operations management themes, concepts and relationships: a forward retrospective of IJOPM. **International Journal of Operations & Production Management,** 26(11), pp.1255-1275. 2006

PILKINGTON, A.; MEREDITH, J. The evolution of the intellectual structure of operations management – 1980-2006: a citation/co-citation analysis. **Journal of Operations Management,** v. 27, n. 3, pp. 185-202, 2009

SARIS, W.E.; GALLHOFER, I.N. Design, evaluation, and analysis of questionnaires for survey research. **Hoboken: John Wiley & Sons**, 2007

SLACK, N. Competitive advantage in manufacturing: Achieving competitiveness in industrial operations. 1. **ed. Atlas**, 1993.

The GLOBAL COMPACT, 2011. The United Nations Global Compact. Available at: **www.unglobalcompact.org.** Last access in: Nov. 2011.

APPENDIX A - QUESTIONNAIRE

Operations Management and Sustainability

Questionnaire

Group 1: Personal Information of respondent

This section characterizes the respondent. It is an open and optional question.

Name:

Function:

Group 2: Institutional Identification

These questions provide information about the organizational profile. All objective and mandatory.

1.1 Mark with an “X” your organization segment

( ) Automotive
( ) Food and Beverage
( ) Plastic
( ) Ceramic
( ) Civil Construction
( ) Leather
( ) Electronics
( ) Graphic or impress material
( ) Wood
( ) Iron and Steel
( ) Metallurgy
( ) Furniture
( ) Oil and gas
( ) Chemicals
( ) Textile
( ) Transports
( ) Wearing apparel
( ) Services: _____
( ) Others: _____

1.2 How many employees work in your facilities?

( ) More than 50
( ) From 50 to 200
( ) From 200 to 500
( ) More than 500

1.3 How much is your annual revenue?

( ) More than $ 250.000,00
( ) From $ 250.000,00 to $ 1.000.000,00
( ) From $ 1.000.000,00 to $ 2.500.000,00
( ) More than $ 2.500.000,00

1.4 What is the total size of your plant?

( ) Less than 200 m²
( ) From 200m² to 1.000m²
( ) From 1.000m² to 5.000m²
( ) More than 5.000m²

1.5 What is the legal situation of your business?

( ) Independent Organization

( ) Service unity from a large company
( ) Franchise of large company
( ) Other: _____

1.6 What is the native origin of your company?

( )	Brazil	( )	South America
( )	Europe	( )	Asia
( )	North America	( )	Other: _____

Group 3: Importance /Performance Matrix

This section enables to interpret perceived importance of respondents in terms of traditional and sustainable competitive criteria under customer or supplier perspectives.

2.1 For each function attributed to performance measures, identify you concordance level under customers perspective:

1. Provides a competitive advantage with customers - is the main driver of competitiveness
2. Is considered an important factor for most customers - is usually considered a criterion in client's decision.
3. Needs to be around the industry average to ensure market share.
4. Is not normally considered by customers, but may become more important in the future.
5. It is never considered by customers.

With regard to the quality dimension (scrap, defects, complaints, rework, default), classify it according to importance to the company's customers.	(1)	(2)	(3)	(4)	(5)
With respect to the size flexibility (service level assistance, market response), sort it according to importance to the company's customers.	(1)	(2)	(3)	(4)	(5)
With regard to the dimension reliability (add value and credibility of the brand, feasibility), sort it according to importance to the company's customers.	(1)	(2)	(3)	(4)	(5)
With respect to the size price (monetary value of the product or service), sort it according to importance to customers of the company.	(1)	(2)	(3)	(4)	(5)
Regarding the innovation dimension (technology, design, new products, research), sort it according to importance to the company's customers.	(1)	(2)	(3)	(4)	(5)

Regarding economic consistency (tangible and intangible assets, liabilities, profitability, growth, risk), sort it according to importance to the company's customers.	(1)	(2)	(3)	(4)	(5)
With regard to internal social responsibility dimension (schooling, health, safety, family support), sort it according to importance to the company's customers.	(1)	(2)	(3)	(4)	(5)
Regarding the scale external social responsibility (improving the community, country), sort it according to importance to the company's customers.	(1)	(2)	(3)	(4)	(5)
With regard to the dimension environmental responsibility in the use of resources (energy resources, raw materials, water resources), sort it according to importance to the company's customers.	(1)	(2)	(3)	(4)	(5)
With regard to the dimension environmental responsibility in the generation of waste (water contamination, solid waste generation, soil contamination), sort it according to importance to the company's customers	(1)	(2)	(3)	(4)	(5)

2.2 As in the previous question, for each feature assigned to performance measures, indicate your level of agreement:
[1] provides a differential from the suppliers - is the main driver of competitiveness;
[2] is considered a relevant factor by the majority of suppliers - is usually considered a criterion in the decision of suppliers;
[3] need to be around the industry average To ensure good representation from suppliers;
[4] is not normally considered by the supplier, but may become more important in the future;
[5] It is never considered by suppliers, there is a relevant factor in our value chain.

With regard to the quality dimension (scrap, defects, complaints, rework, default), classify it according to importance to the company's supplier.	(1)	(2)	(3)	(4)	(5)
With respect to the size flexibility (service level assistance, market response), sort it according to importance to the company's supplier.	(1)	(2)	(3)	(4)	(5)
With regard to the dimension reliability (add value and credibility of the brand, feasibility), sort it according to importance to the company's supplier.	(1)	(2)	(3)	(4)	(5)

With respect to the size price (monetary value of the product or service), sort it according to importance to customers of the supplier.	(1)	(2)	(3)	(4)	(5)
Regarding the innovation dimension (technology, design, new products, research), sort it according to importance to the company's supplier.	(1)	(2)	(3)	(4)	(5)
Regarding economic consistency (tangible and intangible assets, liabilities, profitability, growth, risk) sort it according to importance to the company's supplier.	(1)	(2)	(3)	(4)	(5)
With regard to internal social responsibility dimension (schooling, health, safety, family support), sort it according to importance to the company's supplier.	(1)	(2)	(3)	(4)	(5)
Regarding the scale external social responsibility (improving the community, country), sort it according to importance to the company's supplier.	(1)	(2)	(3)	(4)	(5)
With regard to the dimension environmental responsibility in the use of resources (energy resources, raw materials, water resources), sort it according to importance to the company's supplier.	(1)	(2)	(3)	(4)	(5)
With regard to the dimension environmental responsibility in the generation of waste (water contamination, solid waste generation, soil contamination), sort it according to importance to the company's supplier	(1)	(2)	(3)	(4)	(5)

Group 4: Operations Management and Sustainability

These questions are intended to identify the company's initiatives that incorporate the social, environmental and economic management to their system. They should be answered taking into account the sustainable development practices involving value chain, government and community.

3.1 The company has a sustainability policy which guidelines are reflected in the planning and management of the company?

a) Do not have sustainability policy;

b) Yes, it has a policy of sustainability, but this does not include social requirements;

c) Yes, it has a policy of sustainability, but this does not include environmental requirements;

d) Yes, it has a policy of sustainability; however none of the mentioned developments can be objectively evidenced by the company;

e) Yes, environmental policy and has maintained, in all its operations, goals and objectives related to the commitments in this policy.

3.2 Indicate to which levels of the company's social responsibility assignments in specific environmental or formal description of duties (job description):

Hierarchical level	Yes	No	NA
a) President			
b) Vice-president			
c) CEOs			
d) Operational Managers			
e) Coordinators			
f) Other employees			

3.3 Indicate how the situation of the company for the following sustainable practices:

Inexistent	N I
Planned	N II
Testing	N III
Partially implemented	N IV
Fully implemented	N V

Company situation					
	Level				
a) Incorporation of environmental requirements in the design / process design, products and services.	[N I]	[N II]	[N III]	[N IV]	[N V]
b) Incorporation of social requirements in the design / process design, products and services.	[N I]	[N II]	[N III]	[N IV]	[N V]
c) Identification and evaluation of periodic environmental aspects and impacts related to the activities and processes past, present and future.	[N I]	[N II]	[N III]	[N IV]	[N V]
d) Identification and evaluation of social aspects and impacts of regular social activities and processes past, present and future.	[N I]	[N II]	[N III]	[N IV]	[N V]
e) Identification and evaluation of Social Aspects and Impacts of Activities and regular social processes past, present and future.	[N I]	[N II]	[N III]	[N IV]	[N V]
f) Identification and assessment of social aspects and impacts in its value chain.	[N I]	[N II]	[N III]	[N IV]	[N V]
g) Establishing procedures for operational control activities and processes responsible for environmental and / or social impacts.	[N I]	[N II]	[N III]	[N IV]	[N V]

3.4 Check the situations for which the company's management processes incorporate the concept of sustainable development as fundamental:

a) In the guidelines and strategic goals of the company;

b) investments in research aimed at sustainable use of renewable natural resources;

c) programs specifically aimed at the production process;

d) targets and performance indicators related to sustainable growth of the company;

e) the technical and behavioral training of employees;

3.5 Check the company's practices related to sustainable performance improvement in the value chain:

a) Development of suppliers of goods and services;

b) Requirement of compliance audits of critical suppliers of goods and services;

c) Requirement of legal compliance of all suppliers;

d) Requirements, higher legal compliance for critical suppliers (rules or securities)

e) Requirements in excess of the legal compliance for all suppliers.

3.6 What are the company's shares over the use / consumption of their sustainable products / services?

a) Awareness programs and guidance for end users with a view to sustainable use of products and services;

b) Programs of technical support to end users with a view to the sustainable use of products and services;

c) Encouraging financial support to end users with visas to the use of sustainable products and services;

d) Awareness programs and guidance for end users with a view to the social impacts of their products / services;

e) None of the above.

3.7 Indicate which programs, policies or negotiations listed company is a signatory:

( ) GRI - Global Reporting Initiative GRI

( ) ISE / Bovespa - Corporate Sustainability Index

( ) ISO 14000 Environment

( ) ISO 9000 Quality

( ) ISO 26000 Social Responsibility

( ) OHSA 18000 Safety at Work

( ) ETHOS - Indicators of Social and Corporate Responsibility

( ) Global Compact

( ) Millennium Development Goals

( ) Earth Charter

3.8 Indicate the main reasons that led the company to invest in sustainable development practices:

( ) Forecast growth resulting from the practices of sustainability

( ) Of the final consumer demand

( ) Demand on the part of the value chain
( ) Concern over the lack of natural resources
( ) Government Charges
( ) Charging commercial
( ) Factor for determining the competitive positioning
( ) A determinant factor for the economic balance of the company
( ) Marketing
( ) Other

5 PAPER 3

EVALUATING SUSTAINABLE PRACTICES IN OPERATIONS MANAGEMENT: THE MISSING LINK BETWEEN THEORETICAL CONTENT AND ORGANIZATIONS PRACTICES

Pamela Mocelin Manfrin1, Edson Pinheiro de Lima2, Sérgio Eduardo Gouvêa da Costa3

1 Industrial and Systems Engineering Graduate Program – PPGEPS, Pontifical Catholic University of Parana – PUCPR, pamela.manfrin@pucpr.br; 2 Industrial and Systems Engineering Graduate Program – PPGEPS, Pontifical Catholic University of Parana – PUCPR, e.pinheiro@pucpr.br; 3Industrial and Systems Engineering Graduate Program – PPGEPS, Pontifical Catholic University of Parana – PUCPR, s.gouvea@pucpr.br;

ABSTRACT

The evolution of the concepts of sustainability applied to operations management is increasingly evident in the literature. Several studies show their importance to the global economic scenario and how the guidelines have influenced sustainable organizational practices. But it must be taken into consideration if organizations are actively following these proposals and, if paradigms evidenced in the literature are present in organizational practices. Based on previous studies, this paper proposes the application of a questionnaire aimed at gathering information regarding the adoption of sustainable practices in Brazilian companies. The various steps that comprise the research include the selection of the collection instrument, the selection of the population and sample, presenting the administration protocol of data collection, analysis and data from authors' conclusions. As a result, it was identified that there is no significant evidence of the convergence between theoretical concepts and organizational practices, unless in traditional competitive criteria, enabling different possible interpretations and opportunities for future study and improvement in operational processes and management of organizations.

Keywords: operations management, sustainable practices, survey

5.1 INTRODUCTION

Several changes have occurred in the global economy. Organizations are beginning to awake to the outcome of their actions that are reflected in society, environment and economic balance in their own company. Sustainable development has brought a new approach to strategies and operations; in some scenarios, there are evidences of a number of positive changes.

Likewise, the literature also monitors the demand for sustainable initiatives by providing concepts and models that guide the overall performance with regard to the development perspective. Gupta (1995) proposed the interaction between environmental management and operations function, suggesting impacts on production growth and consumption. Hanna and Newman (1997) also require attention to the relationship among manufacturing strategies and environmental management concerns, both studies introducing environmental regards into operations management context. Gray (1993) suggested that such a discipline is a rapidly developing area of green awareness and that organizations would be at peril if they ignore it. As stated, environmental issues rapidly emerged as one of the most important topics for strategic manufacturing decisions (AZZONE; BERTELE, 1994, AZZONE *et al.* 1997, BLOOM; MORTON, 1991, PORTER; VAN DER LINDE, 1995, WALLEY; WHITEHEAD, 1994, WELFORD; GOULDSON, 1993). Moreover, sustainability has passed the board of environmental issues and accomplished social matters (FRAY, 2007, MARQUES *et al*., 2010, LEIRE; MONT, 2010) and economic aspects firming the triple bottom line concept, a very well accepted theory in sustainability literature (ELKINGTON, 1999, KRAJNC; GLAVIC, 2005). Confirming these assumptions, Pilkington and Fitzgerald (2006) conducted a co-citation analysis and described the evolution of POM's (Production and Operations Management) sub-themes in IJOPM (International Journal of Operations & Productions Management) publications, grouping the topics in earlier and later data set. Not surprisingly, sustainability topic is highlighted as one of the major topics in later data set, and its representativeness among literature has demonstrated a substantial growth in the last decade (MANFRIN; PINHEIRO DE LIMA, 2012a).

But, how companies have absorbed this demand prominent in the literature? Sustainability is a competitive criterion for the future of business or can already be considered a current need for competitiveness? Is there any consonance between models proposed in the literature and practices of OM (Operations Management) organizations? These questions challenge researchers to understand the current situation. In order to monitor the link between organizations practices in sustainability and literature content, this paper proposes a survey analysis with a specific population engaged with sustainable operations, identifying possible interactions and gaps in what is considered important in research content and what is actually done by companies. Similarly, Slack *et al.* (2004) suggests a descriptive analysis in which

they explore gaps that may exist between the focus of academic research and the perceived importance of given OM subject areas to practitioners. Their study also provides a conceptual framework that distinguishes between OM research seeking to consolidate operations practice and that seeks to apply theoretical concepts into a practical context.

The survey method was selected from a prominent need to investigate the theme under an exploratory perspective. According to Forza (2002), descriptive and exploratory survey researches are important and widely used in OM.

The following sections contains the stages of sample selection and the criteria used; the strategies of approach and administration methods of the research application; the results and analysis of response rates; descriptive statistics and analysis for cross-tabulation evaluation of results; the proposition of a conceptual framework and; the study's findings.

5.2 THEORETICAL BACKGROUND

The parameters of competitiveness became significantly on the context of globalization. Due to this phenomenon, organizations are under pressure of a dynamic nature. Companies from diverse backgrounds and segments require standards of quality, cost and high speed to the outstanding demands of the market. For this purpose, the limits are more challenging, requiring fine tuning between processes and collaboration among supply chain links. Moreover, it fundamental a deep knowledge of the life cycle of products, so that the company understands the cognitive processes and technology necessary to ensure long-term supply, without compromising the resources involved along the chain. Taking as its premise the emerging balance between consumption and resource constraints, the Brundtland Commission Report states that sustainable development aims to meet the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987).

According to Kleindorfer *et al*. (2005), sustainable OM is defined as the set of skills and concepts that allow companies to structure and manage their business processes to obtain competitive returns on its capital assets without sacrificing the legitimate needs of internal and external stakeholders and with due regard for the impact of its operations on people and the environment.

Data provided by The Global Report Initiative (2010) demonstrate that the number of organizations publishing reports on sustainable practices is rising continuously reaching more than 1800 publications in 2010. The evolution from 1999 to 2010 can be graphically analyzed through Figure 12. The Global Reporting Initiative (GRI) is a non-profit organization that promotes sustainability. It produces standards for sustainability reporting - also known as ecological footprint reporting, Environmental Social Governance (ESG) reporting, Triple Bottom Line (TBL) reporting, and Corporate Social Responsibility (CSR) reporting. The Sustainability Reporting Guidelines (GRI, 2011) consist of principles for defining report content regarding to sustainability issues and ensuring the quality of reported information. It also includes standard disclosures made up of performance indicators and other disclosure items, as well as guidance on specific technical topics in reporting economic, social and environmental practices in organizations.

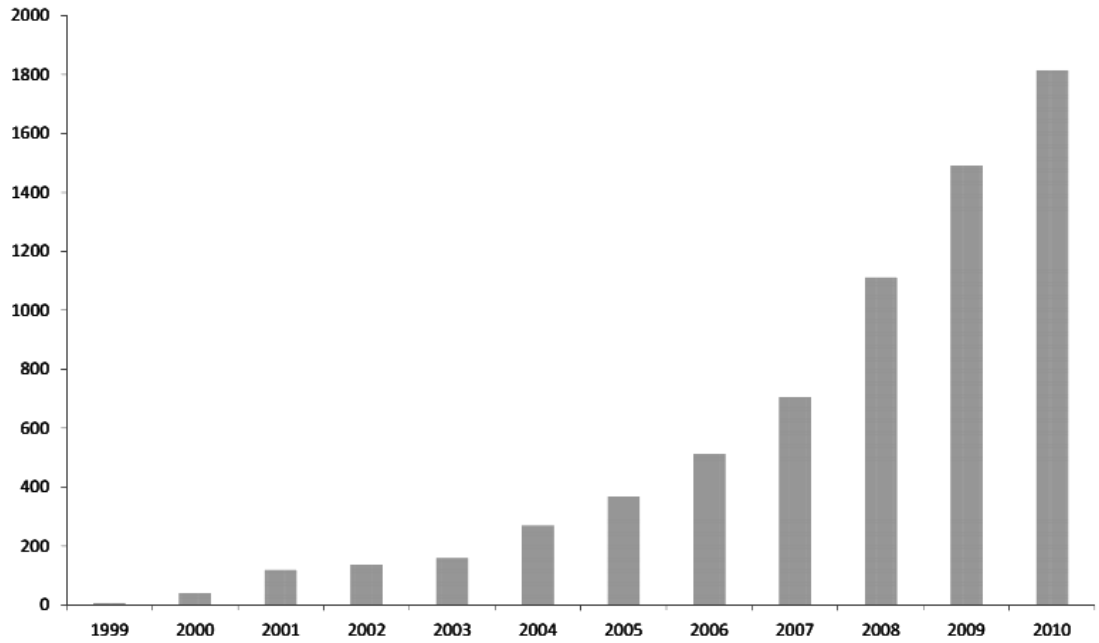

Figure 12 – Evolution of GRI reports publications from 1999 to 2010 – Years versus number of publications
Source: GRI Sustainability Reporting Statistics, 2010

The GRI aims to harmonize reporting standards for all organizations, of whatever size and geographical origin. Statistics reveal the ten countries in numbers of reports in the following sequence: United States of America (10%), Spain (9%), Brazil (7%), Japan (7%), Sweden (6%), Australia (4%), Netherlands (4%), Canada (4%), Germany (4%) and United Kingdom (3%).

Another analysis of GRI reports in focal point countries compare reports publications from 2009 and 2010 in five countries as can be seen in Figure 13.

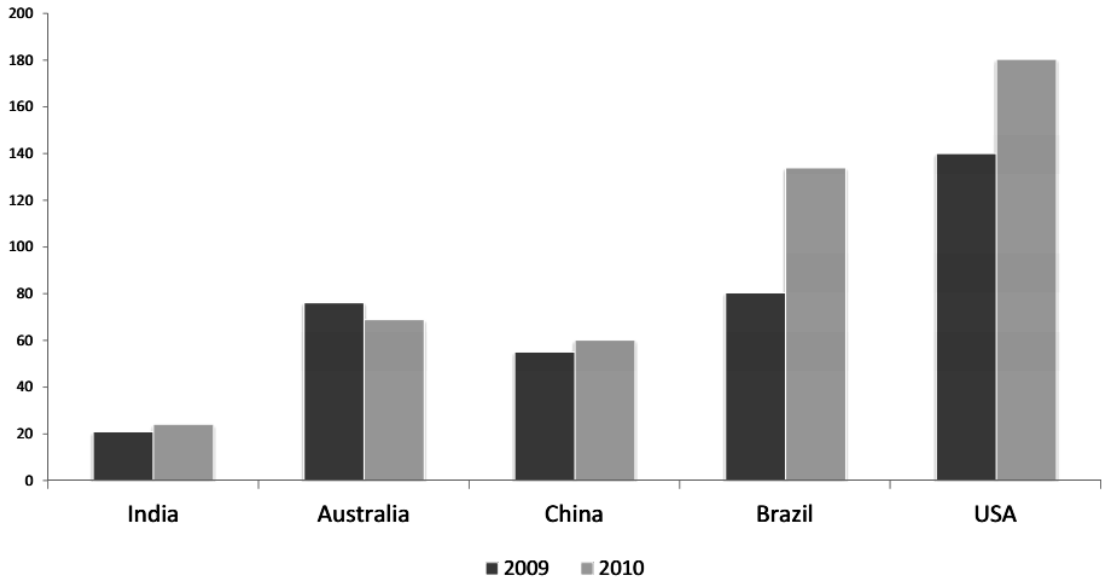

Figure 13 – Comparison of academic publications between 2009 and 2010 in selected countries
Font: GRI Sustainability Reporting Statistics, 2010

Compared to 2009, there is an exceptional increase in reporting in Brazil, and a small decrease in the number of reports from Australia. There is a steady growth in USA and a small growth in India and China. It indicates that companies are increasingly focusing their strategy based on sustainable practices.

Another institution gathering companies to sustainable initiatives is the United Nations Global Compact, which is defined as “a strategic policy initiative for businesses that are committed to aligning their operations and strategies with ten universally accepted principles in the areas of human rights, labor, environment and anti-corruption”. It believes that business is a primary driver of globalization and more than ever before, many companies recognize the need to collaborate and partner with governments, civil society, labor and consequently to the United Nations. This movement count with over 8700 corporate participants and other stakeholders from over 130 countries, forming the largest voluntary corporate responsibility initiative in the world (UN GLOBAL COMPACT, 2011).

Besides the evolution on sustainable practices in industries, the literature has also being challenged on sustainability demands. Previous studies demonstrate the evolution of publications in sustainability in 9 OM databases as can be seen in Figure 14.

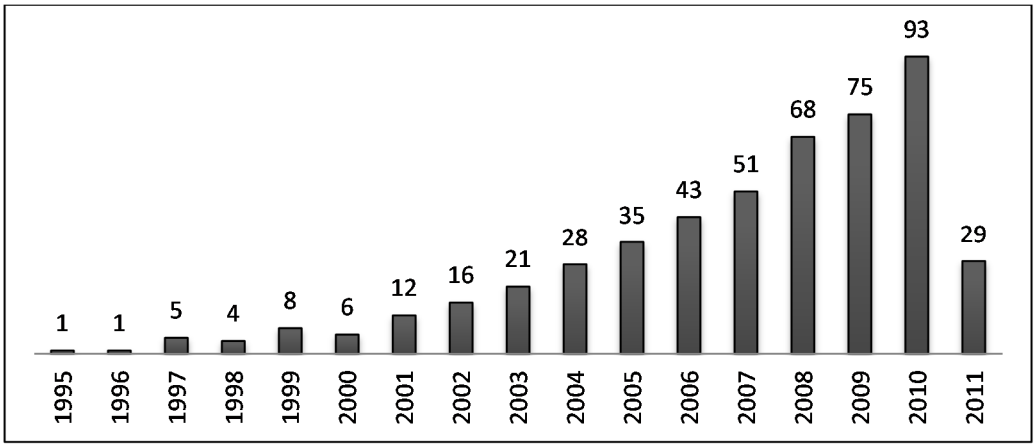

Figure 14: Publications timeline in Sustainability and Operations Management – Year versus number of publications
Source: Manfrin et al (2012a)

Several papers provide a general model of sustainability, some offering theoretical frameworks integrating ecological, economic and social aspects of sustainability (BOMMEL, 2011, DAO, 2011, HACKING; GUTHRIE, 2008), some proposing performance measurement systems for sustainability in many subfields (HUANG *et al.,* 1998, VELEVA; ELLENBECHER, 2001, NEVES; LEAL, 2010).

This study is based on a conceptual framework proposed by Manfrin et al. (2012b), in which authors provide information on main themes highlighted in the literature of sustainability under OM perspective and identified a set of keywords highlighted in 496 articles gathered in the literature. The framework in Figure 15 suggests the interaction of six categories (Economic Sustainability, Environmental Sustainability, Social Sustainability, Sector, Operations Management and Sustainability) combined with sustainability practices, competitive criteria and categories of operations management. The framework graphically emphasizes the majority of OM and Sustainability categories in the literature comprising and linking other aspects proposed.

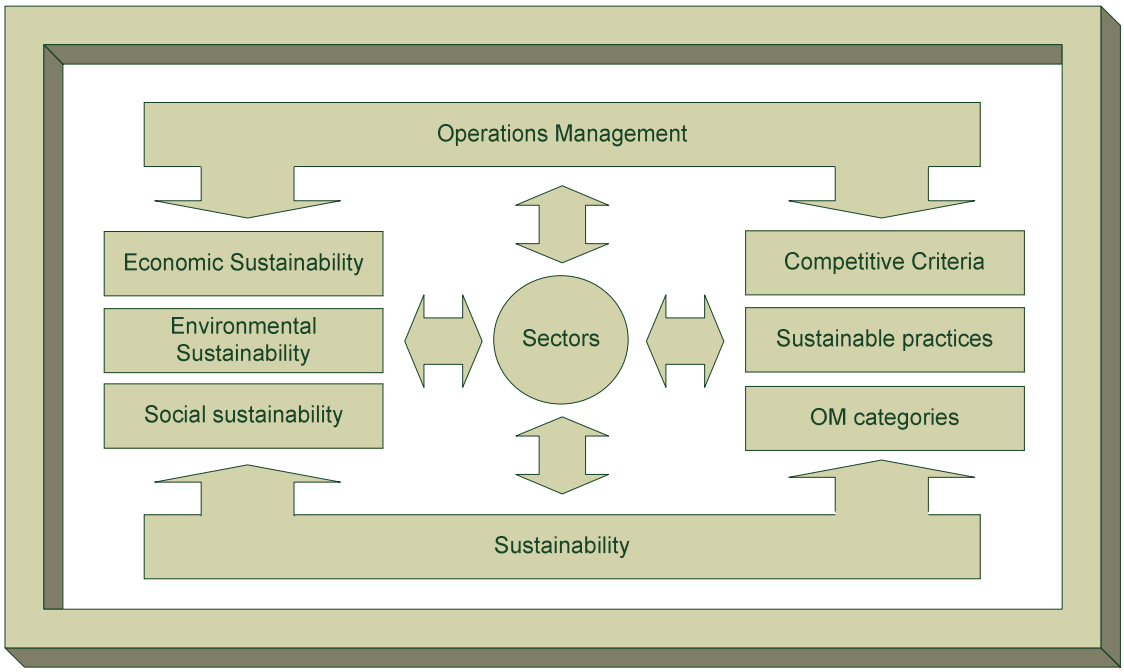

Figure 15 – Framework of interactions among literature top categories
Source: Manfrin *et al.* (2012b)

Aiming to clarify the framework relationship propositions, they also suggested a group of statements to be descriptively tested through survey analysis that will be further discussed and proposed an instrument to be applied in companies recognized by their sustainable practices.

5.3 METHODOLOGY

Based on previous research, this paper purposes the application of a survey aiming to collect information about sustainable practices in Brazilian companies.

The questionnaire was formulated by Manfrin *et al*. (2012b) and focuses on companies that are reference in sustainability, selected from three groups previously investigated (UN Global Compact, Global Reporting Initiative and Corporate Sustainability Index) and that were relevant to the study by going to meet the objectives and methodology proposal. The instrument selected for the study proved feasible, and searches through its validation ensures that can be applied for the purposes desired.

The first two organizations were selected based on their representation on the world stage regarding sustainable practices. Companies participating in the Corporate Sustainability Index (ISE) also undergo rigorous evaluation criteria for

participation of the index proposed by the institute BM&FBOVESPA that intermediates equity market transactions. According to BM&FBOVESPA (2011), the ISE aims to reflect the return of a portfolio composed of shares of companies highly committed to social responsibility and corporate sustainability, and also to promote good practices in the Brazilian business. From these criteria, it was defined the population to be investigated.

According to Forza (2002), population refers to the entire group of people, firms, plants or thing that the researcher wishes to investigate. In total, there were 555 companies gathered from the three Sources: GRI – 135 institutions, UN Global Compact – 385 institutions, ISE – 35 institutions. All these information were collected by the end of 2011 and represents data from 2010 since new reports had not been published by the time of the research execution. After cleaning identical elements and non existing companies that for some reason were erroneously registered, the population was stated as 424 different institutions from several segments, different sizes and distributed all around the country with no restrictions. After selection the general group of interest, the sample was structured.

Following orientations proposed by testing respondents, which affirms that “some business groups may have difficulties in evaluating certain requirements being not part of the context of operations management”, the sample firms focused exclusively on manufacturing or services, including the setting of OM. Another criterion for the composition of the sample was direct contact with those responsible for the practices of sustainability in decision, based on the fact that due to the functional specialization and hierarchical level in the organization, some people are knowledgeable about some facts. Thus, the contact strategy takes this problem into account aiming to avoid refused responses because of lack of interest. For this study the identification of the respondent through its e-mail was fundamental to increase reliability of information. However, the identification of appropriate informants decreased the number of total available respondents because some of the companies comprised in the sample did not provided the email required. This is an additional problem in OM survey research (FORZA, 2002). After application of the filter set, the sample had 119 business elements.

Since the sample was defined, data was aimed to be investigated. Information can be collected in a variety of ways, in different settings and from different sources. In survey research, the main methods used to collect data are interviews and

questionnaires. In this case, the instrument used to the study is a questionnaire based on previews research (MANFRIN; PINHEIRO DE LIMA, 2012b) as stated before, and focuses on competitive criteria and practices related to sustainability and operations strategy. The instrument was administered through e-mails in which, selected respondents were asked to complete the answers on their own and save it into a website database. According to Forza (2002), to increase the probability of success of data collection the researcher should carefully plan the execution of survey research and provide detailed instruction on the following: how sampling units are going to be approached; how questionnaires are going to be administered. In other words, the protocol to be followed in managing the application of the instrument has to be developed. Going forward these issues, this study proposes the following steps on questionnaire administration for data collection:

a) Send a formal invitation to participate of the study with information from the researchers, institution, purpose and terms of confidentiality - First month of approach
b) Send questionnaire link individually through e-mail – First 14 days
c) First call for answers – Third and fourth weeks
d) Second call for answers – Fifth and sixth weeks

The chronogram of application was distributed in 45 days for the questionnaire to be answered. For each confirmation, an acknowledge e-mail was sent to the respondent.

The appropriate response rate is widely discussed in the literature of OM. Some researchers agree that the response rate must be greater than 20 per cent (MALHOTRA; GROVER, 1998). Frohlic (2001) argues that in OM, surveys presents return rates between 20 to 40% in the last decade. Previous researches in sustainable operations that have also included survey methods to gather data from some specific population management (JOHNSTONE *et al*., 2004, KLASSEN, 2001, MADSEN; ULHØI, 2003, BRITO *et al*., 2008, BRUST, 2010) have faced this detail awareness, for example, Beske *et al*. (2008) presents a survey aiming to evaluate whether and to what degree environmental and social standards have been implemented in the German car industry. The overall goal of the survey was to gain insight into whether suppliers today use environmental and/or social standards, and whether they demand support from their own suppliers. The exploratory study was chosen to gain first insights into 378 companies in Germany, gathering returning rate

of 29%. Gattiker and Carter (2010) conducted a survey research aiming to provide information from environmental professionals who have attempted to gain the commitment of another stakeholder within their organization for an environmental project and received usable questionnaires of 21% of its population.

With 119 sent questionnaires, this study gathered 43 completed and usable surveys, representing 36% of the sample. Even though small samples compromise the applicability of some statistical analysis methods, one of the limitations of this paper, the study is shown to be value added through the reliability of the instrument and representativeness of respondents among sustainable organizations of OM context in a national scenario, contribution to an exploratory analysis of sustainability under an OM perspective. Due to its limitations, this paper proposes descriptive statistics as much as simple correlations interpretations.

5.4 RESULTS

Based on a Bibliometric analysis, Manfrin *et al.* (2012b) developed and validated a structured questionnaire to be used to analyze a group of 12 statements:

S1. The quality dimension is positively considered relevant in companies with sustainable initiatives as well as to its stakeholders.

S2. The dimension flexibility is positively considered relevant in companies with sustainable initiatives as well as to its stakeholders.

S3. The dimension reliability is positively considered relevant in companies with sustainable initiatives as well as to its stakeholders.

S4. The dimension cost is positively considered relevant in companies with sustainable initiatives as well as to its stakeholders.

S5. The dimension innovation is positively considered relevant in companies with sustainable initiatives as well as to its stakeholders.

S6. Economic sustainability can be considered positively as competitive criteria in companies that have sustainable initiatives as well as to its stakeholders.

S7. Social sustainability can be considered positively as competitive criteria in companies that have sustainable initiatives as well as to its stakeholders.

S8. Environmental sustainability can be considered positively as competitive

criteria in companies that have sustainable initiatives as well as to its stakeholders.

S9. Sustainability practices are reflected on strategic planning and organizational management

S10. Organizations incorporate performance measurement models using sustainable criteria to evaluate the organization sustainable performance in operations management

S11. The value chain is enclosed by organization's sustainable practices and operational processes

S12. Programs, laws, rules and negotiations are decisive practices for sustainable development in organizations

These statements guide the analysis of the questionnaire in terms of comparison with the conceptual framework presented in Figure 15. The main hypothesis to be tested is defined as:

There is a positive correlation between the theoretical concepts proposed in the literature and sustainable operations.

Thus, different results were obtained by the collection instrument.

In order to properly understand the research sample, it was used descriptive statistics to profile the participating companies, taking into account the segment of the company's operations classified by the International Standard Industrial Classification of All Economic Activities (ISIC, 2008), number of employees, annual turnover and rise of the company. This set of information is contained in Group 1 of the survey questions.

The segmentation of the participating companies can be seen in Table 11 and demonstrates a series of activities distributed by the sample.

Table 11 – Classification of productive activities

Total	Division
6	Education
1	Manufacturing of wearing apparel
3	Human health activities
2	Manufacturer of motor vehicles, trailers and semi-trailers
1	Crop and animal production, hunting and related service activities
3	Civil Engineering
1	Manufacture of coke and refined petroleum product
8	Electricity, gas steam and air conditioning supply

5	Accommodation and food service activities
2	Mining of metal ores
3	Manufacture of basic iron and steel
3	Manufacture of pulp, paper and paperboard
3	Financial service activities, except insurance and pension funding
2	Information service activities

Source: Authors,2012

The divisions presented establish connections with the business of the companies surveyed. Regarding education, six organizations participated in the survey and include universities and business education. The automotive industry is represented by three companies in the sector and the construction industry. Electricity is one of the segments that have more sustainable operations initiatives under GRI - Sustainability Reporting Statistics (2010) and is the division with the largest representation in the sample. Likewise, food service activities are also recognized among the Top Five segments that are published GRI reports, a group that also includes the mining sector.

Regarding the number of employees of the plant, the companies had, in the majority, more than 500 employees (30 organizations), followed by seven companies between 50 and 200 employees, five firms with fewer than 50 and only one containing between 200 and 500 employees . This information may occur due to concentration of activities operations comprise a greater number of employees, or that the practices of sustainable operations cover larger companies. The same analysis gives information about the turnover of the participating companies, where 79% reported revenues greater than two million dollars. The remaining revenues are distributed over one million and two and a half million dollars (14%), two hundred and fifty thousand to one million dollars (5%) and less than two hundred fifty thousand U.S. dollars (2%).

Most companies surveyed have Brazilian nationality (34 Organizations), which can be understood by the geographic scope of the research. Nevertheless, some companies are from other continents: Europe (3 Organizations), North America (3 Organizations), South America (2 Organizations) and Asia (1 organization).

Questions proposed in Group 2 are organized through the importance/ performance matrix and enables the perception of the respondent with the importance he/her considers to the criteria evaluated concerning clients (questions

2.1) and suppliers (questions 2.2), enabling the analysis of several variables in the chain value. Following propositions stated during testing phase, this group is organized by the 5-point Likert scale inverted, ie, the lower the value accepted by the respondent, the greater its perceived importance. Both perspectives (client and suppliers) evaluate 5 competitive advantages suggested: 1 Quality, 2 Flexibility, 3 Reliability, 4 Cost and 5 Innovation; plus 5 sustainable dimensions suggested by Manfrin et al. (2012b) that focuses on sustainable perspectives: 6 Economic Consistency (tangible and intangible assets, liabilities, profitability, growth, risk); 7 Internal Social Responsibility (education, health, safety, family support), 8 External Social Responsibility (improvement of the community, country), 9 Environmental Responsibility in resource utilization (energy resources, raw materials, water resources), 10 Environmental Responsibility in waste (water contamination, solid waste generation, soil contamination).

To better understand the behavior of these data, three basic statistical methods were used and are shown in Table 12:

Table 12 – Mean, median and mode of competitive criteria

Question Code	**2.1.1**	**2.1.2**	**2.1.3**	**2.1.4**	**2.1.5**	**2.1.6**	**2.1.7**	**2.1.8**	**2.1.9**	**2.1.10**	**2.2.1**	**2.2.2**	**2.2.3**	**2.2.4**	**2.2.5**	**2.2.6**	**2.2.7**	**2.2.8**	**2.2.9**	**2.2.10**
Competitive Criteria	Quality	Flexibility	Reliability	Cost	Innovation	Economic Consistency	Internal Social Responsibility	External Social Responsibility	Environmental Responsibility in resource utilization	Environmental Responsibility in waste	Quality	Flexibility	Reliability	Cost	Innovation	Economic Consistency	Internal Social Responsibility	External Social Responsibility	Environmental Responsibility in resource utilization	Environmental Responsibility in waste
Mean	1,8	2,0	1,7	2,1	2,3	2,6	2,6	2,5	2,5	2,5	2,1	2,2	2,0	2,2	2,3	2,3	2,9	2,8	2,7	2,7
Median	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	2	2
Mode	1	2	1	1	2	2	2	2	2	2	1	2	1	2	2	1	4	4	4	4

Source: Authors, 2012

Considering that the greater the proximity of these three measures of central tendency, the greater the symmetry between the data, it can be said that under the customer's perspective, the traditional competitive criteria are considered relevant factors with the most customers. The same observation can be stated from the perspective of the supplier. The sustainability criteria also have significant levels of symmetry, being relevant factors in the decision of customers. On the other hand, the same sustainability criteria show no influence on levels of partnership between suppliers.

The competitive criteria relating to sustainability are emerging concepts in the literature and propose analysis isolated from the perspectives of the triple bottom line in the operations strategy (YANG *et al.,* 2010, HANDFIELD *et al.,* 2002, PORTER; KRAMER, 2006, PAGELL *et al.,* 2004, NEJATI *et al*., 2010, SMITH, 2007). According to the evolution of the theme in the literature and the survey analysis, the level of maturity in sustainable organizational practices tends to grow as the marketing requirements dictate changes in competitive performance.

Having the principal propositions of Manfrin *et al.* (2012b) and the hypothesis to be validated by the survey, it is proposed to correlation analysis by cross-tabulation between variables considered in Group 2 in order to frame statements. The same methodology was applied in studies of sustainability in the work of Epstein and Roy (2007); Paulraj (2009) and Delmas and Toffel (2008) and in several studies across the range of OM. Regarding the classification of questions, respondents should consider the different dimensions of performance according to a Likert scale inverted indexes according to the following:

Client perspective (2.1)

1) Provides a competitive advantage with customers - is the main driver of competitiveness
2) Is considered an important factor for most customers - is usually considered a criterion in client’s decision.
3) Needs to be around the industry average to ensure market share.
4) Is not normally considered by customers, but may become more important in the future.
5) It is never considered by customers.

Supply perspective (2.2)

1) Represents a competitive advantage from other suppliers - is the main driver of competitiveness;
2) Is considered a relevant factor by the majority of suppliers - is usually considered a criterion in the decision of suppliers;
3) Needs to be around the average to ensure good representation from suppliers;
4) Is not normally considered by the supplier, but may become more important in the future;
5) It is never considered by suppliers, it is not a relevant factor in the value chain.

According to the criteria selected, Quality is a relevant item from the perspective of customers, 86.1% responded that this is the main driver of competitiveness or a criterion that is usually considered in the decision of the client. Moreover, the criterion is also relevant from the perspective of suppliers (72.1%). The competitive criterion also presents great distinction in literature and sustainability of OM, confirming the proposition of S.1. Table 13 presents de Crosstabulation of Quality.

Table 13 – Quality Crosstabulation

Crosstabulation

			Quality					**Total**
			1	2	3	4	5	
Quality	1	Count	15	4	4	0	0	23
		% of Total	34,90%	9,30%	9,30%	0,00%	0,00%	53,50%
	2	Count	3	8	0	1	2	14
		% of Total	7,00%	18,60%	0,00%	2,30%	4,70%	32,60%
	3	Count	0	0	1	0	1	2
		% of Total	0,00%	0,00%	2,30%	0,00%	2,30%	4,70%
	4	Count	0	0	0	1	0	1
		% of Total	0,00%	0,00%	0,00%	2,30%	0,00%	2,30%
	5	Count	0	1	0	0	2	3
		% of Total	0,00%	2,30%	0,00%	0,00%	4,70%	7,00%
Total		Count	18	13	5	2	5	43

	% of Total	41,90%	30,20%	11,60%	4,70%	11,60%	100,00%

Source: Authors, 2012

Flexibility is also a criterion that has great competitive importance in view of customers (81.4%) and suppliers (74.4%) confirming the S2. According to Handfield et al. (2002), business strategies must consider supplier's cost, lead-time, quality and flexibility, besides environmental criteria, following the perceived importance pointed by respondents. These data can be observed in Table 14.

Table 14 – Flexibility Crosstabulation

Crosstabulation								
			Flexibility					**Total**
			1	2	3	4	5	
Flexibility	1	Count	10	3	0	0	0	13
		% of Total	23,30%	7,00%	0,00%	0,00%	0,00%	30,20%
	2	Count	3	12	4	2	1	22
		% of Total	7,00%	27,90%	9,30%	4,70%	2,30%	51,20%
	3	Count	0	4	0	0	1	5
		% of Total	0,00%	9,30%	0,00%	0,00%	2,30%	11,60%
	4	Count	0	0	0	1	0	1
		% of Total	0,00%	0,00%	0,00%	2,30%	0,00%	2,30%
	5	Count	0	0	0	0	2	2
		% of Total	0,00%	0,00%	0,00%	0,00%	4,70%	4,70%
Total		Count	13	19	4	3	4	43
		% of Total	30,20%	44,20%	9,30%	7,00%	9,30%	100,00%

Source: Authors, 2012

Subsequently, Reliability also is considered a relevant element for sustainable organizations under customers perspective (81,4%) and also for suppliers, whose representation of 1 and 2 scale sums 74,4% confirming statement S3 as can be seen in Table 15. These characteristics are an important component of the strategy framework as they may significantly affect short-term revenues and costs, and long-term corporate performance on many levels. Epstein and Roy (2001) say that loyalty, great service levels, reliability and innovation among stakeholders provide strategic

advantages throughout the value chain, including shareholders, customers, suppliers, employees and communities.

Table 15 – Reliability Crosstabulation

Crosstabulation								
			Reliability					Total
			1	2	3	4	5	
Reliability	1	Count	16	5	3	0	0	24
		% of Total	37,20%	11,60%	7,00%	0,00%	0,00%	55,80%
	2	Count	1	7	1	2	0	11
		% of Total	2,30%	16,30%	2,30%	4,70%	0,00%	25,60%
	3	Count	0	3	2	0	0	5
		% of Total	0,00%	7,00%	4,70%	0,00%	0,00%	11,60%
	4	Count	0	0	0	1	0	1
		% of Total	0,00%	0,00%	0,00%	2,30%	0,00%	2,30%
	5	Count	0	0	0	0	2	2
		% of Total	0,00%	0,00%	0,00%	0,00%	4,70%	4,70%
Total		Count	17	15	6	3	2	43
		% of Total	39,50%	34,90%	14,00%	7,00%	4,70%	100,00%

Source: Authors, 2012

For 69,7% of respondents, Cost is a dimension that have a high representation in customers decision making process and 67,5% under suppliers relationships. This criterion comprises traditional performance measurement and it is broadly discussed in the literature. Taking into account that mean, mode and median are around 1 and 2 in terms of concordance degree and presents a considerable percentage for both perspectives, S4 is also confirmed. Data are provided in Table 16.

Table 16 – Cost Crosstabulation

Crosstabulation								
			Cost					Total
			1	2	3	4	5	
Cost	1	Count	10	4	2	1	0	17

		% of Total	23,30%	9,30%	4,70%	2,30%	0,00%	39,50%
	2	Count	3	10	0	0	0	13
		% of Total	7,00%	23,30%	0,00%	0,00%	0,00%	30,20%
	3	Count	1	1	5	1	0	8
		% of Total	2,30%	2,30%	11,60%	2,30%	0,00%	18,60%
	4	Count	0	0	1	2	0	3
		% of Total	0,00%	0,00%	2,30%	4,70%	0,00%	7,00%
	5	Count	0	0	0	0	2	2
		% of Total	0,00%	0,00%	0,00%	0,00%	4,70%	4,70%
Total		Count	14	15	8	4	2	43
		% of Total	32,60%	34,90%	18,60%	9,30%	4,70%	100,00%

Source: Authors, 2012

Innovation has also a huge impact on the literature and according to Manfrin *et al*.(2012a), this criteria has a privileged position in keywords relationship network among sustainability in OM, besides, it is strongly associate to sustainable development, supply chain management and environmental management concepts. The cross tabulation indicates that 65,1% of respondents declare that Innovation has a high impact on customers decision and 62,8% under supplier perspective, according to Table 17. The symmetry presented in mean, mode and median confirms S5 as much as its relevance in the literature and perceived percentage importance from respondents.

Table 17 – Innovation Crosstabulation

Crosstabulation								
			Innovation					**Total**
			1	2	3	4	5	
Innovation	1	Count	9	1	0	1	0	11
		% of Total	20,90%	2,30%	0,00%	2,30%	0,00%	25,60%
	2	Count	3	9	4	1	0	17
		% of Total	7,00%	20,90%	9,30%	2,30%	0,00%	39,50%
	3	Count	0	4	2	0	1	7
		% of Total	0,00%	9,30%	4,70%	0,00%	2,30%	16,30%
	4	Count	0	1	2	3	0	6
		% of Total	0,00%	2,30%	4,70%	7,00%	0,00%	14,00%

	5	Count	0	0	0	0	2	2
		% of Total	0,00%	0,00%	0,00%	0,00%	4,70%	4,70%
Total		Count	12	15	8	5	3	43
		% of Total	27,90%	34,90%	18,60%	11,60%	7,00%	100,00%

Source: Authors, 2012

Quality, Flexibility, Reliability, Innovation and Cost are considered traditional measures for perceiving the performance of organizations taking into consideration the competitive criteria, consequently, all were considered relevant not only through the consolidation of concepts in the literature, but also between sustainable practices.

The economic bias of sustainability considers the consistency of economic enterprises through analysis of profitability, growth, risk in establishing long term partnerships. To validate the S6, it is proposed to analyze the set of criteria added to the traditional economic consistency in order to get a complete view of this statement. Under lens customers, 53.5% of respondents say that Economic Consistency is an import criterion for decision-making and 62.8% confirms this criterion is relevant when it comes to long terms partnerships as shown in Table 18. From the set of statements previously validated and perceived importance from the viewpoint of customers in terms of Economic Consistency, the S6 can be validated.

Table 18 – Economic Consistency Crosstabulation

Crosstabulation							
			Economic Consistency				**Total**
			1	2	3	4	5	
Economic Consistency	1	Count	10	1	0	0	0	11
		% of Total	23,30%	2,30%	0,00%	0,00%	0,00%	25,60%
	2	Count	3	6	3	0	0	12
		% of Total	7,00%	14,00%	7,00%	0,00%	0,00%	27,90%
	3	Count	2	3	2	2	0	9
		% of Total	4,70%	7,00%	4,70%	4,70%	0,00%	20,90%
	4	Count	1	1	1	4	0	7
		% of Total	2,30%	2,30%	2,30%	9,30%	0,00%	16,30%
	5	Count	0	0	0	2	2	4
		% of Total	0,00%	0,00%	0,00%	4,70%	4,70%	9,30%

Total	Count	16	11	6	8	2	43
	% of Total	37,20%	25,60%	14,00%	18,60%	4,70%	100,00%

Source: Authors, 2012

Tools that have focused on social business sustainability aspects have addressed business sustainable development reporting in terms of social practices (GRI, 2011; ACCOUNTABILITY, 2006), and product social life cycle assessments (DREYER *et al*., 2006, HUNKELER, 2006, LABUSCHAGNE; BRENT, 2007). According to Laire and Mont (2010), social and ethical issues are gaining importance in the supply chain in all types of organizations. Therefore some public and private organizations have already started to introduce socially responsible purchasing practices, however, current practices are limited and seem unsystematic en though. This affirmative corroborates with results gathered from respondents, in which 58,2% of companies considered examples in sustainable practices believes that Internal Social Responsibility is a competitive advantage in customers perspective and yet, 60,5% for External Social responsibility, according to Table 19

Table 19 – External Social Responsibility Crosstabulation

Crosstabulation								
			External Social Responsibility					**Total**
			1	2	3	4	5	
External Social Responsibility	1	Count	6	3	0	1	0	10
		% of Total	14,00%	7,00%	0,00%	2,30%	0,00%	23,30%
	2	Count	1	9	2	4	0	16
		% of Total	2,30%	20,90%	4,70%	9,30%	0,00%	37,20%
	3	Count	0	1	3	1	0	5
		% of Total	0,00%	2,30%	7,00%	2,30%	0,00%	11,60%
	4	Count	0	0	0	10	0	10
		% of Total	0,00%	0,00%	0,00%	23,30%	0,00%	23,30%
	5	Count	0	0	0	0	2	2
		% of Total	0,00%	0,00%	0,00%	0,00%	4,70%	4,70%
Total		Count	7	13	5	16	2	43
		% of Total	16,30%	30,20%	11,60%	37,20%	4,70%	100,00%

Source: Authors, 2012

In terms of suppliers, only 39,6% affirms that internal social dimensions and 46,5% that external social dimensions are a competitive criteria. Some respondents believe that this criterion might be more important in the future. Even though social dimensions are being widely discussed by the literature, it is not evident that practices are being considered relevant in majority for sustainable companies. As result, based on such arguments, S7 was not validated by this study. Data can be seen in Table 20.

Table 20 – Internal Social Responsibility Crosstabulation

			Crosstabulation					
			Internal Social Responsibility					Total
			1	2	3	4	5	
Internal Social Responsibility	1	Count	6	3	0	1	0	10
		% of Total	14,00%	7,00%	0,00%	2,30%	0,00%	23,30%
	2	Count	0	8	4	3	0	15
		% of Total	0,00%	18,60%	9,30%	7,00%	0,00%	34,90%
	3	Count	0	0	4	0	0	4
		% of Total	0,00%	0,00%	9,30%	0,00%	0,00%	9,30%
	4	Count	0	0	2	8	1	11
		% of Total	0,00%	0,00%	4,70%	18,60%	2,30%	25,60%
	5	Count	0	0	0	0	3	3
		% of Total	0,00%	0,00%	0,00%	0,00%	7,00%	7,00%
Total		Count	6	11	10	12	4	43
		% of Total	14,00%	25,60%	23,30%	27,90%	9,30%	100,00%

Source: Authors, 2012

According to Johansson and Winroth (2010), concern for environmental issues has entered the agenda in many companies within manufacturing industry; however, efficiency benefits are not clearly understood by practitioners. Also, the complexity on manufacturing strategy formulations process and its implementation tents to retard the process of attendance, what could signify a tradeoff between competitive criteria. Therefore, sustainability issues presented on the literature provide many models for planning, implementing and evaluating environmental management in OM

(OLSTHOORN *et al*., 2000, PUTNAM, 2002, HEZRI, 2004, MARQUES *et al.,*2009), being one of the most highlighted topics related to sustainable development.

This approach is consistent with the study developed by Jabbour (2009), which verify if Brazilian companies are adopting environmental requirements in the supplier selection process. He concluded by the time of the research, that companies still use traditional criteria to select suppliers, such as quality and cost, and do not adopt environmental requirements in the supplier selection process in a uniform manner.

The present study shows that 60.5% (Environmental Responsibility in resource utilization – Table 21) and 60.4% (Environmental Responsibility in waste – Table 22) of the respondents consider important criteria for environmental decision factors from the perspective of customers. Moreover, 53.5% of the participants considered relevant environmental decision criteria as regards both the resources utilization and waste.

Table 21 – Environmental Responsibility in Resource Utilization Crosstabulation

			Crosstabulation					
			Environmental Responsibility in resource utilization					**Total**
			1	2	3	4	5	
Environmental Responsibility in resource utilization	1	Count	7	5	0	0	0	12
		% of Total	16,30%	11,60%	0,00%	0,00%	0,00%	27,90%
	2	Count	1	9	0	4	0	14
		% of Total	2,30%	20,90%	0,00%	9,30%	0,00%	32,60%
	3	Count	0	1	2	1	0	4
		% of Total	0,00%	2,30%	4,70%	2,30%	0,00%	9,30%
	4	Count	0	0	0	11	0	11
		% of Total	0,00%	0,00%	0,00%	25,60%	0,00%	25,60%
	5	Count	0	0	0	0	2	2
		% of Total	0,00%	0,00%	0,00%	0,00%	4,70%	4,70%
Total		Count	8	15	2	16	2	43
		% of Total	18,60%	34,90%	4,70%	37,20%	4,70%	100,00%

Source: Authors, 2012

These data enables inferences that this criterion is gaining space in OM organizations. Another important evaluation is that just a few respondents (4,7%) believe that environmental issues are never considered by clients decisions. Moreover, a considerable percentage affirms that this competitive criterion might become more important in the future.

Table 22 – Environmental Responsibility in Waste Crosstabulation

			Crosstabulation					
			Environmental Responsibility in waste					**Total**
			1	2	3	4	5	
Environmental Responsigility in waste	1	Count	8	5	0	0	0	13
		% of Total	18,60%	11,60%	0,00%	0,00%	0,00%	30,20%
	2	Count	1	8	0	4	0	13
		% of Total	2,30%	18,60%	0,00%	9,30%	0,00%	30,20%
	3	Count	0	1	2	0	0	3
		% of Total	0,00%	2,30%	4,70%	0,00%	0,00%	7,00%
	4	Count	0	0	0	12	0	12
		% of Total	0,00%	0,00%	0,00%	27,90%	0,00%	27,90%
	5	Count	0	0	0	0	2	2
		% of Total	0,00%	0,00%	0,00%	0,00%	4,70%	4,70%
Total		Count	9	14	2	16	2	43
		% of Total	20,90%	32,60%	4,70%	37,20%	4,70%	100,00%

Source: Authors, 2012

Since this topic is strongly represented in the literature and do not have huge importance recognition by respondents, S8 was not validated by the present research.

To deeply analyze organizations practices, Group 3 comprises eight objective questions that are intended to identify the company's initiatives that incorporate social, environmental and the economic management system in accordance with the guidelines of the value chain, government and community.

The first question refers to sustainable policies and in what level the company includes social and environmental dimensions in operational process. Answers can be graphically analyzed through Figure 16. Note that 82% of companies surveyed

have sustainability policy and more than half (51%) apply social and environmental aspects in planning and management of the company, demonstrating its commitment to sustainable evidence.

Despite the significant number of companies claiming the existence of policies related to sustainable operations strategies, the number of respondents who claim the existence of evidence practices in their operations, objectives and targets is considerably lower. It is also investigated whether the commitment to the policies established by these organizations in relation to the level of incorporation of social needs, economic and environmental issues in the design of processes, products and services, showing that over 70% of the companies present their strategies sustainability partially or fully implemented

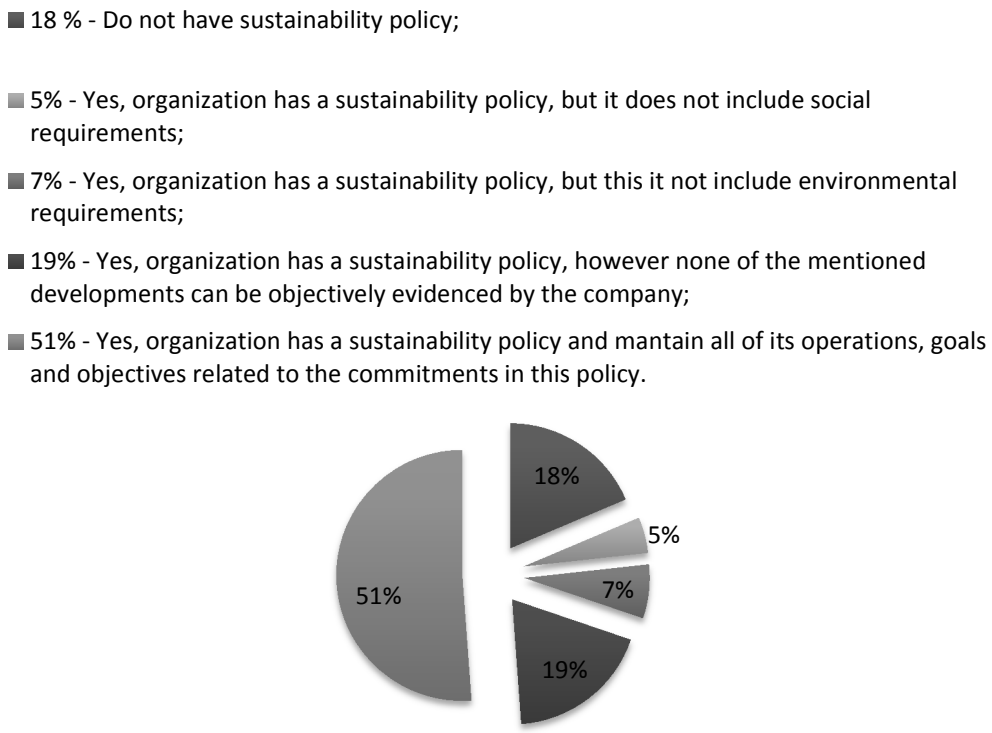

Figure 16: Level of attendance on social and environmental aspect in operational process planning
Source: Authors, 2012

In addition, information regarding the company's management processes, in which the concept of sustainable development is applied as a fundamental factor, show that most companies direct references to sustainable operations efforts highlighting sustainability practices guidelines and strategic goals of the company , information that confirms the existence of policies for the sustainable management of

vector sustainability. These data validate the S9, considering that sustainability practices are reflected on Strategic Planning and organizational management.

With regard to identification and evaluation of social and environmental performance related to the processes, past, present and future, 68% of companies say that these practices are partly or fully implemented. The actions of identifying and evaluating environmental aspects and impacts and social value chain concentrated about 50% of projects in the planning stages or partial implementation of this activity. As previously mentioned, a number of models are proposed in the literature, also standards and negotiations that help to evaluate the sustainability performance of organizations. Considering the maturity level of theoretical propositions and the degree of applicability of the concepts in organizational practices, it cannot be inferred compatibility between the two perspectives, leaving an obvious gap between the two deployment processes. Thus, it is not confirmed the proposition S10.

Among the practices highlighted in the value chain, the development of suppliers of goods and services, and the requirement of legal compliance for supply links can be mentioned. Regarding the use / sustainable consumption of their products / services, companies highlight the awareness programs and guidance for end users in order to use / sustainable consumption, contributing to behavioral change of the target audience. Considering the level of maturity of the studies of sustainability in the supply chain, these issues are not sufficient to validate the sustainability practices in the value chain of organizations surveyed (S11), although they showed commitment to its realization. This proposition proved to be unfeasible to be analyzed by means of the selected instrument, one of the limitations of the research. This limitation was not observed in test phases of the instrument. Thus, we suggest the appropriateness of the questionnaire by inserting scaled questions to assess quantitatively the level of practical application of concepts in the literature regarding the value chain.

Statement 12 is related to programs, laws, rules and negotiations that companies might have as a practice of sustainable management. The proposition aims to evaluate whether they are fundamental criteria for the designation of a sustainable company.

The Table 23 indicates the number of companies associated with each of the proposed elements.

Table 23 – Number of companies associated to elements

Elements	Companies
UN Global Compact	31
GRI - Global Report Initiative	29
ISO 9000	20
Millennium Development Goals	20
ETHOS Institute	19
ISO 14000	15
OHSAS 18000	10
ISE/Bovespa - Corporate Sustainability Index	6
ISO 26000 Responsabilidade Social	3
The Earth Carther	6

Source: Authors, 2012

As the population was established through three elements (GRI, ISE/Bovespa, UN Global Compact), it was known that most companies would present connections with some of these elements. Although the number of participation is very representative in some cases, no element has been proven essential for determining sustainable business. It may be noted that most companies have regulatory measures in their management processes, facilitating process organizations and thus allowing the inclusion of sustainability strategies. This demonstrates that sustainable practices presented by the participating companies are directly related to the maturity degree in management of these entities. Despite the inferences stated, it is not possible to validate the statement S12.

Besides the analysis of the proposed statements, another question aimed to evaluate the reason why companies are investing and spending efforts in pursuit of sustainable development. Among the reasons assigned, 18% of companies say that this is a criterion for competitive positioning, corroborating the information highlighted in the array importance / performance among the respondents. On the other hand, 17% of companies believe they can achieve growth resulting from the practices of sustainability. Only 6% of respondents say they spend in these actions by governmental or business taxes.

In order to graphically demonstrate the relationships presented throughout the study, authors suggest a structured framework in the dimensions covered by the survey, considering the elements raised by Manfrin *et al.* (2012b) contained in Figure 17.

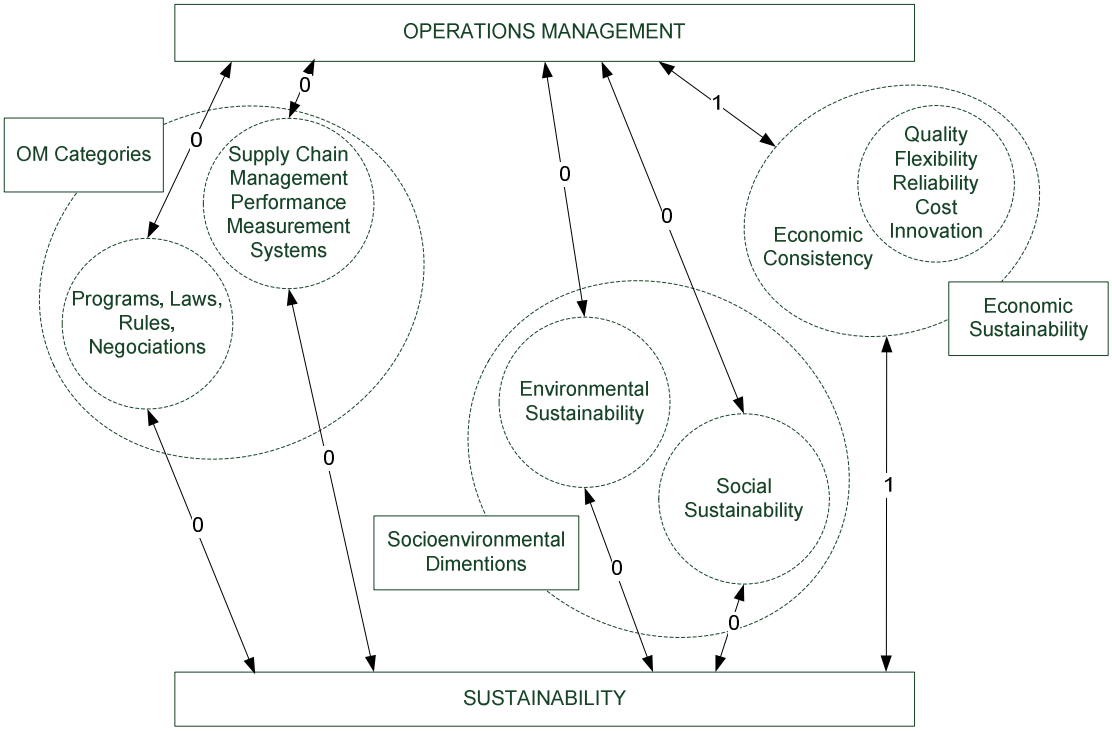

Figure 17– Framework of interactions between OM and Sustainable dimensions
Source: Authors, 2012

The framework identifies the correlations proposed in the statements and adds dimensions into three groups, OM Categories, Socioenvironmental dimensions and Economic Sustainability. These dimensions are assessed under the Sustainability optical defined by the concept of Triple Bottom Line and Operations Management. The relationships between the dimensions are shown by arrows and labeled with 0 - indicating an opportunity of future research in the literature and / or the possibility of practical implementation by the organizations; 1 - indicating the degree of correlation evident between the concepts proposed in the literature and organizational practices.

Since the 1990s (MANFRIN *et al,* 2012a), some researchers have drawn attention to the need of studies that integrate sustainable management to production strategy. This trend has been increasing over the years demonstrating its importance on the world stage.

Regarding the economic dimensions, the study showed considerable convergence between competitive criteria proposed by Slack, beyond the concept of Economic Consistency and the perception of companies in relation to its customers and suppliers. These traditional measures of competitiveness are applied in several sub-themes of the OM and also have practical aspects involving sustainability.

Several studies have demonstrated through empirical research the validity of the inclusion of social and environmental dimensions in the competitive strategy of organizations. According to Wagner (2007a), the integration of environmental management organization with other functions can result in better marketing performance, an improved image, greater efficiency and less risk. For Jayachandran *et al.* (2006), there is a need for considering environmental issue in manufacturing companies with the same Importance than other aspects, such as cost and quality. Nevertheless, it is not possible to observe convergence between the theoretical and structuring perception of companies and their importance in the eyes of customers and suppliers.

One of the possible barriers to this development would be the existence of tradeoffs between the complexity of deployment (since most of the companies have a high level of planning for sustainable practices) and the results realized in the value chain.

The social aspects are new in the literature and despite having representation on the literature of sustainability from the perspective of OM, practical solutions are not structured to provide convergence of organizational practices, especially in terms of evaluation and results. These gaps proposed complement propositions of opportunities for future studies suggested by Manfrin *et al*. (2012a).

Since sustainability actions are not considered relevant competitive criteria, investments could not bring short term results, such as increased market share or identify new business opportunities. Thus, this is another tradeoff that might be explored by future researches.

The subcategories of OM are heavily exploited in the literature, and recently have been incorporating sustainable practices in order to ensure long-term balance in social, economic and environmental. Nevertheless, there are not evident practical actions involving supply chain management or performance measurement systems at considerable levels, for example. This result demonstrates that there is greater need for empirical studies that prove the applicability of these concepts between organizational practices, emphasizing strategic results for the entire value chain. Another tradeoff that can be presented is the complexity of covering the various links in the chain, requiring higher levels of maturity in management. One alternative is to invest in management system formatted for this purpose. It is believed that

companies tent to Increase their market value and reliability through structured systems such as ISO 9000, ISO 14000, OHSAS 18000 and Other Management models.

5.5 CONCLUSION

Companies aiming the equilibrium of their actions in the economic, social and environmental in order to balance the long term has proved increasingly evident. To measure this balance, several models and management tools have been discussed in the literature seeking to consolidate concepts, directing organizational strategies. Nevertheless, studies show that there is still a big gap between what is proposed and what is effectively run by organizations.

In order to highlight some structural holes between theory and practice of sustainability in OM, this study aimed to analyze the actions of organizations considered a model for sustainability in Brazil and to make a comparison between the concepts shown in previous studies.

For this purpose, it was used the survey method through the application of electronic questionnaires sent to 119 companies. The survey achieved a 36% response rate, proving to be viable for the application of descriptive analysis. To increase the rate of return, probably a face to face approach could be a more viable alternative as the people the study seeks to approach is relatively small, however, it should be taken into account the geographically sprayed population. Thus, no inference was categorically affirmed about the results of the research, prior characteristics of an exploratory analysis.

The instrument consists of three groups of questions covered institutional characteristics, competitive criteria and operational practices and management highlighted by the respondents. From the application of descriptive statistical methods, some propositions were validated by this study demonstrating that the traditional competitive criteria are also evidenced in sustainable practices of organizations, positioning the economic dimension in a more mature stage of applicability in relation to other dimensions of sustainability proposed by Triple Bottom Line. Regarding the socioeconomic measures, there is great applicability of the concepts on strategic planning and organizational management, demonstrating

an initial maturity stage of these processes. Further proposed statements could not be validated. Thus, the general hypothesis presented could not be confirmed as well.

In order to improve analysis, authors suggest performing multiple case studies in order to allow greater interaction with the operational processes and management of sustainable enterprises. A closer relationship would enable to understand strategies and propose viable alternatives propagation, not only to other links in the value chain, but also to a wider range of organizations. Another opportunity is to focus on one of the pillars of the triple bottom line, targeting research and improving the level of data interpretation. It is also suggested the use of other statistical methods of analysis providing more robust results.

REFERENCES

ACCOUNTABILITY **AA1000 Series.** available at: <www.accountability21.net/aa1000/>.2011

AZZONE, G. AND BERTELÈ, U., Exploiting green strategies for competitive advantage. **Long Range Planning**. December, pp. 62-72, 1994

AZZONE, G., BIANCHI, R., MAURI, R. and NOCI, G. Defining operating environmental strategies: programmes and plans within Italian industries. **Environmental Management and Health**. Vol. 8, Part 1, pp. 1-15. 1997

BESKE, P., KOPLIN, J. & SEURING, S. The Use of Environmental and Social Standards by German First-Tier Suppliers of the Volkswagen AG. **Corporate Social Responsibility and Environmental Management,** 75, pp.63-75. 2008

BLOOM, G.S. and SCOTT MORTON, M.S. Hazardous waste is every managers' problem. **Sloan Management Review.** Summer, pp. 75-84. 1991

BOMMEL, H., A conceptual framework for analyzing sustainability strategies in industrial supply networks from an innovation perspective, **Journal of Cleaner Production**, vol. 19, no. 8, pp. 895-904, May 2011.

BRITO, M., CARBONE, V. & BLANQUART, C. Towards a sustainable fashion retail supply chain in Europe: Organization and performance. **International Journal of Production Economics,** 114(2), pp.534-553. 2008

BRUST, D. & HEYES, C. Environmental management intentions: an empirical investigation of Argentina's polluting firms. **Journal of environmental management**, 91(5), pp.1111-22. 2010

DAO, V., LANGELLA, I. and CARBO, J., From green to sustainability: Information Technology and an integrated sustainability framework, **The Journal of Strategic Information Systems**, vol. 20, no. 1, pp. 63-79, Mar. 2011.

DELMAS, M. and TOFFEL, M., Organizational responses to environmental demands : opening the black box," **Strategic Management Journal**, vol. 1055, no. 2005, pp. 1027-1055, 2008.

DREYER, L., HAUSCHILD, M.Z. and SCHIERBECK, J. A framework for social life cycle impact assessment, **International Journal of Life Cycle Assessment**, Vol. 11 No. 2, pp. 88-97. 2006

ELKINGTON, J**., Cannibals with forks**: the triple bottom line of 21st century business. **Capstone, Oxford**, 1999

EPSTEIN, M. and ROY, M., Implementing a Corporate Environmental Strategy : Establishing Coordination and Control within Multinational Companies. Business **Strategy and the Environment**, vol. 403, no. 2006, pp. 389-403, 2007.

EPSTEIN, M. and ROY, M., Sustainability in Action: Identifying and Measuring the Key Performance Drivers. **Long Range Planning**, vol. 34, no. 5, pp. 585-604, Oct. 2001.

FRAY, A., Ethical behavior and social responsibility in organizations: process and evaluation. **Management Decision**, vol. 45, no. 1, pp. 76-88, 2007.

GRAY, R.H., Accounting for the Environment. **Paul Chapman Publishing**, London, pp. 95-103, 1993

HACKING, T. and GUTHRIE, P. A framework for clarifying the meaning of Triple Bottom-Line, Integrated, and Sustainability Assessment, **Environmental Impact Assessment Review**, vol. 28, no. 2-3, pp. 73-89, Feb. 2008.

HANDFIELD, R., WALTON, S., SROUFE, R. and MELNYK, S., Applying environmental criteria to supplier assessment: A study in the application of the Analytical Hierarchy Process, **European Journal of Operational Research**, vol. 141, no. 1, pp. 70-87, Aug. 2002.

HEZRI. A., Sustainability indicator system and policy processes in Malaysia: a framework for utilization and learning., **Journal of environmental management**, vol. 73, no. 4, pp. 357-71, Dec. 2004.

HUANG, S.L., WONG, J.H. and CHEN, T.C., A framework of indicator system for measuring Taipei's urban sustainability, **Landscape and Urban Planning**, vol. 42, no. 1, pp. 15-27, Jul. 1998.

HUNKELER, D., Societal LCA methodology and case study, **International Journal of Life Cycle Assessment**, Vol. 11 No. 6, pp. 371-82. 2006

INTERNATIONAL STANDARD - Industrial Classification of All Economic Activities, 2008

JABBOUR, A. and JABBOUR, C., Are supplier selection criteria going green? Case studies of companies in Brazil. **Industrial Management & Data Systems**, vol. 109, no. 4, pp. 477-495, 2009.

JAYACHANDRAN, R., SINGH, S., GOODYER, J., POPPLEWELL, K., The design of a sustainable manufacturing system: a case study of its importance to product variety manufacturing. In: Pham, D.T., Eldukhri, E.E., Soroka, A.J. (Eds.), **Intelligent Production Machines and Systems.** Elsevier Science Ltd, Oxford, pp. 650e655. 2006.

JOHANSSON, G. and WINROTH, M., Introducing environmental concern in manufacturing strategies: Implications for the decision criteria, **Management Research Review**, vol. 33, no. 9, pp. 877-899, 2010.

JOHNSTONE N, SCAPECCHI P, YITERHUS B, WOLFF R. The firm, environmental management and environ- mental measures: lessons from a survey of European manufacturing firms. **Journal of Environmental Planning and Management** 47(5): 685–707. 2004

KLASSEN R.D. Plant-level environmental management orientation: the influence of management views and plant characteristics. **Production and Operations Management** 10(3): 257–275. 2001

KLEINDORFER, P. R., SINGHAL, K. and Van WASSENHOVE, L. N. Sustainable Operations Management, **Production and Operations Management**, 14(4), 482-492. 2005

KRAJNC, D.; GLAVIČ, P. A model for integrated assessment of sustainable development. Resources, **Conservation and Recycling**, v. 43, n. 2, p. 189-208, Jan. 2005

LABUSCHAGNE, C. , BRENT, A. , and ERCK, R., Assessing the sustainability performances of industries. **Journal of Cleaner Production**, vol. 13, no. 4, pp. 373-385, Mar. 2005.

LEIRE, C. and MONT, O. , The Implementation of Socially Responsible Purchasing, **Corporate Social Responsibility and Environmental Management**, vol. 39, no. 2009, pp. 27-39, 2010.

MADSEN H, ULHØI JP. Have trends in corporate environmental management influenced companies' competitiveness? **Greener Management International** 44: (Winter): 75–88. 2003

MANFRIN, P.; PINHEIRO DE LIMA, E.; GOUVÊA DA COSTA, S. E. Developing and validating a survey to evaluate sustainable practices in Operations Management. **Industrial and Systems Engineering Graduate Program** – PPGEPS, 2012b, work in progress

MANFRIN, P.; PINHEIRO DE LIMA, E.; GOUVÊA DA COSTA, S. E.; MACHADO, C., Operations Management and sustainability: Framing the literature based on

bibliometric techniques**. Industrial and Systems Engineering Graduate Program –** PPGEPS, 2012a , work in progress

MARQUES, F., MENDONÇA, P. and JABBOUR, C., Social dimension of sustainability in retail: case studies of small and medium Brazilian supermarkets, **Social Responsibility Journal**, vol. 6, no. 2, pp. 237-251, 2010.

MARQUES, J. C., BASSET, A., BREY, T., and ELLIOTT, M., The ecological sustainability trigon-a proposed conceptual framework for creating and testing management scenarios. **Marine pollution bulletin**, vol. 58, no. 12, pp. 1773-9, Dec. 2009.

NEJATI, M., SHAHBUDIN, A. and AMRAN, A., Sustainable development: a competitive advantage or a threat? **Business Strategy Series**, vol. 11, no. 2, pp. 84-89, 2010.

NEVES, A. R. and LEAL, V., Energy sustainability indicators for local energy planning: Review of current practices and derivation of a new framework. **Renewable and Sustainable Energy Reviews,** vol. 14, no. 9, pp. 2723-2735, Dec. 2010.

OLSTHOORN, X., TYTECA, D. , WEHRMEYER, W. and WAGNER, M., Environmental Indicators for Business : A Review of the Literature and Standardization Methods, **Journal of Cleaner Production**, pp. 1-27, 2000.

P. JAMES, A. GHOBADIAN, H. VINEY, AND J. LIU, Addressing the divergence between environmental strategy formulation and implementation**. Management Decision**, vol. 37, no. 4, pp. 338-348, 1999.

PAGELL, M., YANG, C., KRUMWIEDE, D., and SHEU, C., Does the Competitive Environment Influence the Efficacy of Investments in Environmental Management?, **The Journal of Supply Chain Management**, vol. 40, no. 3, pp. 30-39, Jun. 2004.

PAULRAJ, A., Environmental Motivations: a Classifi cation Scheme and its Impact on Environmental Strategies and Practices. **Business Strategy and the Environment**, vol. 468, no. 2008, pp. 453-468, 2009.

PORTER, M. and KRAMER, M., Strategy & Society - The link between competitive advantagem and corporate social responsibility. **Harvard Business Review**, pp. 1-15, 2006.

PORTER, M. and VAN DER LINDE, C. Green and competitive: ending the stalemate. **Harvard Business Review**. September-October, pp. 120-34. 1995

PUTNAM, D., ISO 14031 : Environmental Performance Evaluation, **Performance Evaluation**, no. September, 2002.

SCUDDER, G.D. and HILL, C.A. A review and classification od empirical research in operations management, **Journal of Operations Management**, Vol.20 No.4, pp. 810-29, 1998

SLACK, N.; LEWIS, M.; BATES, H. The two worlds of operations management research and practice: Can they meet, should they meet? **International Journal of Operations & Production Management**, vol. 24, n. 4, p. 372-387, 2004.

SMITH, A., Making the case for the competitive advantage of corporate social responsibility. **Business Strategy Series**, vol. 8, no. 3, pp. 186-195, 2007.

THE GLOBAL COMPACT, 2011. **The United Nations Global Compact**. Available at: www.unglobalcompact.org. Last access in: Nov. 2011

VELEVA, V., and ELLENBECKER, M., Indicators of sustainable production: framework and methodology, **Journal of Cleaner Production**, vol. 9, no. 6, pp. 519-549, Dec. 2001.

WAGNER, M., Integration of environmental management with other Mana- gerial functions of the firm. Empirical effects on Drivers of economic performance. **Long Range Planning** 40 (6), 611e628. 2007a

WALLEY, N. and WHITEHEAD, B. Is not easy being green. **Harvard Business Review**. Vol. 72, No. 3, pp. 46-52, 1994

WCED - World Commission on Environment and Development (1987). **Our Common Future**, Oxford *University Press*, Oxford.

WELFORD, R. and GOULDSON, A. Environmental Management and Business Strategies. **Pitman Publishing**, London. 1993

YANG, C., LIN, S., CHAN, Y., and SHEU, C., Mediated effect of environmental management on manufacturing competitiveness: An empirical study, **International Journal of Production Economics**, vol. 123, no. 1, pp. 210-220, Jan. 2010.

6 CONCLUSION

In order to comply with the new scenario challenge within corporations and society, it is required a management-oriented sustainable development. Companies are seeking to insert concepts of sustainable management in its operational strategies. In this context, organizations, individually and through its value chain, are seeking ways to guide their internal processes. Models suggested in the literature guide and allow practical implementation of these initiatives.

This study, in its initial phase conducted a literature review and the results generated Could Be Summarized as:

- Research communities are being created around research topics as: sustainable supply chains, design for sustainability, sustainability reference models and reports, and value creation, governance and operations strategy.
- Research topics recovered from keywords analysis and that are based on sustainable development; social corporate responsibility; and environmental performance concentrate the research agenda.
- The references that are founding OM papers in sustainability and are considerably influential are classified equally as academic, NGO and governmental agencies reports and standards.

The information generated by the studied papers could be used to frame the OM research in sustainability and could also be used for planning future research and for evaluating companies' sustainable policies.

Based on the information generated by the descriptive analysis and by relationships networks, a conceptual framework was structured in order to enable better analysis and comprehensions. From the stated framework, authors provide a methodology aiming to propose and test an instrument to validate stated relationships presented in the framework suggested.

From the questionnaire, a survey was conducted on 119 companies from various sectors and geographically sprayed. These characteristics increase the significance of the results realized by the sample. It was obtained a response rate of 36% and according to studies, presents acceptable levels for understanding research

in OM. Subsequently, analyses of descriptive statistics were applied in addition to cross tabulation method that allowed some inferences.

In terms of results, it was evident a low-level of convergence between the concepts of literature and the sustainable practices of organizations. Only traditional competitive criteria can be validated as well as the economic dimension of triple bottom line. Thus, the main hypothesis raised in paper 3 cannot be validated. Also, the research question is answered concerning the study taking into account all the steps and surveyed in accordance with the results, there are no significant correlation between the proposed theoretical concepts in the literature and sustainable operations, unless in terms of economic dimensions and traditional competitive criteria.

These steps followed the proposals of the specific goals that proved suitable for achieving the main objective of the research, as much as the method and instrument selected.

Some limitations were found during the research. A proposed statement (S11) could not be analyzed through questions suggested, opening an opportunity for improvements in methods and research results. Besides, authors consider sustainability a huge theme to be approached in a general study. After the comprehension of the literature scenario and convergence levels with operations strategy, it is proposed a deployment of the triple bottom line concept to be studied individually and their further integration. Authors also suggest the application of the improved questionnaire in a larger number of organizations to identify weather the perceived importance of non sustainable institution are according to sustainable ones. This comparison might help to realize why companies are slowly moving toward sustainable thinking. Enlarging respondents sample could also contribute to the application of more robust statistical methods, enabling better interpretation of results.

In general, this study can be conclude affirming that there is a large number of opportunities for theoretical and practical perspectives in order to contribute to the maturity level of sustainable development.

REFERENCES

ANGELL, L. & KLASSEN, R., Integrating environmental issues into the mainstream: an agenda for research in operations management. **Journal of Operations Management**, 17(5), pp.575-598. 1999.

BESKE, P., KOPLIN, J. & SEURING, S., The Use of Environmental and Social Standards by German First-Tier Suppliers of the Volkswagen AG. **Corporate Social Responsibility and Environmental Management**, 75(December 2006), pp.63-75. 2008.

BRITO, M., CARBONE, V. & BLANQUART, C., Towards a sustainable fashion retail supply chain in Europe: Organization and performance. **International Journal of Production Economics,** 114(2), pp.534-553. 2008.

BRUST, D. & HEYES, C., Environmental management intentions: an empirical investigation of Argentina's polluting firms. **Journal of environmental management, 91(5)**, pp.1111-22. 2010.

BRYMAN, A. Research methods and Organization studies. **London: Unwin Hyman**, 1989.

DUBIN, R. **Theory building**, The Free Press, New York, NY, 1978.

ELKINGTON, J., Cannibals with forks: the triple bottom line of 21st century business. **Capstone, Oxford**, 1999.

FLYNN B.B., SAKAKIBARA S., SCHROEDER R.G., BATES K.A. AND FLYNN E.J. Empirical research methods in operations management**. Journal of Operations Management**, v. 9, n. 2, pp. 250-284, 1990.

FORZA, C., Survey research in operations management: a process-based perspective. **International Journal of Operations & Production Management**, 22(2), pp.152-194. 2002.

GRI – GLOBAL REPORTING INITIATIVE., Available at: **www.globalreporting.org**. Accessed in: 5 apr.2011.

HAIR, J.; BABIN, B.; MONEY, A.; SAMOUEL, P. Fundamentos de Métodos de Pesquisa em Administração. Porto Alegre: **Bookman**, 2005.

HART, S., A natural-resource-based view of the firm, **Academy of Management Review**, Vol. 25 No. 4, pp. 986-1114. 1995.

JOHNSTONE N, SCAPECCHI P, YITERHUS B, WOLFF R. The firm, environmental management and environ- mental measures: lessons from a survey of European manufacturing firms. **Journal of Environmental Planning and Management** 47(5): 685–707. 2004.

KERLINGER, F.N., Foundations of behavioral research, 3rd ed. Harcourt Brace Jovanovich **College Publishers**, New York, NY, 1986.

KLASSEN RD. Plant-level environmental management orientation: the influence of management views and plant characteristics. **Production and Operations Management** 10(3): 257–275. 2001.

KRAJNC, D.; GLAVIČ, P., A model for integrated assessment of sustainable development. Resources, **Conservation and Recycling**, v. 43, n. 2, p. 189-208, Jan. 2005.

Madsen H, Ulhøi JP. Have trends in corporate environmental management influenced companies' competitiveness? **Greener Management International** 44: (Winter): 75–88. 2003.

MALHOTRA, M. J.; GROVER, V. An assessment of survey research in POM: from constructs to theory. **Journal of Operations Management**, v. 16, n. 4, pp. 407-425, 1998.

MANFRIN, P. AND PINHEIRO DE LIMA, E., Operations Management and sustainability: Framing the literature based on bibliometric techniques. **Industrial and Systems Engineering Graduate Program** – PPGEPS, 2012.

MIGUEL, P.P.A.C. (Org.) and Collaborators. Research Methodology in Production Engineering and Operations Management. São Paulo: **Elsevier**, 2010.

NUNNALLY, J.C., **Psychonometric Theory**. McGraw-Hill, New York. 1978.

PANNIRSELVAM, A., ZEITHAML, V.A. AND BERYY, L.L., "SERVQUAL": a multiple-item scale for measuring consumer perceptions of service quality**", Journal of retailing**, Vol. 64 No.1, 1988.

PILKINGTON, A. & FITZGERALD, R., Operations management themes, concepts and relationships: a forward retrospective of IJOPM**. International Journal of Operations & Production Management**, 26(11), pp.1255-1275. 2006.

PILKINGTON, A.; MEREDITH, J. The evolution of the intellectual structure of operations management – 1980-2006: a citation/co-citation analysis. **Journal of Operations Management,** v. 27, n. 3, pp. 185-202, 2009.

SARIS, W.E.; GALLHOFER, I.N. Design, evaluation, and analysis of questionnaires for survey research. Hoboken: **John Wiley & Sons**, 2007.

SLACK, N. Competitive advantage in manufacturing: Achieving competitiveness in industrial operations. 1. ed**. Atlas**, 1993.

THE GLOBAL COMPACT, 2011. The United Nations Global Compact. Available at: **www.unglobalcompact.org**. Last access in: Nov. 2011.

APPENDIX B – REFERENCES PUBLISHED, ACCEPTED AND SUBMITTED DERIVED FROM INTERMEDIATE PHASES OF RESEARCH

MACHADO, C. G.; MANFRIN, P. M.; PINHEIRO DE LIMA, E.; GOUVEA DA COSTA, S. E., Sustainability operations management: an overview of research trends**. Industrial and Systems Engineering Research Conference**, 2012

MACHADO, C. G.; PINHEIRO DE LIMA, E.; GOUVEA DA COSTA, S. E.; MANFRIN, P. M, Industrial Engineering, Operations Management and Sustainability: an overview. **The International Conference on Industrial Engineering and Operations Management**, 2012

MANFRIN, P. M.; OLIVEIRA, A. L. G., Ferramentas para a construção do desenvolvimento sustentável, **Simpósio de Engenharia de Produção**, 2011

MANFRIN, P. M.; OLIVEIRA, A. L. G.; Chimanski, S. M. L.; Pinheiro de Lima, E.; Gouvêa da Costa, S. E., Um panorama da pesquisa em Operações Sustentáveis. **Revista Produção**, 2011

MANFRIN, P. M.; PINHEIRO DE LIMA, E.; GOUVEA DA COSTA, S. E., Researching sustainability in OM community, **The European Operations Management Association Conference,** 2011

MANFRIN, P. M.; PINHEIRO DE LIMA, E.; OLIVEIRA, A. L. G., Sustainability: The evolution of the theme in Operations Management: A literature review, **The International Conference on Industrial Engineering and Operations Management**, 2011

OLIVEIRA, A. L. G.; GOUVEA DA COSTA, S. E.; MANFRIN, P. M., Customização em massa: principais meios de publicação e análise de redes de relacionamento dos grupos de conhecimento, **Simpósio de Engenharia de Produção,** 2011

OLIVEIRA, A. L. G.; GOUVEA DA COSTA, S. E.; PINHEIRO DE LIMA, E.; MANFRIN, P. M., Elemetos capacitadores para a customização em massa na indústria automobilística brasileira sob a ótica de gestão estratégica de operações: uma revisão de literatura, **Encontro nacional de engenharia de produção**, 2011.

PINHEIRO DE LIMA, E.; GOUVEA DA COSTA, S. E.; MANFRIN, P. M, Operations strategic management and sustainability. **Production and Operations Management annual Conference**, 2011

APPENDIX C – REFERENCES FOR BIBLIOMETRIC ANALYSIS

ABIDIN N, PASQUIRE C. Delivering sustainability through value management: Concept and performance overview. **Engineering, Construction and Architectural Management**. 2005;12(2):168-180. Available at: http://www.emeraldinsight.com/10.1108/09699980510584502. Accessed September 15, 2010.

ABUKHADER S, JÖNSON G. The environmental implications of electronic commerce: A critical review and framework for future investigation. **Management of Environmental Quality: An International Journal**. 2003;14(4):460-476. Available at: http://www.emeraldinsight.com/10.1108/14777830310488668 5. Accessed September 2, 2010.

ABUKHADER S. Eco-efficiency in the era of electronic commerce – should “Eco-Effectiveness” approach be adopted . **Journal of Cleaner Production**. 2008;16(7):801-808. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652607001047. Accessed November 24, 2010.

ADAMS C, GONZÁLEZ C. Engaging with organisations in pursuit of improved sustainability accounting and performance. **Accounting, Auditing & Accountability Journal**. 2007;20(3):333-355. Available at: http://www.emeraldinsight.com/10.1108/09513570710748535. Accessed September 15, 2010.

ADAMS C, MCNICHOLAS P. Making a difference: Sustainability reporting, accountability and organisational change. **Accounting, Auditing & Accountability Journal**. 2007;20(3):382-402. Available at: http://www.emeraldinsight.com/10.1108/09513570710748553. Accessed September 7, 2010.

ADIVAR B, ATAN T, OFLAÇ B, ORTEN T. Improving social welfare chain using optimal planning model. **Supply Chain Management: An International Journal**. 2010;15(4):290-305. Available at: http://www.emeraldinsight.com/10.1108/13598541011054661. Accessed September 7, 2010.

ADRIANA B. Environmental supply chain management in tourism: The case of large tour operators. **Journal of Cleaner Production**. 2009;17(16):1385-1392. Available at: http://linkinghub.elsevier.com/retrieve/pii/S095965260900211X. Accessed November 24, 2010.

AHMED M, TAN K, SUNDARAM D. Sustainable Enterprise Modelling and Simulation in a Warehousing Context. **Business Process Management Journal**. 2010;16(5):16.

ALLENBY B. Industrial Ecology, information and sustainability. **Foresight**. 2000;02(02):9.

ALSHUWAIKHAT H, ABUBAKAR I. An integrated approach to achieving campus sustainability: assessment of the current campus environmental management practices. **Journal of Cleaner Production**. 2008;16(16):1777-1785. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652607002545.

ALVAREZ A, ROGERS J. GOING “out there”: learning about sustainability in place. **International Journal of Sustainability in Higher Education**. 2006;7(2):176-188. Available at: http://www.emeraldinsight.com/10.1108/14676370610655940. Accessed September 7, 2010.

AMIN M, BANERJEE S. Benchmarking environmental performance: five leading steel mills in India. **Benchmarking: An International Journal**. 2010;17(3):378-395. Available at: http://www.emeraldinsight.com/10.1108/14635771011049353. Accessed July 28, 2010.

AMIR A, BURT S. Sainsbury’s in Egypt: the strange case of Dr Jekyll and Mr Hyde? **International Journal of Retail & Distribution Management**. 2008;36(4):300-322. Available at: http://www.emeraldinsight.com/10.1108/09590550810862697. Accessed September 7, 2010.

ANDERSEN M, LARSEN T. Corporate social responsibility in global supply chains. **Supply Chain Management: An International Journal**. 2009;14(2):75-86. Available at: http://www.emeraldinsight.com/10.1108/13598540910941948. Accessed September 15, 2010.

ANGELL L, KLASSEN R. Integrating environmental issues into the mainstream: an agenda for research in operations management. **Journal of Operations Management**. 1999;17(5):575-598. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0272696399000066.

ARAS G, AYBARS A, KUTLU O. Managing corporate performance: Investigating the relationship between corporate social responsibility and financial performance in emerging markets. **International Journal of Productivity and Performance Management**. 2010;59(3):229-254. Available at: http://www.emeraldinsight.com/10.1108/17410401011023573. Accessed September 14, 2010.

ARAS G, CROWTHER D. Governance and sustainability: An investigation into the relationship between corporate governance and corporate sustainability. **Management Decision**. 2008;46(3):433-448. Available at: http://www.emeraldinsight.com/10.1108/00251740810863870. Accessed September 14, 2010.

ARLBJORN J, JONSSON P, JOHANSEN J. Nordic research in logistics and supply chain management: an empirical analysis. **International Journal of Physical Distribution & Logistics Management**. 2008;38(6):452-474. Available at: http://www.emeraldinsight.com/10.1108/09600030810893526. Accessed September 14, 2010.

AZAPAGIC A. Developing a framework for sustainable development indicators for the mining and minerals industry. **Journal of Cleaner Production**. 2004;12(6):639-662. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652603000751. Accessed August 5, 2010.

AZORÍN J, CORTÉS E, GAMERO M, TARÍ J. Green management and financial performance: a literature review. **Management Decision**. 2009;47(7):1080-1100. Available at: http://www.emeraldinsight.com/10.1108/00251740910978313. Accessed September 14, 2010.

AZORÍN J, CORTÉS E, GAMERO M, TARÍ J. Quality management, environmental management and firm performance: A review of empirical studies and issues of integration. **International Journal of Management Reviews**. 2009;11(2):197-222. Available at: http://doi.wiley.com/10.1111/j.1468-2370.2008.00238.x. Accessed October 21, 2010.

AZORÍN J, CORTÉS E, MOLINER C, TARÍ J. Environmental practices and firm performance: an empirical analysis in the Spanish hotel industry. **Journal of Cleaner Production**. 2009;17(5):516-524. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652608002345.

AZZONE G, NOCI G. Identifying effective PMSs for the deployment of “green” manufacturing strategies. **International Journal of Operations & Production Management**. 1998;18(4):308-335. Available at: http://www.emeraldinsight.com/10.1108/01443579810199711.

AZZONE G, NOCI G. Seeing ecology and “green” innovations as a source of change. **Journal of Organizational Change Management**. 1998;11(2):94-111. Available at: http://www.emeraldinsight.com/10.1108/09534819810212106.

BAI C, SARKIS J. Green supplier development: analytical evaluation using rough set theory. **Journal of Cleaner Production**. 2010;18(12):1200-1210. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652610000272. Accessed October 25, 2010.

BAINES T, LIGHTFOOT H, BENEDETTINI O, KAY J. The servitization of manufacturing: A review of literature and reflection on future challenges. **Journal of Manufacturing Technology Management**. 2009;20(5):547-567. Available at: http://www.emeraldinsight.com/10.1108/17410380910960984. Accessed August 5, 2010.

BALA A, MUNOZ P, RIERADEVALL J, YSERN P. Experiences with greening suppliers. The Universitat Auto`noma de Barcelona. **Journal of Cleaner Production**. 2008;16(15):1610-1619. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652608001066. Accessed July 25, 2010.

BALZAROVA M, CASTKA P. Underlying mechanisms in the maintenance of ISO 14001 environmental management system. **Journal of Cleaner Production**. 2008;16(18):1949-1957. Available at:

http://linkinghub.elsevier.com/retrieve/pii/S0959652608000176. Accessed November 24, 2010.

BANTJES R. Rural sustainability and the built environment. **Journal of Enterprising Communities: People and Places in the Global Economy**. 2011;5(2):158-178. Available at: http://www.emeraldinsight.com/10.1108/17506201111133387. Accessed June 22, 2011.

BARDATI D. The integrative role of the campus environmental audit: experiences at Bishop's University, Canada. **International Journal of Sustainability in Higher Education**. 2006;7(1):57-68. Available at: http://www.emeraldinsight.com/10.1108/14676370610639245. Accessed September 13, 2010.

BAYNARD C. The landscape infrastructure footprint of oil development: Venezuela's heavy oil belt. **Ecological Indicators**. 2011;11(3):789-810. Available at: http://linkinghub.elsevier.com/retrieve/pii/S1470160X10001767. Accessed July 20, 2011.

BAYRAKTAR E, JOTHISHANKAR M, TATOGLU E, WU T. Evolution of operations management: past, present and future. **Management Research News**. 2007;30(11):843-871. Available at: http://www.emeraldinsight.com/10.1108/01409170710832278. Accessed August 27, 2010.

BECKETT R, JONKER J. AccountAbility 1000: a new social standard for building sustainability. **Managerial Auditing Journal**. 2002;17(1/2):36-42. Available at: http://www.emeraldinsight.com/10.1108/02686900210412225. Accessed July 29, 2010.

BELZ F, RIEDIGER B. Marketing Strategies in the Age of Sustainable Development: Evidence from the Food Industry. **Business Strategy and the Environment**. 2010;416(June 2009):401-416.

BENDERS J, MORITA M. Changes in Toyota Motors' operations management. **International Journal of Production Research**. 2004;42(3):433-444. Available at: http://www.informaworld.com/openurl?genre=article&doi=10.1080/00207540310001602883&magic=crossref||D404A21C5BB053405B1A640AFFD44AE3. Accessed August 26, 2010.

BENEDETTO L, KLEMES J. The Environmental Performance Strategy Map: an integrated LCA approach to support the strategic decision-making process. **Journal of Cleaner Production**. 2009;17(10):900-906. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652609000316. Accessed September 1, 2010.

BENITO J, BENITO O. A study of the motivations for the environmental transformation of companies. **Industrial Marketing Management**. 2005;34(5):462-475. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0019850104001336. Accessed November 24, 2010.

BENITO J, BENITO O. Environmental proactivity and business performance: an empirical analysis. **Omega**. 2005;33(1):1-15. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0305048304000349. Accessed November 24, 2010.

BENITO J, BENITO O. Implications of market orientation on the environmental transformation of industrial firms. **Ecological Economics**. 2008;64(4):752-762. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0921800906003478. Accessed July 1, 2010.

BENITO J, BENITO O. Operations management practices linked to the adoption of ISO 14001: An empirical analysis of Spanish manufacturers☆. **International Journal of Production Economics**. 2008;113(1):60-73. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0925527308000042. Accessed November 24, 2010.

BERINGER A, WRIGHT T, MALONE L. Sustainability in higher education in Atlantic Canada. **International Journal of Sustainability in Higher Education**. 2008;9(1):48-67. Available at: http://www.emeraldinsight.com/10.1108/14676370810842184. Accessed September 7, 2010.

BERINGER A. Campus sustainability audit research in Atlantic Canada: pioneering the campus sustainability assessment framework. **International Journal of Sustainability in Higher Education**. 2006;7(4):437-455. Available at: http://www.emeraldinsight.com/10.1108/14676370610702235. Accessed September 7, 2010.

BESKE P, KOPLIN J, SEURING S. The Use of Environmental and Social Standards by German First-Tier Suppliers of the Volkswagen AG. **Corporate Social Responsibility and Environmental Management**. 2008;75(December 2006):63-75.

BIEHL M, PRATER E, REALFF M. Assessing performance and uncertainty in developing carpet reverse logistics systems. **Computers & Operations Research**. 2007;34(2):443-463. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0305054805001036. Accessed November 24, 2010.

BITITCI U, ACKERMANN F, ATES A, ET AL. Managerial processes: an operations management perspective towards dynamic capabilities. **Production Planning & Control**. 2011;22(2):157-173. Available at: http://www.tandfonline.com/doi/abs/10.1080/09537281003738860. Accessed July 25, 2011.

BJÖRKLUND M. Benchmarking tool for improved corporate social responsibility in purchasing. **Benchmarking: An International Journal**. 2010;17(3):340-362. Available at: http://www.emeraldinsight.com/10.1108/14635771011049335. Accessed August 12, 2010.

BOMMEL H. A conceptual framework for analyzing sustainability strategies in industrial supply networks from an innovation perspective. **Journal of Cleaner Production**. 2011;19(8):895-904. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652610004683. Accessed July 20, 2011.

BREMMERS H, HAVERKAMP D, OMTA O. “Dynamic behavioral fingerprinting”: what drives the deployment of environmental information and communication capabilities? **Journal of Cleaner Production**. 2009;17(8):751-761. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652608002874.

BRENT A, LABUSCHAGNE C. An appraisal of social aspects in project and technology life cycle management in the process industry. **Management of Environmental Quality: An International Journal**. 2007;18(4):413-426. Available at: http://www.emeraldinsight.com/10.1108/14777830710753811. Accessed September 15, 2010.

BRINK T, WOERD F. Industry Specific Sustainability Benchmarks: An ECSF Pilot Bridging Corporate Sustainability with Social Responsible Investments. **Journal of Business Ethics**. 2004;55(2):187-203. Available at: http://www.springerlink.com/openurl.asp?id=doi:10.1007/s10551-004-1901-2.

BRÍO J, FERNÁNDEZ E, JUNQUERA B. The role of the public administrations in the promotion of the environmental activity in Spanish industrial companies. **Ecological Economics**. 2002;40(2):279-294. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0921800901002683.

BRITO M, CARBONE V, BLANQUART C. Towards a sustainable fashion retail supply chain in Europe: Organisation and performance. **International Journal of Production Economics**. 2008;114(2):534-553. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0925527308000480. Accessed July.

BROCHNER J, JOSEPHSON P, ALTE J. Identifying management research priorities. **Construction Management & Economics**. 2005;23(8):793-796. Available at: http://www.informaworld.com/openurl?genre=article&doi=10.1080/01446190500249569&magic=crossref||D404A21C5BB053405B1A640AFFD44AE3. Accessed September 22, 2010.

BRUNET A, NEW S. Kaizen in Japan: an empirical study. **International Journal of Operations & Production Management**. 2003;23(12):1426-1446. Available at: http://www.emeraldinsight.com/10.1108/01443570310506704. Accessed September 3, 2010.

BRUST D, HEYES C. Environmental management intentions: an empirical investigation of Argentina’s polluting firms. **Journal of environmental management**. 2010;91(5):1111-22. Available at: http://www.ncbi.nlm.nih.gov/pubmed/20110148. Accessed November 24, 2010.

BURRITT R, SCHALTEGGER S, ZVEZDOV D. Carbon Management Accounting: Explaining Practice in Leading German Companies. **Australian Accounting**

Review. 2011;21(1):80-98. Available at: http://doi.wiley.com/10.1111/j.1835-2561.2010.00121.x. Accessed June 22, 2011.

CABEZAS H, PAWLOWSKI C, MAYER A, HOAGLAND N. Sustainability : ecological , social , economic , technological , and systems perspectives. **Clean Technologies and Environmental Policy**. 2003;5:167-180.

CAGIAO J, GÓMEZ B, DOMÉNECH J, MAINAR S, LANZA H. Calculation of the corporate carbon footprint of the cement industry by the application of MC3 methodology. **Ecological Indicators**. 2011;11(6):1526-1540. Available at: http://linkinghub.elsevier.com/retrieve/pii/S1470160X11000495. Accessed June 22, 2011.

CAGLIANO R, CANIATO F, GOLINI R, LONGONI A, MICELOTTA E. The impact of country culture on the adoption of new forms of work organization. **International Journal of Operations & Production Management**. 2011;31(3):297-323. Available at: http://www.emeraldinsight.com/10.1108/01443571111111937. Accessed July 20, 2011.

CAMINO JR. Re-evaluating green marketing strategy: a stakeholder perspective. **European Journal of Marketing**. 2007;41(11/12):1328-1358. Available at: http://www.emeraldinsight.com/10.1108/03090560710821206. Accessed August 24, 2010.

CANO C, SAMS D, SCHWARTZ J. Is socially responsible behavior good business? An investigation of tomorrow's business leaders. **Social Responsibility Journal**. 2008;4(4):491-503. Available at: http://www.emeraldinsight.com/10.1108/17471110810909894. Accessed September 15, 2010.

CARLSEN J, ANDERSSON T, KNIGHT J, JAEGER K, TAYLOR R. Festival management innovation and failure. **International Journal of Event and Festival Management**. 2010;1(2):120-131. Available at: http://www.emeraldinsight.com/10.1108/17852951011056900. Accessed September 14, 2010.

CARRASCO I, ANDRÉS E, VALLEJO J. Corporate Environmentalism Strategy in the Spanish Consumer Product Sector : a Typology of Firms. **Business Strategy and the Environment**. 2008;368(July 2006):350-368.

CARTER C, ROGERS D. A framework of sustainable supply chain management: moving toward new theory. **International Journal of Physical Distribution & Logistics Management**. 2008;38(5):360-387. Available at: http://www.emeraldinsight.com/10.1108/09600030810882816.

CARTER C. Purchasing and Social Responsibility: A Replication and Extension. **The Journal of Supply Chain Management**. 2004;40(4):4-16. Available at: http://doi.wiley.com/10.1111/j.1745-493X.2004.tb00175.x.

CARTER C. Purchasing social responsibility and firm performance: The key mediating roles of organizational learning and supplier performance. **International**

Journal of Physical Distribution & Logistics Management. 2005;35(3):177-194. Available at: http://www.emeraldinsight.com/10.1108/09600030510594567. Accessed August 5, 2010.

CASTKA P, BALZAROVA M. A critical look on quality through CSR lenses: Key challenges stemming from the development of ISO 26000. **International Journal of Quality & Reliability Management**. 2007;24(7):738-752. Available at: http://www.emeraldinsight.com/10.1108/02656710710774700. Accessed September 15, 2010.

CASTKA P, BALZAROVA M. Adoption of social responsibility through the expansion of existing management systems. **Industrial Management & Data Systems**. 2008;108(3):297-309. Available at: http://www.emeraldinsight.com/10.1108/02635570810858732. Accessed September 15, 2010.

CASTKA P, BALZAROVA M. ISO 26000 and supply chains—On the diffusion of the social responsibility standard. **International Journal of Production Economics**. 2008;111(2):274-286. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0925527307001879.

CASTKA P, BAMBER C, BAMBER D, SHARP J. Integrating corporate social responsibility (CSR) into ISO management systems – in search of a feasible CSR management system framework. **The TQM Magazine**. 2004;16(3):216-224. Available at: http://www.emeraldinsight.com/10.1108/09544780410532954.

CHAMORRO A, BANEGIL T. Green Marketing Philosophy : A Study of Spanish Firms with Ecolabels. **Corporate Social Responsibility and Environmental Management**. 2006;24(August 2005):11-24.

CHAN W. Environmental measures for hotels' environmental management systems: ISO 14001. **International Journal of Contemporary Hospitality Management**. 2009;21(5):542-560. Available at: http://www.emeraldinsight.com/10.1108/09596110910967791. Accessed September 16, 2010.

CHARTER M. DARCY WINSLOW , General Manager , Sustainable Business Strategies , Nike. **The Journal of Sustainable Product Design**. 2002:53-56.

CHEN A, BOUDREAU M, WATSON R. Information systems and ecological sustainability. **Journal of Systems and Information Technology**. 2008;10(3):186-201. Available at: http://www.emeraldinsight.com/10.1108/13287260810916907. Accessed August 4, 2010.

CHOI D, GRAY E. The venture development processes of "sustainable" entrepreneurs. **Management Research News**. 2008;31(8):558-569. Available at: http://www.emeraldinsight.com/10.1108/01409170810892127. Accessed August 5, 2010.

CHUNG L, PARKER L. Integrating Hotel Environmental Strategies with Management Control: a Structuration Approach. **Business Strategy and the Environment**. 2008;286(May 2006):272-286.

CILIBERTI F, GROOT G, HAAN J, PONTRANDOLFO P. Codes to coordinate supply chains: SMEs' experiences with SA8000. **Supply Chain Management: An International Journal**. 2009;14(2):117-127. Available at: http://www.emeraldinsight.com/10.1108/13598540910941984. Accessed September 14, 2010.

CILIBERTI F, PONTRANDOLFO P, SCOZZI B. Logistics social responsibility: Standard adoption and practices in Italian companies. **International Journal of Production Economics**. 2008;113(1):88-106. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0925527307003118. Accessed September 17, 2010.

COELHO J, MOY D. The new performance evaluation methodology and its integration with management systems. **The TQM Magazine**. 2003;15(1):25-29. Available at: http://www.emeraldinsight.com/10.1108/09544780310454411. Accessed September 15, 2010.

COLLIER J, WANDERLEY L. Thinking for the future: global corporate responsibility in the twenty-first century. **Futures**. 2005;37(2-3):169-182. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0016328704000795. Accessed August 4, 2010.

CORBETT C, KLASSEN R. Extending the Horizons: Environmental Excellence as Key to Improving Operations. **Manufacturing & Service Operations Management**. 2006;8(1):5-22. Available at: http://msom.journal.informs.org/cgi/doi/10.1287/msom.1060.0095. Accessed September 10, 2010.

CORBETT L, CUTLER D. Environmental management systems in the New Zealand plastics industry. **International Journal of Operations & Production Management**. 2000;20(2):204-224. Available at: http://www.emeraldinsight.com/10.1108/01443570010304260.

COTE R, LOPEZ J, MARCHE S, PERRON G, WRIGHT R. Influences, practices and opportunities for environmental supply chain management in Nova Scotia SMEs. **Journal of Cleaner Production**. 2008;16(15):1561-1570. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652608001017. Accessed October 27, 2010.

CROWE D, BRENNAN L. Environmental Considerations within Manufacturing Strategy : an International Study. **Business Strategy and the Environment**. 2007;289(August 2005):266-289.

CRUZ J. Dynamics of supply chain networks with corporate social responsibility through integrated environmental decision-making. **European Journal of Operational Research**. 2008;184(3):1005-1031. Available at:

http://linkinghub.elsevier.com/retrieve/pii/S037722170601229X. Accessed September 23, 2010.

CRUZ J. The impact of corporate social responsibility in supply chain management: Multicriteria decision-making approach. **Decision Support Systems**. 2009;48(1):224-236. Available at: http://linkinghub.elsevier.com/retrieve/pii/S016792360900178X. Accessed September 17, 2010.

CURKOVIC S, SROUFE R. Using ISO 14001 to Promote a Sustainable Supply Chain Strategy. **Business Strategy and the Environment**. 2010.

CURRY A, KADASAH N. Focusing on key elements of TQM – evaluation for sustainability. **The TQM Magazine**. 2002;14(4):207-216. Available at: http://www.emeraldinsight.com/10.1108/09544780210429816. Accessed September 15, 2010.

DAILY B, HUANG S. Achieving sustainability through attention to human resource factors in environmental management. **International Journal of Operations & Production Management**. 2001;21(12):1539-1552. Available at: http://www.emeraldinsight.com/10.1108/01443570110410892.

DALY H. Reconciling the Economics of Social Equity and Environmental Sustainability. **Population and Environment**. 2002;24(1):47-53.

DANGELICO R, PONTRANDOLFO P. From green product definitions and classifications to the Green Option Matrix. **Journal of Cleaner Production**. 2010;18(16-17):1608-1628. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652610002659. Accessed November 24, 2010.

DANIEL S, DIAKOULAKI DC, PAPPIS CP. Operations research and environmental planning. **European Journal of Operational Research**. 1997;102(2):248-263. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0377221797001070.

DARNALL N, HENRIQUES I, SADORSKY P. Adopting Proactive Environmental Strategy: The Influence of Stakeholders and Firm Size. **Journal of Management Studies**. 2009;47(6):1072-1094. Available at: http://doi.wiley.com/10.1111/j.1467-6486.2009.00873.x. Accessed September 24, 2010.

DARNALL N, HENRIQUES I, SADORSKY P. Do environmental management systems improve business performance in an international setting? **Journal of International Management**. 2008;14(4):364-376. Available at: http://linkinghub.elsevier.com/retrieve/pii/S1075425308000690. Accessed September 5, 2010.

DARNALL N, JOLLEY G, HANDFIELD R. Environmental Management systems and Green Supply Chain Management : Complements for Sustainability ? **Business Strategy and the Environment**. 2008;45(October 2006):30-45.

DARNALL N, SEOL I, SARKIS J. Perceived stakeholder influences and organizations' use of environmental audits☆. **Accounting, Organizations and Society**. 2009;34(2):170-187. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0361368208000639. Accessed July 30, 2010.

DAS N, SEN M, PATTANAYAK J. Assessment of students' perception towards developing a course in environmental accounting. **International Journal of Accounting and Information Management**. 2008;16(2):122-139. Available at: http://www.emeraldinsight.com/10.1108/18347640810913799. Accessed September 15, 2010.

DEFEE C, ESPER T, MOLLENKOPF D. Leveraging closed-loop orientation and leadership for environmental sustainability. **Supply Chain Management: An International Journal**. 2009;14(2):87-98. Available at: http://www.emeraldinsight.com/10.1108/13598540910941957. Accessed September 7, 2010.

DEHGHANIAN F, MANSOUR S. Designing sustainable recovery network of end-of-life products using genetic algorithm. **Resources, Conservation and Recycling**. 2009;53(10):559-570. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0921344909000664. Accessed July 10, 2010.

DEJONGE A. Stakeholder evaluation of sustainable development in the life sciences industry. **Journal of Cleaner Production**. 2006;14(2):152-162. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652605000028. Accessed September 1, 2010.

DELAI I, TAKAHASHI S. Sustainability measurement system: a reference model proposal. **Social Responsibility Journal**. 2011;7(3):438-471. Available at: http://www.emeraldinsight.com/10.1108/17471111111154563. Accessed September 5, 2011.

DELMAS M, MONTIEL I. Greening the Supply Chain: When Is Customer Pressure Effective? **Journal of Economics & Management Strategy**. 2009;18(1):171-201. Available at: http://doi.wiley.com/10.1111/j.1530-9134.2009.00211.x.

DELMAS M, TOFFEL M. ORGANIZATIONAL RESPONSES TO ENVIRONMENTAL DEMANDS : OPENING THE BLACK BOX. **Strategic Management Journal**. 2008;1055(December 2005):1027-1055.

DELMAS M, TOFFEL M. Stakeholders and environmental management practices: an institutional framework. **Business Strategy and the Environment**. 2004;13(4):209-222. Available at: http://doi.wiley.com/10.1002/bse.409. Accessed October 22, 2010.

DIAKAKI C, GRIGOROUDIS E, STABOULI M. A risk assessment approach in selecting environmental performance indicators. **Management of Environmental Quality: An International Journal**. 2006;17(2):126-139. Available at:

http://www.emeraldinsight.com/10.1108/14777830610650456. Accessed September 15, 2010.

DIXON S, CLIFFORD A. Ecopreneurship – a new approach to managing the triple bottom line. **Journal of Organizational Change Management**. 2007;20(3):326-345. Available at: http://www.emeraldinsight.com/10.1108/09534810710740164. Accessed July 20, 2010.

DOANE D. Beyond corporate social responsibility: minnows, mammoths and markets. **Futures**. 2005;37(2-3):215-229. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0016328704000801. Accessed July 31, 2010.

DONNELLY K, OLDS R, BLECHINGER F, REYNOLDS D, BECKETT Z. ISO 14001 – effective management of sustainable design. **The Journal of Sustainable Product Design**. 2004;4(1-4):43-54. Available at: http://www.springerlink.com/index/10.1007/s10970-006-0004-9. Accessed September 11, 2010.

DOUGLAS A, DORIS J, JOHNSON B. Corporate social reporting in Irish financial institutions. **The TQM Magazine**. 2004;16(6):387-395. Available at: http://www.emeraldinsight.com/10.1108/09544780410563301. Accessed September 7, 2010.

DOWNEY P. Sustainability takes time. **International Journal of Sustainability in Higher Education**. 2004;5(1):81-90. Available at: http://www.emeraldinsight.com/10.1108/14676370410512607. Accessed September 15, 2010.

DUAN C-H. Mapping the intellectual structure of modern technology management. **Technology Analysis & Strategic Management**. 2011;23(5):583-600. Available at: http://www.informaworld.com/openurl?genre=article&doi=10.1080/09537325.2011.565672&magic=crossref||D404A21C5BB053405B1A640AFFD44AE3. Accessed June 19, 2011.

DUNK A. Product quality, environmental accounting and quality performance. **Accounting, Auditing & Accountability Journal**. 2002;15(5):719-732. Available at: http://www.emeraldinsight.com/10.1108/09513570210448975. Accessed September 7, 2010.

EDVARDSSON B, ENQUIST B, HAY M. Values-based service brands: narratives from IKEA. **Managing Service Quality**. 2006;16(3):230-246. Available at: http://www.emeraldinsight.com/10.1108/09604520610663471. Accessed September 7, 2010.

ELLRAM L, TATE W, CARTER C. Applying 3DCE to environmentally responsible manufacturing practices. **Journal of Cleaner Production**. 2008;16(15):1620-1631. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652608001078. Accessed October 25, 2010.

ELLRAM L, ZSIDISIN G. Factors that drive purchasing and supply management's use of information technology. **IEEE Transactions on Engineering Management**. 2002;49(3):269-281. Available at: http://ieeexplore.ieee.org/lpdocs/epic03/wrapper.htm?arnumber=1046060.

EMANUEL R, ADAMS J. College students' perceptions of campus sustainability. **International Journal of Sustainability in Higher Education**. 2011;12(1):79-92. Available at: http://www.emeraldinsight.com/10.1108/14676371111098320. Accessed July 20, 2011.

ENQUIST B, EDVARDSSON B, SEBHATU S. Values-based service quality for sustainable business. **Managing Service Quality**. 2007;17(4):385-403. Available at: http://www.emeraldinsight.com/10.1108/09604520710760535. Accessed August 31, 2010.

EPSTEIN M, ROY M. Implementing a Corporate Environmental Strategy : Establishing Coordination and Control within Multinational Companies. **Business Strategy and the Environment**. 2007;403(July 2006):389-403.

EPSTEIN M, ROY M. Sustainability in Action: Identifying and Measuring the Key Performance Drivers. **Long Range Planning**. 2001;34(5):585-604. Available at: http://linkinghub.elsevier.com/retrieve/pii/S002463010100084X.

EROL I, VELIOGLU M, SERIFOGLU F, et al. Exploring reverse supply chain management practices in Turkey. **Supply Chain Management: An International Journal**. 2010;15(1):43-54. Available at: http://www.emeraldinsight.com/10.1108/13598541011018111.

ESPINOSA A, HARNDEN R, WALKER J. Beyond hierarchy: a complexity management perspective. **Kybernetes**. 2007;36(3/4):333-347. Available at: http://www.emeraldinsight.com/10.1108/03684920710746995. Accessed September 3, 2010.

ESSOUSSI L, LINTON J. New or recycled products: how much are consumers willing to pay? **Journal of Consumer Marketing**. 2010;27(5):458-468. Available at: http://www.emeraldinsight.com/10.1108/07363761011063358. Accessed September 15, 2010.

FALALEEVA M, O'MAHONY C, GRAY S, et al. Towards climate adaptation and coastal governance in Ireland: Integrated architecture for effective management? **Marine Policy**. 2011;35(6):784-793. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0308597X11000066. Accessed July 20, 2011.

FARRELL T, OLLERVIDES F. The School for Field Studies Centre for Coastal Studies: A case study of sustainable development education in México. **International Journal of Sustainability in Higher Education**. 2005;6(2):122-133. Available at: http://www.emeraldinsight.com/10.1108/14676370510589846. Accessed August 19, 2010.

FEDERICI M, ULGIATI S, VERDESCA D, BASOSI R. Efficiency and sustainability indicators for passenger and commodities transportation systems The case of Siena, Italy. **Ecological Indicators**. 2003;3(3):155-169. Available at: http://linkinghub.elsevier.com/retrieve/pii/S1470160X03000402.

FERNÁNDEZ E, JUNQUERA B, ORDIZ M. Managers ' Profile in Environmental Strategy : A Review of the Literature. **Corporate Social Responsibility and Environmental Management**. 2006;274(June):261-274.

FERRETTI I, ZANONI S, ZAVANELLA L, DIANA A. Greening the aluminium supply chain. **International Journal of Production Economics**. 2007;108(1-2):236-245. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0925527306003215. Accessed November 24, 2010.

FIGGE F, HAHN T. Sustainable Value Added—measuring corporate contributions to sustainability beyond eco-efficiency. **Ecological Economics**. 2004;48(2):173-187. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0921800903002866. Accessed September 15, 2010.

FOERSTL K, REUTER C, HARTMANN E, BLOME C. Managing supplier sustainability risks in a dynamically changing environment—Sustainable supplier management in the chemical industry. **Journal of Purchasing and Supply Management**. 2010;16(2):118-130. Available at: http://linkinghub.elsevier.com/retrieve/pii/S1478409210000233.

FONSECA A, MACDONALD A, DANDY E, VALENTI P. The state of sustainability reporting at Canadian universities. **International Journal of Sustainability in Higher Education**. 2011;12(1):22-40. Available at: http://www.emeraldinsight.com/10.1108/14676371111098285. Accessed July 20, 2011.

FONT X, TAPPER R, SCHWARTZ K, KORNILAKI M. Sustainable Supply Chain Management in Tourism. **Business Strategy and the Environment**. 2008;271(July 2006):260-271.

FRANCESCO A, LEVY D. The impact of sustainability on the investment environment. **Journal of European Real Estate Research**. 2008;1(1):72-87. Available at: http://www.emeraldinsight.com/10.1108/17539260810891505. Accessed September 7, 2010.

FRAY A. Ethical behavior and social responsibility in organizations: process and evaluation. **Management Decision**. 2007;45(1):76-88. Available at: http://www.emeraldinsight.com/10.1108/00251740710718971. Accessed July 29, 2010.

FRENCH M. Improving sustainability through effective reuse of product returns: minimizing waste in a batch blending process environment. **Journal of Cleaner Production**. 2008;16(15):1679-1687. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652608000152. Accessed October 27, 2010.

FROTA J, RUWAARD J, NUNEN J, HECK E. Designing and evaluating sustainable logistics networks. **International Journal of Production Economics**. 2008;111(2):195-208. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0925527307001818. Accessed August 4, 2010.

FROTA J, WALTHER G, BLOEMHOF J, VAN NUNEN J, SPENGLER T. From closed-loop to sustainable supply chains: the WEEE case. **International Journal of Production Research**. 2010;48(15):4463-4481. Available at: http://www.informaworld.com/openurl?genre=article&doi=10.1080/00207540902906151&magic=crossref||D404A21C5BB053405B1A640AFFD44AE3. Accessed September 22, 2010.

FUENTES M, SÁEZ C, MONTES F. The impact of environmental characteristics on TQM principles and organizational performance. **Omega**. 2004;32(6):425-442. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0305048304000143. Accessed November 24, 2010.

GABZDYLOVA B, RAFFENSPERGER J, CASTKA P. Sustainability in the New Zealand wine industry: drivers, stakeholders and practices. **Journal of Cleaner Production**. 2009;17(11):992-998. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652609000481. Accessed September 16, 2010.

GAMERO M, AZORÍN J, CORTÉS E. The potential of environmental regulation to change managerial perception, environmental management, competitiveness and financial performance. **Journal of Cleaner Production**. 2010;18(10-11):963-974. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652610000624. Accessed September 7, 2010.

GAMERO M, AZORÍN J, CORTÉS E. The whole relationship between environmental variables and firm performance: competitive advantage and firm resources as mediator variables. **Journal of environmental management**. 2009;90(10):3110-21. Available at: http://www.ncbi.nlm.nih.gov/pubmed/19482410. Accessed November 24, 2010.

GANDHI N, SELLADURAI V, SANTHI P. Unsustainable development to sustainable development: a conceptual model. **Management of Environmental Quality: An International Journal**. 2006;17(6):654-672. Available at: http://www.emeraldinsight.com/10.1108/14777830610702502. Accessed September 15, 2010.

GAO S, ZHANG J. Stakeholder engagement, social auditing and corporate sustainability. **Business Process Management Journal**. 2006;12(6):722-740. Available at: http://www.emeraldinsight.com/10.1108/14637150610710891. Accessed September 15, 2010.

GATTIKER T, CARTER C. Understanding project champions' ability to gain intra-organizational commitment for environmental projects. **Journal of Operations Management**. 2010;28(1):72-85. Available at:

http://linkinghub.elsevier.com/retrieve/pii/S0272696309000588. Accessed October 9, 2010.

GAUTHIER C. Measuring Corporate Social and Environmental Performance: The Extended Life-Cycle Assessment. **Journal of Business Ethics**. 2005;59(1-2):199-206. Available at: http://www.springerlink.com/index/10.1007/s10551-005-3416-x. Accessed September 15, 2010.

GAVRONSKI I, FERRER G, Paiva E. ISO 14001 certification in Brazil: motivations and benefits. **Journal of Cleaner Production**. 2008;16(1):87-94. Available at: http://linkinghub.elsevier.com/retrieve/pii/S095965260600415X. Accessed October 24, 2010.

GEBAUER H. Identifying service strategies in product manufacturing companies by exploring environment–strategy configurations. **Industrial Marketing Management**. 2008;37(3):278-291. Available at: http://linkinghub.elsevier.com/retrieve/pii/S001985010700154X. Accessed November 24, 2010.

GEORGIADIS P, BESIOU M. Environmental and economical sustainability of WEEE closed-loop supply chains with recycling: a system dynamics analysis. **The International Journal of Advanced Manufacturing Technology**. 2009;47(5-8):475-493. Available at: http://www.springerlink.com/index/10.1007/s00170-009-2362-7. Accessed October 27, 2010.

GEORGIADIS P, BESIOU M. Sustainability in electrical and electronic equipment closed-loop supply chains: A System Dynamics approach. **Journal of Cleaner Production**. 2008;16(15):1665-1678. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652608001091. Accessed October 27, 2010.

GETZ D, ANDERSSON T, CARLSEN J. Festival management studies: Developing a framework and priorities for comparative and cross-cultural research. **International Journal of Event and Festival Management**. 2010;1(1):29-59. Available at: http://www.emeraldinsight.com/10.1108/17852951011029298. Accessed September 13, 2010.

GHOBADIAN A, GALLEAR D, HOPKINS M. TQM and CSR nexus. **International Journal of Quality & Reliability Management**. 2007;24(7):704-721. Available at: http://www.emeraldinsight.com/10.1108/02656710710774683. Accessed September 3, 2010.

GLASER J. Corporate responsibility and the triple bottom line. **Clean Technologies and Environmental Policy**. 2006;8(4):225-228. Available at: http://www.springerlink.com/index/10.1007/s10098-006-0067-2. Accessed November 24, 2010.

GOLD S, SEURING S. Supply chain and logistics issues of bio-energy production. **Journal of Cleaner Production**. 2010;19(1):32-42. Available at:

http://linkinghub.elsevier.com/retrieve/pii/S0959652610003240. Accessed November 24, 2010.

GONZÁLEZ C, FENECH F, GONZÁLEZ F, RUÍZ C, SANDUBETE J. The role of environmental accounting in organizational change -An exploration of Spanish companies. **Accounting, Auditing & Accountability Journal**. 2001;14(2):213-239. Available at: http://www.emeraldinsight.com/10.1108/09513570110389323.

GONZÁLEZ P, SARKIS J, DÍAZ B. Environmental management system certification and its influence on corporate practices: Evidence from the automotive industry. **International Journal of Operations & Production Management**. 2008;28(11):1021-1041. Available at: http://www.emeraldinsight.com/10.1108/01443570810910179. Accessed July 24, 2010.

GOVINDARAJULU N, DAILY B. Motivating employees for environmental improvement. **Industrial Management & Data Systems**. 2004;104(4):364-372. Available at: http://www.emeraldinsight.com/10.1108/02635570410530775. Accessed September 8, 2010.

GRAEDEL T. Quantitative sustainability in a college or university setting. **International Journal of Sustainability in Higher Education**. 2002;3(4):346-358. Available at: http://www.emeraldinsight.com/10.1108/14676370210442382. Accessed September 16, 2010.

GRAHAM A. Airport benchmarking: a review of the current situation. **Benchmarking: An International Journal**. 2005;12(2):99-111. Available at: http://www.emeraldinsight.com/10.1108/14635770510593059. Accessed September 7, 2010.

GRANEK F, HASSANALI M. The Toronto Region Sustainability Program: insights on the adoption of pollution prevention practices by small to medium-sized manufacturers in the Greater Toronto Area (GTA). **Journal of Cleaner Production**. 2006;14(6-7):572-579. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652605001757. Accessed November 24, 2010.

GRANT D, BANOMYONG R. Design of closed-loop supply chain and product recovery management for fast-moving consumer goods: The case of a single-use camera. **Asia Pacific Journal of Marketing and Logistics**. 2010;22(2):232-246. Available at: http://www.emeraldinsight.com/10.1108/13555851011026971. Accessed August 20, 2010.

GRAYSON D. Embedding corporate responsibility and sustainability: Marks & Spencer. **Journal of Management Development**. 2011;30(10):1017-1026. Available at: http://www.emeraldinsight.com/10.1108/02621711111182510. Accessed December 2, 2011.

GRIFFITHS A, PETRICK J. Corporate architectures for sustainability. **International Journal of Operations & Production Management**. 2001;21(12):1573-1585. Available at: http://www.emeraldinsight.com/10.1108/01443570110410919.

GUBI E, ARLBJORN J, JOHANSEN J. Doctoral dissertations in logistics and supply chain management: A review of Scandinavian contributions from 1990 to 2001. **International Journal of Physical Distribution & Logistics Management**. 2003;33(10):854-885. Available at: http://www.emeraldinsight.com/10.1108/09600030310508690. Accessed July 16, 2010.

GUERIN T. A Survey of Sustainable Development Initiatives in the Australian Mining and Minerals Industry. **Minerals and Energy - Raw Materials Report**. 2006;20(3-4):11-44. Available at: http://www.informaworld.com/openurl?genre=article&doi=10.1080/14041040500537129&magic=crossref||D404A21C5BB053405B1A640AFFD44AE3. Accessed September 3, 2010.

GUNGOR A, GUPTA S. Issues in environmentally conscious manufacturing and product recovery: a survey. **Computers & Industrial Engineering**. 1999;36(4):811-853. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0360835299001679.

GUPTA M. Environmental management and its impact on the operations function. **International Journal of Operations & Production Management**. 1995;15(8):34-51. Available at: http://www.emeraldinsight.com/10.1108/01443579510094071.

GUTBERLET J. Sustainability : a new paradigm for industrial production. **International Journal of sustainability in higher education**. 2000;1(3):225-236.

HAAKE H, SEURING S. Sustainable Procurement of Minor Items – Exploring Limits to Sustainability. **Sustainable Development**. 2009;294(July):284-294.

HAHN T, FIGGE F, LIESEN A, BARKEMEYER R. Opportunity cost based analysis of corporate eco-efficiency: A methodology and its application to the CO(2)-efficiency of German companies. **Journal of environmental management**. 2010;91(10):1997-2007. Available at: http://www.ncbi.nlm.nih.gov/pubmed/20570034. Accessed July 27, 2010.

HALILA F. Networks as a Means of Supporting the Adoption of Organizational Innovations in SMEs : The Case of Environmental Management Systems (EMSs) Based on ISO 14001. **Corporate Social Responsibility and Environmental Management**. 2007;181(September 2006):167-181.

HALL J, DANEKE G, LENOX M. Sustainable development and entrepreneurship: Past contributions and future directions. **Journal of Business Venturing**. 2010;25(5):439-448. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0883902610000200. Accessed August 2, 2010.

HALL J, MATOS S. Incorporating impoverished communities in sustainable supply chains. **International Journal of Physical Distribution & Logistics Management**.

2010;40(1/2):124-147. Available at: http://www.emeraldinsight.com/10.1108/09600031011020368. Accessed September 14, 2010.

HAMERI A, HINTSA J. Assessing the drivers of change for cross-border supply chains. **International Journal of Physical Distribution & Logistics Management**. 2009;39(9):741-761. Available at: http://www.emeraldinsight.com/10.1108/09600030911008184. Accessed July 13, 2010.

HANDFIELD R, MELNYK S, CALANTONE R, CURKOVIC S. Integrating environmental concerns into the design process: the gap between theory and practice. **IEEE Transactions on Engineering Management**. 2001;48(2):189-208. Available at: http://ieeexplore.ieee.org/lpdocs/epic03/wrapper.htm?arnumber=922478.

HANDFIELD R, SROUFE R, WALTON S. Integrating environmental management and supply chain strategies. **Business Strategy and the Environment**. 2005;14(1):1-19. Available at: http://doi.wiley.com/10.1002/bse.422. Accessed October 19, 2010.

HANDFIELD R, WALTON S, SEEGERS L, MELNYK S. “Green” value chain practices in the furniture industry. **Journal of Operations Management**. 1997;15(4):293-315. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0272696397000041.

HANDFIELD R, WALTON S, SROUFE R, MELNYK S. Applying environmental criteria to supplier assessment: A study in the application of the Analytical Hierarchy Process. **European Journal of Operational Research**. 2002;141(1):70-87. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0377221701002612.

HANNA M, NEWMAN W, JOHNSON P. Linking operational and environmental improvement through employee involvement. **International Journal of Operations & Production Management**. 2000;20(2):148-165. Available at: http://www.emeraldinsight.com/10.1108/01443570010304233.

HARRIS R, KHARE A. Sustainable development issues and strategies for Alberta’s oil industry. **Technovation**. 2002;22(9):571-583. Available at: http://linkinghub.elsevier.com/retrieve/pii/S016649720100058X.

HENDRICKSON L, TUTTLE D. Dynamic management of the environmental enterprise: a qualitative analysis. **Journal of Organizational Change Management**. 1997;10(4):363-382. Available at: http://www.emeraldinsight.com/10.1108/09534819710175875.

HENRI J, JOURNEAULT M. Eco-control: The influence of management control systems on environmental and economic performance. **Accounting, Organizations and Society**. 2010;35(1):63-80. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0361368209000257. Accessed August 18, 2010.

HENRI J, JOURNEAULT M. Environmental performance indicators: an empirical study of Canadian manufacturing firms. **Journal of environmental management**. 2008;87(1):165-76. Available at: http://www.ncbi.nlm.nih.gov/pubmed/17368921. Accessed November 24, 2010.

HENRIKSEN B, RØSTAD C. Evaluating and prioritizing projects – setting targets: The business effect evaluation methodology (BEEM). **International Journal of Managing Projects in Business**. 2010;3(2):275-291. Available at: http://www.emeraldinsight.com/10.1108/17538371011036581. Accessed August 31, 2010.

HENRIQUES I, SADORSKY P. Environmental Technical and Administrative Innovations in the Canadian Manufacturing Industry. **Business Strategy and the Environment**. 2007;132(July 2006):119-132.

HERMOSILLA J, RÍO P, KÖNNÖLÄ T. Diversity of eco-innovations: Reflections from selected case studies☆. **Journal of Cleaner Production**. 2010;18(10-11):1073-1083. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652610000612. Accessed August 3, 2010.

HERVANI A, HELMS M, SARKIS J. Performance measurement for green supply chain management. **Benchmarking: An International Journal**. 2005;12(4):330-353. Available at: http://www.emeraldinsight.com/10.1108/14635770510609015. Accessed July 5, 2010.

HEZRI A. Sustainability indicator system and policy processes in Malaysia: a framework for utilisation and learning. **Journal of environmental management**. 2004;73(4):357-71. Available at: http://www.ncbi.nlm.nih.gov/pubmed/15531393. Accessed September 1, 2010.

HILL M. Sustainability, greenhouse gas emissions and international operations management. **International Journal of Operations & Production Management**. 2001;21(12):1503-1520. Available at: http://www.emeraldinsight.com/10.1108/EUM0000000006292.

HILSON G, NAYEE V. Environmental management system implementation in the mining industry: a key to achieving cleaner production. **International Journal of Mineral Processing**. 2002;64(1):19-41. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0301751601000710.

HO S. Integrated lean TQM model for global sustainability and competitiveness. **The TQM Journal**. 2010;22(2):143+-158. Available at: http://www.emeraldinsight.com/10.1108/17542731011024264. Accessed August 31, 2010.

HOEK R, JOHNSON M. Sustainability and energy efficiency: Research implications from an academic roundtable and two case examples. **International Journal of Physical Distribution & Logistics Management**. 2010;40(1/2):148-158. Available at: http://www.emeraldinsight.com/10.1108/09600031011018064. Accessed September 15, 2010.

HOFFMANN E, ANKELE K, NILL J, RENNINGS K. Product Innovation Impacts of EMAS: Results of Case Studies and a Survey of German Firms Validated according to the EU Environmental Management and Auditing Scheme. **The Journal of Sustainable Product Design**. 2003;3(3-4):93-100. Available at: http://www.springerlink.com/index/10.1007/s10970-005-2973-5. Accessed July 24, 2010.

HOLDSWORTH S, WYBORN C, BEKESSY S, THOMAS I. Professional development for education for sustainability: How advanced are Australian universities? **International Journal of Sustainability in Higher Education**. 2008;9(2):131-146. Available at: http://www.emeraldinsight.com/10.1108/14676370810856288. Accessed September 16, 2010.

HOLLAND L, FOO Y. Differences in environmental reporting practices in the UK and the US: the legal and regulatory context. **The British Accounting Review**. 2003;35(1):1-18. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0890838902001270. Accessed August 9, 2010.

HOLLOWAY J. Performance management from multiple perspectives: taking stock. **International Journal of Productivity and Performance Management**. 2009;58(4):391-399. Available at: http://www.emeraldinsight.com/10.1108/17410400910951035. Accessed September 14, 2010.

HOLT D, GHOBADIAN A. An empirical study of green supply chain management practices amongst UK manufacturers. **Journal of Manufacturing Technology Management**. 2009;20(7):933-956. Available at: http://www.emeraldinsight.com/10.1108/17410380910984212. Accessed September 13, 2010.

HONG P, KWON H, ROH J. Implementation of strategic green orientation in supply chain: An empirical study of manufacturing firms. **European Journal of Innovation Management**. 2009;12(4):512-532. Available at: http://www.emeraldinsight.com/10.1108/14601060910996945. Accessed August 12, 2010.

HSU C, HU A, CHIOU C, CHEN T. Using the FDM and ANP to construct a sustainability balanced scorecard for the semiconductor industry. **Expert Systems with Applications**. 2011;38(10):12891-12899. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0957417411006099. Accessed July 20, 2011.

HU A, HSU C. Critical factors for implementing green supply chain management practice: An empirical study of electrical and electronics industries in Taiwan. **Management Research Review**. 2010;33(6):586-608. Available at: http://www.emeraldinsight.com/10.1108/01409171011050208. Accessed September 7, 2010.

HU G, BIDANDA B. Modeling sustainable product lifecycle decision support systems. **International Journal of Production Economics**. 2009;122(1):366-375. Available at: http://linkinghub.elsevier.com/retrieve/pii/S092552730900200X. Accessed November 24, 2010.

HUI I, LEE W, PUN K. An EMS approach to friendly construction operations. **Environmental Management**. 2001;13(2):112-119.

HUMPHREYS P, MCIVOR R, CHAN F. Using case-based reasoning to evaluate supplier environmental management performance. **Expert Systems with Applications**. 2003;25:141-153. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0957417403000423. Accessed November 24, 2010.

HUSTED B, ALLEN D. Strategic Corporate Social Responsibility and Value Creation among Large FirmsLessons from the Spanish Experience. **Long Range Planning Journal**. 2007;40(6):594-610. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0024630107000738. Accessed July

HUTCHINS M, SUTHERLAND J. An exploration of measures of social sustainability and their application to supply chain decisions. **Journal of Cleaner Production**. 2008;16(15):1688-1698. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652608001455. Accessed September 1, 2010.

IBRAHIM A, ROY M, AHMED Z, IMTIAZ G. An investigation of the status of the Malaysian construction industry. **Benchmarking: An International Journal**. 2010;17(2):294-308. Available at: http://www.emeraldinsight.com/10.1108/14635771011036357. Accessed September 3, 2010.

ILGIN M, GUPTA S. Environmentally conscious manufacturing and product recovery (ECMPRO): A review of the state of the art. **Journal of environmental management**. 2010;91(3):563-91. Available at: http://www.ncbi.nlm.nih.gov/pubmed/19853369.

IRALDO F, TESTA F, FREY M. Is an environmental management system able to influence environmental and competitive performance? The case of the eco-management and audit scheme (EMAS) in the European union. **Journal of Cleaner Production**. 2009;17(16):1444-1452. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652609001863. Accessed November 24, 2010.

ISAKSSON R, GARVARE R. Measuring sustainable development using process models. **Managerial Auditing Journal**. 2003;18(8):649-656. Available at: http://www.emeraldinsight.com/10.1108/02686900310495142. Accessed September 15, 2010.

ISAKSSON R, STEIMLE U. What does GRI-reporting tell us about corporate sustainability? **The TQM Journal**. 2009;21(2):168-181. Available at:

http://www.emeraldinsight.com/10.1108/17542730910938155. Accessed September 15, 2010.

ISAKSSON R. Total quality management for sustainable development: Process based system models. **Business Process Management Journal**. 2006;12(5):632-645. Available at: http://www.emeraldinsight.com/10.1108/14637150610691046. Accessed September 15, 2010.

JABBOUR A, JABBOUR C. Are supplier selection criteria going green? Case studies of companies in Brazil. **Industrial Management & Data Systems**. 2009;109(4):477-495. Available at: http://www.emeraldinsight.com/10.1108/02635570910948623. Accessed September 7, 2010.

JABBOUR C, SANTOS F, NAGANO M. Environmental management system and human resource practices: is there a link between them in four Brazilian companies? **Journal of Cleaner Production**. 2008;16(17):1922-1925. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652608000371. Accessed November 24, 2010.

JABBOUR C, SANTOS F. Relationships between human resource dimensions and environmental management in companies: proposal of a model. **Journal of Cleaner Production**. 2008;16(1):51-58. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652606002769. Accessed November 24, 2010.

JABBOUR C. Greening of business schools: a systemic view. **International Journal of Sustainability in Higher Education**. 2010;11(1):49-60. Available at: http://www.emeraldinsight.com/10.1108/14676371011010048. Accessed September 7, 2010.

JABBOUR C. Non-linear pathways of corporate environmental management: a survey of ISO 14001-certified companies in Brazil. **Journal of Cleaner Production**. 2010;18(12):1222-1225. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652610001125. Accessed November 24, 2010.

JAIN V, BENYOUCEF L. Managing long supply chain networks: some emerging issues and challenges. **Journal of Manufacturing Technology Management**. 2008;19(4):469-496. Available at: http://www.emeraldinsight.com/10.1108/17410380810869923. Accessed September 16, 2010.

JAMALI D. Insights into triple bottom line integration from a learning organization perspective. **Business Process Management Journal**. 2006;12(6):809-821.

JAMES P, GHOBADIAN A, VINEY H, LIU J. Addressing the divergence between environmental strategy formulation and implementation. **Management Decision**. 1999;37(4):338-348. Available at: http://www.emeraldinsight.com/10.1108/00251749910269384.

JASCH C, LAVICKA A. Pilot project on sustainability management accounting with the Styrian automobile cluster. **Journal of Cleaner Production**. 2006;14(14):1214-1227. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652605001940. Accessed September 15, 2010.

JAYAWARDENA C, PATTERSON D, CHOI C, BRAIN R. Sustainable tourism development in Niagara: Discussions, theories, projects and insights. **International Journal of Contemporary Hospitality Management**. 2008;20(3):258-277. Available at: http://www.emeraldinsight.com/10.1108/09596110810866082. Accessed September 7, 2010.

JIANG B, FRAZIER G, HEISER D. China-related POM research: a literature review and suggestions for future research. **International Journal of Operations & Production Management**. 2007;27(7):662-684. Available at: http://www.emeraldinsight.com/10.1108/01443570710756947. Accessed September 6, 2010.

JIMÉNEZ A, MILÁN P. LA experiencia de adocion de la producción más limpia en el sector de la fundición de México. **INNOVAR JOURNAL**. 2006;16(28):173-186.

Jiménez J, Lorente J. Environmental performance as an operations objective. **International Journal of Operations & Production Management**. 2001;21(12):1553-1572. Available at: http://www.emeraldinsight.com/10.1108/01443570110410900.

JOHANSSON G, WINROTH M. Introducing environmental concern in manufacturing strategies: Implications for the decision criteria. **Management Research Review**. 2010;33(9):877-899. Available at: http://www.emeraldinsight.com/10.1108/01409171011070305. Accessed August 25, 2010.

JOHNS BL. A Theory of the Growth of the Firm. **Economic Record**. 1998;7(3):276-182.

JONES R, CRESSER M. Determining a quantifiable pollution management model (QPM). **Management of Environmental Quality: An International Journal**. 2005;16(5):421-443. Available at: http://www.emeraldinsight.com/10.1108/14777830510614312. Accessed September 15, 2010.

JOVANE F, YOSHIKAWA H, ALTING L, et al. The incoming global technological and industrial revolution towards competitive sustainable manufacturing. **CIRP Annals - Manufacturing Technology**. 2008;57(2):641-659. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0007850608001959.

JUNQUERA B, BRÍO J. A review of the literature on environmental innovation management in SMEs: implications for public policies. **Technovation**. 2003;23(12):939-948. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0166497202000366. Accessed November 24, 2010.

KAMMERER D. The effects of customer benefit and regulation on environmental product innovation.☆Empirical evidence from appliance manufacturers in Germany. **Ecological Economics**. 2009;68(8-9):2285-2295. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0921800909000755. Accessed November 24, 2010.

KAMPF C. Corporate social responsibility: WalMart, Maersk and the cultural bounds of representation in corporate web sites. **Corporate Communications: An International Journal**. 2007;12(1):41-57. Available at: http://www.emeraldinsight.com/10.1108/13563280710723741. Accessed August 11, 2010.

KASARDA M, TERPENNY J, INMAN D, et al. Design for adaptability (DFAD)—a new concept for achieving sustainable design. **Robotics and Computer-Integrated Manufacturing**. 2007;23(6):727-734. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0736584507000221. Accessed July 7, 2010.

KAYA O. Incentive and production decisions for remanufacturing operations. **European Journal of Operational Research**. 2010;201(2):442-453. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0377221709001544. Accessed November 24, 2010.

KAZMIERCZAK K, NEUMANN W, WINKEL J. A Case Study of Serial-Flow Car Disassembly : Ergonomics , Productivity and Potential System. **Human Factors**. 2007;17(4):331-351.

KEARINS K, FRYER M. Relating Sustainability Theory to Practice at Auckland Airport: An Engaged Scholarship Endeavour Involving Students. **Corporate Social Responsibility and Environmental Management**. 2011;161:151-161.

KEHBILA A, ERTEL J, BRENT A. Corporate Sustainability, Ecological Modernization and the Policy Process in the South African Automotive Industry. **Business Strategy and the Environment**. 2010;465(December 2009):453-465.

KEHBILA A, ERTEL J, BRENT A. Strategic Corporate Environmental Management within the South African Automotive Industry: Motivations, Benefi ts, Hurdles. **Corporate Social Responsibility and Environmental Management**. 2009;323(March):310-323.

KIRKWOOD J, WALTON S. What motivates ecopreneurs to start businesses? **International Journal of Entrepreneurial Behaviour & Research**. 2010;16(3):204-228. Available at: http://www.emeraldinsight.com/10.1108/13552551011042799. Accessed September 14, 2010.

KITAZAWA S, SARKIS J. The relationship between ISO 14001 and continuous source reduction programs. **International Journal of Operations & Production Management**. 2000;20(2):225-248. Available at: http://www.emeraldinsight.com/10.1108/01443570010304279.

KLASSEN R, WHYBARK D. Environmental Management in Operations: The Selection of Environmental Technologies. **Decision Sciences**. 1999;30(3):601-631. Available at: http://doi.wiley.com/10.1111/j.1540-5915.1999.tb00900.x.

KNOPPEN D, CHRISTIAANSE E. Interorganizational adaptation in supply chains: a behavioral perspective. **The International Journal of Logistics Management**. 2007;18(2):217-237. Available at: http://www.emeraldinsight.com/10.1108/09574090710816940. Accessed September 13, 2010.

KOCABASOGLU C, PRAHINSKI C, KLASSEN R. Linking forward and reverse supply chain investments: The role of business uncertainty. **Journal of Operations Management**. 2007;25(6):1141-1160. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0272696307000186. Accessed November 24, 2010.

KOENIG H, CANTLON J. Quantitative Industrial Ecology & Ecological Economics. **Journal of Industrial Ecology**. 1999;3(2-3):63-83. Available at: http://www.blackwell-synergy.com/doi/abs/10.1162/108819899569557.

KONNOLA T, UNRUH G. Really Changing the Course : the Business Strategy and the Environment. **Business Strategy and the Environment**. 2007;537(April 2005):525-537.

KOPLIN J, SEURING S, MESTERHARM M. See: <http://www.oecd.org/department/0,2688,en_2649_34889_1_1_1_ 1_1, 00.html> [accessed 31 August 2005]. [61] Diller J. A social conscience in the global marketplace? Labour dimen- sion of codes of conduct, social labelling and investor initiatives. Inte. **Journal of Cleaner Production**. 2007;15(11-12):1053-1062. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652606002459. Accessed July 23, 2010.

KORHONEN J, OKKONEN L, NIUTANEN V. Industrial ecosystem indicators - direct and indirect effects of integrated waste- and by-product management and energy production. **Clean Technologies and Environmental Policy**. 2003;6(3):162-173. Available at: http://springerlink.metapress.com/openurl.asp?genre=article&id=doi:10.1007/s10098-003-0234-7. Accessed September 15, 2010.

KORHONEN J. Do we really need the debate on the natural ecosystem metaphor in technology management and sustainable development literature? **Clean Technologies and Environmental Policy**. 2004;7(1):33-41. Available at: http://www.springerlink.com/index/10.1007/s10098-004-0255-x. Accessed September 15, 2010.

KOVACS G. Corporate environmental responsibility in the supply chain. **Journal of Cleaner Production**. 2008;16(15):1571-1578. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652608001029. Accessed September 1, 2010.

KRAJNC D, GLAVIC P. A model for integrated assessment of sustainable development. **Resources, Conservation And Recycling**. 2005;43:189-208.

KUEHNLE H. Post mass production paradigm (PMPP) trajectories. **Journal of Manufacturing Technology Management**. 2007;18(8):1022-1037. Available at: http://www.emeraldinsight.com/10.1108/17410380710828316. Accessed September 14, 2010.

KUO T, WU H, SHIEH J. Integration of environmental considerations in quality function deployment by using fuzzy logic. **Expert Systems with Applications**. 2009;36(3):7148-7156. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0957417408005708. Accessed July 7, 2010.

KUOSMANEN T, KUOSMANEN N. How not to measure sustainable value (and how one might). **Ecological Economics**. 2009;69(2):235-243. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0921800909003152. Accessed August 30, 2010.

LABUSCHAGNE C, BRENT A, ERCK R. Assessing the sustainability performances of industries. **Journal of Cleaner Production**. 2005;13(4):373-385. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652603001811.

LANSILUOTO A, JARVENPAA M. Collective action in the implementation of a “greener” performance measurement system. **Journal of Accounting & Organizational Change**. 2010;6(2):200-227. Available at: http://www.emeraldinsight.com/10.1108/18325911011048763. Accessed September 3, 2010.

LANSILUOTO A, JARVENPAA M. Environmental and performance management forces: Integrating “greenness” into balanced scorecard. **Qualitative Research in Accounting & Management**. 2008;5(3):184-206. Available at: http://www.emeraldinsight.com/10.1108/11766090810910218. Accessed September 3, 2010.

LANSILUOTO A, JARVENPAA M. Greening the balanced scorecard. **Business Horizons**. 2010;53(4):385-395. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0007681310000376. Accessed November 24, 2010.

LARSON T, GREENWOOD R. Perfect complements: Synergies between lean production and eco-sustainability initiatives. **Environmental Quality Management**. 2004;13(4):27-36. Available at: http://doi.wiley.com/10.1002/tqem.20013. Accessed November 24, 2010.

LEE A, KANG H, HSU C, HUNG H. A green supplier selection model for high-tech industry. **Expert Systems with Applications**. 2009;36(4):7917-7927. Available at: http://linkinghub.elsevier.com/retrieve/pii/S095741740800821X. Accessed July 5, 2010.

LEE D, DONG M, BIAN W. The design of sustainable logistics network under uncertainty. **International Journal of Production Economics**. 2010;128(1):159-166. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0925527310002173. Accessed October 25, 2010.

LEE K. Current status of CSR in the realm of supply management: the case of the Korean electronics industry. **Supply Chain Management: An International Journal**. 2009;14(2):138-148. Available at: http://www.emeraldinsight.com/10.1108/13598540910942000. Accessed September 9, 2010.

LEE S, RHEE S. From end-of-pipe technology towards pollution preventive approach: the evolution of corporate environmentalism in Korea. **Journal of Cleaner Production**. 2005;13(4):387-395. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652603001859. Accessed November 24, 2010.

LEE S, RHEE S. The change in corporate environmental strategies: a longitudinal empirical study. **Management Decision**. 2007;45(2):196-216. Available at: http://www.emeraldinsight.com/10.1108/00251740710727241. Accessed September 16, 2010.

LEFEBVRE E, LEFEBVRE L, TALBOT S. Determinants and impacts of environmental performance in SMEs. **R & D Management**. 2003;33(3):263-283. Available at: http://doi.wiley.com/10.1111/1467-9310.00297.

LEIRE C, MONT O. The Implementation of Socially Responsible Purchasing. **Corporate Social Responsibility and Environmental Management**. 2010;39(June 2009):27-39.

LI C, LIU F, TAN X, DU Y. A methodology for selecting a green technology portfolio based on synergy. **International Journal of Production Research**. 2010;(917903101):1-14. Available at: http://www.informaworld.com/openurl?genre=article&doi=10.1080/00207540903382857&magic=crossref||D404A21C5BB053405B1A640AFFD44AE3. Accessed September 22, 2010.

LI X, GU X, LIU Z. A strategic performance measurement system for firms across supply and demand chains on the analogy of ecological succession. **Ecological Economics**. 2009;68(12):2918-2929. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0921800909002638. Accessed July 1, 2010.

LINK S, NAVEH E. Standardization and Discretion: Does the Environmental Standard ISO 14001 Lead to Performance Benefits? **IEEE Transactions on Engineering Management**. 2006;53(4):508-519. Available at: http://ieeexplore.ieee.org/lpdocs/epic03/wrapper.htm?arnumber=1715643.

LINTON J, KLASSEN R, JAYARAMAN V. Sustainable supply chains: An introduction. **Journal of Operations Management**. 2007;25(6):1075-1082. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0272696307000149.

LIYANAGE J, KUMAR U. Towards a value-based view on operations and maintenance performance management. **Journal of Quality in Maintenance Engineering**. 2003;9(4):333-350. Available at: http://www.emeraldinsight.com/10.1108/13552510310503213. Accessed September 9, 2010.

LIYANAGE J. Operations and maintenance performance in production and manufacturing assets: The sustainability perspective. **Journal of Manufacturing Technology Management**. 2007;18(3):304-314. Available at: http://www.emeraldinsight.com/10.1108/17410380710730639. Accessed September 14, 2010.

LOZANO R. The state of sustainability reporting in universities. **International Journal of Sustainability in Higher Education**. 2011;12(1):67-78. Available at: http://www.emeraldinsight.com/10.1108/14676371111098311. Accessed June 10, 2011.

LUCAS M. Understanding Environmental Management Practices: Integrating Views from Strategic Management and Ecological Economics. **Business Strategy and the Environment**. 2010;556(October 2009):543-556.

LUKMAN R, GLAVIC P. What are the key elements of a sustainable university? **Clean Technologies and Environmental Policy**. 2006;9(2):103-114. Available at: http://www.springerlink.com/index/10.1007/s10098-006-0070-7. Accessed November 24, 2010.

LYRA M, GOMES R, JACOVINE L. O papel dos stakeholders na sustentabilidade da empresa: contribuições para construção de um modelo de análise. **Revista de Administração Contemporânea**. 2009;13(spe):39-52. Available at: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1415-65552009000500004&lng=pt&nrm=iso&tlng=pt.

MACLEAN H, LAVE L. Evaluating automobile fuel/propulsion system technologies. **Progress in Energy and Combustion Science**. 2003;29(1):1-69. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0360128502000321.

MANRING S, MOORE S. Creating and managing a virtual inter-organizational learning network for greener production: a conceptual model and case study. **Journal of Cleaner Production**. 2006;14(9-11):891-899. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652606000254. Accessed September 10, 2010.

MAON F, LINDGREEN A, VANHAMME J. Developing supply chains in disaster relief operations through cross-sector socially oriented collaborations: a theoretical model. **Supply Chain Management: An International Journal**. 2009;14(2):149-164. Available at: http://www.emeraldinsight.com/10.1108/13598540910942019.

MARGOLIS J, WALSH J. Misery Loves Companies : Rethinking Social Initiatives by Business. **Administrative Science Quarterly**. 2003;48(2):268-305.

MARQUES F, MENDONÇA P, JABBOUR C. Social dimension of sustainability in retail: case studies of small and medium Brazilian supermarkets. **Social Responsibility Journal**. 2010;6(2):237-251. Available at: http://www.emeraldinsight.com/10.1108/17471111011051748. Accessed July 30, 2010.

MARSHALL R, HARRY S. Introducing a new business course: “Global business and sustainability.” **International Journal of Sustainability in Higher Education**. 2005;6(2):179-196. Available at: http://www.emeraldinsight.com/10.1108/14676370510589882. Accessed September 15, 2010.

MASSOUD M, FAYAD R, FADEL M, KAMLEH R. Drivers, barriers and incentives to implementing environmental management systems in the food industry: A case of Lebanon. **Journal of Cleaner Production**. 2010;18(3):200-209. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652609003217. Accessed November 24, 2010.

MATOS S, HALL J. Integrating sustainable development in the supply chain: The case of life cycle assessment in oil and gas and agricultural biotechnology. **Journal of Operations Management**. 2007;25(6):1083-1102. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0272696307000150. Accessed September 1, 2010.

MCLOUGHLIN J, KAMINSKI J, SODAGAR B, et al. A strategic approach to social impact measurement of social enterprises: The SIMPLE methodology. **Social Enterprise Journal**. 2009;5(2):154-178. Available at: http://www.emeraldinsight.com/10.1108/17508610910981734. Accessed September 14, 2010.

MEEHAN J, BRYDE D. Sustainable Procurement Practice. **Business Strategy and the Environment**. 2010;(August 2009).

MEEHAN J, BRYDE D. Sustainable Procurement Practice. **Business Strategy and the Environment**. 2010;106(May 2010):94-106.

MENDIBIL K, HERNANDEZ J, ESPINACH X, GARRIGA E, MACGREGOR S. HOW CAN CSR PRACTICES LEAD TO SUCCESSFUL INNOVATION IN SMES? **Business**. (Little 2006):1-7.

MENZEL V, SMAGIN J, DAVID F. Can companies profit from greener manufacturing? **Measuring Business Excellence**. 2010;14(2):22-31. Available at: http://www.emeraldinsight.com/10.1108/13683041011047830. Accessed September 16, 2010.

MICHELINI R, RAZZOLI R. Product-service for environmental safeguard: a metrics to sustainability. **Resources, Conservation and Recycling**. 2004;42(1):83-98.

Available at: http://linkinghub.elsevier.com/retrieve/pii/S092134490400045X. Accessed October 13, 2010.

MICHELSEN O, FET A, DAHLSRUD A. Eco-efficiency in extended supply chains: a case study of furniture production. **Journal of environmental management**. 2006;79(3):290-7. Available at: http://www.ncbi.nlm.nih.gov/pubmed/16253417. Accessed August 4, 2010.

MICHELSEn O. Investigation of relationships in a supply chain in order to improve environmental performance. **Clean Technologies and Environmental Policy**. 2006;9(2):115-123. Available at: http://www.springerlink.com/index/10.1007/s10098-006-0071-6. Accessed September 15, 2010.

MILES M, RUSSELL G. ISO 14000 total quality environmental management: The integration of environmental marketing, total quality management, and corporate environmental policy. **Journal of Quality Management**. 1997;2(1):151-168. Available at: http://linkinghub.elsevier.com/retrieve/pii/S1084856897900262.

MILL G. The Financial Performance of a Socially Responsible Investment Over Time and a Possible Link with Corporate Social Responsibility. **Journal of Business Ethics**. 2006;63(2):131-148. Available at: http://www.springerlink.com/index/10.1007/s10551-005-2410-7. Accessed September 3, 2010.

MILLER T, ERICKSON T, REDMAN C. Transforming knowledge for sustainability: towards adaptive academic institutions. **International Journal of Sustainability in Higher Education**. 2011;12(2):177-192. Available at: http://www.emeraldinsight.com/10.1108/14676371111118228. Accessed July 20, 2011.

MISHRA S, SUAR D. Do stakeholder management strategy and salience influence corporate social responsibility in Indian companies? **Social Responsibility Journal**. 2010;6(2):306-327. Available at: http://www.emeraldinsight.com/10.1108/17471111011051784. Accessed September 16, 2010.

MITCHELL R. Sustaining change on a Canadian campus: Preparing Brock University for a sustainability audit. **International Journal of Sustainability in Higher Education**. 2011;12(1):7-21. Available at: http://www.emeraldinsight.com/10.1108/14676371111098276. Accessed June 22, 2011.

MOLLENKOPF D, STOLZE H, TATE W, UELTSCHY M. Green, lean, and global supply chains. **International Journal of Physical Distribution & Logistics Management**. 2010;40(1/2):14-41. Available at: http://www.emeraldinsight.com/10.1108/09600031011018028.

MONDRAGON A, LYONS A, MICHAELIDES Z, KEHOE D. Automotive supply chain models and technologies: a review of some latest developments. **Journal of Enterprise Information Management**. 2006;19(5):551-562. Available at:

http://www.emeraldinsight.com/10.1108/17410390610703675. Accessed September 3, 2010.

MONEVA J, LIRIO J, TORRES M. The corporate stakeholder commitment and social and financial performance. **Industrial Management & Data Systems**. 2007;107(1):84-102. Available at: http://www.emeraldinsight.com/10.1108/02635570710719070. Accessed September 15, 2010.

MONEVA J, ORTAS E. Corporate environmental and financial performance: a multivariate approach. **Industrial Management & Data Systems**. 2010;110(2):193-210. Available at: http://www.emeraldinsight.com/10.1108/02635571011020304. Accessed August 31, 2010.

MONTABON F, SROUFE R, NARASIMHAN R. An examination of corporate reporting, environmental management practices and firm performance. **Journal of Operations Management**. 2007;25(5):998-1014. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0272696306001148. Accessed October 9, 2010.

MOORE G, SPENCE L. Editorial: Responsibility and Small Business. **Journal of Business Ethics**. 2006;67(3):219-226. Available at: http://www.springerlink.com/index/10.1007/s10551-006-9180-8. Accessed August 24, 2010.

MOORE S, WEN J. Business ethics? A global comparative study on corporate sustainability approaches. **Social Responsibility Journal**. 2008;4(1/2):172-184. Available at: http://www.emeraldinsight.com/10.1108/17471110810856938. Accessed September 15, 2010.

MORATIS L, HOFF J, REUL B. A dual challenge facing management education: Simulation-based learning and learning about CSR. **Journal of Management Development**. 2006;25(3):213-231. Available at: http://www.emeraldinsight.com/10.1108/02621710610648150. Accessed September 15, 2010.

MORRISH S, MILES M, POLONSKY M. An Exploratory Study of Sustainability as a Stimulus for Corporate Entrepreneurship. **Corporate Social Responsibility and Environmental Management**. 2011:162-171.

MUELLER J, KLANDT H, MCDONALD G, SCHUERMANN T. The Chihuahua sustainability practice: lots of shivering but no real action. Practical sustainability acceptance is low in German and New Zealand firms. **Corporate Governance**. 2007;7(3):227-237. Available at: http://www.emeraldinsight.com/10.1108/14720700710756517. Accessed September 14, 2010.

NAWROCKA D, BRORSON T, LINDHQVIST T. ISO 14001 in environmental supply chain practices. **Journal of Cleaner Production**. 2009;17(16):1435-1443. Available

at: http://linkinghub.elsevier.com/retrieve/pii/S0959652609001577. Accessed November 24, 2010.

NAWROCKA D, PARKER T. Finding the connection: environmental management systems and environmental performance. **Journal of Cleaner Production**. 2009;17(6):601-607. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652608002539. Accessed November 24, 2010.

NEJATI M, SHAHBUDIN A, AMRAN A. Sustainable development: a competitive advantage or a threat? **Business Strategy Series**. 2010;11(2):84-89. Available at: http://www.emeraldinsight.com/10.1108/17515631011026407. Accessed September 15, 2010.

NEUMANN W, DUL J. Human factors: spanning the gap between OM and HRM. **International Journal of Operations & Production Management**. 2010;30(9):923-950. Available at: http://www.emeraldinsight.com/10.1108/01443571011075056. Accessed September 16, 2010.

NEWMAN W, HANNA M. An empirical exploration of the relationship between manufacturing strategy and environmental management: Two complementary models. **International Journal of Operations & Production Management**. 1996;16(4):69-87. Available at: http://www.emeraldinsight.com/10.1108/01443579610114086.

NEWPORT D, CHESNES T, LINDNER A. The “environmental sustainability” problem: Ensuring that sustainability stands on three legs. **International Journal of Sustainability in Higher Education**. 2003;4(4):357-363. Available at: http://www.emeraldinsight.com/10.1108/14676370310497570. Accessed September 6, 2010.

NGA J. The influence of ISO 14000 on firm performance. **Social Responsibility Journal**. 2009;5(3):408-422. Available at: http://www.emeraldinsight.com/10.1108/17471110910977311. Accessed September 15, 2010.

NI D, LI K, TANG X. Social responsibility allocation in two-echelon supply chains: Insights from wholesale price contracts. **European Journal of Operational Research**. 2010;207(3):1269-1279. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0377221710004625. Accessed November 24, 2010.

NICHOLLS A. Strategic options in fair trade retailing. **International Journal of Retail & Distribution Management**. 2002;30(1):6-17. Available at: http://www.emeraldinsight.com/10.1108/09590550210415220. Accessed September 3, 2010.

NICOLAIDES A. The implementation of environmental management towards sustainable universities and education for sustainable development as an ethical imperative. **International Journal of Sustainability in Higher Education**.

2006;7(4):414-424. Available at: http://www.emeraldinsight.com/10.1108/14676370610702217. Accessed September 7, 2010.

NIJHOF A, FISSCHER O, LOOISE J. Inclusive innovation: a research project on the inclusion of social responsibility. **Corporate Social Responsibility and Environmental Management**. 2002;9(2):83-90. Available at: http://doi.wiley.com/10.1002/csr.10. Accessed November 24, 2010.

NISHITANI K. An empirical study of the initial adoption of ISO 14001 in Japanese manufacturing firms. **Ecological Economics**. 2009;68(3):669-679. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0921800908002565. Accessed November 24, 2010.

NUNES B, BENNETT D. Green operations initiatives in the automotive industry: An environmental reports analysis and benchmarking study. **Benchmarking: An International Journal**. 2010;17(3):396-420. Available at: http://www.emeraldinsight.com/10.1108/14635771011049362. Accessed August 31, 2010.

O'BRIEN C. Sustainable production – a new paradigm for a new millennium. **International Journal of Production Economics**. 1999;60-61:1-7. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0925527398001261.

O'BRIEN S, FATHAIGH M. Ideological challenges to the social inclusion agenda in the Republic of Ireland. **International Journal of Inclusive Education**. 2006;-1(1):593-606. Available at: http://taylorandfrancis.metapress.com/Index/10.1080/13603110600668686. Accessed September 3, 2010.

OLIVEIRA O, SERRA J, Salgado M. Does ISO 14001 work in Brazil? **Journal of Cleaner Production**. 2010;18(18):1797-1806. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652610003185. Accessed November 24, 2010.

OLUGU E, WONG K, SHAHAROUN A. Development of key performance measures for the automobile green supply chain. **Resources, Conservation and Recycling**. 2010. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0921344910001400. Accessed October 25, 2010.

PADMA P, GANESH L, RAJENDRAN C. A study on the ISO 14000 certification and organizational performance of Indian manufacturing firms. **Benchmarking: An International Journal**. 2008;15(1):73-100. Available at: http://www.emeraldinsight.com/10.1108/14635770810854353. Accessed September 15, 2010.

PAGELL M, KRUMWIEDE D, SHEU C. Efficacy of environmental and supplier relationship investments - moderating effects of external environment. **International Journal of Production Research**. 2007;45(9):2005-2028. Available at: http://www.informaworld.com/openurl?genre=article&doi=10.1080/00207540600634

31&magic=crossref||D404A21C5BB053405B1A640AFFD44AE3. Accessed September 22, 2010.

PAGELL M, WU Z, MURTHY N. The supply chain implications of recycling. **Business Horizons**. 2007;50(2):133-143. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0007681306001133. Accessed November 20, 2010.

PAGELL M, WU Z. Building a More Complete Theory of Sustainable Supply Chain Management Using Case Studies of 10 Exemplars. **Journal of Supply Chain Management**. 2009;45(2):37-56. Available at: http://doi.wiley.com/10.1111/j.1745-493X.2009.03162.x.

PAGELL M, YANG C, KRUMWIEDE D, SHEU C. Does the Competitive Environment Influence the Efficacy of Investments in Environmental Management? **The Journal of Supply Chain Management**. 2004;40(3):30-39. Available at: http://doi.wiley.com/10.1111/j.1745-493X.2004.tb00172.x.

PARISI C, HOCKERTS K. Managerial mindsets and performance measurement systems of CSR-related intangibles. **Measuring Business Excellence**. 2008;12(2):51-67. Available at: http://www.emeraldinsight.com/10.1108/13683040810881199. Accessed September 12, 2010.

PARK J, SARKIS J, WU Z. Creating integrated business and environmental value within the context of China's circular economy and ecological modernization. **Journal of Cleaner Production**. 2010;18(15):1494-1501. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652610002131. Accessed September 5, 2010.

PARTHASARATHY G, HART R, JAMRO E, MINER L. Value of sustainability: perspectives of a chemical manufacturing site. **Clean Technologies and Environmental Policy**. 2005;7(3):219-229. Available at: http://www.springerlink.com/index/10.1007/s10098-005-0278-y.

PAULRAJ A. Environmental Motivations: a Classifi cation Scheme and its Impact on Environmental Strategies and Practices. **Business Strategy and the Environment**. 2009;468(April 2008):453-468.

PAULRAJ A. UNDERSTANDING THE RELATIONSHIPS BETWEEN INTERNAL RESOURCES AND CAPABILITIES , SUSTAINABLE SUPPLY MANAGEMENT AND ORGANIZATIONAL SUSTAINABILITY. **Journal of Supply Chain Management**. 2011;(January):19-37.

PEDERSEN E, NEERGAARD P. From periphery to center: how CSR is integrated in mainstream performance management frameworks. **Measuring Business Excellence**. 2008;12(1):4-12. Available at: http://www.emeraldinsight.com/10.1108/13683040810864341. Accessed September 13, 2010.

PEDERSEN E, NEERGAARD P. What matters to managers?: The whats, whys, and hows of corporate social responsibility in a multinational corporation. **Management Decision**. 2009;47(8):1261-1280. Available at: http://www.emeraldinsight.com/10.1108/00251740910984532. Accessed September 14, 2010.

PEDERSEN E. The many and the few: rounding up the SMEs that manage CSR in the supply chain. **Supply Chain Management: An International Journal**. 2009;14(2):109-116. Available at: http://www.emeraldinsight.com/10.1108/13598540910941975. Accessed September 14, 2010.

PELHAM F. Will sustainability change the business model of the event industry? **Worldwide Hospitality and Tourism Themes**. 2011;3(3):187-192. Available at: http://www.emeraldinsight.com/10.1108/17554211111142149. Accessed June 22, 2011.

PERALTA J, VELAZQUEZ L, MUNGUIA N. Perceptions of core elements for sustainability management systems (SMS). **Management Decision**. 2008;46(7):1027-1038. Available at: http://www.emeraldinsight.com/10.1108/00251740810890195. Accessed September 7, 2010.

PEROTTO E, CANZIANI R, MARCHESI R, BUTELLI P. Environmental performance, indicators and measurement uncertainty in EMS context: a case study. **Journal of Cleaner Production**. 2008;16(4):517-530. Available at: http://linkinghub.elsevier.com/retrieve/pii/S095965260700008X. Accessed September 1, 2010.

PERRY P, TOWERS N. Determining the antecedents for a strategy of corporate social responsibility by small- and medium-sized enterprises in the UK fashion apparel industry. **Journal of Retailing and Consumer Services**. 2009;16(5):377-385. Available at: http://linkinghub.elsevier.com/retrieve/pii/S096969890900037X. Accessed September 30, 2010.

PFLIEGER J, FISCHER M, KUPFER T, EYERER P. The contribution of life cycle assessment to global sustainability reporting of organizations. **Management of Environmental Quality: An International Journal**. 2005;16(2):167-179. Available at: http://www.emeraldinsight.com/10.1108/14777830510583182. Accessed September 15, 2010.

PHILLIS Y, DAVIS B. Assessment of Corporate Sustainability via Fuzzy Logic. **Journal of Intelligent and Robotic Systems**. 2008;55(1):3-20. Available at: http://www.springerlink.com/index/10.1007/s10846-008-9289-3. Accessed November 24, 2010.

PILKINGTON A, FITZGERALD R. Operations management themes, concepts and relationships: a forward retrospective of IJOPM. **International Journal of Operations & Production Management**. 2006;26(11):1255-1275. Available at:

http://www.emeraldinsight.com/10.1108/01443570610705854. Accessed September 3, 2010.

PILKINGTON A, HEYES C. Is production and operations management a discipline? A citation/co-citation study. **International Journal of Operations & Production Management**. 1999;19(1):7-20. Available at: http://www.emeraldinsight.com/10.1108/01443579910244188.

PILUSO C, HUANG Y, LOU H. Ecological Input−Output Analysis-Based Sustainability Analysis of Industrial Systems. **Industrial & Engineering Chemistry Research**. 2008;47(6):1955-1966. Available at: http://pubs.acs.org/doi/abs/10.1021/ie061283s.

PIOTROWICZ W, CUTHBERTSON R. Sustainability – a new dimension in information systems evaluation. **Journal of Enterprise Information Management**. 2009;22(5):492-503. Available at: http://www.emeraldinsight.com/10.1108/17410390910993509. Accessed August 4, 2010.

PITTMAN J, WILHELM K. New Economic and Financial Indicators of Sustainability. **Advancing Sustainability in Higher education**. 2007;(134):55-69.

POLAZ C, TEIXEIRA B. Indicators of sustainability for municipal solid waste management : case study of the city of São Carlos (SP) Indicadores de sustentabilidade para a gestão municipal de resíduos sólidos urbanos : um estudo para São Carlos (SP). **Engenharia Sanitaria e Ambiental**. 2009;14(3):411-420.

POLLOCK N, HORN E, COSTANZA R, SAYRE M. Envisioning helps promote sustainability in academia: A case study at the University of Vermont. **International Journal of Sustainability in Higher Education**. 2009;10(4):343-353. Available at: http://www.emeraldinsight.com/10.1108/14676370910990693. Accessed September 15, 2010.

PORTER M, KRAMER M. Strategy & Society - The link between competitive advantagem and corporate social responsibility. **Harvard Business Review**. 2006:1-15.

POTOCAN V, MULEJ M. Toward a holistical perception of the content of business ethics. **Kybernetes**. 2009;38(3/4):581-595. Available at: http://www.emeraldinsight.com/10.1108/03684920910944803. Accessed September 16, 2010.

PREUSS L. Addressing sustainable development through public procurement: the case of local government. **Supply Chain Management: An International Journal**. 2009;14(3):213-223. Available at: http://www.emeraldinsight.com/10.1108/13598540910954557.

PREUSS L. Rhetoric and reality of corporate greening: a view from the supply chain management function. **Business Strategy and the Environment**. 2005;14(2):123-139. Available at: http://doi.wiley.com/10.1002/bse.435. Accessed November 24, 2010.

PROTOGEROS N, VONTAS A, CHATZIKOSTAS G, KOUMPIS A. A software shell for environmental accounting. **Environmental Modelling & Software**. 2010;26(2):235-237. Available at: http://linkinghub.elsevier.com/retrieve/pii/S1364815210002070. Accessed November 24, 2010.

PUSAVEC F, KRAMAR D, KRAJNIK P, KOPAC J. Transitioning to sustainable production – part II: evaluation of sustainable machining technologies. **Journal of Cleaner Production**. 2010;18(12):1211-1221. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652610000260. Accessed July 21, 2010.

PUTNIK G. Complexity framework for sustainability: an analysis of five papers. **The Learning Organization**. 2009;16(3):261-270. Available at: http://www.emeraldinsight.com/10.1108/09696470910949971. Accessed September 15, 2010.

QI G, SHEN L, ZENG S, JORGE O. The drivers for contractors' green innovation: an industry perspective. **Journal of Cleaner Production**. 2010;18(14):1358-1365. Available at: http://linkinghub.elsevier.com/retrieve/pii/S095965261000168X. Accessed September 7, 2010.

QUINN L, DALTON M. Leading for sustainability: implementing the tasks of leadership. **Corporate Governance**. 2009;9(1):21-38. Available at: http://www.emeraldinsight.com/10.1108/14720700910936038. Accessed September 9, 2010.

RAAR J. Reported social and environmental taxonomies: a longer-term glimpse. **Managerial Auditing Journal**. 2007;22(8):840-860. Available at: http://www.emeraldinsight.com/10.1108/02686900710819670. Accessed September 15, 2010.

RAKE M, GRAYSON D. Embedding corporate responsibility and sustainability – everybody's business. **Corporate Governance**. 2009;9(4):395-399. Available at: http://www.emeraldinsight.com/10.1108/14720700910984945. Accessed September 15, 2010.

RAMETSTEINER E, PÜLZL H, OLSSON J, FREDERIKSEN P. Sustainability indicator development—Science or political negotiation? **Ecological Indicators**. 2009. Available at: http://linkinghub.elsevier.com/retrieve/pii/S1470160X09001046. Accessed September 6, 2010.

RAMIREZ P, HACHIYA T. A comprehensive study on profits and sustainable competitive advantages. **Management Research News**. 2008;31(9):670-682. Available at: http://www.emeraldinsight.com/10.1108/01409170810898563. Accessed September 15, 2010.

RAMOS T, CAEIRO S. Meta-performance evaluation of sustainability indicators. **Ecological Indicators**. 2010;10(2):157-166. Available at:

http://linkinghub.elsevier.com/retrieve/pii/S1470160X09000648. Accessed September 7, 2010.

RAO P, HOLT D. Do green supply chains lead to competitiveness and economic performance? **International Journal of Operations & Production Management**. 2005;25(9):898-916. Available at: http://www.emeraldinsight.com/10.1108/01443570510613956. Accessed August 12, 2010.

RAO P. Greening production: a South-East Asian experience. **International Journal of Operations & Production Management**. 2004;24(3):289-320. Available at: http://www.emeraldinsight.com/10.1108/01443570410519042. Accessed September 15, 2010.

RAO P. Greening the supply chain: a new initiative in South East Asia. **International Journal of Operations & Production Management**. 2002;22(6):632-655. Available at: http://www.emeraldinsight.com/10.1108/01443570210427668. Accessed July 15, 2010.

RATTNER H. Sustentabilidade - uma visão humanista. **Ambiente & sociedade**. 1999;(5):233-240. Available at: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1414-753X1999000200020&lng=pt&nrm=iso&tlng=pt.

REYES P, MEADE L. Improving Reverse Supply Chain Operational Performance: A Transshipment Application Study for Not-for-Profit Organizations. **The Journal of Supply Chain Management**. 2006;42(1):38-48. Available at: http://doi.wiley.com/10.1111/j.1745-493X.2006.04201005.x.

RICCABONI A, LEONE E. Implementing strategies through management control systems: the case of sustainability. **International Journal of Productivity and Performance Management**. 2010;59(2):130-144. Available at: http://www.emeraldinsight.com/10.1108/17410401011014221. Accessed August 24, 2010.

ROBSON A, MITCHELL E. CSR performance: driven by TQM implementation, size, sector? **International Journal of Quality & Reliability Management**. 2007;24(7):722-737. Available at: http://www.emeraldinsight.com/10.1108/02656710710774692. Accessed September 7, 2010.

RODRÍGUEZ S. Environmental engagement, organizational capability and firm performance. **Corporate Governance**. 2009;9(4):400-408. Available at: http://www.emeraldinsight.com/10.1108/14720700910984954. Accessed September 16, 2010.

RUSINKO C. Green Manufacturing: An Evaluation of Environmentally Sustainable Manufacturing Practices and Their Impact on Competitive Outcomes. **IEEE Transactions on Engineering Management**. 2007;54(3):445-454. Available at: http://ieeexplore.ieee.org/lpdocs/epic03/wrapper.htm?arnumber=4278016.

RUSINKO C. Integrating sustainability in higher education: a generic matrix. **International Journal of Sustainability in Higher Education**. 2010;11(3):250-259. Available at: http://www.emeraldinsight.com/10.1108/14676371011058541. Accessed September 7, 2010.

RUSINKO C. Using quality management as a bridge in educating for sustainability in a business school. **International Journal of Sustainability in Higher Education**. 2005;6(4):340-350. Available at: http://www.emeraldinsight.com/10.1108/14676370510623838. Accessed September 7, 2010.

RUSSO M. Explaining the Impact of ISO 14001 on Emission Performance: a Dynamic Capabilities Perspective on Process and Learning. **Business Strategy and the Environment**. 2009;319(July 2007):307-319.

SAKO M. Supplier development at Honda, Nissan and Toyota: comparative case studies of organizational capability enhancement. **Industrial and Corporate Change**. 2004;13(2):281-308. Available at: http://icc.oupjournals.org/cgi/doi/10.1093/icc/dth012. Accessed September 14, 2010.

SAMMALISTO K, BRORSON T. Training and communication in the implementation of environmental management systems (ISO 14001): a case study at the University of Gävle, Sweden. **Journal of Cleaner Production**. 2008;16(3):299-309. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652606002836. Accessed November 24, 2010.

Sánchez G, López F. A methodology to identify sustainability indicators in construction project management—Application to infrastructure projects in Spain. **Ecological Indicators**. 2010;10(6):1193-1201. Available at: http://linkinghub.elsevier.com/retrieve/pii/S1470160X10000798. Accessed September 15, 2010.

SÁNCHEZ J, SOTORRÍO L. The Creation of Value Through Corporate Reputation. **Journal of Business Ethics**. 2007;76(3):335-346. Available at: http://www.springerlink.com/index/10.1007/s10551-006-9285-0. Accessed September 15, 2010.

SANTOS M. CSR in SMEs: strategies, practices, motivations and obstacles. Social Responsibility Journal. 2011;7(3):490-508. Available at: http://www.emeraldinsight.com/10.1108/17471111111154581. Accessed January 10, 2012.

SARKIS J, HELMS M, HERVANI A. Reverse Logistics and Social Sustainability. **Corporate Social Responsibility and Environmental Management**. 2010.

SARKIS J, TORRE P, DIAZ B. Stakeholder pressure and the adoption of environmental practices: The mediating effect of training. **Journal of Operations Management**. 2010;28(2):163-176. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0272696309000709. Accessed October 9, 2010.

SARKIS J, ZHU H. Information technology and systems in China's circular economy: Implications for sustainability. **Journal of Systems and Information Technology**. 2008;10(3):202-217. Available at: http://www.emeraldinsight.com/10.1108/13287260810916916. Accessed September 14, 2010.

SARMIENTO R, THOMAS A. Identifying improvement areas when implementing green initiatives using a multitier AHP approach. **Benchmarking: An International Journal**. 2010;17(3):452-463. Available at: http://www.emeraldinsight.com/10.1108/14635771011049399. Accessed September 15, 2010.

SCHALTEGGER S, WAGNER M. Sustainable Entrepreneurship and Sustainability Innovation: Categories and Interactions. **Business Strategy and the Environment**. 2011;237(July 2010):222-237.

SCHVANEVELDT S. Environmental performance of products: Benchmarks and tools for measuring improvement. **Benchmarking: An International Journal**. 2003;10(2):137-152. Available at: http://www.emeraldinsight.com/10.1108/14635770310469662. Accessed September 15, 2010.

SCIULLI N. The views of managers from a local coastal council on sustainability reporting issues: An Australian-based case study. **Qualitative Research in Accounting & Management**. 2011;8(2):139-160. Available at: http://www.emeraldinsight.com/10.1108/11766091111137555. Accessed June 22, 2011.

SEARCY C, KARAPETROVIC S, MCCARTNEY D. Designing Corporate Sustainable Development Indicators : Reflections on a Process. **Environmental Quality Management**. 2009:31-42.

SEARCY C. Setting a course in corporate sustainability performance measurement. **Measuring Business Excellence**. 2009;13(3):49-57. Available at: http://www.emeraldinsight.com/10.1108/13683040910984329. Accessed August 21, 2010.

SEBHATU S, ENQUIST B. ISO 14001 as a driving force for sustainable development and value creation. **The TQM Magazine**. 2007;19(5):468-482. Available at: http://www.emeraldinsight.com/10.1108/09544780710817883. Accessed September 16, 2010.

SEITZ M, WELLS P. Challenging the implementation of corporate sustainability: The case of automotive engine remanufacturing. **Business Process Management Journal**. 2006;12(6):822-836. Available at: http://www.emeraldinsight.com/10.1108/14637150610710954. Accessed September 15, 2010.

SEURING S, MULLER M. Core Issues in Sustainable Supply Chain Management – a Delphi Study. **Business Strategy and the Environment**. 2008;466(December 2007):455-466.

SEURING S, MULLER M. From a literature review to a conceptual framework for sustainable supply chain management. **Journal of Cleaner Production**. 2008;16(15):1699-1710. Available at: http://linkinghub.elsevier.com/retrieve/pii/S095965260800111X.

SEURING S, SARKIS J, MULLER M, RAO P. Sustainability and supply chain management – An introduction to the special issue. **Journal of Cleaner Production**. 2008;16(15):1545-1551. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652608000334. Accessed August 11, 2010.

SHANAHAN H, SOLER C, BERGSTROM K. Green Supply Chains and the Missing Link Between Environmental Information and Practice. **Business Strategy and the Environment**. 2010;25(June 2009):14-25.

SHARFMAN M, SHAFT T, ANEX R. The Road to Cooperative Supply-Chain Environmental Management : Trust and Uncertainty Among Pro-Active Firms. **Business Strategy and the Environment**. 2009;13(April 2007):1-13.

SHARMA A, IYER G, MEHROTRA A, Krishnan R. Sustainability and business-to-business marketing: A framework and implications. **Industrial Marketing Management**. 2010;39(2):330-341. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0019850108001600. Accessed August 9, 2010.

SHAW J, SHAW H. Business education, aesthetics and the rule of law: cultivating the moral manager. **Social Responsibility Journal**. 2010;6(3):469-486. Available at: http://www.emeraldinsight.com/10.1108/17471111011064816. Accessed September 15, 2010.

SHAW S, GRANT D, MANGAN J. Developing environmental supply chain performance measures. **Benchmarking: An International Journal**. 2010;17(3):320-339. Available at: http://www.emeraldinsight.com/10.1108/14635771011049326. Accessed August 20, 2010.

SHIH K, CHEN H, CHEN J. Assessment of sustainable development and knowledge of environmental management: Internal auditors' perspectives. **Industrial Management & Data Systems**. 2006;106(6):896-909. Available at: http://www.emeraldinsight.com/10.1108/02635570610671542. Accessed September 15, 2010.

SIMPSON D, POWER D, SAMSON D. Greening the automotive supply chain: a relationship perspective. **International Journal of Operations & Production Management**. 2007;27(1):28-48. Available at: http://www.emeraldinsight.com/10.1108/01443570710714529. Accessed September 13, 2010.

SIMPSON D, POWER D. Use the supply relationship to develop lean and green suppliers. **Supply Chain Management: An International Journal**. 2005;10(1):60-68. Available at: http://www.emeraldinsight.com/10.1108/13598540510578388. Accessed August 24, 2010.

SIMPSON I, HALSE C. Illusions of consensus: New South Wales stakeholders' constructions of the identity of history. **Curriculum Journal**. 2006;17(4):351-366. Available at: http://www.informaworld.com/openurl?genre=article&doi=10.1080/09585170601072577&magic=crossref||D404A21C5BB053405B1A640AFFD44AE3. Accessed September 3, 2010.

SIMPSON M, TAYLOR N, BARKER K. Environmental responsibility in SMEs: does it deliver competitive advantage? **Business Strategy and the Environment**. 2004;13(3):156-171. Available at: http://doi.wiley.com/10.1002/bse.398. Accessed November 23, 2010.

SINGH P, SMITH A, SOHAL A. Strategic supply chain management issues in the automotive industry: an Australian perspective. **International Journal of Production Research**. 2005;43(16):3375-3399. Available at: http://www.informaworld.com/openurl?genre=article&doi=10.1080/00207540500095738&magic=crossref||D404A21C5BB053405B1A640AFFD44AE3. Accessed July 23, 2010.

SKINNER L, BRYANT P, RICHEY R. Examining the impact of reverse logistics disposition strategies. **International Journal of Physical Distribution & Logistics Management**. 2008;38(7):518-539. Available at: http://www.emeraldinsight.com/10.1108/09600030810900932. Accessed September 12, 2010.

SMITH A. Corporate social responsibility practices in the pharmaceutical industry. **Business Strategy Series**. 2008;9(6):306-315. Available at: http://www.emeraldinsight.com/10.1108/17515630810923612. Accessed September 3, 2010.

SMITH A. Making the case for the competitive advantage of corporate social responsibility. **Business Strategy Series**. 2007;8(3):186-195. Available at: http://www.emeraldinsight.com/10.1108/17515630710684187. Accessed August 27, 2010.

SPOHRER J, MAGLIO P, BAILEY J, GRUHL D. Steps Toward a Science of Service Systems. **Computer**. 2007;40(1):71-77. Available at: http://ieeexplore.ieee.org/lpdocs/epic03/wrapper.htm?arnumber=4069198.

STAINER A, STAINER L. Ethical dimensions of environmental management. **European Business Review**. 1997;97(5):224-230. Available at: http://www.emeraldinsight.com/10.1108/09555349710179834.

STONEBRAKER P, GOLDHAR J, NASSOS G. Weak links in the supply chain: measuring fragility and sustainability. **Journal of Manufacturing Technology**

Management. 2009;20(2):161-177. Available at: http://www.emeraldinsight.com/10.1108/17410380910929600. Accessed September 15, 2010.

STUBBS W, COCKLIN C. Teaching sustainability to business students: shifting mindsets. **International Journal of Sustainability in Higher Education**. 2008;9(3):206-221. Available at: http://www.emeraldinsight.com/10.1108/14676370810885844. Accessed September 7, 2010.

SUBHADRA B. Water management policies for the algal biofuel sector in the Southwestern United States. **Applied Energy**. 2011;88(10):3492-3498. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0306261910004265. Accessed July 20, 2011.

SUBRAMONIAM R, HUISINGH D, CHINNAM R. Remanufacturing for the automotive aftermarket-strategic factors: literature review and future research needs. **Journal of Cleaner Production**. 2009;17(13):1163-1174. Available at: http://linkinghub.elsevier.com/retrieve/pii/S095965260900078X.

SURROCA J, TRIBÓ J, WADDOK S. CORPORATE RESPONSIBILITY AND FINANCIAL PERFORMANCE : THE ROLE OF INTANGIBLE. **Strategic Management Journal**. 2010;490(May 2006):463-490.

SVENSSON G. The transparency of SCM ethics: conceptual framework and empirical illustrations. **Supply Chain Management: An International Journal**. 2009;14(4):259-269. Available at: http://www.emeraldinsight.com/10.1108/13598540910970090. Accessed September 14, 2010.

SZEKELY F, KNIRSCH M. Responsible Leadership and Corporate Social Responsibility:Metrics for Sustainable Performance. **European Management Journal**. 2005;23(6):628-647. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0263237305001131. Accessed August 4, 2010.

TAHIR A, DARTON R. The Process Analysis Method of selecting indicators to quantify the sustainability performance of a business operation. **Journal of Cleaner Production**. 2010. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652610002702. Accessed August 21, 2010.

TAMAZIAN A, CHOUSA J, VADLAMANNATI K. Does higher economic and financial development lead to environmental degradation: Evidence from BRIC countries. **Energy Policy**. 2009;37(1):246-253. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0301421508005065. Accessed November 24, 2010.

TAPIA I, CORREA J, BARRIO M. Being green and export intensity of SMEs: The moderating influence of perceived uncertainty☆. **Ecological Economics**. 2008;68(1-

2):56-67. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0921800908000724. Accessed November 24, 2010.

TAPLIN D, SPEDDING T, KHOO H. Use of Simulation and Modelling to Develop a Sustainable Production System. **Sustainable Development**. 2006;161(January):149-161.

TARÍ J, CORTÉS E, MOLINER J, AZORÍN J. Levels of quality and environmental management in the hotel industry: Their joint influence on firm performance. **International Journal of Hospitality Management**. 2010;29(3):500-510. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0278431909001509. Accessed November 24, 2010.

TATE W, ELLRAM L, KIRCHOFF J. Corporate Social Responsibility Reports : A Thematic Analysis Related To Supply Chain Management. **Journal of Supply Chain Management**. 2010;(January):19-44.

TAYEB T, ZAILANI S, JAYARAMAN K. The examination on the drivers for green purchasing adoption among EMS 14001 certified companies in Malaysia. **Journal of Manufacturing Technology Management**. 2010;21(2):206-225. Available at: http://www.emeraldinsight.com/10.1108/17410381011014378. Accessed September 16, 2010.

TAYLOR A, TAYLOR M. Operations management research: contemporary themes, trends and potential future directions. **International Journal of Operations & Production Management**. 2009;29(12):1316-1340. Available at: http://www.emeraldinsight.com/10.1108/01443570911006018. Accessed August 2, 2010.

TEIXEIRA K, POMPERMAYER M. Corporate Social Responsibility: Profile and Diagnosis of 797 Programs Developed in Brazil. **Business and Society Review**. 2007;112(3):343-367. Available at: http://doi.wiley.com/10.1111/j.1467-8594.2007.00300.x.

TENCATI A, RUSSO A, QUAGLIA V. Sustainability along the global supply chain: the case of Vietnam. **Social Responsibility Journal**. 2010;6(1):91-107. Available at: http://www.emeraldinsight.com/10.1108/17471111011024577. Accessed September 7, 2010.

TESTA F, IRALDO F. Shadows and lights of GSCM (Green Supply Chain Management): determinants and effects of these practices based on a multi-national study. **Journal of Cleaner Production**. 2010;18(10-11):953-962. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652610001058. Accessed July 27, 2010.

THEYEL G. Management practices for environmental innovation and performance. **International Journal of Operations & Production Management**. 2000;20(2):249-266. Available at: http://www.emeraldinsight.com/10.1108/01443570010304288.

THOMAS I. Sustainability in tertiary curricula: what is stopping it happening? **International Journal of Sustainability in Higher Education**. 2004;5(1):33-47. Available at: http://www.emeraldinsight.com/10.1108/14676370410517387. Accessed September 14, 2010.

THOMPSON R, GREEN W. When sustainability is not a priority: An analysis of trends and strategies. **International Journal of Sustainability in Higher Education**. 2005;6(1):7-17. Available at: http://www.emeraldinsight.com/10.1108/14676370510573104. Accessed September 15, 2010.

THUN J, MULLER A. An Empirical Analysis of Green Supply Chain Management in the German Automotive Industry. **Business Strategy and the Environment**. 2010;132(January 2009):119-132.

TOFFEL M, MARSHALL J. Improving Environmental Performance Assessment - A Comparative Analysis of Weighting Release Inventories. **Journal of Industrial Ecology**. 2004;8(1):143-172.

TSOULFAS G, PAPPIS C. Environmental principles applicable to supply chains design and operation. **Journal of Cleaner Production**. 2006;14(18):1593-1602. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652605001356. Accessed November 24, 2010.

TUCKER B, PAXTON J. Using SCOR as a Supply Chain Management Framework fo Government Agency Contract Requirements. **Aerospace Conference, 2010 IEEE**. 2009;1:5-12.

TÜRKAY M, ORUÇA C, FUJITA K, ASAKURAB T. Multi-company collaborative supply chain management with economical and environmental considerations. **Computers & Chemical Engineering**. 2004;28(6-7):985-992. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0098135403002370. Accessed November 24, 2010.

TURNER T, BITITCI U, NUDURUPATI S. Implementation and impact of performance measures in two SMEs in Central Scotland. **Production Planning & Control**. 2005;16(2):135-151. Available at: http://www.informaworld.com/openurl?genre=article&doi=10.1080/09537280512331330 48&magic=crossref||D404A21C5BB053405B1A640AFFD44AE3. Accessed September 22, 2010.

UEDA K, TAKENAKA T, VÁNCZA J, MONOSTORI L. Value creation and decision-making in sustainable society. **CIRP Annals - Manufacturing Technology**. 2009;58(2):681-700. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0007850609001772. Accessed November 24, 2010.

UPHAM P, MILLS J. Environmental and operational sustainability of airports: Core indicators and stakeholder communication. **Benchmarking: An International Journal**. 2005;12(2):166-179. Available at:

http://www.emeraldinsight.com/10.1108/14635770510593103. Accessed September 15, 2010.

VACHON S, KLASSEN R. Extending green practices across the supply chain: The impact of upstream and downstream integration. **International Journal of Operations & Production Management**. 2006;26(7):795-821. Available at: http://www.emeraldinsight.com/10.1108/01443570610672248. Accessed July 9, 2010.

VACHON S, KLASSEN R. Supply chain management and environmental technologies: the role of integration. **International Journal of Production Research**. 2007;45(2):401-423. Available at: http://www.informaworld.com/openurl?genre=article&doi=10.1080/00207540600597781&magic=crossref||D404A21C5BB053405B1A640AFFD44AE3. Accessed August 19, 2010.

VACHON S. International Operations and Sustainable Development: Should National Culture Matter? **Sustainable Development**. 2010;361(April 2009):350-361.

VALENTINE SV. The green onion: a corporate environmental strategy framework. **Corporate Social Responsibility and Environmental Management**. 2010;298(October 2009):284-298. Available at: http://onlinelibrary.wiley.com/doi/10.1002/csr.217/abstract. Accessed December 8, 2011.

VANBERKEL R. Eco-efficiency in the Australian minerals processing sector. **Journal of Cleaner Production**. 2007;15(8-9):772-781. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652606002290. Accessed November 24, 2010.

VANEK F. The sector-stream matrix: Introducing a new framework for the analysis of environmental performance. **Sustainable Development**. 2002;10(1):12-24. Available at: http://doi.wiley.com/10.1002/sd.173. Accessed November 24, 2010.

VARELA S. Enfoque y conceptos de una administración renovada . El aporte de Aktouf. **INNOVAR**. 2005;15:134-137.

VASILEIOU K, MORRIS J. The sustainability of the supply chain for fresh potatoes in Britain. **Supply Chain Management: An International Journal**. 2006;11(4):317-327. Available at: http://www.emeraldinsight.com/10.1108/13598540610671761. Accessed August 5, 2010.

VELAZQUEZ L, MUNGUIA N, PLATT A, TADDEI J. Sustainable university: what can be the matter? **Journal of Cleaner Production**. 2006;14(9-11):810-819. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652606000199. Accessed October 21, 2010.

VELEVA V, ELLENBECKER M. Indicators of sustainable production: framework and methodology. **Journal of Cleaner Production**. 2001;9(6):519-549. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652601000105.

VELEVA V, HART M, GREINER T, CRUMBLEY C. Indicators for measuring environmental sustainability: A case study of the pharmaceutical industry. **Benchmarking: An International Journal**. 2003;10(2):107-119. Available at: http://www.emeraldinsight.com/10.1108/14635770310469644. Accessed September 15, 2010.

VELEVA V, HART M, GREINER T, CRUMBLEY C. Indicators of sustainable production. **Journal of Cleaner Production**. 2001;9(5):447-452.

VERNUCCIO M, COZZOLINO A, MICHELINI L. An exploratory study of marketing, logistics, and ethics in packaging innovation. **European Journal of Innovation Management**. 2010;13(3):333-354. Available at: http://www.emeraldinsight.com/10.1108/14601061011060157. Accessed September 15, 2010.

VINODH S. Improvement of agility and sustainability: A case study in an Indian rotary switches manufacturing organisation. **Journal of Cleaner Production**. 2010;18(10-11):1015-1020. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652610000673. Accessed September 7, 2010.

WAGNER M. How to reconcile environmental and economic performance to improve corporate sustainability: corporate environmental strategies in the European paper industry. **Journal of environmental management**. 2005;76(2):105-18. Available at: http://www.ncbi.nlm.nih.gov/pubmed/15939122. Accessed September 15, 2010.

WAGNER M. The role of corporate sustainability performance for economic performance: A firm-level analysis of moderation effects. **Ecological Economics**. 2010;69(7):1553-1560. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0921800910000741. Accessed July 15, 2010.

WALKER D, PITT M, THAKUR U. Environmental management systems: Information management and corporate responsibility. **Journal of Facilities Management**. 2007;5(1):49-61. Available at: http://www.emeraldinsight.com/10.1108/14725960710726346. Accessed September 15, 2010.

WALKER H, BRAMMER S. Sustainable procurement in the United Kingdom public sector. **Supply Chain Management: An International Journal**. 2009;14(2):128-137. Available at: http://www.emeraldinsight.com/10.1108/13598540910941993. Accessed September 14, 2010.

WALKER H, DISISTO L, MCBAIN D. Drivers and barriers to environmental supply chain management practices: Lessons from the public and private sectors. **Journal of Purchasing and Supply Management**. 2008;14:69-85. Available at: http://linkinghub.elsevier.com/retrieve/pii/S1478409208000083.

WALKER S, DORSA E. Making design work Sustainability, Product Design and Social Equity. **The Journal of Sustainable Product Design**. 2004;32(2):174-176.

WALTON S, GALEA C. Some considerations for applying business sustainability practices to campus environmental challenges. **International Journal of Sustainability in Higher Education**. 2005;6(2):147-160. Available at: http://www.emeraldinsight.com/10.1108/14676370510589864. Accessed September 16, 2010.

WALTON S, HANDFIELD R, MELNYK S. The Green Supply Chain: Integrating Suppliers into Environmental Management Processes. **International Journal of Purchaising and Materials Management**. 1998;34(2):2-11. Available at: http://doi.wiley.com/10.1111/j.1745-493X.1998.tb00042.x.

WARHURST A. Future roles of business in society: the expanding boundaries of corporate responsibility and a compelling case for partnership. **Futures**. 2005;37(2-3):151-168. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0016328704000850. Accessed July 6, 2010.

WATSON M, EMERY A. Environmental management and auditing systems The reality of environmental self-regulation. **Managerial Auditing Journal**. 2004;19(7):47-54.

WEBER O. Sustainability Benchmarking of European Banks and Financial Service Organizations. **Corporate Social Responsibility and Environmental Management**. 2005;87:73-87.

WHITE C, MANASET E, ROSEN CM, BECKMAN SL. Product recovery with some byte: an overview of management challenges and environmental consequences in reverse manufacturing for the computer industry. **Journal of Cleaner Production**. 2003;11(4):445-458. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652602000665. Accessed October 20, 2010.

WHITE L, LEE G. Operational research and sustainable development: Tackling the social dimension. **European Journal of Operational Research**. 2009;193(3):683-692. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0377221707010314. Accessed November 24, 2010.

WHITE P. Building a sustainability strategy into the business. **Corporate Governance**. 2009;9(4):386-394. Available at: http://www.emeraldinsight.com/10.1108/14720700910984936. Accessed July 30, 2010.

WHITE S. Early participation in the American College and University Presidents' Climate Commitment. **International Journal of Sustainability in Higher Education**. 2009;10(3):215-227. Available at: http://www.emeraldinsight.com/10.1108/14676370910972530. Accessed September 16, 2010.

WILENIUS M. Towards the age of corporate responsibility? Emerging challenges for the business world. **Futures**. 2005;37(2-3):133-150. Available at:

http://linkinghub.elsevier.com/retrieve/pii/S0016328704000862. Accessed August 4, 2010.

WILKINSON A, HILL M, GOLLAN P. The sustainability debate. **International Journal of Operations & Production Management**. 2001;21(12):1492-1502. Available at: http://www.emeraldinsight.com/10.1108/01443570110410865.

WOGNUM P, BREMMERS H, TRIENEKENS J, VAN DER VORST J, BLOEMHOF J. Systems for sustainability and transparency of food supply chains – Current status and challenges. **Advanced Engineering Informatics**. 2011;25(1):65-76. Available at: http://linkinghub.elsevier.com/retrieve/pii/S1474034610000455. Accessed July 11, 2011.

WOLF C, SEURING S. Environmental impacts as buying criteria for third party logistical services. **International Journal of Physical Distribution & Logistics Management**. 2010;40(1/2):84-102. Available at: http://www.emeraldinsight.com/10.1108/09600031011020377. Accessed August 12, 2010.

WRIGHT T. Definitions and frameworks for environmental sustainability in higher education. **International Journal of Sustainability in Higher Education**. 2002;3(3):203-220. Available at: http://www.emeraldinsight.com/10.1108/14676370210434679. Accessed September 16, 2010.

WU S, MELNYK S, CALANTONE R. Assessing the Core Resources in the Environmental Management System From the Resource Perspective and the Contingency Perspective. **IEEE Transactions on Engineering Management**. 2008;55(2):304-315. Available at: http://ieeexplore.ieee.org/lpdocs/epic03/wrapper.htm?arnumber=4494748.

XIA Y, TANG T. Sustainability in supply chain management: suggestions for the auto industry. **Management Decision**. 2011;49(4):495-512. Available at: http://www.emeraldinsight.com/10.1108/00251741111126459. Accessed June 21, 2011.

YANG B, YANG Y, WIJNGAARD J. Impact of postponement on transport: an environmental perspective. **The International Journal of Logistics Management**. 2005;16(2):192-204. Available at: http://www.emeraldinsight.com/10.1108/09574090510634502. Accessed September 7, 2010.

YANG C, LIN S, CHAN Y, SHEU C. Mediated effect of environmental management on manufacturing competitiveness: An empirical study. **International Journal of Production Economics**. 2010;123(1):210-220. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0925527309002916. Accessed August 2, 2010.

YANG C, PEIJUN L, LUPI C, ET AL. Sustainable management measures for healthcare waste in China. **Waste management (New York, N.Y.)**. 2009;29(6):1996-

2004. Available at: http://www.ncbi.nlm.nih.gov/pubmed/19157834. Accessed November 24, 2010.

YANG Q, QI G, LOW H, SONG B. Sustainable recovery of nickel from spent hydrogenation catalyst: economics, emissions and wastes assessment. **Journal of Cleaner Production**. 2011;19(4):365-375. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652610004397. Accessed June 13, 2011.

YORK J, VENKATARAMAN S. The entrepreneur–environment nexus: Uncertainty, innovation, and allocation. **Journal of Business Venturing**. 2010;25(5):449-463. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0883902609000822. Accessed September 5, 2010.

YUSOFF H, LEHMAN G, NASIR NM. Environmental engagements through the lens of disclosure practices: A Malaysian story. **Asian Review of Accounting**. 2006;14(1/2):122-148. Available at: http://www.emeraldinsight.com/10.1108/13217340610729509. Accessed September 14, 2010.

ZACHARIASSEN F, ARLBJORN J. Doctoral dissertations in logistics and supply chain management: A review of Nordic contributions from 2002 to 2008. **International Journal of Physical Distribution & Logistics Management**. 2010;40(4):332-352. Available at: http://www.emeraldinsight.com/10.1108/09600031011045334. Accessed September 14, 2010.

ZAFARMAND S, SUGIYAMA K, WATANABE M. Aesthetic and Sustainability: The Aesthetic Attributes Promoting Product Sustainability. **The Journal of Sustainable Product Design**. 2003;3(3-4):173-186. Available at: http://www.springerlink.com/index/10.1007/s10970-005-6157-0. Accessed November 24, 2010.

ZHU Q, DOU Y, SARKIS J. A portfolio-based analysis for green supplier management using the analytical network process. **Supply Chain Management: An International Journal**. 2010;15(4):306-319. Available at: http://www.emeraldinsight.com/10.1108/13598541011054670. Accessed September 15, 2010.

ZHU Q, GENG Y, FUJITA T, HASHIMOTO S. Green supply chain management in leading manufacturers: Case studies in Japanese large companies. **Management Research Review**. 2010;33(4):380-392. Available at: http://www.emeraldinsight.com/10.1108/01409171011030471. Accessed September 15, 2010.

ZHU Q, GENG Y, LAI K. Circular economy practices among Chinese manufacturers varying in environmental-oriented supply chain cooperation and the performance implications. **Journal of environmental management**. 2010;91(6):1324-31. Available at: http://www.ncbi.nlm.nih.gov/pubmed/20223586. Accessed November 24, 2010.

ZHU Q, LIU Q. Eco-design planning in a Chinese telecommunication network company: Benchmarking its parent company. **Benchmarking: An International Journal**. 2010;17(3):363-377. Available at: http://www.emeraldinsight.com/10.1108/14635771011049344. Accessed September 15, 2010.

ZHU Q, SARKIS J, CORDEIRO J, LAI K. Firm-level correlates of emergent green supply chain management practices in the Chinese context☆. **Omega**. 2008;36(4):577-591. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0305048307000849. Accessed July 25, 2010.

ZHU Q, SARKIS J, GENG Y. Green supply chain management in China: pressures, practices and performance. **International Journal of Operations & Production Management**. 2005;25(5):449-468. Available at: http://www.emeraldinsight.com/10.1108/01443570510593148. Accessed August 24, 2010.

ZHU Q, SARKIS J, LAI K, GENG Y. The Role of Organizational Size in the Adoption of Green Supply Chain Management Practices. **Corporate Social Responsibility and Environmental Management**. 2008;337(February):322-337. Available at: k.

ZHU Q, SARKIS J, LAI K. Confirmation of a measurement model for green supply chain management practices implementation☆. **International Journal of Production Economics**. 2008;111(2):261-273. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0925527307001855. Accessed June 24, 2010.

ZHU Q, SARKIS J, LAI K. Green supply chain management: pressures, practices and performance within the Chinese automobile industry. **Journal of Cleaner Production**. 2007;15(11-12):1041-1052. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652606002411. Accessed September 1, 2010.

ZHU Q, SARKIS J. An inter-sectoral comparison of green supply chain management in China: Drivers and practices. **Journal of Cleaner Production**. 2006;14(5):472-486. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652605000065. accessed october 25, 2010.

ZHU Q, SARKIS J. The link between quality management and environmental management in firms of differing size: An analysis of organizations in China. **Environmental Quality Management**. 2004;13(3):53-64. Available at: http://doi.wiley.com/10.1002/tqem.20004. Accessed November 24, 2010.

ZHU Q, SARKIS J. The moderating effects of institutional pressures on emergent green supply chain practices and performance. **International Journal of Production Research**. 2007;45(18):4333-4355. Available at: http://www.informaworld.com/openurl?genre=article&doi=10.1080/00207540701440345&magic=crossref||D404A21C5BB053405B1A640AFFD44AE3. Accessed September 13, 2010.

ZOFIO J, PRIETO A. Environmental efficiency and regulatory standards: the case of CO2 emissions from OECD industries. **Resource and Energy Economics**. 2001;23(1):63-83.

ZUIDWIJK R, KRIKKE H. Strategic response to EEE returns:Product eco-design or new recovery processes? **European Journal of Operational Research**. 2008;191(3):1206-1222. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0377221707008715.

ZUO K, POTANGAROA R, WILKINSON S, ROTIMI J. A project management prospective in achieving a sustainable supply chain for timber procurement in Banda Aceh, Indonesia. **International Journal of Managing Projects in Business**. 2009;2(3):386-400. Available at: http://www.emeraldinsight.com/10.1108/17538370910971045. Accessed August 31, 2010.

ZUTSHI A, SOHAL A. A study of the environmental management system (EMS) adoption process within Australasian organisations—2. Role of stakeholders. **Technovation**. 2004;24(5):371-386. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0166497202001153. Accessed September 18, 2010.

ZUTSHI A, SOHAL A. Adoption and maintenance of environmental management systems: Critical success factors. **Management of Environmental Quality: An International Journal**. 2004;15(4):399-419. Available at: http://www.emeraldinsight.com/10.1108/14777830410540144. Accessed September 7, 2010.

ZUTSHI A, SOHAL A. Environmental management system adoption by Australasian organisations: part 1: reasons, benefits and impediments. **Technovation**. 2004;24(4):335-357. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0166497202000536. Accessed September 18, 2010.