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Janaina Ottonelli

ORIENTAÇÕES ESTRATÉGICAS, PRÁTICAS DE GESTÃO DA CADEIA DE SUPRIMENTOS SUSTENTÁVEL E TRIPLE BOTTOM LINE PERFORMANCE: FRAMEWORK CONCEITUAL E EVIDÊNCIAS EMPÍRICAS

Santa Maria, RS
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Orientadora: Profa. Dra. Clandia Maffini Gomes

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Santa Maria, RS
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“O que vale na vida não é o ponto de partida e sim a caminhada.
Caminhando e semeando, terás o que colher.” [Cora Coralina]

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RESUMO

ORIENTAÇÕES ESTRATÉGICAS, PRÁTICAS DE GESTÃO DA CADEIA DE SUPRIMENTOS SUSTENTÁVEL E TRIPLE BOTTOM LINE PERFORMANCE: FRAMEWORK CONCEITUAL E EVIDÊNCIAS EMPÍRICAS

AUTORA: Janaina Ottonelli
ORIENTADORA: Clandia Maffini Gomes

As empresas buscam cada vez mais melhorias estratégicas e operacionais para produzir bens e serviços mais competitivos. Além disso, precisam equilibrar questões econômicas com a preservação do meio ambiente e da saúde e do bem-estar das pessoas. Esta tese tem como objetivo desenvolver e testar um modelo para identificar as relações entre orientações estratégicas (inovação, reputação e eficiência), práticas da gestão da cadeia de suprimentos sustentável (para frente e reversa) e triple bottom line performance (econômica, ambiental e social). Para isso são elaborados dois artigos. O Artigo I, intitulado "*A Framework of Strategic Orientations, Sustainable Supply Chain Management Initiatives and Triple Bottom Line Performance*", tem com objetivo propor um framework conceitual para verificar se existem relações entre as orientações estratégicas, as práticas da gestão da cadeia de suprimentos sustentável e o triple bottom line performance. A abordagem metodológica é a pesquisa qualitativa. A revisão da literatura permitiu o aprofundamento dos assuntos abordados, bem como identificar lacunas de pesquisa a serem investigadas a partir do estado da arte. As proposições levantadas indicam que as decisões estratégicas e operacionais precisam considerar aspectos internos e externos à organização; as orientações estratégicas de inovação, reputação e eficiência são antecedentes à adoção das práticas de gestão da cadeia de suprimentos sustentável; e a adoção de práticas sustentáveis na cadeia de suprimentos para frente e reversa leva a melhorias na performance empresarial medida pelas dimensões econômica, ambiental e social. Tais proposições levaram ao desenvolvimento do Artigo II, intitulado "*Strategic Orientations, Sustainable Supply Chain Management Initiatives and Triple Bottom Line Performance: empirical evidences from U.S. automotive industry*", que tem como objetivo desenvolver e testar um modelo teórico integrado sobre as relações identificadas no framework conceitual. A metodologia deste estudo consiste em pesquisa quantitativa. Um instrumento de pesquisa survey foi desenvolvido e enviado a indústrias manufatureiras do setor automotivo dos Estados Unidos. Foram obtidas 210 respostas. Os resultados da estimação do modelo integrado através da modelagem de equações estruturais indicam uma relação significativa e negativa entre a orientação estratégica de inovação e as práticas da cadeia de suprimentos para frente e cadeia de suprimentos reversa. A orientação estratégica de reputação apresentou uma relação significativa e positiva com as práticas da cadeia de suprimentos para frente e cadeia de suprimentos reversa. A cadeia de suprimentos reversa apresentou relação significativa e positiva com a performance ambiental e social. Este estudo apresenta novidades ao discutir as orientações estratégicas de inovação, reputação e eficiência ainda pouco investigadas, considerar as práticas reversas como parte da cadeia de suprimentos sustentável, por medir o triple bottom line performance, especialmente a dimensão social, e por propor um modelo que integra questões estratégicas, operacionais e de desempenho.
Palavras-chave: Gestão Estratégica, Iniciativas Operacionais, Sustentabilidade, Desempenho, Indústria Automotiva dos Estados Unidos.

ABSTRACT

STRATEGIC ORIENTATIONS, SUSTAINABLE SUPPLY CHAIN MANAGEMENT INITIATIVES AND TRIPLE BOTTOM LINE PERFORMANCE: CONCEPTUAL FRAMEWORK AND EMPIRICAL EVIDENCES

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Companies are increasingly looking for strategic and operational improvements to produce more competitive goods and services. Besides that, they need to balance economic issues with the preservation of the environment and the health and well-being of people. This thesis aims to develop and test a model to identify the relationships between strategic orientations (innovation-led, reputation-led, and efficiency-led), sustainable supply chain management (forward and reverse) and triple bottom line performance (economic, environmental and social). For this, two articles are elaborated. Article I, "*A Framework of Strategic Orientations, Sustainable Supply Chain Management Initiatives and Triple Bottom Line Performance*", aims to propose a conceptual framework to verify if there are relations between strategic orientations, practices of sustainable supply chain management and triple bottom line performance. The methodology of this study consists of bibliographic research. The review of the literature allowed the deepening of the subjects covered, as well as identify research gaps to be investigated from the state of the art. The propositions raised indicate that strategic and operational decisions need to consider aspects internal and external to the organization; the strategic guidelines for innovation, reputation and efficiency are antecedents to the adoption of sustainable supply chain management practices; and the adoption of sustainable practices in the forward and reverse supply chain leads to improvements in business performance measured by the economic, environmental and social dimensions. Such propositions led to the development of Article II, "*Strategic Orientations, Sustainable Supply Chain Management Initiatives and Triple Bottom Line Performance: empirical evidences from U.S. automotive industry*". It proposition is to develop and test the relationships identified in the conceptual model. The methodology is quantitative research. A research survey instrument was developed and shipped to automotive manufacturing industries in the United States. 210 responses were obtained. The results of the estimation of the integrated model through the modeling of structural equations indicate a significant and negative relationship between the strategic orientation of innovation and the practices of the forward supply chain and the reverse supply chain. Strategic reputation orientation has had a significant and positive relationship with forward supply chain practices and the reverse supply chain. The reverse supply chain presented a significant and positive relationship with environmental and social performance. The novelties of the study were to discuss the strategic orientations of innovation, reputation and efficiency, to consider reverse practices as part of the sustainable supply chain, to measure the triple bottom line performance, especially the social dimension, and to propose a model that integrates strategic issues, operational and performance.
Keywords: Strategic Management, Operational Initiatives, Sustainability, Performance, U.S. Automotive Industry.

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3PT	Third Party Logistics
CFA	Confirmatory Factor Analysis (Análise Fatorial Confirmatória)
CLSC	Closed-Loop Supply Chain (Cadeia de Suprimentos de Circuito Fechado)
CSR	Corporate Social Responsibility (Responsabilidade Social Corporativa)
EC	Economic Performance
EF	Efficiency-led
EMS	Environmental Management System (Sistema de Gestão Ambiental)
EN	Environmental Performance
EPA	Environmental Protection Agency (Agência de Proteção Ambiental)
ERP	Enterprise Resource Planing
FSC	Forward Supply Chain
GDP	Gross Domestic Product
GRI	Global Reporting Initiative
GSCM	Green Supply Chain Management (Gestão da Cadeia de Suprimentos Verde)
IN	Innovation-led
IRB	Institutional Review Board
ISO	International Organization for Standardization
LSP	Logistics Service Provider
LTL	Less Than Truckload
MBE	Minority Business Enterprise
NAICS	North American Industry Classification System
NRBV	Natural Resource-Based View
OECD	Organization for Economic Cooperation and Development
ODS	Objetivos de Desenvolvimento Sustentável
ONU	Organização das Nações Unidas
RBV	Resource-Based View
RP	Reputation-led
RSC	Reverse Supply Chain
SCM	Supply Chain Management (Gestão da Cadeia de Suprimentos)
SD	Standard Deviation
SDG	Sustainable Development Goals (Objetivos de Desenvolvimento Sustentável)
SEM	Structural Equation Modeling (Modelagem de Equações Estruturais)
SO	Social Performance
SSCM	Sustainable Supply Chain Management (Gestão da Cadeia de Suprimentos Sustentável)
UN	United Nations
U.S.	United States of America (Estados Unidos da América)

Sumário

1 Apresentação

As empresas buscam cada vez mais melhorias estratégicas e operacionais para produzir bens e serviços mais competitivos de modo a aumentar a parcela de participação no mercado e os indicadores de performance. O alvo a ser atingido é o crescimento, que pode ser do número de clientes, do volume de vendas e dos lucros a serem distribuídos e reinvestidos. Tais melhorias passam por questões econômicas, mas também estão envolvendo questões sociais e ambientais devido pressões institucionais, sociais, políticas e ambientais por operações empresariais que preservem o meio ambiente e a saúde e o bem-estar das pessoas.

A produção industrial tem facilitado o acesso dos consumidores aos produtos e tem contribuído para o crescimento do descarte inadequado de resíduos sólidos, líquidos e gasosos no ambiente. Este descarte ocorre diretamente por meio das operações empresarias e também indiretamente quando os consumidores não destinam corretamente os resíduos dos produtos utilizados. O resultado deste cenário é um grande desequilíbrio que gera consequências como a poluição hídrica, a emissão de gases tóxicos na atmosfera, a destruição da camada de ozônio, a devastação dos ecossistemas e o acúmulo de lixo em locais impróprios, que são causas das mudanças climáticas.

A Organização das Nações Unidas (ONU) tem contribuído para a discussão pública sobre os problemas ambientais e suas consequências para o ecossistema natural e para a vida humana. Também tem discutido sobre a necessidade da responsabilização das empresas pelos produtos durante todo o ciclo de vida, desde a fabricação até a destinação final após o uso pelo consumidor. Alguns documentos resultantes dos encontros promovidos pela ONU são a Declaração de Estocolmo que estabelece princípios para preservação do ambiente humano (UNITED NATIONS, 1972); o relatório "*Our Common Future*" da Comissão Brundtland que define o desenvolvimento sustentável como o desenvolvimento que atende às necessidades do presente sem comprometer as possibilidades de as gerações futuras atenderem às suas necessidades (WCED, 1987); e a "Agenda 21", uma ferramenta para guiar a construção de sociedades sustentáveis com ações para preservação dos recursos naturais, planejamento da produção e de sistemas de consumo e alertar sobre os problemas causados pelo lixo (UNITED NATIONS, 1992).

Em 2015 a ONU adotou uma nova agenda global, a "Agenda 2030", com um conjunto de 17 Objetivos de Desenvolvimento Sustentável (ODS) para elevar o desenvolvimento no mundo e melhorar a qualidade de vida de todos até 2030, por meio do combate à pobreza, proteção do planeta e garantia de prosperidade a todos (UNITED NATIONS, 2015). Os 17 ODSs são: 1. erradicação da pobreza; 2. fome zero e agricultura sustentável; 3. saúde e bem-estar; 4. educação de qualidade; 5. igualdade de gênero; 6. água potável e saneamento; 7. energia limpa e acessível; 8. trabalho decente e crescimento econômico; 9. indústria, inovação e infraestrutura; 10. redução das desigualdades; 11. cidades e comunidades sustentáveis; 12. consumo e produção responsáveis; 13. ação contra a mudança global do clima; 14. vida na água; 15. vida terrestre; 16. paz, justiça e instituições eficazes; 17. parcerias e meios de implantação.

As empresas, especialmente as indústrias, podem estar ligadas a diferentes ODS, entre eles agricultura sustentável, igualdade de gênero, energia limpa, trabalho decente, comunidades sustentáveis e indústria, inovação e infraestrutura e, em especial, consumo e produção responsáveis. Essa ampla gama de objetivos aos quais as indústrias estão vinculadas se deve às características das atividades e operações desempenhadas pelas mesmas. As indústrias estão sendo desafiadas a cada vez mais oferecer produtos e serviços de maneira mais rápida, mantendo a qualidade, gerando riqueza e protegendo o ambiente e as pessoas.

Para enfrentar esse desafio, a gestão estratégica e operacional das empresas precisa considerar pressões de instituições e das pessoas, direta ou indiretamente envolvidas com as empresas, e os recursos internos disponíveis. Segundo a teoria da visão baseada em recursos (RBV), os recursos internos empresariais são recursos físicos (tecnologia, equipamentos, infraestrutura), de capital humano (treinamento, conhecimento, experiência) e organizacionais (estrutura formal, sistemas de planejamento, controle, coordenação) (BARNEY, 1991). Segundo a teoria institucional, as pressões sociais, políticas e econômicas são pressões externas realizadas por agências reguladoras, governos, legislação, pesquisadores, organizações não governamentais e demais grupos da sociedade, que podem influenciar as estratégias e a tomada de decisão sobre as práticas empresariais (DIMAGGIO; POWELL, 1983; SARKIS; ZHU; LAI, 2011; GLOVER et al., 2014). E a teoria dos stakeholders afirma que qualquer grupo de pessoas podem influenciar as decisões nas empresas, podendo ser elas externas ou internas à organização, tais como funcionários, consumidores/clientes, shareholders (acionistas), agentes governamentais e sociedade em geral (FREEMAN, 2010; SARKIS; GONZALEZ-TORRE; ADENSO-DIAZ, 2010).

Escolhas estratégicas são feitas pela alta gerência das empresas para guiar a gestão e as operações organizacionais com o objetivo de melhorar os níveis de performance (HAMBRICK; MASON, 1984). Os gestores também podem estabelecer orientações estratégicas a serem perseguidas para adaptar ou mudar aspectos da firma para um alinhamento mais favorável entre os objetivos e as práticas operacionais (MANU; SRIRAM, 1996). Existem diferentes orientações estratégicas tais como a orientação de diversificação e estratégia de baixo custo (PORTER, 1980), a orientação estratégica de mercado (NARVER; SLATER, 1990), a orientação tecnológica (GATIGNON; XUEREB, 1997), a orientação empreendedora (LUMPKIN; DESS, 1996), a orientação de aprendizado organizacional (GRINSTEIN, 2008), e a orientação ambiental (BANERJEE, 2002). Testa e Iraldo (2010) investigaram as orientações estratégicas de inovação, de reputação, de eficiência e de imitação.

As pressões internas e externas exigiram mudanças na gestão da cadeia de suprimentos (SCM) para adequação das atividades operacionais. Além disso, as empresas estão tendo que se destacar diante dos competidores, de modo que a SCM tem papel fundamental uma vez que a competição está deixando de ser entre empresas para ser entre cadeias de suprimentos (COX, 1999; BAI et al., 2012). A SCM envolve atividades para frente e reversa na cadeia de suprimentos. As atividades para frente englobam o desenvolvimento do produto, compra de materiais, produção, distribuição, transporte e serviços pós-venda (COOPER; LAMBERT; PAGH, 1997;

ELLRAM; COOPER, 1990; MENTZER et al., 2001). As atividades reversas consistem na coleta de produtos e embalagens usados, seleção, desmontagem, recuperação, reuso, remanufatura, reciclagem e disposição final dos resíduos em local adequado (THIERRY et al., 1995; GUIDE JR.; VAN WASSENHOVE, 2002; JAYARAMAN; LUO, 2007). A integração das práticas da cadeia de suprimentos para frente e reversa pode ser chamada de cadeia de suprimentos de circuito fechado ou *closed-loop supply chain* (CLSC) (KLEINDORFER; SINGHAL; VAN WASSENHOVE, 2005; GUIDE JR.; VAN WASSENHOVE, 2009).

Tradicionalmente, a SCM busca melhorar aspectos econômicos nas práticas empresariais (BEAMON, 1999; LI et al., 2006; TAN et al., 1999). Por muito tempo, a SCM ignorou questões relacionadas ao uso de recursos naturais e humanos, poluição, geração de lixo no ambiente, aspectos éticos e de responsabilidade por todo o ciclo de vida do produto (HART, 1995; GUIDE JR.; VAN WASSENHOVE, 2001; FLEISCHMANN et al., 2000). Mas os aspectos ambientais e sociais, além do aspecto econômico, passaram a ser introduzidos nas práticas da SCM de modo a contemplar as três dimensões da sustentabilidade, estabelecida pela abordagem do triple bottom line (TBL) (ELKINGTON, 1997).

A gestão da cadeia de suprimentos verde ou *green supply chain management* (GSCM) consiste na integração de um pensamento ambiental na gestão da cadeia de suprimentos, que inclui o design do produto, a seleção e a compra de materiais, os processos de produção, a entrega do produto final ao consumidor bem como a gestão do produto após sua vida útil ou uso pelo consumidor (SRIVASTAVA, 2007). As práticas que integram a gestão ambiental nas operações da organização tem como objetivo conter a deterioração do ambiente provocada pelo exploração excessiva de recursos naturais, excesso de lixo e aumento dos níveis de poluição através da implementação de práticas relacionadas aos Rs (Redução, Reuso, Retrabalho Recondicionamento, Recuperação, Remanufatura, Reciclagem, Logística Reversa, etc.) (ZHU; SARKIS, 2004; SRIVASTAVA, 2007). A GSCM inclui a possibilidade da recuperação de valor de produtos usados e dos resíduos ao reintegrá-los no sistema da cadeia de suprimentos através das práticas da cadeia de suprimentos reversa (SARKIS; ZHU; LAI, 2011).

A gestão da cadeia de suprimentos sustentável ou *sustainable supply chain management* (SSCM) inclui práticas que reduzam custos, riscos ambientais e sociais na organização. A SSCM é a gestão integrada das atividades operacionais de design de produto, de produção e de processos de recuperação ao final da vida útil do produto (LINTON; KLASSEN; JAYARAMAN, 2007) levando em consideração os objetivos das três dimensões da sustentabilidade: econômica, ambiental e social (SEURING; MÜLLER, 2008; CARTER; ROGERS, 2008; AHI; SEARCY, 2013). Kleindorfer, Singhal e Van Wassenhove (2005) descrevem a SSCM como a integração dos lucros, das pessoas e do planeta na cultura, na estratégia e nas operações das empresas. Além de reduzir impactos ambientais, a SSCM também engloba a redução de impactos sociais através das ações de responsabilidade social corporativa (CSR) (STINDT, 2017). A CSR está relacionada a questões como ética nos negócios, filantropia, relações com a comunidade onde a firma atua, diversidade no ambiente de trabalho, segurança, direitos humanos e

meio ambiente e tem como ideia central que a firma pode afetar stakeholders, tais como clientes, funcionários, governos, comunidade e investidores (MALONI; BROWN, 2006).

Muitos estudos investigam práticas de GSCM e SSCM adotadas por empresas. Normalmente os pesquisadores investigam as práticas em partes da cadeia de suprimentos para frente como design e desenvolvimento de produtos e processos (ZHU; SARKIS, 2004; HSU et al., 2013; LAI; WU; WONG, 2013; PAULRAJ; CHEN; BLOME, 2017), aquisição de materiais (PAULRAJ, 2011; BLOME; HOLLOS; PAULRAJ, 2014), produção (SARKIS; GONZALEZ-TORRE; ADENSO-DIAZ, 2010; LI et al., 2015; HSU; TAN; ZAILANI, 2016), embalagem (ZAILANI et al., 2012; PEROTTI et al., 2012), distribuição e transporte (LUTHRA; GARG; HALEEM, 2016; DUBEY et al., 2017; STINDT, 2017), mas não investigam essas práticas conjuntamente. Poucos estudos investigam a integração das práticas das atividades para frente na cadeia de suprimentos (ZAILANI et al., 2012) e são poucos os estudos que consideram as práticas da logística reversa como parte da gestão da cadeia de suprimentos (HSU et al., 2013; LAI; WU; WONG, 2013; LUTHRA; GARG; HALEEM, 2016).

Como as práticas da gestão cadeia de suprimentos sustentável consistem na inclusão de questões sociais e ambientais, além de econômicas, nas operações das firmas, muitos estudos afirmam que tais práticas sustentáveis podem gerar TBL performance, ou seja, performance econômica, social e ambiental (AHI; SEARCY, 2013). A performance corporativa normalmente é medida em sua dimensão econômica ou financeira (RAO; HOLT, 2005; LI et al., 2006; LEE et al., 2012). Um número crescente de estudos relacionam a adoção de práticas verdes ou sustentáveis da cadeia de suprimentos as empresas com a performance ambiental (ZHU; SARKIS; LAI, 2007; JABBOUR et al., 2014; WOLF, 2014) e performance social (WOLF, 2014). Ainda são poucos os estudos que consideram as três dimensões da sustentabilidade conjuntamente (PAULRAJ, 2011; ZAILANI et al., 2012; PAULRAJ; BLOME, 2017). Os resultados sociais das práticas operacionais das firmas foram por muito tempo negligenciados, mas estão cada vez mais recebendo a atenção de gestores e pesquisadores (MANI et al., 2016).

Zailani et al. (2012) considerou grandes empresas manufatureiras da Malásia para investigar se as práticas de compras ambientais e embalagens sustentáveis impactam na performance econômica, ambiental, social e operacional dos fornecedores. Os resultados apontam que a prática de compras ambientais têm um efeito positivo na performance econômica, social e operacional, enquanto que a prática de embalagem sustentável tem um efeito positivo nos resultados econômicos, ambientais e sociais.

Alguns estudos investigaram a existência de relações entre orientações estratégicas, práticas da cadeia de suprimentos sustentável e performance empresarial. Testa e Iraldo (2010) consideraram empresas manufatureiras em sete países pertencentes a OECD para investigar se as orientações estratégicas de inovação, reputação, eficiência e imitação impactavam na adoção de práticas de GSCM e de um sistema de gestão ambiental (EMS). Eles também mediram se tais adoções impactam na performance econômica e ambiental dos fornecedores. Os resultados apontam que as orientações estratégicas de inovação, reputação e imitação afetam a adoção das

práticas de GSCM, enquanto a orientação estratégica de eficiência não afeta. Além disso, as práticas de GSCM reduzem impactos ambientais.

Li et al. (2015) analisaram empresas chinesas de alta tecnologia e encontraram um efeito positivo da orientação ambiental nas práticas de GSCM, um efeito positivo da adoção das práticas de GSCM de compras verdes, produção verde e sistema de informação verde na performance ambiental e financeira e um efeito positivo da adoção do design verde de produto na performance ambiental. Hsu, Tan e Zailani (2016) investigaram empresas manufatureiras na Malásia e encontraram que as orientações estratégicas de eco-inovação e eco-reputação são importantes antecedentes da adoção das práticas de SSCM de produção verde e embalagens verdes, as práticas de SSCM têm um positivo impacto nas práticas de logística reversa e também existe uma relação bidirecional entre as orientações estratégicas.

Nesse contexto, foram identificadas quarto lacunas de pesquisa às quais esta tese busca gerar contribuições. Primeira, Testa e Iraldo (2010) investigaram as orientações estratégicas de inovação, reputação, eficiência e imitação com indicadores singulares e sem aprofundar a discussão teórica sobre a definição e objetivos destas orientações estratégicas. Este estudo busca revisar a literatura para definir e propor indicadores representativos para a mensuração das orientações estratégicas de inovação, reputação e eficiência. Esta escolha é motivada pelo fato de a competição hoje ser entre as cadeias de suprimentos (COX, 1999; BAI et al., 2012) o que exige das empresas a busca constante pela inovação e diferenciação, eficiência em processos e melhoria da imagem e reputação.

Segunda, as práticas da cadeia de suprimentos para frente normalmente são reduzidas a uma etapa do processo produtivo como aquisição de materiais, produção ou embalagem, sem considerar todas as etapas em conjunto (ZHU; SARKIS, 2004; PAULRAJ, 2011; ZAILANI et al., 2012; PEROTTI et al., 2012) e são poucos os estudos consideram práticas da cadeia de suprimentos reversa como parte integrante de SSCM (HSU et al., 2013; LAI; WU; WONG, 2013; LUTHRA; GARG; HALEEM, 2016). Terceira, ainda é um desafio considerar a dimensão social na mensuração da triple bottom line performance (ZAILANI et al., 2012; MANI et al., 2016; PAULRAJ; BLOME, 2017). Finalmente, poucos estudos investigam as relações entre aspectos estratégicos, operacionais e de resultados tais como as relações entre entre o conjunto de orientações estratégicas, práticas da SSCM e triple bottom line performance (TESTA; IRALDO, 2010; LI et al., 2015; HSU; TAN; ZAILANI, 2016).

Tais lacunas levam ao seguinte problema de pesquisa: Existem relações entre as orientações estratégicas de inovação, reputação e eficiência, a adoção de práticas da gestão da cadeia de suprimentos sustentável para frente e reversa e o triple bottom line performance, medido pelas dimensões econômica, ambiental e social?

1.1 Proposição

Objetivo Geral

Desenvolver e testar um modelo para verificar se existem relações entre as orientações estratégicas de inovação, reputação e eficiência impactam, a adoção de práticas da gestão da cadeia de suprimentos sustentável para frente e reversa, e o triple bottom line performance, medido pelas dimensões econômica, ambiental e social.

Objetivos Específicos

- Desenvolver framework conceitual para verificar se existem relações entre as orientações estratégicas de inovação, eficiência e reputação, as práticas da gestão da cadeia de suprimentos sustentável para frente e reversa e o triple bottom line performance.
- Desenvolver hipóteses a partir das relações identificadas no modelo conceitual.
- Construir um instrumento de pesquisa para a coleta de dados.
- Testar as hipóteses desenvolvidas sobre as relações entre as orientações estratégicas, as práticas da gestão da cadeia de suprimentos sustentável e o triple bottom line performance.

1.2 Materiais e Métodos

Neste estudo são utilizadas duas abordagens metodológicas. A primeira abordagem consiste na pesquisa qualitativa para investigar se existem as relações entre os conceitos de orientações estratégicas, práticas de gestão da cadeia de suprimentos sustentável e triple bottom line. O método usado é a revisão da literatura sobre os conceitos, modelos propostos e relações previamente investigadas em artigos de periódicos científicos, livros, relatórios e teses.

A segunda abordagem utilizada é a pesquisa quantitativa. São desenvolvidas hipóteses para as relações identificadas entre os conceitos no modelo conceitual. Um instrumento de coleta de dados para pesquisa survey é elaborado (ver Apêndice B) para envio eletrônico para indústrias manufatureiras do setor automotivo dos Estados Unidos. Os métodos utilizados na análise dos dados e teste das hipóteses incluem estatística descritiva, análise confirmatória de dados (CFA) e modelagem de equações estruturais (SEM).

1.3 Contribuições da Pesquisa

Balancear ganhos econômicos com questões ambientais e sociais ainda é um desafio para as indústrias. Isso porque tais questões são vistas como aumento de gastos. Embora a adoção de práticas de gestão da cadeia de suprimentos sustentável (SSCM) possa resultar no crescimento de investimentos e gastos, ela também pode resultar na redução de custos, melhoria na

relação com funcionários, melhoria da imagem corporativa, conquista de novos clientes, entre outros benefícios. Muitos gestores estão se conscientizado dos benefícios da adoção de práticas sustentáveis ao longo da cadeia de suprimentos e de se tornarem responsáveis pelos produtos usados ou em final da vida útil, evitando danos ao ambiente e protegendo as pessoas. Assim, as práticas se estendem dos fluxos da cadeia de suprimentos para frente para os fluxos da cadeia de suprimentos reversa, criando um sistema integrado chamado de cadeia de suprimentos de circuito fechado (CLSC) para a recuperação de valor dos produtos.

A adoção das práticas de gestão da cadeia de suprimentos sustentáveis pelas indústrias pode contribuir de forma direta e efetiva na realização dos Objetivos de Desenvolvimento Sustentável (ODS) estabelecidos pela ONU, especialmente do consumo e produção sustentável. Essas práticas podem ter impacto direto nas operações, no trabalho dos funcionários, na relação com fornecedores, clientes e comunidade. Os resultados obtidos pela adoção das práticas sustentáveis pela indústria podem ir além dos financeiros e atingir resultados ambientais e sociais.

Mas as ações diárias da indústria podem depender dos objetivos estratégicos estabelecidos pela alta gerência. Testa e Iraldo (2010) sugerem as orientações estratégicas de inovação, reputação e eficiência. Inovação tem sido a palavra-chave a ser perseguida por empresas que querem ser líderes no seu setor. Para isso, elas precisam criar novos processos e produtos e ser a primeira a lançá-los no mercado. Reputação tem se tornado um valoroso ativo intangível porque uma boa reputação resulta de boas práticas, oferta de produtos de qualidade, responsabilidade, compromisso com questões ambientais e sociais que podem atrair novos consumidores, fidelizar clientes e funcionários, e construir uma boa imagem corporativa. Finalmente, a orientação estratégica de eficiência consiste na busca pela redução de custos em cada atividade e processo desempenhados para melhorar a competitividade da indústria.

Assim, este estudo visa gerar contribuições teóricas, práticas e sociais. A principal contribuição teórica é o desenvolvimento de um framework conceitual para mostrar as relações existentes entre os conceitos de orientações estratégicas, práticas da cadeia de suprimentos sustentável e triple bottom line performance. Para isso, são propostos oito construtos. Três construtos referem-se às orientações estratégicas de inovação, reputação e eficiência ainda não validados pela literatura. Uma empresa pode escolher perseguir uma ou diferentes orientações estratégicas, sendo que esta escolha pode ajudar a empresa a estruturar sua missão, valores e objetivos. A compreensão pelos gerentes de qual orientação estratégica melhor se aproxima do que a empresa visa alcançar, pode facilitar o alinhamento entre objetivos a serem perseguidos, praticas implementadas e resultados obtidos.

Dois construtos são relacionados às práticas de gestão da cadeia de suprimentos sustentável, que incluem as atividades para frente e reversas. Propõe-se como práticas para frente as principiais atividades desempenhadas pela empresa para a produção e oferta de produtos ao consumidor, que inclui design e desenvolvimento de produtos, aquisição de materiais, produção, embalagem, distribuição e transporte. As práticas reversas são pouco consideradas como parte integrante das práticas da gestão da cadeia de suprimentos sustentáveis e consistem nas atividades

des de coleta de produtos e embalagens usadas, recuperação e reuso de produtos, componentes e materiais, destino adequado de resíduos e gestão da logística reversa. E os demais construtos são relacionados ao triple bottom line são performance econômica, ambiental e social. Os construtos bem como os indicadores são propostos e suas interações sugeridas em proposições.

A contribuição prática consiste na validação do framework proposto a partir de dados levantados em pesquisa survey. Como a cadeia de suprimentos é o ponto central deste estudo, busca-se testar o modelo utilizando dados de indústrias do setor manufatureiro automotivo dos Estados Unidos. A indústria automotiva recebe o código 336 do sistema norte americano de classificação da indústria (NAICS), chamado de Equipamentos de Transporte e Manufatura, que produz equipamentos para o transporte de pessoas e bens (U.S. CENSUS BUREAU, 2017). Em 2017, o setor manufatureiro foi responsável por 11,6% dos resultados econômicos americanos, sendo que o valor adicionado da indústria automotiva representou 0,9% dos resultados econômicos (U.S. BUREAU OF ECONOMIC ANALYSIS, 2018). No mesmo ano setor manufatureiro emprega mais de 12,5 milhões de trabalhadores, sendo que a indústria automotiva empregou mais de 1,6 milhões de trabalhadores (U.S. BUREAU OF LABOR STATISTICS, 2018). A indústria automotiva tem respondido às leis e regulações estabelecidas pela Agência de Proteção Ambiental (EPA) em ordem a evitar impactos ambientais (U.S. ENVIRONMENTAL PROTECTION AGENCY, 2018). A legislação exige o cumprimento de ações relacionadas a resíduos perigosos como tratamento de água poluída, substitutos na limpeza de metais, controles de poluição do ar e poços de descarte de veículos a motor, por exemplo.

A validação dos construtos propostos e o teste das hipóteses desenvolvidas com dados empíricos permite a compreensão do fenômeno na prática dos negócios. Desse modo, foi possível inferir se as relações teóricas propostas são verdadeiras e válidas. Se assim forem, este estudo concretiza sua contribuição para o avanço deste campo de estudo. Os resultados poderão servir como guia para pesquisadores compreenderem o fenômeno e proporem novas pesquisas relacionadas ao tema aplicadas a diferentes setores e segmentos de empresas. Aos gestores, o estudo poderá servir como guia no estabelecimento de orientações estratégicas norteadoras da gestão e na adoção de práticas de gestão cadeia de suprimentos sustentáveis.

A contribuição social deste estudo é mostrar que as indústrias podem contribuir para o desenvolvimento sustentável impactando diretamente na vida das pessoas. As orientações estratégicas testadas neste estudo podem contribuir nesse sentido orientando as empresas a estabelecer objetivos sociais. A adoção de práticas de produção e de consumo sustentável em todas a gestão da cadeia de suprimentos consiste na ferramenta chave para que as indústrias transformem os objetivos em resultados.

1.4 Estrutura da Tese

Esta tese está organizada em cinco seções e adota a estrutura de artigos científicos integrados. Por este motivo, duas seções consistem em artigos redigidos na língua inglesa a serem

submetidos em periódicos internacionais, enquanto as demais seções da tese são apresentadas em língua portuguesa. Esta primeira seção de apresentação expôs o problema de pesquisa, as proposições do estudo, os materiais e métodos e as contribuições esperadas.

A seção dois consiste no Artigo I da tese intitulado "*A Framework of Strategic Orientations, Sustainable Supply Chain Management Initiatives and Triple Bottom Line Performance*". Este artigo propõe o desenvolvimento de um framework conceitual para verificar se existem relações entre os conceitos de orientações estratégicas de inovação, reputação e eficiência, de práticas de gestão da cadeia de suprimentos sustentável para frente e reversa, do triple bottom line performance, que considera as dimensões econômica, ambiental e social da sustentabilidade.

A seção três consiste no Artigo II da tese intitulado "*Strategic Orientations, Sustainable Supply Chain Management Initiatives and Triple Bottom Line Performance: empirical evidences from U.S. automotive industry*". Este artigo consiste no desenvolvimento e teste empírico de um modelo conceitual sobre as relações entre orientações estratégicas de inovação, reputação e eficiência, de práticas de gestão da cadeia de suprimentos sustentável para frente e reversa, do triple bottom line performance. Para isso, realiza-se a revisão da literatura, a construção de um instrumento de pesquisa para colta de dados com indústrias do setor automotivo nos Estados Unidos, a análise descritiva dos dados e o teste das hipóteses utilizando a modelagem de equações estruturais (SEM).

A seção quatro reúne e integra os principais resultados encontrados nos dois artigos que compõe a tese, relacionando-os com resultados de estudos anteriores revisados na literatura. Por fim, a seção cinco aponta as principais conclusões, lista as limitações encontradas na realização do estudo, sugere implicações gerenciais do estudo e direções para pesquisas futuras.

2 Artigo I - Conceptual Framework

A Framework of Strategic Orientations, Sustainable Supply Chain Management Initiatives and Triple Bottom Line Performance

Abstract

Purpose: This paper proposes a conceptual framework concerning the relationship between strategic orientations, sustainable supply chain management initiatives and triple bottom line performance.

Design/methodology/approach: A qualitative literature review was performed on strategic orientations of innovation-led, reputation-led, and efficiency-led, sustainable supply chain management initiatives in forward and reverse flows, and triple bottom line performance in the economic, environmental, and social dimensions.

Findings: The review of the literature and research gaps identified pointed out that strategic orientations of innovation-led, reputation-led, and efficiency-led can affect sustainable supply chain management initiatives in forward and reverse flows, and these initiatives can impact in triple bottom line performance.

Research limitations/implications: Some limitations were the lack of previous studies that define the strategic orientations of innovation, reputation and efficiency, and the complexity to identify the relationships and to integrate strategic, operational, and performance aspects.

Practical implications: Proposed relationships between concepts can serve as a guide for managers in establishing strategies to be pursued, in adopting sustainable initiatives and in setting goals to be achieved.

Originality/value: This paper developed a framework to identify the relationships among the strategic, operational and performance aspects of companies.

Keywords: Literature Review, Strategies, Operations, Sustainability, Performance.

2.1 Introduction

Responsible consumption and production is the goal number 12 of 17 sustainable development goals (SDGs) set by the United Nations (UN) in 2015 as part of the 2030 Agenda, an universal call to action to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity (UNITED NATIONS, 2015). The UN's efforts come from alarming problems such as 13 million tonnes of plastic is reached the ocean every year, only 3 percent of the world's water is fresh (drinkable), and one-fifth of the world's energy consumption is from renewable sources (UNDP, 2018). Thus, responsible consumption and production goal aims to reduce ecological footprint and water use, manage the shared natural resources, dispose adequately waste toxic and pollutants, encourage industries, businesses and consumers to recycle and reduce waste by changing the way we produce and consume goods and resources (UNDP, 2018).

Firms are being pressured for institutions and people to assume their responsibility on environmental and social problems resulting from internal process production, product use and waste disposal. Some theories can be associate to internal and external pressures. Resource-based view (RBV) theory states that firm's internal resources include physical resources, human capital, and organizational capital controlled by top managers to conceive and implement strategies and to create sustained competitive advantage by offering resources that are valuable, rare, imperfectly imitable, and non-substitutable (BARNEY, 1991; SARKIS; ZHU; LAI, 2011). Natural resource based view (NRBV) aims integrate the internal and external perspectives by including natural environment into the business strategies through three strategies: pollution prevention, product stewardship, and sustainable development (HART, 1995).

Institutional theory states that external social, politics, and economic pressures from groups such as regulatory structures, governmental agencies, laws, professions, and non-governmental organizations that influences firm's strategies and organizational decision making related to business initiatives (DIMAGGIO; POWELL, 1983; SARKIS; ZHU; LAI, 2011; GLOVER et al., 2014). Finally, stakeholder theory affirm that each group of people are able to affect business internal or external decisions such as employees, consumers, customers, shareholders, government regulators, and society in general represented by non-governmental organizations (FREEMAN, 2010; SARKIS; GONZALEZ-TORRE; ADENSO-DIAZ, 2010).

Thus, firms can contribute in goal number 12 achievement by establishing strategies and adopting operational initiatives to answer internal and external pressures. Companies upper echelons are responsible for the directions and strategic choices to be follow for a firm in order to increase its performance levels (HAMBRICK; MASON, 1984). They can establish strategic orientations to allow firm uses strategy to adapt or change internal aspects for a more favorable alignment (MANU; SRIRAM, 1996). Some examples of strategic orientations are diversification and low-cost orientation (PORTER, 1980), market orientation (NARVER; SLATER, 1990), technological orientation (GATIGNON; XUEREB, 1997), entrepreneurial orientation (LUMPKIN; DESS, 1996), learning orientation (GRINSTEIN, 2008), and environmental orientation (BANERJEE, 2002).

Testa e Iraldo (2010) introduced three strategic orientations that can affect the adoption of environmental practices: innovation-led, reputation-led, and efficiency-led. According to the authors, innovation-led strategic orientation are the goals to allow a firm to be a front-runner in developing product and process innovations. Reputation-led strategic orientation are business goals to improve corporate image. Finally, efficiency-led strategic orientation are business goals that lead to cost savings and enables a firm to supply cost-competitive product to the market.

Increasing public awareness led companies to engage their operational initiatives in sustainable development in order to meet the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987). Furthermore, Elkington (1997) stated that a corporation have to build triple bottom line (TBL) commitment and performance in order to achieve economic prosperity, environmental quality and social justice. The author

defined sustainability as a set of economic, environmental, and social dimensions.

Competition tends to shift from being business to business and moving between supply chains (COX, 1999; BAI et al., 2012). Operational initiatives are the daily firm's supply chain management (SCM) forward and reverse activities. Forward activities are product design, purchasing, production, distribution and transportation (COOPER; LAMBERT; PAGH, 1997; ELLRAM; COOPER, 1990; MENTZER et al., 2001) and reverse activities are used product collection, disassembly, recovery, refurbishing, recycling, final disposal (THIERRY et al., 1995; GUIDE JR.; VAN WASSENHOVE, 2002; JAYARAMAN; LUO, 2007). The integration of forward and reverse supply chain management initiatives results in a closed-loop supply chain management (KLEINDORFER; SINGHAL; VAN WASSENHOVE, 2005; GUIDE JR.; VAN WASSENHOVE, 2009).

Pressures for firms to have more responsible production and consumption actions have led them to take into account ways to ensure economic gains, to protect the environment and the people in their operations (ELKINGTON, 1997; KLEINDORFER; SINGHAL; VAN WASSENHOVE, 2005). As a result, new forms of SCM have emerged to include profit, planet and people issues into business initiatives. Green supply chain management (GSCM) encompasses production initiatives and product characteristics to avoid environmental problems and to allow recovery value from used products (ZHU; SARKIS, 2004; SRIVASTAVA, 2007; SARKIS; ZHU; LAI, 2011). Sustainable supply chain management (SSCM) includes initiatives to avoid environmental and social problems during production, consume and after-consume (KLEINDORFER; SINGHAL; VAN WASSENHOVE, 2005; SEURING; MÜLLER, 2008; CARTER; ROGERS, 2008; HASSINI; SURTI; SEARCY, 2012; AHI; SEARCY, 2013).

At the performance level, firm's should to pursue the triple bottom line outcomes. Companies' performance is commonly measured as economic (RAO; HOLT, 2005). Growing number of studies are also showing that companies can achieve environmental performance through environmental initiatives for pollution reduction, water and energy use, waste generation, and air emissions (AMBEC; LANOIE, 2008; LI et al., 2015; ZHU; SARKIS; LAI, 2007). A few studies investigate company's social performance in order to measure the impacts of firm's strategies and operations on employees, customers, and community (PAGELL; WU, 2009; ZAILANI et al., 2012; LUTHRA; GARG; HALEEM, 2016; PAULRAJ; BLOME, 2017; HONG; ZHANG; DING, 2017).

The aim of this article is to present a new conceptual framework to analyze and understand the links between strategic orientations, sustainable supply chain management initiatives and triple bottom line performance. We are interested in: (i) define the strategic orientations of innovation-led, reputation-led, and efficiency led; (ii) review the sustainable supply chain management initiatives in forward and reverse flows; and (iii) revise the triple bottom line performance on its three dimensions: economic, environmental, and social performance; and (iv) identify the relationships between strategic orientations, sustainable supply chain management initiatives, and triple bottom line performance.

The remainder of the paper is organized as follows: in Subsection 2.2 we present the research methodology. In Subsection 2.3 we detail the analysis of the literature. In Subsection 2.4 we discuss the research gaps. In Subsection 2.5 we develop the conceptual framework. Finally, in Subsection 2.6 we come up with conclusions.

2.2 Research Methodology

This article conducts a systematic literature review aimed at collecting and analyzing relevant papers in the area that overlaps strategic orientations of innovation-led, reputation-led and efficiency-led, sustainable supply chain management of forward and reverse initiatives, and triple bottom line performance measured by economic, environmental and social dimensions. The aim is to verify the relationships between these concepts.

Literature review offers a significant improving in building valid theories (MEREDITH, 1993). In order to systematically review the literature and to clarify research methodology for the article, Tranfield, Denyer e Smart (2003) suggest to follow five methodological steps: i) identification of research aim; ii) selection of articles; iii) quality assessment of studies; iv) data extraction; and v) synthesis of data and reporting.

Based on this approach, a database of articles was created, which was examined to provide answers to the research objective defined in the introduction section. A qualitative literature review has been conducted in ethical, strategic, operational and supply chain management journals. The steps of selection of articles and quality assessment of studies are detailed in subsection 2.2.1 material collection. The data extraction and synthesis of data and reporting are explained in subsection 2.2.2 descriptive analysis. Finally, the category selection is detailed.

2.2.1 Material collection

Material collection methodology and unit of analysis is the first step of the literature review process. The unit of analysis has been defined as article, book, report or thesis dissertation. The review process was initiated by searching for titles, abstracts and keywords of documents in Google-scholar search engine (www.scholar.google.com) and in ScienceDirect database (www.sciencedirect.com) with options of searching for articles in English language and sorted by relevance. Each group of concepts of the analysis were specified by defining the following keywords: i) strategic orientation: “strategic orientation”, “strategic management”, “innovation”, “corporate reputation”, and “corporate efficiency”; ii) supply chain management initiatives: “supply chain management”, “green supply chain management”, “sustainable supply chain management”, “closed-loop supply chain management”, “reverse supply chain”, “reverse logistics”; iii) performance: “triple bottom line performance”; “sustainability performance”, “economic performance”, “environmental performance”, “social performance”. The articles belong to the leading publishers including Elsevier, Emerald, Springer, Taylor and Francis, Wiley and Informs.

Articles were collected and all considered for first quick check of content and relevancy for the study. Only those articles which were focused on the above mentioned issues were taken into consideration. Finally, 147 articles were selected, reviewed and examined in detail. 11 books, research reports, and thesis dissertations were also included because of their contribution and importance for the study of strategic orientations, supply chain management and business performance.

2.2.2 Descriptive analysis

To comprehend the multi perspective view of the concepts, articles were sorted out from more then 60 journals. Table 1 illustrates the articles published by various journals. From Table 1, it is observed that most of the articles have been published in repute journals such as Journal of Cleaner Production, International Journal of Production Economics, International Journal of Operations & Production Management, International Journal of Production Research, Harvard Business Review, Journal of Business Ethics, Journal of Business Research, Journal of Operations Management, Journal of Supply Chain Management, International Journal of Physical Distribution & Logistics Management, Academy of Management Journal, Academy of Management Review, California Management Review, Corporate Social Responsibility and Environmental Management, Omega, Strategic Management Journal, and Supply Chain Management: An International Journal.

Annual distribution of number of articles published from year to 1934 to 2017 is shown in Figure 1. Most of the articles were selected from recent publications. 33 articles out of total 147 selected articles were published before the year 2001. Rests of the articles (114) were selected from the year 2001 and onward. Highest number of articles (13) has been published in year 2012. It is also clear that number of articles have increased considerably in last few years because of growing interest of researches in this area.

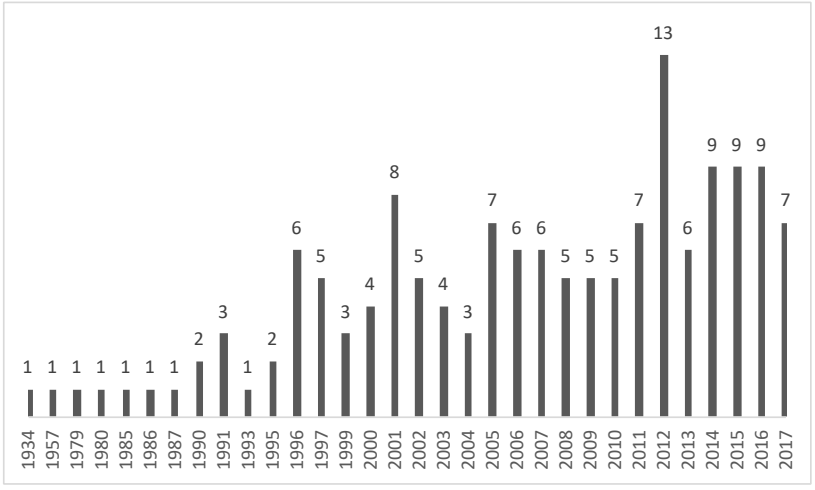

Figure 1: Annual distribution of publications across the period of study

Table 1: Number of articles published by main journals

Articles published by journals	No. of articles
Journal of Cleaner Production	15
International Journal of Production Economics	11
International Journal of Operations & Production Management	6
International Journal of Production Research	6
Harvard Business Review	4
Journal of Business Ethics	4
Journal of Business Research	4
Journal of Operations Management	4
Journal of Supply Chain Management	4
International Journal of Physical Distribution & Logistics Management	4
Academy of Management Journal	3
Academy of Management Review	3
California Management Review	3
Corporate Social Responsibility and Environmental Management	3
Omega	3
Journal of Marketing	3
Strategic Management Journal	3
Supply Chain Management: An International Journal	3
Academy of Management Perspectives, European Journal of Operational Research, Interfaces, Management Science, Production and Operations Management, Resources, Conservation and Recycling, Research Policy, Transportation Research Part E: Logistics and Transportation Review	2 Each
BAR - Brazilian Administration Review, Benchmarking: An International Journal, Business Horizons, Business Process Management Journal, Business Strategy and the Environment, Corporate Communications: An International Journal, Corporate Reputation Review, Decision Support Systems, European Journal of Marketing, European Management Journal, Industrial Management & Data Systems, International Journal of Business Innovation and Research, International Journal of Management Reviews, International Journal of Operations & Production, International Journal of Operations and Production Management, Journal of Business Logistics, Journal of Environmental Economics and Management, Journal of Leadership & Organizational Studies, Journal of Management Studies, Journal of Manufacturing Technology Management, Journal of Marketing Research, Journal of Purchasing and Supply Management, Journal of the Academy of Marketing Science, Journal of the Royal Statistical Society, Management Decision, Operations Research, Production Planning and Control, R&D Management, The Academy of Management Review, The International Journal of Logistics Management, The Journal of Business, The Scientific World Journal, Total Quality Management & Business Excellence, Vikalpa	1 Each
Books/Reports/Thesis	11
Total number	147

2.2.3 Category selection

Categories and organization of the study are shown in Figure 2. The literature review are classified into three groups: i) strategic orientation as the categories innovation-led, reputation-led, and efficiency-led; ii) sustainable supply chain management initiatives as the categories forward supply chain and and reverse supply chain; and iii) triple bottom line performance as the categories economic performance, environmental performance, and social performance.

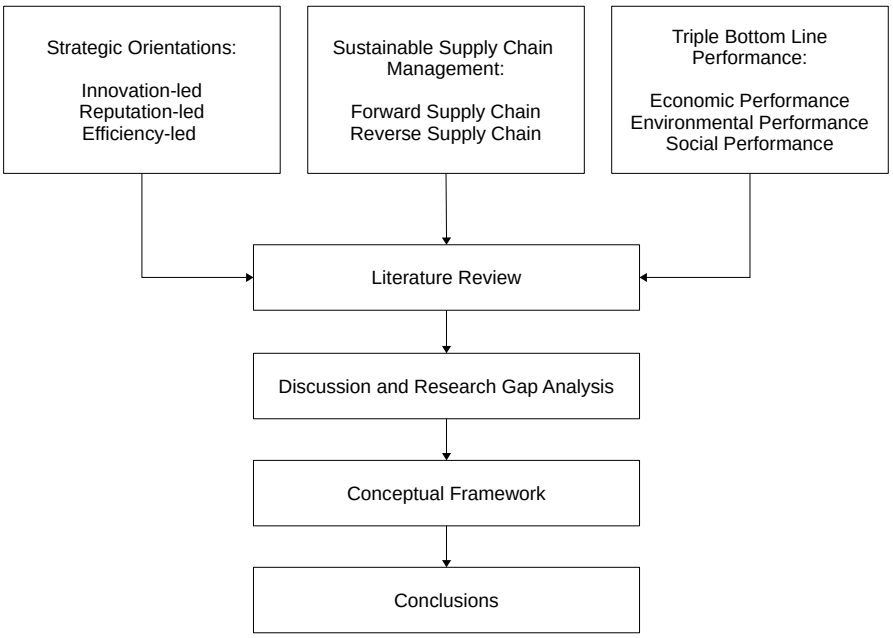

Figure 2: Categories and organization of the study

Literature review allows the building of strategic orientations of innovation, reputation, and efficiency definitions as well as the sustainable supply chain management and triple bottom line performance definitions. It also points out to the discussion and research gaps as basis for the conceptual framework development and conclusions.

2.3 Detailed analyses of the literature

2.3.1 Strategic Orientations

Corporate strategy is defined as the creation of a unique and valuable position, involving a different set of activities (PORTER, 1996). It is a commitment to a set of coherent, mutually reinforcing policies or behaviors to reach goals, clarify objectives and priorities and promote alignment among diverse groups withing an firm (PISANO, 2015).

Strategies can be grouped into strategic orientations. Strategic orientation "refers to how an organization uses strategy to adapt to and/or change aspects of its environment for a more favorable alignment" (MANU; SRIRAM, 1996, p. 79). It is "the guiding principles that influence a firm's marketing and strategy-making activities" that represent company's culture and guide its interactions with customers and competitors (NOBLE; SINHA; KUMAR, 2002, p. 25). Strategic orientations defines the broad outlines for the firm's strategy (SLATER; OLSIN; HULT, 2006) such as overall direction, objectives, and actions to be driven by top management (HSU; TAN; ZAILANI, 2016).

Several theories related to strategic orientations were proposed in the literature. Market orientation as the set of customer orientation, competitor orientation, and interfunctional coordination (NARVER; SLATER, 1990; GATIGNON; XUEREB, 1997; VOSS; VOSS, 2000).

Diversification orientation as a low-cost strategy (PORTER, 1980). Technological orientation as innovative firms that are strongly R&D oriented, committed in buying new technologies for the development of their new products (GATIGNON; XUEREB, 1997). Entrepreneurial orientation as new entry in new or established markets with new or existing goods or services (LUMPKIN; DESS, 1996). Organizational learning orientation as the company's development of knowledge in the organization (GRINSTEIN, 2008) by having a strong commitment to learning, open-mindedness, and a shared vision (SINKULA; BAKER; NOORDEWIER, 1997). Corporate environmental orientation as the company "recognition of the legitimacy and importance of the biophysical environment in the formulation of organization strategy, and the integration of environmental issues into the strategic planning process" (BANERJEE, 2002, p. 181).

Testa e Iraldo (2010) introduced three strategic orientations as main motivational approaches to the adoption of environmental initiatives at the firm level: innovation-led, reputation-led, and efficiency-led. The authors defined these strategic orientations with environmental attributes and they they used single indicators to represent them. This study is looking for a broader definition related to these strategic orientations in order to include other attributes.

2.3.1.1 Innovation-led

Innovation is the adoption of a change in the combinations of materials and forces employed in the production of goods and services and it embodies new products, new methods of production, new sources of supply, the exploitation of new markets and new ways to organize business (SCHUMPETER, 1934). Innovation means the adoption of new ideas or behaviors related to structure or administrative system, policy, product and services, production processes technology, plan or program pertaining to organizational members in an attempt to adapt to the environment to increase or sustain firm efficiency and competitiveness (DAMANPOUR, 1991; DAMANPOUR; GOPALAKRISHNAN, 2001). It is highly linked to a strong technological and R&D orientation (NAPOLITANO, 1991; BALDWIN; JOHNSON, 1996; GATIGNON; XUEREB, 1997). Furthermore, the management of innovation embodies both technological and human aspects and top management support and commitment is crucial for successful innovation (PRAJOGO; AHMED, 2006).

Oslo Manual introduced four innovation types: product innovation, process innovation, organizational innovation and marketing innovation (OECD, 2005). A product innovation is the introduction of good service that is new or significantly improved regarding its characteristics or intended uses, including significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics (OECD, 2005). A product innovation is a reflection of a firm's commitment to developing and marketing products to meet a user or a market need (LI; ATUAHENE-GIMA, 2001). Process innovation is the implementation of a new or significantly improved production or delivery method (OECD, 2005). It includes significant changes in techniques, equipment and/or software. It can be intended to decrease unit costs of production or delivery, to increase quality, or to produce

or deliver new/improved products (UTTERBACK; ABERNATHY, 1975; OECD, 2005).

Organizational innovation is the implementation of a new organizational method in the firm's business practices workplace organization or external relations (OECD, 2005). It tends to introduce new structure or administrative system, or new plan or program, and improving learning and knowledge sharing in order to reduce administrative and transaction costs, improve workplace satisfaction (DAMANPOUR, 1991; GUNDAY et al., 2011). Marketing innovation is the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing addressing to reach customer needs, opening up new markets, or newly positioning a firm's product on the market with the intention of increasing firm's sales (OECD, 2005). Companies should target quality of products, customer service, flexibility in responding to consumer needs, customer feedback, range of products, and frequency of new products (BALDWIN; JOHNSON, 1996).

Many companies are known for their innovation strategies. General Electric is an example. The company's mission is "to invent the next industrial era, to build, move, power and cure the world" (GENERAL ELECTRIC, 2014). It operates in several sectors related to good production and service delivery such as aerospace, food and beverage, industrial manufacturing, chemical, healthcare, oil and gas, transportation, digital, capital, and energy. The company seeks to boost innovation and creativity by leveraging technology across product platforms. To capture more supply chain value, the company invests in its materials innovation and process manufacturing innovation, and has actions to reduce leftovers in production and hazardous wastes (GENERAL ELECTRIC, 2016).

The success of innovation depends on a design that balances the requirements of the new product and its manufacturing process, the market needs, and the company interests (KLINE; ROSENBERG, 1986). Product design and process improvement can lead to the reduction of cost, defects, pollution and waste, if the company is interested in quality control and re-engineering (YANG et al., 2010). A company can also invest in innovation to increase market share and win customer loyalty (DAMANPOUR; GOPALAKRISHNAN, 2001).

Summarizing, a firm with an innovation-led strategic orientation seeks to achieve a competitive advantage and superior performance by being a technology market leader. This may be achieved by having a strong research orientation, developing new groundbreaking products and/or adopting new advanced processes; cultivating ideas internally (by supporting employee inventions and internal ventures) and externally (by establishing relationships with partners, suppliers, universities, and customers) to develop innovative products, process or services; and having market focus to meet customer needs, advancing technologies, shortening product life cycles and increasing global competition to assimilate design and manufacture of the product.

2.3.1.2 Reputation-led

Corporate reputation consists on the judgments and collective evaluations of stakeholders with respect to a company (GOTSI; WILSON, 2001; SARKIS; ZHU; LAI, 2011). Fombrun

e Shanley (1990) define reputation as a perceptual representation of a company's past actions and future prospects, a construct that should articulate multiple aspects, economic (financial and accounting) and non-economic (institutional, strategy, social responsibility, and media visibility). According to the authors, it includes quality of management, quality of products or services, long-term investment value, corporate innovativeness, financial soundness, ability to attract, develop, and keep talented people, community and environmental responsibility, and use of corporate assets.

Reputation signals stakeholders about the management of financial, social and environmental responsibility attributed to the corporation over time (BARNETT; JERMIER; LAFFERTY, 2006). It can be seen as an intangible asset with potential for value creation and firm's image development that leads to retain employees, attract customers, build a trusting relationship with suppliers and difficult competitors replication (ROBERTS; DOWLING, 2002). As a result, companies are competing for costumer and for reputation status (FOMBRUN; SHANLEY, 1990).

In order to compete for customer and reputation, Treacy e Wiersema (1993) argue that firms are building powerful and cohesive business systems that could deliver more value than competitors. Thus, firm's have to go beyond delivering quality and price of product and services. They have to reach convenience of purchase, after-sales service, dependability, and other costumers expectations, for example. The success of industries in the leadership positions is resulting of strategies to narrowing their business instead broadening it to deliver superior customer value. Firms have to focus on build customer intimacy and loyalty for the long term by "segmenting and targeting markets precisely to match the demands of those niches" (TREACY; WIERSEMA, 1993, p. 2).

The social and environmental issues of corporate reputation are related to the firm's corporate social responsibility (CSR). CSR consists of the firm's commitment to generate long-run beneficial impact on society (customer, suppliers, employees, investors, and communities), beyond the interest of the firm and the requirements by law (MCWILLIAMS; SIEGEL, 2001). It encompasses economic, legal, ethical and discretionary (voluntary/philanthropy) issues related to social responsiveness such as product safety, occupational safety and health, reduction environment impacts, human rights, education, employee diversity, recycling, and philanthropic contributions (CARROLL, 1979; CARROLL, 1991). Gotsi e Wilson (2001) recognize the employee role to improve brand image and to build a good corporate reputation internally to the company and also to external public because they are closed to customers.

Many companies are adopting reputation strategies and publishing their annual CSR reports. Starbucks, for example, has as mission "to inspire and nurture the human spirit - one person, one cup and one neighborhood at a time." The company's actions are focusing in four areas: sustainable coffee, greener retail business, creating opportunities, and strengthening communities. It pursue this actions through greening stores, using renewed energy, improving the recyclability of cups, employing youth, offering community service to improving access to ed-

ucation and agricultural training, microfinance and microcredit services, and increasing levels of health, nutrition and water sanitation, ensuring inclusive workplace and diverse supply chain (STARBUCKS, 2016).

A firm with a reputation-led strategic orientation (RP) seeks to achieve a competitive advantage and superior performance by leveraging its corporate image, corporate brand equity, and/or organizational identity. This may be achieved by cultivating an organizational culture that is strongly committed to customer service, developing products and/or services that deliver superior customer value (quality, reliability, cost), and adopting processes that lead to products and services that are environmentally friendly; treating employees fairly; responding to crisis quickly and efficiently, instituting good corporate governance practices; establishing fair trade, avoiding illegal labor, promoting community support for economic and health care improvements; and supporting local community (social projects, philanthropy, donations).

2.3.1.3 Efficiency-led

Efficiency usually means firm's success in production as large as possible an output from a given set of inputs, without absorbing further resources (FARRELL, 1957). Porter (1980) suggest that companies have pursued efficiency strategy of overall cost leader through a set of functional policies aimed at this basic objective. This strategy requires construction of efficient-scale facilities, pursuit of cost reductions, tight cost and overhead control, avoidance of marginal customer accounts, and cost minimization in areas like R&D, service, sales force, and advertising. The author highlights the importance of managerial attention to cost control.

Porter (1996) suggests that a firm can achieve cost-leadership, productivity, quality, and speed by using management tools and techniques such as total quality management, benchmarking, time-based competition, outsourcing, partnering, reengineering, change management. Other tools that enable company to achieve efficiency are adopting standardization system as ISO 9000 (ZAIRI, 1997), standard products (SU; YANG; YANG, 2012), lean six sigma (DASGUPTA, 2003), process control, just-in-time inventory control, and compensation-based management incentives (BALDWIN; JOHNSON, 1996). Moreover, efficiency strategies implementation depends on talented employees and process reliability, which is the extent to which work processes are performed without delays, defects, or accidents (MAHSUD; YUKL; PRUSSIA, 2011).

Walmart is an example of company that pursue efficiency strategy. Company's mission statement is "saving people money so they can live better." The multinational retail corporation seeks to moving with speed to save customers time and money in all ways they want to shop: in stores, on their mobile device, or through pickup and delivery. Investments in e-commerce, technology and logistics are allow it to increase productivity, speed, and effectiveness efficiencies with more efficient supply chain processes and creating more real-time information (WALMART, 2017).

Companies that operating with an efficiency strategy produce different types of products

and utilize different technologies, organizational structures, control systems and employees (EBBEN; JOHNSON, 2005). By increasing efficiency, the company can eliminate losses, leftovers and defects, improve customer satisfaction, and achieve best practice (PORTER, 1996). Company's operational efficiency through activities and human resources can create competitive advantage over competitors (BANKER; MASHRUWALA; TRIPATHY, 2014).

Finally, a firm with an efficiency-led strategic orientation seeks to achieve a competitive advantage and superior performance by being a cost leader. This may be achieved by adopting processes to facilitate the manufacture of products and delivery of services with the least amount of wasted time, materials, and labor. Firms with an efficiency-led orientation focus on improving operational metrics related to processes (speed/productivity, scale), products (quality/defect rates and yields, inventory).

2.3.2 Sustainable supply chain management initiatives

Supply chain management (SCM) is "a set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer," (and return) (MENTZER et al., 2001, p. 4). SCM involves company, supplier, and customers involved in business processes and activities as systems management, purchasing, production, inventory management, transportation, warehousing, costumer services, cooperative efforts between chain member in such areas as marketing research, promotion, sales, research and development, and product design (COOPER; LAMBERT; PAGH, 1997).

Increasing pressures related to environmental and social problems have changed the way that supply chains operate. As a result, the triple bottom line dimensions of economic, environmental and social have became part of the new forms of SCM initiatives such as green supply chain management (GSCM) and sustainable supply chain management (SSCM). Green supply chain management is defined as "integrating environmental thinking into supply-chain management, including product design, material sourcing and selection, manufacturing processes, delivery of final product to the consumers as well as end-of-life management of the product after its useful life" (SRIVASTAVA, 2007, p. 54-55).

Environmental management practices in the organization's operations aim to contain the deterioration of the environment caused by excessive exploitation of natural resources, excess waste and increased levels of pollution (ZHU; SARKIS, 2004; SRIVASTAVA, 2007). Greening supply chain also leads to packaging material reduction, ISO 14001 adherence, lean management, Eco-design, production facilities, clean programs, reducing carbon footprints, product life cycle costing or assessment, reducing transportation costs, reverse logistics and manufacturing (AGERON; GUNASEKARAN; SPALANZANI, 2012). GSCM includes the possibility of recovering the value of waste products and waste by reintegrating them into the supply chain system through reverse supply chain practices (SARKIS; ZHU; LAI, 2011).

Sustainable supply chain management (SSCM) initiatives include practices to reduce costs

reduction and environmental and social risks in the firm, by taking into account the three dimensions of sustainability. Some SSCM definitions proposed in the literature are shown in Table 2. SSCM definitions has been reviewed in the literature (CARTER; ROGERS, 2008; CARTER; EASTON, 2011; HASSINI; SURTI; SEARCY, 2012; ANSARI; KANT, 2017; DUBEY et al., 2017; STINDT, 2017).

Table 2: Sustainable supply chain management definitions

Reference	Definitions
Linton, Klassen e Jayaraman (2007, p. 1078)	Sustainability in supply chain management (SSCM) can be defined as the integration of issues and flows related to the activities of product design, manufacturing by-products, by-products produce during product use, product life extension, and recovery processes at end-of-life.
Seuring e Müller (2008, p. 1700)	SSCM is defined as the management of material, information and capital flows as well as cooperation among companies along the supply chain while taking goals from all three dimensions of sustainable development, i.e., economic, environmental and social, into account.
Carter e Rogers (2008, p. 368)	SSCM is the strategic, transparent integration and achievement of an organization's social, environmental, and economic goals in the systemic coordination of key interorganizational business processes for improving the long-term economic performance and its supply chains.
Pagell e Wu (2009, p. 38)	Sustainable supply chain management is the specific managerial actions that are taken to make the supply chain more sustainable (i.e. it performs well on all elements of triple bottom line) with an end goal of creating a truly sustainable chain.
Wolf (2011, p. 223)	SSCM integration is defined as the degree to which a manufacturer strategically collaborates with its supply chain partners and collaboratively manages intra- and inter-organization processes for sustainability. The goal is to achieve economic, environmental and social sustainability by integrating flows of products and services, information, capital and decisions, to provide maximum value to multiple stakeholder groups.
Ahi e Searcy (2013, p. 339)	SSCM is defined as the creation of coordinated supply chains through the voluntary integration of economic, environmental, and social considerations with key inter-organizational business systems designed to efficiently and effectively manage the material, information, and capital flows associated with the procurement, production, and distribution of products or services in order to meet stakeholder requirements and improve the profitability, competitiveness, and resilience of the organization over the short- and long-term.
Pagell e Shevchenko (2014, p. 45)	SSCM is the designing, organizing, coordinating, and controlling of supply chains to become truly sustainable with the minimum expectation of a truly sustainable supply chain being to maintain economic viability, while doing no harm to social or environmental systems. These definitions and many others share a focus on the triple bottom line of economic, environmental, and social performance and examining this performance over an extended period of time.
Masoumik et al. (2014, p. 3)	Sustainable supply chain integrating the concept of the closed loop supply chain, green supply chain, and organizational sustainability. It can be summarized as supply chain that closes the loop of upstream and downstream flows of products and materials by recycling and recovering used-items and re-entering them in production cycles and engages in sustainability-conscious practices taking goals from all three dimensions - economic, environmental and social -of sustainable development into account, which are derived from the customer and stakeholder requirements.

SSCM encompasses the practices of GSCM and Corporate Social Responsibility (CSR) (STINDT, 2017). CSR is related to issues such as business ethics, philanthropy, community relations where the firm operates, diversity in the workplace, security, human rights and the

environment and has as a central idea that the firm can affect stakeholders, such as customers, employees, governments, community and investors (MALONI; BROWN, 2006). Social management practices of the sustainability include make investments in employee training and education to improve customer service (before, during, and after purchase), employ ergonomic workplace considerations and material handling, create jobs to improve employee diversity (e.g. women, youth, elderly, disable people), adopt reward structures (STINDT, 2017), employee satisfaction (LEE et al., 2012), employee training, health and safety (PAULRAJ; CHEN; BLOME, 2017), and cooperation with customers for Eco-design, cleaner production, and green packaging (WU; DING; CHEN, 2012).

Organizations will need to deal with environmental and social issues into the supply chain (KLEINDORFER; SINGHAL; VAN WASSENHOVE, 2005). The adoption of sustainable practices in the supply chain means that all stages of the supply chain must consider environmental and social as well as economic aspects, which include relationships with input producer communities, employee support, supplier collaboration, production responsible and activities to recover value of used products and contribute to their proper destination. Furthermore, SSCM practices integrate reverse activities in firm's forward supply chain operations by closing the loop through using recovery used materials and components into new materials or products with value in the marketplace (HERVANI; HELMS; SARKIS, 2005; HSU et al., 2013; LUTHRA; GARG; HALEEM, 2016; SRIVASTAVA, 2007).

The original SCM's structure include just forward supply chain initiatives (BEAMON, 1999; TAN et al., 1999; LI et al., 2006). However, the emergence of environmental and social problems has drove shareholders, consumers, customers, state and federal regulatory mandates, nongovernmental organizations, employees, and community group to pressure for responsible production and consumption (HENRIQUES; SADORSKY, 1996; DE BAKKER; NIJHOF, 2002; UNITED NATIONS, 2015). Companies are forcing to become responsible for residual and final products, after customer use (DOWLATSHAH, 2000). Thus, forward and reverse supply chain initiatives became part of SCM as well as GSCM and SSCM structures.

Forward supply chain initiatives are design and development, purchasing, production, packaging, distribution, transportation, sales, and customer service (ABBEY; GUIDE JR., 2017; GOVINDAN; SOLEIMANI; KANNAN, 2015; KRIKKE; BLOEMHOF-RUWAARD; VAN WASSENHOVE, 2003). Reverse supply chain initiatives are product and packaging collection, disassembly, recovery reuse, refurbishing, remanufacturing, recycling, and final disposal (THIERRY et al., 1995; GUIDE JR.; VAN WASSENHOVE, 2002; JAYARAMAN; LUO, 2007; ABBEY; GUIDE JR., 2017). The integration of forward and reverse initiatives can be called as closed-loop supply chain management (CLSC), as shown in Figure 3. CLSC management is defined as "the design, control, and operation of a system to maximize value creation over the entire life cycle of a product with dynamic recovery of value from different types and volumes of returns over time" (GUIDE JR.; VAN WASSENHOVE, 2009, p. 10).

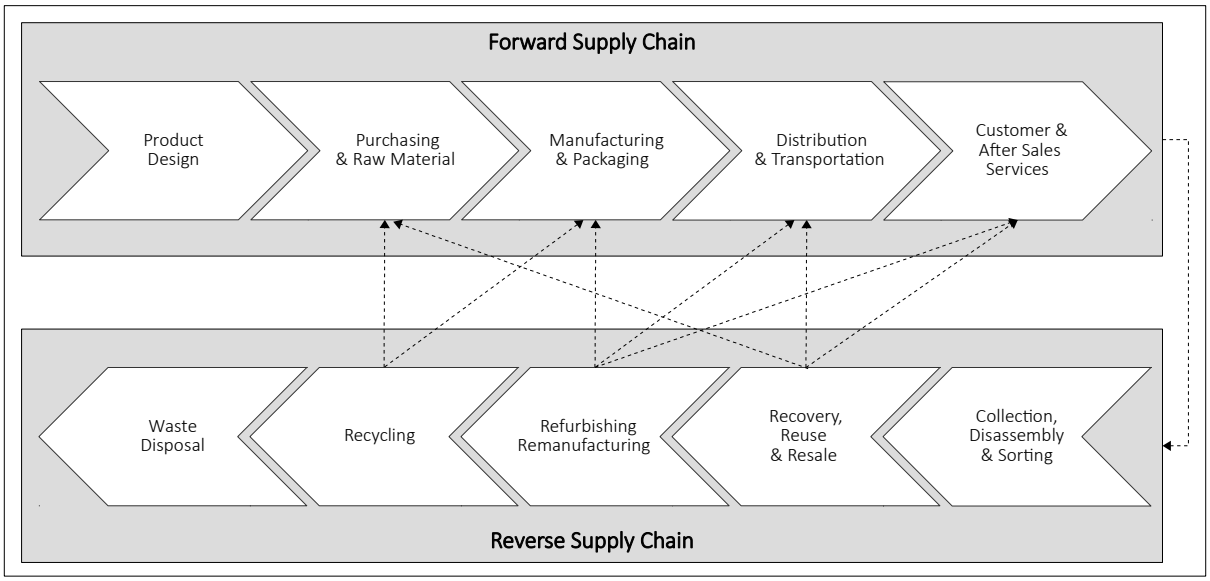

Figure 3: Sustainable supply chain management in a closed loop system
Source: Adapted from Thierry et al. (1995), Fleischmann et al. (2000), Krikke, Bloemhof-Ruwaard e Van Wassenhove (2003), Talbot, Lefebvre e Lefebvre (2007), Stindt (2017)

In the following, we revise the literature on green and sustainable initiatives related to forward and reverse supply chains.

2.3.2.1 Forward supply chain initiatives

Forward supply chain initiatives integrate economic, environmental and social issues into activities from product design to consumer use (GOVINDAN; SOLEIMANI; KANNAN, 2015; ABBEY; GUIDE JR., 2017). Normally terms such as Eco, green, environment, and sustainable comes with these activities in the articles. Table 3 summarizes previous studies related to forward supply chain initiatives. The majority of the studies focus on product design and development (76%), following by purchasing/aw materials (76%), manufacturing/production (32%), packaging (24%), and distribution and transportation (20%).

Product design and development initiatives should result in products with less materials and toxic inputs, biodegradable, low energy consume, easy to recovery and low impact during production and use use (STINDT, 2017). Product design and development aims to reduce consumption of material and energy, design products for reuse, recycling, recovery of materials and parts, avoid or reduce use of hazardous of products in the manufacturing process, facilitate disassembly, use recycled materials, make packaging reusable, use environmentally friendly raw materials (ZHU; SARKIS, 2004; RAO; HOLT, 2005; FULLER; OTTMAN, 2004; HSU et al., 2013; PAULRAJ; CHEN; BLOME, 2015).

Purchasing/procurement of raw materials involves the decision in choosing products with environmental and social aspects from suppliers (STINDT, 2017). It goal is to provide design specifications to suppliers, cooperate with suppliers for environmental objectives, collaborate

with suppliers to reduce or eliminate product environmental impacts, choose suppliers by environmental criteria such as ISO14001 certification, ask suppliers to commit to waste reduction goals, purchase products recycle content or nontoxic materials and packaging (CARTER; KALE; GRIMM, 2000; RAO; HOLT, 2005; ZHU; SARKIS; LAI, 2007; ZAILANI et al., 2012; HSU et al., 2013).

Table 3: Review of sustainable forward supply chain initiatives

No.	Authors	Product Design/ Development	Purchasing/ Raw materials	Manufacturing/ Production	Packaging	Distribution/ Transportation
1	Zhu e Sarkis (2004)	✓				
2	Fuller e Ottman (2004)	✓				
3	Knight e Jenkins (2009)	✓				
4	Lai, Wu e Wong (2013)	✓				
5	Paulraj, Chen e Blome (2015)	✓				
6	Carter, Kale e Grimm (2000)		✓			
7	Paulraj (2011)		✓			
8	Blome, Hollos e Paulraj (2014)		✓			
	Jabbour et al. (2014)		✓			
9	Zhu, Sarkis e Lai (2007)	✓	✓			
10	Zhu e Sarkis (2007)	✓	✓			
11	Zhu, Sarkis e Lai (2008)	✓	✓			
12	Zhu, Sarkis e Lai (2013)	✓	✓			
13	Hsu et al. (2013)	✓	✓			
14	Green Jr. et al. (2012)	✓	✓			
15	Vanalle et al. (2017)	✓	✓			
16	Tan et al. (2016)		✓	✓		
17	Sarkis, Gonzalez-Torre e Adenso-Diaz (2010)	✓		✓		
18	Zailani et al. (2012)		✓		✓	
19	Li et al. (2015)	✓	✓	✓		
20	Hsu, Tan e Zailani (2016)		✓	✓	✓	
21	Tang e Zhou (2012)	✓		✓		✓
22	Talbot, Lefebvre e Lefebvre (2007)	✓	✓	✓		✓
23	Perotti et al. (2012)	✓	✓		✓	✓
24	Rao e Holt (2005)	✓	✓	✓	✓	✓
25	Luthra, Garg e Haleem (2016)	✓	✓	✓	✓	✓
	Total	19	19	8	6	5
	Percent	76	76	32	24	20

Note: "✓" indicates the study found specific forward supply chain initiatives.

Manufacturing/production aims achieve Eco-efficiency process and to guarantee employee

safety and working conditions (STINDT, 2017). It includes the substitution of polluting and hazardous materials/parts, production planning and control and optimization focus on reducing waste and emissions, use of clean technology/equipment to make savings in energy, water, and waste, and use of lean manufacturing (RAO; HOLT, 2005; LI et al., 2015; HSU; TAN; ZAILANI, 2016).

Packaging enables the distribution of products and reduced environment impact of product spoilage and wast (ZAILANI et al., 2012). Packaging should be made from materials healthy in all probable end-of-life scenarios, with renewable contents and without hazardous contents, and be reusable (ZAILANI et al., 2012; HSU; TAN; ZAILANI, 2016).

Distribution and transportation objective is to save fuels and to reduce waste and emissions generated (STINDT, 2017). Distribution and transportation encompass use of environmental friendly transportation and distribution, use of alternative fuels, choose an environmentally friendly facility location, (re)design logistics system components for higher efficiency, use of more recent/less polluting vehicles (RAO; HOLT, 2005; PEROTTI et al., 2012; LUTHRA; GARG; HALEEM, 2016).

2.3.2.2 Reverse supply chain initiatives

Reverse supply chain helps companies to become more responsible since it encompass processes such as reduction, reuse, recyclability, remanufacturing, and final disposal (THIERRY et al., 1995; SARKIS, 2001). Reverse logistics is "the process of planning, implementing, and controlling the efficient, cost effective flow of raw materials, in-process inventory, finished goods and related information from the point of consumption to the point of origin for the purpose of recapturing value or proper disposal" (ROGERS; TIBBEN-LEMBKE, 1999, p. 2). It has become a important field for firms due to growing environmental concerns, legislation, corporate social responsibility and sustainable competitiveness (AGRAWAL; SINGH; MURTAZA, 2015).

Product take-back can be a profit center because recovery strategies for end-of-life products such as reverse logistics, closed-loop supply chains, industrial ecology, and life cycle assessment (LCA) can represent an environmental liability, or an economic opportunity, or both (GEYER; JACKSON, 2004). Table 4 summarizes previous studies related to reverse supply chain initiatives. Most of the studies focus on collection or take-back products and packaging, repair or reuse, refurbishing or remanufacturing and recycling. Less studies focus on waste management initiatives.

Collection/take-back refers to all activities to collect used products and packaging and physically moving them to some point to further treatment (FLEISCHMANN et al., 2000; KRIKKE; BLOEMHOF-RUWAARD; VAN WASSENHOVE, 2003). Firms can collect used products directly from customers, they can provide suitable incentives to an existing retailer or they can subcontract the collection activity to a third party (SAVASKAN; BHATTACHARYA; VAN WASSENHOVE, 2004). Firms can taking back packaging (RAO; HOLT, 2005), collecting

products used products from customer for recycling, reclamation, or reuse (HSU; TAN; ZAILANI, 2016).

Repair/reuse means fixing and/or replacement of broken part to be reusable (THIERRY et al., 1995). It includes reuse, separation of reusable products, separation of reusable parts (LAI; WU; WONG, 2013), returns packaging to suppliers for reuse or recycling (HSU et al., 2013). Refurbishing aims to bring used product up to specified quality and remanufacturing aims to bring used products up to quality standards that are as rigorous as those for new products (THIERRY et al., 1995).

Recycling propose is to reuse materials from used products and components (THIERRY et al., 1995). It includes recycling of materials internal to the company (RAO; HOLT, 2005), establish recycling procedures (TALBOT; LEFEBVRE; LEFEBVRE, 2007), returns the products from customers for safe refill (HSU et al., 2013).

Table 4: Review of sustainable reverse supply chain initiatives

No.	Authors	Collection/ Take-back	Repair/ Reuse	Refurbishing/ Remanufacturing	Recycling	Waste Management
1	Sarkis, Gonzalez-Torre e Adenso-Diaz (2010)				✓	
2	Rao e Holt (2005)	✓			✓	✓
3	Tang e Zhou (2012)	✓		✓	✓	
4	Perotti et al. (2012)		✓		✓	✓
5	Hsu et al. (2013)	✓	✓	✓	✓	
6	Hsu, Tan e Zailani (2016)	✓	✓	✓	✓	
7	Talbot, Lefebvre e Lefebvre (2007)		✓	✓	✓	✓
8	Lau e Wang (2009)	✓	✓	✓	✓	✓
9	Lai, Wu e Wong (2013)	✓	✓	✓	✓	✓
10	Nikolaou, Evangelinos e Allan (2013)	✓	✓	✓	✓	✓
	Total	7	7	7	10	6
	Percent	70	70	70	100	60

Note: "✓" indicates the study found specific reverse supply chain initiatives.

Waste management are the activities required to manage waste to its final disposal. It includes reduction of solid and liquid waste (RAO; HOLT, 2005), ensuring appropriate storage/dumping waste (TALBOT; LEFEBVRE; LEFEBVRE, 2007), waste incineration and landfilling (LAI; WU; WONG, 2013).

2.3.3 Triple bottom line performance

Increasing public awareness related to environmental and social problems led the World Commission on Environment and Development (WCED), Brundtland Commission, to produce

the “Our Future Common” Report where they established the concept of sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987). The initial discussions toward sustainable development embrace economic and environmental issues. However, Elkington (1997) stated that a firm have to build triple bottom line (TBL) commitment and performance in order to produce economic prosperity, environmental quality and social justice. Thus, the author defined sustainability as a set of economic, environmental, and social dimensions.

Triple bottom line approach proposes the integration of profit, people, and the planet into the culture, strategy, and operation of companies (KLEINDORFER; SINGHAL; VAN WASSENHOVE, 2005). Elkington (1997) says that triple bottom line implies in a challenge for firms, where if they refuse it is to risk extinction and to accept it is to embark on a process which is likely to be both intensely taxing and, potentially, highly rewarding. Thus, firms have to think ways to adapt or change their supply chain in order to adopt sustainable initiatives, and such initiatives can generate sustainability outcomes.

Company’s performance is normally measured by economic and financial indicators. However, the growing concern related to environmental protection, firm transparency, employee benefits and security concerns lead firms to change their supply chains models and to measure environmental and social performance (HONG; ZHANG; DING, 2017). These three types of performance consist on the triple bottom line approach of sustainability (ELKINGTON, 1997; KLEINDORFER; SINGHAL; VAN WASSENHOVE, 2005; CARTER; ROGERS, 2008; GRI, 2016). While economic performance is easy to measure, measuring environmental and social goals is a challenging task (GOLD; SEURING; BESKE, 2010).

Table 5 summarizes previous studies that propose indicators to measure the TBL performance dimensions. Most of the studies (90.6%) investigated the economic and environmental performance, while 50% investigated the social performance. The dimensions of TBL performance are described below.

2.3.3.1 Economic Performance

Elkington (1997) define the firm’s economic bottom line as the economic capital that includes physical capital (including machinery and plant), financial capital, human capital, and intellectual capital. GRI (2016) establish economic performance indicators as the direct economic value generated and distributed, including revenues, operating costs, employee compensation, donations and other community investment, retained gains, and payments to capital providers and governments.

The most common economic indicators are profit margin and market share (RAO; HOLT, 2005; SANTOS; BRITO, 2012; DE GIOVANNI, 2012; PEROTTI et al., 2012; LI et al., 2015) and sales (RAO; HOLT, 2005; GOPAL; THAKKAR, 2012; LI et al., 2015). Santos e Brito (2012) suggest three dimensions of the economic indicators: i) profitability: return on assets, EBTIDA margin, return on investment, net income/revenues, return on equity, economic value

added; ii) earnings per share, stock price improvement, dividend yield, stock price volatility, market value added, Tobin's q; iii) market-share growth, asset growth, net revenue growth, net income growth, number of employees growth.

Table 5: Review of Triple Bottom Line performance indicators

No.	Authors	Economic Performance	Environmental Performance	Social Performance
1	Rao e Holt (2005)	✓		
2	Li et al. (2006)	✓		
3	Lee et al. (2012)	✓		
4	Jabbour et al. (2014)		✓	
5	Rao (2014)		✓	
6	Melnyk, Sroufe e Calantone (2003)	✓	✓	
7	Zhu e Sarkis (2004)	✓	✓	
8	Zhu e Sarkis (2007)	✓	✓	
9	Zhu, Sarkis e Lai (2008)	✓	✓	
10	Testa e Iraldo (2010)	✓	✓	
11	Perotti et al. (2012)	✓	✓	
12	Green Jr. et al. (2012)	✓	✓	
13	Zhu, Sarkis e Lai (2013)	✓	✓	
14	Li et al. (2015)	✓	✓	
15	Paulraj, Chen e Blome (2017)	✓	✓	
16	Vanalle et al. (2017)	✓	✓	
17	Wolf (2014)		✓	✓
18	Paulraj (2011)	✓	✓	✓
19	Santos e Brito (2012)	✓	✓	✓
20	de Giovanni (2012)	✓	✓	✓
21	Shi et al. (2012)	✓	✓	✓
22	Gimenez, Sierra e Rodon (2012)	✓	✓	✓
23	Zailani et al. (2012)	✓	✓	✓
24	Nikolaou, Evangelinos e Allan (2013)	✓	✓	✓
25	Govindan, Khodaverdi e Jafarian (2013)	✓	✓	✓
26	Gomes et al. (2014)	✓	✓	✓
27	Gopal e Thakkar (2015)	✓	✓	✓
28	GRI (2016)	✓	✓	✓
29	Luthra, Garg e Haleem (2016)	✓	✓	✓
30	Kushwaha e Sharma (2016)	✓	✓	✓
31	Hong, Zhang e Ding (2017)	✓	✓	✓
32	Paulraj e Blome (2017)	✓	✓	✓
	Total	29	29	16
	Percent	90.6	90.6	50

Note: "✓" indicates the study found specific triple bottom line performance.

Other economic indicators are: increase in productivity, increased firm's competitiveness, increase in profitability (LUTHRA; GARG; HALEEM, 2016), decrease of fee for waste treatment and discharge (PAULRAJ, 2011; PEROTTI et al., 2012; ZAILANI et al., 2012; VANALLE

et al., 2017), decrease of costs for materials purchasing, decrease of fine for environmental accidents, increase of investments (PEROTTI et al., 2012), improvement in terms of resources efficiency (ZAILANI et al., 2012).

2.3.3.2 Environmental Performance

Elkington (1997) define the firm's environmental bottom line as the natural capital (related to water, atmosphere, soils, flora, and fauna). According to the author, environmental performance indicators comprise number of public complaints, the life-cycle impacts of products, energy, materials, and water usage at production sites, potentially polluting emissions, environmental risks, and waste generation. Environmental performance refers to internal management aspects and external natural resources conservation issues (NIKOLAOU; EVANGELINOS; ALLAN, 2013).

GRI (2016) suggests environmental indicators related to materials used by weight or volume, percentage of materials used that are recycled input materials, direct and indirect energy consumption, total water used, localization and size of land used, description of significant impacts of activities, products and services on biodiversity, air emissions, water discharge, waste and disposal methods, spills.

The most common indicators are: reduction of air emissions, reduction of waste water, reduction of solid wastes, reduction of consumption for hazardous/harmful/toxic materials, decrease of frequency for environmental accidents (ZHU; SARKIS, 2004; ZHU; SARKIS; LAI, 2007; ZHU; SARKIS; LAI, 2008; PAULRAJ, 2011; PEROTTI et al., 2012; ZHU; SARKIS; LAI, 2013; LI et al., 2015).

Santos e Brito (2012) used the following indicators to measure environmental outcomes: number of projects to improve/recover the environment, level of pollutants emission, use of recyclable materials, recycling level and reuse of residuals, number of environmental lawsuits. Other environmental indicators are: improvement of transportation environmental performance (PEROTTI et al., 2012), extent or recycling & reuse (LUTHRA; GARG; HALEEM, 2016).

2.3.3.3 Social Performance

Elkington (1997) define the firm's social bottom line as human capital, in the form of public health, skills and education. According to the author, social performance indicators includes community relations, employment of minorities, human rights, trade union relations, wages and working conditions. Social performance includes quality and ethical issues regarding to employment, risk, and health and safety issues for customers, employees, and community (NIKOLAOU; EVANGELINOS; ALLAN, 2013).

Social dimension of sustainability are rarely considered in corporate practices (KLEINDORFER; SINGHAL; VAN WASSENHOVE, 2005; PAGELL; WU, 2009; SARKIS; HELMS; HERVANI, 2010). GRI (2016) suggests social indicators related to labor practices and decent

work, human rights, society, and product responsibility. It includes corporate social responsibility (GOVINDAN; KHODAVERDI; JAFARIAN, 2013) such as employee health and safety (KLEINDORFER; SINGHAL; VAN WASSENHOVE, 2005), employee training and education (MANI et al., 2016), human rights (CARTER; ROGERS, 2008), community initiatives and philanthropy (SZEKELY; KNIRSCH, 2005). Therefore, social sustainability issues are related to internal human resources, external populations, stakeholder participation and macro social performance issues (LABUSCHAGNE; BRENT; CLAASEN, 2005; SARKIS; HELMS; HERVANI, 2010).

Santos e Brito (2012) used three dimensions to measure social outcomes: i) social performance: employment of minorities, number of social and cultural projects, umber of lawsuits filed by employees, customers and regulatory agencies; ii) employee satisfaction: turn-over, investments in employees development and training, wages and rewards policies, career plans, organizational climate, general employees' satisfaction; and iii) customer satisfaction: mix of products and services, number of complaints, repurchase rate, new customer retention, general customers' satisfaction, number of new products/services launched.

Other social indicators are: reduction of environmental risks, contribution to environmental protection, and corporate image improvement (LUTHRA; GARG; HALEEM, 2016), improvement in overall stakeholder welfare or betterment, improvement in community health and safety, reduction in environmental impacts and risks to general public, improvement in occupational health and safety of employees, improved awareness and protection of the claims and rights of people in community served (PAULRAJ, 2011), improvement in firm's image in the eyes of its customers, improvement in relationships with community stakeholders, improvement in product image (ZAILANI et al., 2012).

2.4 Discussion and Research Gap Analysis

Previous studies that link strategic orientations, green or sustainable supply chain management initiatives and the dimensions of TBL performance are shown in Table 6. Some articles studied the relationship between forward supply chain initiatives and dimensions of TBL performance.

Carter, Kale e Grimm (2000) analyzed firms members of National Association of Purchasing Management in the U.S. and they found that environmental purchasing is significantly related to both net income and cost of goods sold. Rao e Holt (2005) explored ISO14001 certified companies in South East Asia and found that greening the different phases of the supply chain leads to an integrated green supply chain, which leads to competitiveness and economic performance. Tan et al. (2016) explored Malaysian manufacturing companies and they revealed that green production and green purchasing have a direct effect on firm competitiveness.

Jabbour et al. (2014) investigated Brazilian firms with ISO 14001 and they found that green purchasing affects positively green/environmental performance. Zhu e Sarkis (2004) indicated

that GSCM practices tended to have win-win relationships in terms of environmental and economic performance. Zhu, Sarkis e Lai (2013) studied Chinese manufacturers and their statistic result suggest that GSCM practices do not affect directly economic performance.

Table 6: Review of literature linking strategic orientations, initiatives and performance

Authors	Strategic Orientations	FSC	RSC	Economic Performance	Environmental Performance	Social Performance
Carter, Kale e Grimm (2000)		✓		✓		
Tan et al. (2016)		✓		✓		
Jabbour et al. (2014)		✓			✓	
Zhu e Sarkis (2004)		✓		✓	✓	
Zhu, Sarkis e Lai (2013)		✓		✓	✓	
Green Jr. et al. (2012)		✓		✓	✓	
Zhu, Sarkis e Lai (2013)		✓		✓	✓	
Vanalle et al. (2017)		✓		✓	✓	
Paulraj, Chen e Blome (2017)		✓		✓	✓	
Zailani et al. (2012)		✓		✓	✓	✓
Gopal e Thakkar (2015)		✓		✓	✓	✓
Hong, Zhang e Ding (2017)		✓		✓	✓	✓
Wolf (2014)		✓			✓	✓
Lai, Wu e Wong (2013)			✓	✓	✓	✓
Nikolaou, Evangelinos e Allan (2013)			✓	✓	✓	✓
Rao e Holt (2005)		✓	✓	✓		
Rao (2014)		✓	✓		✓	
Perotti et al. (2012)		✓	✓	✓	✓	
Kushwaha e Sharma (2016)		✓	✓	✓	✓	✓
Hsu, Tan e Zailani (2016)	✓	✓	✓			
Testa e Iraldo (2010)	✓	✓		✓	✓	
Li et al. (2015)	✓	✓		✓	✓	
Mariadoss et al. (2016)	✓	✓				
Kirchoff, Tate e Mollenkopf (2016)	✓	✓		✓	✓	

Note: "✓" indicates the study found specific strategic orientation, supply chain management activity or triple bottom line performance. Type of SSCMs initiatives: FSC = Forward Supply Chain, RSC = Reverse Supply Chain.

Green Jr. et al. (2012) found that economic and environmental performance of the studied U.S. manufacturing supply chain is positively related to the adoption of GSCM practices. Vanalle et al. (2017) investigated Brazilian automotive industries and they found that the economic and environmental performance of the studied supply chain is positively related to the adoption of GSCM practices. Paulraj, Chen e Blome (2017) investigated supply-chain firms in Germany and their results shows that SSCM initiatives play a central role in enhancing a firm's environmental and financial performance.

Zailani et al. (2012) investigated manufacturing firms in Malaysia and they found that environmental purchasing has a positive effect on economic, social, and operational performance, whereas sustainable packaging has a positive effect on environmental, economic and social per-

formance. Hong, Zhang e Ding (2017) analyzed Chinese manufacturing firms reveal that SSCM practices have a significant positive effect on economic, environmental, and social dimensions of performances.

Some studies investigated the relationship between reverse supply chain initiatives and dimensions of TBL performance. Nikolaou, Evangelinos e Allan (2013) proposed a framework that integrate Corporate Social Responsibility (CSR) and sustainability issues in reverse logistics systems to measure the triple bottom line performance of economic, environmental, and social dimensions. Lai, Wu e Wong (2013) investigated Chinese manufacturing industries and their results indicated that reverse logistics practices except waste management practices could positively influence a manufacturing enterprise's environmental and financial performance; reuse and design for reverse logistics could generate a significant positive performance impact in all three TBL performance dimensions; only practicing waste management cannot improve a manufacturer's operational and financial performance and may even hurt its social performance; and recycle, reprocess, and recovery practices improve financial performance but have not contributed to the improvement of social performance.

Some studies investigate the links between strategic orientation, supply chain initiatives and and the dimensions of TBL performance. Li et al. (2015) analyzed Chinese high-tech firms and found a positive effect of environmental orientation on green supply chain constructs, a positive effect of adopting green supply chain initiatives of green purchasing, green manufacturing, and green information system on a firm's environmental and financial performance and a positive effect of adopting green product design on environmental performance. Hsu, Tan e Zailani (2016) investigated manufacturing firms in Malaysia and found that strategic orientations of eco-innovation and eco-reputation as important antecedents on the adoption of SSCM initiatives of green manufacturing and green packaging, a positive impact of SSCM initiatives on the adoption of reverse logistics initiatives and a bidirectional relationship between the strategic orientations.

Mariadoss et al. (2016) proposed an integrative model that incorporates the relationships between a firm's orientations (environmental, societal, cultural, and local community orientations) and sustainable supply chain practices (sustainable purchasing practices and sustainable supply practices). The findings suggested that a that a firm's environmental and cultural orientations affect its sustainable supply chain practices. Kirchoff, Tate e Mollenkopf (2016) investigated antecedent roles of two strategic orientations, supply chain orientation and environmental orientation, on both the implementation and outcomes of green SCM practices. Results showed that environmental orientation leads to the adoption of GSCM initiatives.

Testa e Iraldo (2010) investigated manufacturing facilities in seven OECD countries. They analyze the impact of four strategic approaches, innovation-led, efficiency-led, reputation-led, and imitation-led in green supply chain management (GSCM) initiatives and environmental management system (EMS) practices and the impact of these initiatives and practices on environmental and competitive performance. They used single indicators to represent each strate-

gic orientation in the econometric model to measure the impact of the strategic orientation on GSCM and EMS practices. Their results showed that reputation-led is the most effective in stimulating the adoption of GSCM initiatives; imitation-led and innovation-led influence the adoption of GSCM initiatives; and the efficiency-led was the only hypothesis not confirmed in the model, indicating that the objective of reducing costs or economizing resources does not seem to be a determinant for the adoption of GSCM practices.

In this context, we identified three gaps to be explored. First, studies investigate the impact of strategic orientation such as environmental orientation on production activities (LI et al., 2015), but few studies explore the impact of strategic orientations of innovation, efficiency and reputation together on SCM initiatives (TESTA; IRALDO, 2010). Second, studies that explore SCM initiatives typically consider processes in the forward supply chain (LI et al., 2015; ZHU; SARKIS; LAI, 2013), but few studies have considered the reverse supply chain as an integral part of the SCM (THIERRY et al., 1995; HERVANI; HELMS; SARKIS, 2005; LUTHRA; GARG; HALEEM, 2016). Finally, studies investigate the impact of SCM initiatives on economic (RAO; HOLT, 2005) and environmental performance (JABBOUR et al., 2014), but few investigate the impact on social performance (ZAILANI et al., 2012; HONG; ZHANG; DING, 2017).

2.5 Conceptual framework

The analysis presented above highlighted some important points. First, there is clear need for definition on strategic orientations of innovation-led, reputation-led and efficiency led. Second, there is a need to companies adopt sustainable supply chain initiatives in their operations. Third, there is a need for focus reverse supply chain initiatives, besides forward supply chain initiatives in studies related to SSCM. Fourth, there is a need for the measurement of triple bottom line performance dimensions, in particular for social dimensions. Finally, there is a need for investigation of the relationships between strategic orientations, sustainable supply chain management initiatives, and triple bottom line performance.

With the above in mind, a conceptual framework for integrating the strategic orientations of innovation-led, reputation-led, and efficiency-led, sustainable supply chain management in forward and reverse flows, and triple bottom line performance, measured by economic, environmental, and social dimensions, is proposed in Figure 4. The purpose of the framework is to provide a starting point for the academics and researchers seeking to understand the links between strategic level, operational level and business outcomes. The framework is based in fundamental propositions linked to the issues raised in the analysis as explained above:

P1. Firm's strategies and operations should take into account pressures form interested parties, compliance obligations, internal and external issues.

P2. Strategic orientations of innovation-led, reputation-led, and efficiency-led are antecedents of the adoption of sustainable supply chain management initiatives in forward and reverse flows.

P3. Sustainable supply chain management initiatives are antecedents of triple bottom line performance (economic, environmental, and social performance).

Building in Proposition 1, the framework highlights that the firm's strategic orientations are embedded in four elements from the context of the organization context, namely internal issues, external issues, regulatory obligations, and interested parties pressure (ISO, 2015). These elements are internal and external to the firm and includes institutions, stakeholders, regulations, and resources such as physical resources, human capital, and organizational capital (BARNEY, 1991; SARKIS; GONZALEZ-TORRE; ADENSO-DIAZ, 2010; SARKIS; ZHU; LAI, 2011; ISO, 2015). They can to lead to changes in strategies, strategic orientations, and operations. Strategic formulation should consider the different organizational levels and seek integration internally and across supply chain partners (RALSTON et al., 2015).

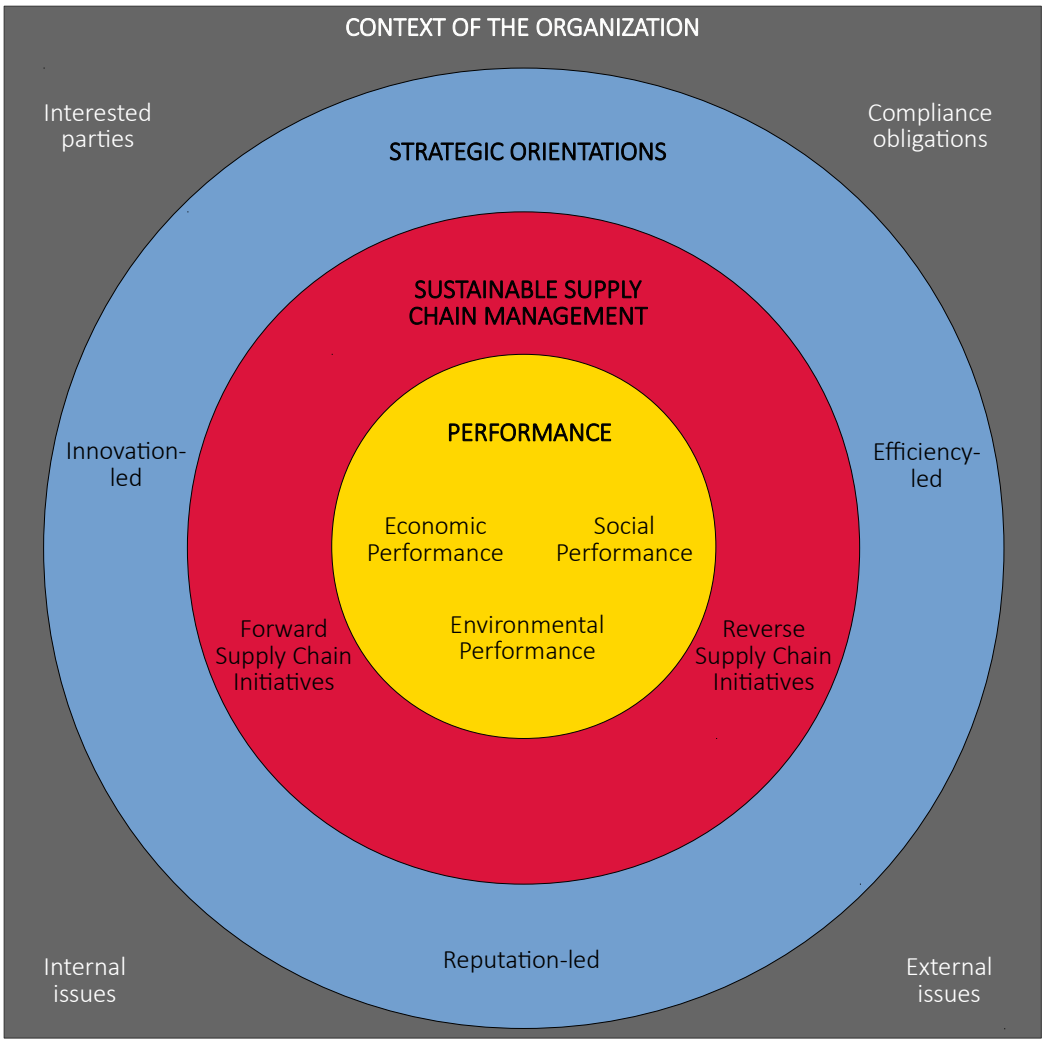

Figure 4: Proposed conceptual framework for measuring strategic orientations, sustainable supply chain management initiatives and triple bottom line performance

Building on Proposition 2, the framework highlights that the basis for sustainable supply chain management initiatives in forward and reverse flows are the strategic orientations of

innovation-led, reputation-led, and efficiency-led introduced by Testa e Iraldo (2010) . An organization's sustainability initiatives and its corporate strategy must be closely connected (CARTER; ROGERS, 2008). Firm's strategic orientation are crucial for SSCM adoption because these practices demand substantial firm resources, are technically complex, and require top management skills (HSU; TAN; ZAILANI, 2016). Thus, strategic orientation can lead to sustainable practices in the supply chain (MARIADOSS et al., 2016).

Building on Proposition 3, the framework highlights that the basis for triple bottom line performance are the SSCM initiatives in forward and reverse flows. The literature has pointed out that triple bottom line performance can be facilitated by sustainable supply chain initiatives, such as initiatives that take into account the economic, environmental and social dimensions of sustainability (CARTER; ROGERS, 2008; SEURING; MÜLLER, 2008). Companies are seeking results that affect economic improvement and also have a positive impact on the environment and people's lives (GRI, 2016). Sustainable supply chain management initiatives in forward and reverse activities should include economic aspects such as practice to reduce costs and improve profits as well as environmental and social aspects related to prevent pollution and contribute to employees, customers and community health, safety, and satisfaction (ZHU; SARKIS; LAI, 2013; LUTHRA; GARG; HALEEM, 2016; MANI et al., 2016). These theories allow a firm to prevent pollution, minimize or eliminate emissions, effluents and waste from its operations, reduce production costs, reduce life-cycle environmental costs, minimize economic and social costs of the product, establish socially networks with external stakeholders, minimize economic impact, engage with external stakeholders for future opportunities.

The corporate, social and environmental responsibility of the firms have become part of strategic goals and objectives of both manufacturing and service organizations and have contributed to the improvement of bottom line (AGERON; GUNASEKARAN; SPALANZANI, 2012). The integration of the three dimensions of sustainability into the practices of the supply chain is SSCM's fundamental characteristic to improve the company's competitiveness and profitability in the short and long term (CARTER; ROGERS, 2008; AHI; SEARCY, 2013). The social results of firm's operating practices have long been neglected but are increasingly receiving the attention of managers and researchers (MANI et al., 2016). Meeting environmental and social standards along all stages of the supply chain can leads firms to achieve sustainability performance (SEURING, 2013).

2.6 Conclusions

Firms aims to become more innovative in order to be ahead of competitors, efficient to reduce costs and improve their gains, and achieve a good reputation to meet stakeholders expectations. In order to achieve these objectives, they must define strategies that guide the operations, processes and activities to be followed in the firm. A well-defined strategic orientation can help align the desired goals, the means to achieve them, and the expected results.

The key part of the company to turn objectives into results is supply chain management, which involves forward and reverse flows. It consists of processes and people involved in the transformation of the materials into products to be delivered to the final consumer. The speed and quality of supply chain processes can result in gains for firms as they attract new customers and retain existing customers, improve employee and shareholder satisfaction, and improve brand and corporate image.

Supply chain management that takes environmental and social issues into consideration, in addition to being economical, turning the supply chain into sustainable. Operations can be considered sustainable when they respect people, the planet and generate profits. Upstream, sustainable supply chains can improve supplier's environmental performance and downstream, sustainable supply chain can reduce environmental and social impacts of the products produced during their production, use, and disposal (HSU; TAN; ZAILANI, 2016). As a consequence, it can generate triple bottom line performance outcomes.

This study brings several contributions. First, it proposed a definition on strategic orientations introduced by Testa e Iraldo (2010): innovation-led, reputation-led and efficiency led. Second, it presented a review on sustainable supply chain initiatives in forward and reverse flows. Third, it presented a review on triple bottom line performance dimensions: economic, environmental indicators. Fourth, it investigated previous studies to verify if there are links between strategic orientations, SSCM initiatives and triple bottom line performance. Fifth, it proposed the existence of strategic guidelines for innovation, reputation and efficiency that can foster the adoption of sustainable supply chain management initiatives. Finally, it proposed the improvement of triple bottom line performance by adopting sustainable supply chain management initiatives.

The novelties of this study are the detailing of the concept of strategic orientations of innovation, reputation, and efficiency, still little explored in previous studies; integration of reverse logistics activities into sustainable supply chain management; and in the effort to consider the social dimension of business performance. The paper also underlined that additional effort is needed on the development of context-based metrics for GSCM and SSCM. It contributes to the advancement of research and business management.

Some limitations were the absence of previous studies that detailed the concept of strategic guidelines for innovation, reputation and efficiency, as well as indicating the objectives to be pursued by companies in choosing some of the strategies; few studies that include reverse logistics as an integral part of the supply chain.

There are several opportunities to extend the research presented in this paper. There is a need to develop a common list of indicators to measure strategic orientations of innovation-led, reputation-led, and efficiency-led. Build on that point, there is also a need for research on how organizations can select metrics most appropriate for them. Future studies can test a integrated model of strategic orientations, sustainable supply chain management and triple bottom line performance. A consolidated set of scientifically-sound metrics that have been tested in the

real world would provide a useful reference point for organizations seeking to measure their strategic orientations efforts, sustainable supply chain management initiatives and triple bottom line outcomes.

3 Artigo II - Empirical Evidences from U.S. Automotive Industry

Strategic Orientations, Sustainable Supply Chain Management Initiatives and Triple Bottom Line Performance: empirical evidences from U.S. automotive industry

Abstract

Purpose: This article aims to develop and test a theoretical model to investigate the relationships between strategic orientation of innovation-led, reputation-led, efficiency-led, sustainable supply chain management initiatives in forward and reverse flows, and triple bottom line performance measured by economic, environmental and social dimensions.

Design/methodology/approach: Using survey data collected from 210 automotive manufacturing industries in the U.S., the proposed model are tested through structural equation modeling.

Findings: The integrated model validated seven constructs. Only efficiency-led construct should be drop off from the model. The results shows that innovation-led has a negative effect on forward and reverse supply chain initiatives, while reputation-led has a positive effect on these initiatives. The reverse supply chain has a positive impact on environmental and social performance.

Research limitations/implications: This study shows a relationship between strategic orientations of innovation-led and reputation led on forward and reverse supply chain initiatives. Innovation-led has a negative impact on initiatives, while reputation-led has a positive impact. In particular, it shows the direct relationship between reverse supply chain initiatives with social and environmental performance.

Practical implications: Decision makers can use these findings to establish strategic orientations in their firms as well as to implement sustainable initiatives, especially in reverse supply chain. Firm's should become more responsible for used products, and this practices generate good benefits for the environment and public health and well-being.

Originality/value: This study reveals the reverse supply chain have contributed to improve environmental and social performance indicators in the U.S. automotive industry. This results evidence the importance of collect, recover and give an appropriated waste disposal for used products. Moreover, the results shows that innovation-led goals do not lead companies to adopt SSCM initiatives. But, reputation-led goals are leading companies to adopt more sustainable initiatives.

Keywords: Survey Methods, Structural Equation Modeling, Sustainability, Strategies, Operations, Performance.

3.1 Introduction

The increase in industrial production has contributed to an increment in demand. Factors such as technological development, improvements in production processes, information systems, and transportation has led to a reduction of the product life cycle, reduction on prices and easy access to the products. However, the high production and consumption of goods have caused the growth of the inadequate disposal of solid, liquid and gaseous wastes in the environment.

The result of this scenario is a major imbalance. Firms want to sell more products and the consumer is willing to acquire and discard more. At end-of-use or end-of-life all the products consumed turn into trash that is often left in the environment or destined to the open dumps where there are no adequate waste treatment. The consequences are water pollution, destruction of the ozone layer, emissions of toxic gases into the atmosphere, destruction of ecosystems, accumulation of waste in inappropriate places, and climate change.

Firms are increasingly facing the challenge of delivering goods and services more quickly and efficiently at competitive prices, while become responsible for them during and after customer use. Over the past three decades, external pressures from community, consumers, state and federal regulatory mandates, international standards, along with internal pressures from shareholders and employees have driven companies to embrace sustainable development. The sustainable development is defined as the development that meets the needs of the present world without compromising the ability the future generations to meet their owns (WCED, 1987). Thus, firms should take into account the triple bottom line (TBL) approach of the sustainability to achieve economic prosperity, environmental quality, and social justice (ELKINGTON, 1997).

Firms can do better for the profits, planet and people throughout their strategies and operational practices. For the strategic side, companies upper echelon are responsible for the directions and strategic choices to be follow for a company to increase performance levels (HAMBRICK; MASON, 1984) and contribute for a sustainable development. Top management can establish the company' strategic orientation to be pursue (HITT et al., 1997), since it "refers to how an organization uses strategy to adapt to and/or change aspects of its environment for a more favorable alignment" (MANI et al., 2016, p. 79).

For the operational side, the supply chain management (SCM) is key to deliver on this challenge. The original aim of supply chain management was to generate a competitive advantage that led to improved economic performance by integrating the forward business processes in the supply chain (BEAMON, 1999; LI et al., 2006; TAN et al., 1999). Hence, in its original form SCM ignored concerns related to environmental problems and human wealth consequence, as well as firm's responsibility for used products (HART, 1995; GUIDE JR.; VAN WASSENHOVE, 2001; FLEISCHMANN et al., 2000; SARKIS; HELMS; HERVANI, 2010).

In this way, new forms of SCM have emerged. Green supply chain management (GSCM)

aims to ensure environmental goals into the supply chain as the reduction of impacts in product design, process development, material sourcing and selection, operations, logistics, marketing, regulatory compliance, end-of-life and waste management decisions (SRIVASTAVA, 2007). Sustainable supply chain management (SSCM) includes social goals of Corporate Social Responsibility (CSR) into the supply chain, in addition to economic and environmental goals (KLEINDORFER; SINGHAL; VAN WASSENHOVE, 2005; CARTER; ROGERS, 2008; SEURING; MÜLLER, 2008; AHI; SEARCY, 2013; STINDT, 2017). SSCM should include the TBL dimensions, but the social dimension is still little investigate in the literature (MANI et al., 2016).

At the performance level, firm's should to pursue the triple bottom line outcomes. Companies' performance is commonly measured as economic (RAO; HOLT, 2005). Growing number of studies are also showing that companies can achieve environmental performance through environmental initiatives for pollution reduction, water and energy use, waste generation, and air emissions (AMBEC; LANOIE, 2008; LI et al., 2015; ZHU; SARKIS; LAI, 2007). A few studies investigate company's social performance in order to measure the impacts of firm's strategies and operations on employees, customers, and community (PAGELL; WU, 2009; ZAILANI et al., 2012; LUTHRA; GARG; HALEEM, 2016; PAULRAJ; BLOME, 2017; HONG; ZHANG; DING, 2017).

The links between strategic orientations, supply chain initiatives, and corporate performance have been little investigated in the literature. Some studies consider the green and sustainable SCM as a integration of forward and reverse activities (THIERRY et al., 1995; HERVANI; HELMS; SARKIS, 2005; LUTHRA; GARG; HALEEM, 2016). Rao e Holt (2005) explored ISO14001 certified companies in South East Asia and found that greening the different phases of the supply chain leads to an integrated green supply chain, which leads to competitiveness and economic performance. Zailani et al. (2012) investigated manufacturing firms in Malaysia and they found that environmental purchasing has a positive effect on economic, social and operational outcomes, whereas sustainable packaging has a positive effect on environmental, economic and social outcomes. Jabbour et al. (2014) investigated ISO14001 certified companies in Brazil and found that green purchasing have positive influence on environmental performance.

Li et al. (2015) analyzed Chinese high-tech firms and found a positive effect of environmental orientation on green supply chain constructs, a positive effect of adopting green supply chain initiatives of green purchasing, green manufacturing, and green information system on a firm's environmental and financial performance and a positive effect of adopting green product design on environmental performance. Hsu, Tan e Zailani (2016) investigated manufacturing firms in Malaysia and found that strategic orientations of eco-innovation and eco-reputation as important antecedents on the adoption of SSCM initiatives of green manufacturing and green packaging, a positive impact of SSCM initiatives on the adoption of reverse logistics initiatives and a bidirectional relationship between the strategic orientations.

Testa e Iraldo (2010) investigated manufacturing facilities in seven OECD countries. They

analyze the impact of four strategic approaches, innovation-led, efficiency-led, reputation-led, and imitation-led in green supply chain management (GSCM) initiatives and environmental management system (EMS) practices and the impact of these initiatives and practices on environmental and competitive performance. They used single indicators to represent each strategic orientation in the econometric model to measure the impact of the strategic orientation on GSCM and EMS practices. Their results showed that reputation-led is the most effective in stimulating the adoption of GSCM initiatives; imitation-led and innovation-led influence the adoption of GSCM initiatives; and the efficiency-led was the only hypothesis not confirmed in the model, indicating that the objective of reducing costs or economizing resources does not seem to be a determinant for the adoption of GSCM practices.

In this context, we identified three gaps to be investigated in this article. First, studies investigate the impact of strategic orientation such as environmental orientation on production activities (LI et al., 2015), but few studies explore the impact of strategic orientations of innovation, efficiency and reputation together on SCM initiatives (TESTA; IRALDO, 2010). Second, studies that explore SCM initiatives typically consider processes in the forward supply chain (LI et al., 2015; ZHU; SARKIS; LAI, 2013), but few studies have considered the reverse supply chain as an integral part of the SCM (THIERRY et al., 1995; HERVANI; HELMS; SARKIS, 2005; LUTHRA; GARG; HALEEM, 2016). Finally, studies investigate the impact of SCM initiatives on economic (RAO; HOLT, 2005) and environmental performance (JABBOUR et al., 2014), but few investigate the impact on social performance (ZAILANI et al., 2012; HONG; ZHANG; DING, 2017).

This article aims to investigate if having a strategic orientation of innovation-led, reputation-led, and efficiency-led affects the adoption of SSCM initiatives and, in turn, how such initiatives affect triple bottom line performance. The remainder of the paper is organized as follows: in Subsection 3.2, we position our work with respect to the strategic orientation, supply chain management initiatives, and triple bottom line outcomes literature. In Subsection 3.3 we develop our research model and hypothesis. In Subsection 3.4 we show the methodology. In Subsection 3.5 we present results and discussion. Finally, in Subsection 3.6 we come up with conclusions.

3.2 Literature Review

3.2.1 Strategic orientations goals

Strategic orientation is the firms' overall direction, objectives, and actions of driven by top management that demand resource commitments for a more favorable alignment in order to enhance profitability, competitive advantage, and establish strategic positioning (MANU; SRIRAM, 1996; HSU; TAN; ZAILANI, 2016). Firm's orientation is the managerial perceptions, predispositions, tendencies, motivations, and desires that guide strategy formulation (MARIADOSS et al., 2016). It may facilitate the integration of various firm concerns into tactical and operational activities since the firm's strategic orientation reflects organizational beliefs, culture,

and propensity regarding a specific issue (MARIADOSS et al., 2016). Organizational orientation has been considered as intangible strategic capabilities that allow a firm to achieve strategic goals because it represent strategic directions and behaviors that are implemented throughout the supply chain to create superior performance (KIRCHOFF; TATE; MOLLENKOPF, 2016).

In this study we are considering a set of strategic orientations introduced by Testa e Iraldo (2010) as main motivational approaches to the adoption of green initiatives at firm level called innovation-led, reputation-led, and efficiency-led. The authors used single environmental indicators to represent each each strategic orientation. In the following, we review the literature to propose strategic orientations goals for these three types of strategic orientations.

3.2.1.1 Innovation-led

Innovation encompasses goals to make a change or improvement in product, process, organizational and marketing (OECD, 2005). Product innovation strategies include the introduction of new products or services (KNIGHT, 1967), new technology or combination of technologies (UTTERBACK; ABERNATHY, 1975), developing new products with superior quality in components and materials (ZHANG; LI, 2010; GUNDAY et al., 2011), efforts to training teams to develop products (JIMENEZ-JIMÉNEZ; SANZ-VALLE, 2011), develop new product components, technologies, and features (OKE; PRAJOGO; JAYARAM, 2013; PRAJOGO, 2016), and develop or use new materials that include green or recycled materials (OKE; PRAJOGO; JAYARAM, 2013).

Strategies for process innovation encompass the introduction of new elements in the organization's task, decision, information system, and technology in its physical production or service operations (KNIGHT, 1967), adoption of the latest technological innovations in processes, attempt to stay on the leading edge of new technology in industry, pursues innovative and leading-edge research in R&D (PRAJOGO; AHMED, 2006), development of processes to reduce costs and increase quality in manufacturing processes, techniques, machinery and software, increase delivery speed (GUNDAY et al., 2011), improve the reliability of production processes and technologies, improve the speed and efficiency of production processes, use advanced technologies in production processes, and strive to keep production processes and technologies (PRAJOGO, 2016).

Strategies for organizational innovation include the introduction of communication system or formal reward program (KNIGHT, 1967), generation, development, and implementation of new ideas and behaviors (DAMANPOUR, 1991), establishment of external relations to improve business practices at workplace (government laboratories, universities, policy departments, regulators, competitors, suppliers and customers) (OECD, 2005), improvement of production and quality, human resources, supply chain, and information management systems (GUNDAY et al., 2011).

Marketing innovation strategies encompass quality of products, customer service, flexibility in responding to consumer needs, customer feedback, range of products, and frequency of

new products (BALDWIN; JOHNSON, 1996). Marketing innovation strategies include the introduction of significant changes in product design or packaging (OECD, 2005), product line breadth, constant search for new markets and products (MANU; SRIRAM, 1996), improve distribution channels, product pricing techniques (GUNDAY et al., 2011), adoption of new channel of communication, product and service delivery (GUPTA et al., 2016).

Baldwin e Johnson (1996) list as sources of innovation: R&D activity for both product and processes innovations, develop, improve, and refine technology, purchase of equipment, design and patents, seek new materials and more efficient ways of using existing ones, proposals from employees, customer requests, and staff training. The authors cite several aspects related to human sources that can foster innovation such as attention to employee relations and motivation, full utilization of employee skills, a strong commitment to continually improving quality and productivity, innovative compensations packages, and close contact between top level executives and persons developing new technologies. They also mention investments in manufacturing systems, management practices and access to financing as benefits to innovation activities.

3.2.1.2 Reputation-led

Reputation signals stakeholders about the management of financial, social and environmental responsibility attributed to the corporation over time (BARNETT; JERMIER; LAFFERTY, 2006). It can be seen as an intangible asset with potential for value creation and firm's image development that leads to retain employees, attract customers, build a trusting relationship with suppliers and difficult competitors replication (ROBERTS; DOWLING, 2002). As a result, companies are competing for costumer and for reputation status (FOMBRUN; SHANLEY, 1990).

In order to compete for customer and reputation, Treacy e Wiersema (1993) argue that firms are building powerful and cohesive business systems that could deliver more value than competitors by segmenting and targeting markets precisely to match the demands of those niches to build customer intimacy and loyalty for the long term. Thus, firm's have to go beyond delivering quality and price of product and services. They have to reach convenience of purchase, after-sales service, dependability, and other costumers expectations, for example. The success of industries in the leadership positions is resulting of strategies to narrowing their business instead broadening it to deliver superior customer value.

Reputation strategies include are using high-quality products and materials in production, promoting diversity in workplace, investing in R&D, implementing progressive workplace practices such as strong emphasis on teamwork and employee empowerment, providing product information (MCWILLIAMS; SIEGEL, 2001), adopting information systems to collect, integrate, and analyze data from many sources, using databases to supply sales teams with a repertoire of usable programs, products, value-added ideas, and selling tools, emphasizing empowerment of people working close to consumers, adopting hiring and training programs to stress

the creative decision-making skills required to respond to individual customer needs, building customers databases to customize a service or a product just for them (TREACY; WIERSEMA, 1993).

Other reputation strategies purchasing materials with environmental or green attributes, purchasing from minority business enterprise (MBE), requiring labor conditions at supplier's plants, cooperating with exchange partners, supporting local community (social projects, philanthropy, donations) (CARTER; JENNINGS, 2002), establishing fair trade, extending supply chain partners including suppliers, customers and logistics provides, training employee, training and supporting suppliers, supporting healthcare, childcare and housing, preventing environmental impacts as water and energy conservation, air pollution, waste and recycling, engaging in reverse logistics activities (MALONI; BROWN, 2006), establishing effective corporate governance to prevent the violation of environmental regulations (ARORA; RAVI, 2011), establishing good corporate governance to enforce managers to act on the best interests of shareholders, adopting external governance monitoring (HARJOTO; JO, 2011), increasing degree of transparency and voluntary disclosure of information (JIZI et al., 2013), involving institutional investors in actually challenging decisions and strategies, especially at times of crisis (YOUNG; THYIL, 2014), adopting crisis events communication strategies to prevent and to repair damages on reputation (GATZERT, 2015).

3.2.1.3 Efficiency-led

Firms pursue efficiency strategies to achieve cost-leadership, productivity, product quality, and production speed (PORTER, 1996) throughout talented employees and process reliability (MAHSUD; YUKL; PRUSSIA, 2011) . Treacy e Wiersema (1993) argue that companies are pursuing operational excellence to provide customers with reliable products or services at competitive prices and delivered wit minimal difficulty or inconvenience. It includes strategies to minimize overhead costs, to eliminate production steps, to reduce transactions costs, and to optimize business processes across functional and organizational boundaries such as reengineer old business process, redesign systems, reconfigure information system, reconfigure management systems, create a new mind-set among employees and educate and motivate them.

Efficiency strategies encompass increasing quality and speed of product development, production, and delivery, linking R&D, manufacturing, and marketing, meeting competitive demands of a rapidly changing marketplace (KOTABE, 1998), utilizing different technologies, organizational structures, control systems, and employees, providing products of a prescribed quality, implementing systems for production scheduling, inventory levels, and delivery in order to estimate costs (EBBEN; JOHNSON, 2005), increasing commitment of top management to develop and push the adoption of sustainability practices such as reduction of resources use cost including water, energy, raw materials, packaging, as well as expanding recycling and reuse, avoiding accidents, recognizing emerging risks, potential threats and management failures (SZEKELY; KNIRSCH, 2005), building operations around information systems

(TREACY; WIERSEMA, 1993), measuring the performance of key processes and benchmark costs of operations (TALLURI, 2000; HERVANI; HELMS; SARKIS, 2005; TSENG et al., 2014).

Other efficiency strategies are investing in employee talents, which includes the extent to which the members have the skills and motivation needed to do the work effectively, minimizing costs relative to employee compensation and benefits, employee training and development, and expenses for materials, supplies, facilities, energy, inventories, shipping, distribution, marketing, services provided by vendors, litigation, subcontractors, and consultants, improving processes, eliminating waste, improving supply chain management, improving organizational learning (MAHSUD; YUKL; PRUSSIA, 2011), requesting supplier quality integration, supplier involvement in quality improvement practices (HUO et al., 2016).

3.2.2 Sustainable supply chain management

Sustainable supply chain management includes practices to reduce costs reduction and environmental and social risks in the firm. SSCM encompasses the practices of GSCM and Corporate Social Responsibility (CSR) (STINDT, 2017). The adoption of sustainable practices in the supply chain means that all stages of the supply chain must consider environmental and social as well as economic aspects, which include relationships with input producer communities, employee support, supplier collaboration, production responsible and activities to recover value of used products and contribute to their proper destination. Furthermore, SSCM practices integrate forward and reverse supply chain operations by closing the loop through using recovery used materials and components into new materials or products with value in the marketplace (HERVANI; HELMS; SARKIS, 2005; HSU et al., 2013; LUTHRA; GARG; HALEEM, 2016; SRIVASTAVA, 2007).

3.2.2.1 Forward supply chain initiatives

Forward supply chain initiatives are the upstream activities in the firm, from suppliers to customer use. Such initiatives encompass economic, environmental and social issues into product design and development, purchasing of raw materials, manufacturing, packaging, distribution and transportation (KRIKKE; BLOEMHOF-RUWAARD; VAN WASSENHOVE, 2003; GOVINDAN; SOLEIMANI; KANNAN, 2015; ABBEY; GUIDE JR., 2017).

Product design and development

Product design and development is the creation of new or improved products or services to be produced and delivered to customers. Product design goal is "developing designs that avoid environmentally hazardous components and make it economically possible to save components that have high reuse value" (KLEINDORFER; SINGHAL; VAN WASSENHOVE, 2005, p. 486). Design issues are associated with environmental safety and health over the full product

life cycle and include disciplines such as environmental risk management, product safety, occupational health and safety, pollution prevention, resource conservation and waste management (SRIVASTAVA, 2007). It takes into account environmental and social impacts of product during production, customer use and end-of-life (TANG; ZHOU, 2012; STINDT, 2017).

Product design initiatives encompass cooperating with suppliers for environmental objectives (ZHU; SARKIS, 2004; RAO; HOLT, 2005), designing products for reduced consumption of materials and energy, disassembly, reuse, recycling, and recovery materials and components, designing to avoid or reduce use of hazardous of products and their manufacturing processes, selling scrap and used materials (ZHU; SARKIS, 2004), minimizing waste, design for disassembly with accessible parts for ease of disassembly, or using minimal welds, screws, clinches and snaps and institute design for recycling program (ZHU; SARKIS; LAI, 2013), design for reduce risk of occupational injuries and customer use risks (STINDT, 2017).

It focus on cutting both the production lean time and its costs through selection of resources (MAYYAS et al., 2012), reducing material intensity, modifying the material mix, extending useful life, minimizing operating waste/energy consumption, reinventing the core benefit delivery system, recovering resources by reusing packaging systems and remanufacturing, reconditioning, and repairing, designing for disassembly, designing for recycling process compatibility, reducing inventories of hazardous materials, increase productivity of operations, selling recycled materials, using waste as resources, and reusing parts/components in order to savings raw material, energy, terminal disposal, and regulatory and future liability costs (FULLER; OTTMAN, 2004; CHEN et al., 2012), designing products recyclable or reusable contents (HSU et al., 2013), designing for pollution minimization, designing for waste minimization, designing for minimum use of hazardous substances, designing for material/component recovery, disassembly, separability, recycling and for waste recovery and re-use (KNIGHT; JENKINS, 2009; LUTHRA; GARG; HALEEM, 2016), design also has to encompass redesigning packaging to use less material (ROGERS; TIBBEN-LEMBKE, 1999), packaging with recyclable contents, designing packaging for reuse, minimizes the use of materials in packaging (KNIGHT; JENKINS, 2009; HSU et al., 2013).

Purchasing

Purchasing is the procurement of raw materials for production of new products and/or service delivery. It can facilitate activities as disassembly, recycling, reuse, and resource reduction in products, materials, and packaging (CARTER; KALE; GRIMM, 2000; HSU; TAN; ZAILANI, 2016). It can address issues such as reduction of waste produced, material substitution through environmental sourcing of raw materials, and waste minimization of hazardous materials (RAO; HOLT, 2005). Sustainable procurement can require source inputs be free of hazardous materials and insist on suppliers adherence to ecological and social standards within their processes (STINDT, 2017).

Purchasing initiatives are selecting suppliers committed with environmental managements

system (EMS) or ISO 14001 certification (ZHU; SARKIS; LAI, 2007; LI et al., 2015; HSU et al., 2013; HSU; TAN; ZAILANI, 2016; LUTHRA; GARG; HALEEM, 2016), pressuring suppliers to take environmental actions (RAO; HOLT, 2005; ZHU; SARKIS, 2004), cooperating with suppliers for environmental objectives (ZHU; SARKIS, 2004), encouraging suppliers to use recycled materials (WU; DING; CHEN, 2012; ZHU; SARKIS; LAI, 2013), choosing suppliers with low energy consumption and committed to waste reduction goals (BLOME; HOLLOS; PAULRAJ, 2014), buying products that have environmentally friendly attributes (recyclable content, nontoxic etc.) (ZAILANI et al., 2012; LUTHRA; GARG; HALEEM, 2016), materials free of hazardous contents (HSU; TAN; ZAILANI, 2016), products and materials that contain green attributes such as recycled/reusable items (HSU et al., 2013), and recyclable packaging (ZAILANI et al., 2012). A number of sustainability indicators is specific to procurement comprising factors like the fraction of suppliers that are either located nearby, are under control of minorities (e.g. indigenous people), or are located in developing countries in order to strengthen the regional economy (STINDT, 2017).

Manufacturing

Manufacturing is the transformation process of raw materials into final products. The production or manufacturing phase includes environmentally and socially responsible initiatives (LUTHRA; GARG; HALEEM, 2016) and it is also called by green manufacturing (LI et al., 2015; HSU; TAN; ZAILANI, 2016), green production (RAO; HOLT, 2005; LUTHRA; GARG; HALEEM, 2016), and sustainable manufacturing (STINDT, 2017). Green manufacturing aims to reduce the ecological burden by using appropriate material and technologies (SRIVASTAVA, 2007) such as cleaner technologies and environmental friendly materials, components, and products in order to reuse, recycle and remanufacturing of materials, reduce energy consumption, air emissions, liquid and solid wastes (RAO; HOLT, 2005; LI et al., 2015; LUTHRA; GARG; HALEEM, 2016), and to produce environmental-friendly products and services by closed loop manufacturing (RAO; HOLT, 2005).

Green operations relate to all aspects related to product manufacture/remanufacture, usage, handling, logistics and waste management once the design has been finalized (SRIVASTAVA, 2007). Green manufacturing aims to reduce the ecological burden by using appropriate material and technologies, while remanufacturing refers to an industrial process in which worn-out products are restored to like-new condition. (SRIVASTAVA, 2007).

Sustainable manufacturing has to be Eco-efficient and Human-oriented (STINDT, 2017). Eco-efficient management is done by using technologies to become production processes that are less-polluting, energy efficient, and emit a minimum of unwanted substances. Human-oriented manufacturing deals with employee safety and working conditions by reducing accidents risk, ensuring worker well-being, including minorities, increasing employee training and corporate reward structures.

Manufacturing initiatives include using of cleaner technologies and environmental friendly

materials, components, and products, reuse, recycle and remanufacturing of materials, reduce energy consumption, air emissions, liquid and solid wastes (RAO; HOLT, 2005; LI et al., 2015; LUTHRA; GARG; HALEEM, 2016) to produce environmental-friendly products and services by closed loop manufacturing (RAO; HOLT, 2005). It includes production, planning and control focused on optimizing materials consume and reducing energy and natural sources consumption in operations (LI et al., 2015). The production/manufacturing phase includes environmentally and socially responsible initiatives (LUTHRA; GARG; HALEEM, 2016) by using of cleaner technologies and environmental friendly materials, components, and products, reuse, recycle and remanufacturing of materials, reduce energy consumption, air emissions, liquid and solid wastes (RAO; HOLT, 2005; LI et al., 2015; LUTHRA; GARG; HALEEM, 2016) to produce environmental-friendly products and services by closed loop manufacturing (RAO; HOLT, 2005).

Packaging

Packaging is the materials in which objects are wrapped to be transported, distributed, sold and delivered. It facilitates the distribution of products and can protect worker and consumers and reduce environmental impacts due materials and shipping cost reduction, adequate protection of the product, compliance with legal requirements (AGERON; GUNASEKARAN; SPALANZANI, 2012). Packaging is being designed to be reusable and recyclable (RAO; HOLT, 2005; ZAILANI et al., 2012; HSU; TAN; ZAILANI, 2016).

Packaging initiatives include maximizing the use of renewable or recycled source of materials, designed to optimize materials and energy (ZAILANI et al., 2012), designed to be refilling or recycling (TSOULFAS; PAPPIS, 2008), be reusable (RAO; HOLT, 2005; HSU; TAN; ZAILANI, 2016), low density and use of minimum levels of materials (FULLER; OTTMAN, 2004), use environmental and bio-degradable materials (FULLER; OTTMAN, 2004; RAO; HOLT, 2005; PEROTTI et al., 2012; ZHU; SARKIS; LAI, 2013).

Distribution and transportation

Distribution and transportation supports the delivery of raw materials and finished products to consumers, business and government agencies. It includes the type of transport, fuel sources, infrastructure, and operational practices (PEROTTI et al., 2012; PLAMBECK, 2012). Logistics optimization of the speed, rout, and load, use of alternate fuel instead of fossil fuels, establishment of logistics collaboration can reduce energy consumption and carbon footprint emissions (DUBEY et al., 2017).

Distribution and transportation includes the type of transport, fuel sources, infrastructure, and operational practices (RAO; HOLT, 2005; PEROTTI et al., 2012). It involves use of information system to select cleaner transportation, avoid traffic congestion, minimize energy consumption (LI et al., 2015), be engaged with third party logistics (3PL) providers (STADTLER,

2005; PLAMBECK, 2012; JI; GUNASEKARAN; YANG, 2014), use crossdocking to consolidate less than truckload (LTL) shipments (STADTLER, 2005; PLAMBECK, 2012; JI; GUNASEKARAN; YANG, 2014), conduct carbon footprint analysis (PLAMBECK, 2012), invest in natural gas or hybrid vehicle ground fleet (LUTHRA; GARG; HALEEM, 2016), reduce the energy and pollution from transportation are important activities (ROGERS; TIBBEN-LEMBKE, 1999), be engaged in emissions reduction initiatives (logistics routes optimization, transport load and speed optimization (LI et al., 2015).

3.2.2.2 Reverse supply chain initiatives

Reverse logistics is the process of flow of raw materials, in-process inventory, and finished goods from the point of consumption to the point of origin with the purpose of recapturing value by re-entering it into the supply chain or proper disposal (THIERRY et al., 1995; ROGERS; TIBBEN-LEMBKE, 1999; GUIDE JR.; VAN WASSENHOVE, 2002; GUIDE JR.; HARRISON; VAN WASSENHOVE, 2003; AGRAWAL; SINGH; MURTAZA, 2015). Reverse supply chain include the collection of warranty returns, end-of-use and/or end-of life products or packaging returned by the consumer or reseller (KRIKKE; HOFENK; WANG, 2013; LINTON; KLASSEN; JAYARAMAN, 2007), transportation of products to place of inspiration, classification, and disposal (NIKOLAOU; EVANGELINOS; ALLAN, 2013), testing of the products or components collected (SASIKUMAR; KANNAN, 2008b), recovery of value by reuse, recycling or remanufacturing for resale, or sale of components to other companies (ZHU; SARKIS, 2004), marketing and creating markets for products, and the proper disposal of waste by incineration, landfill or donation (ROGERS; TIBBEN-LEMBKE, 2001; LAI; WU; WONG, 2013).

Reverse supply chain helps companies to become more responsible since it encompass processes such as reduction, reuse, recyclability, remanufacturing, and final disposal (SARKIS, 2001). It has become a important field for firms due to growing environmental concerns, legislation, corporate social responsibility and sustainable competitiveness (AGRAWAL; SINGH; MURTAZA, 2015).

Product and packaging collection/take back

Product and packaging collection/take-back is the implementation of a customer return program directly, by mail-in or partner with third party collector of their used products or packaging (SAVASKAN; BHATTACHARYA; VAN WASSENHOVE, 2004; RAO; HOLT, 2005). Returns of used products and packaging can be resulting from commercial returns (warranties), end-of-use, and end-of life (GUIDE JR.; HARRISON; VAN WASSENHOVE, 2003; SASIKUMAR; KANNAN, 2008a; SASIKUMAR; KANNAN, 2008b; DOWLATSHAHI, 2010; SHAHARUDIN; ZAILANI; TAN, 2015; DIFRANCESCO; HUCHZERMEIER, 2016).

Product collection and take-back is the implementation of a customer return program directly, by mail-in or partner with third party collector of their used products or packaging

(SAVASKAN; BHATTACHARYA; VAN WASSENHOVE, 2004; RAO; HOLT, 2005). It include customer return program implementation, establish mail-in program, partner with a third party collector (SAVASKAN; BHATTACHARYA; VAN WASSENHOVE, 2004), collect used packaging from customers for reuse or recycling (RAO; HOLT, 2005; HSU et al., 2013).

Returned product use

Returned product use is the repair of used products for resale, remanufacture materials for reuse in manufacturing, disassembly or recycling for reuse as raw materials, refurbish product for sale in secondary market, use returned parts as spare part for warranty claims, disassembly for sale as scrap (ROGERS; TIBBEN-LEMBKE, 1999; KHOR; UDIN, 2012). It encompasses disassembly for reuse as raw material, refurbish product for sale in secondary markets (THIERRY et al., 1995), use returned parts as spare parts for warranty claims (BLISCHKE; MURTHY, 1992; KRIKKE; BLANC; VELDE, 2004), disassembly for sale as scrap (ZHU; SARKIS, 2004).

Product/packaging disposal

Product and packaging disposal encompasses procedures for recycling end-of-life products, components, and packaging, procedures for storage of waste, appropriate treatment of waste disposal procedures (landfill or incineration), appropriate dumping of waste disposal (KHOR; UDIN, 2012; AGRAWAL; SINGH; MURTAZA, 2015). It includes procedures for recycling end-of-life product/components, appropriate treatment of waste disposal procedures, appropriate dumping of waste disposal (THIERRY et al., 1995), procedures for recycling packaging (HSU et al., 2013), procedures for handling hazardous materials for end-of-life products (ZHU; SARKIS; LAI, 2013; LUTHRA; GARG; HALEEM, 2016), procedures for the storage of waste (HU; SHEU; HUANG, 2002).

Other reverse logistics activities

Reverse supply chain may require the adoption of a reverse logistics software or improvements on existing EPR system to control activities flows, measure activities costs, and map the impact on profit margins (GUIDE JR.; HARRISON; VAN WASSENHOVE, 2003; LI et al., 2015) . It involves the adoption and implementation of reverse flows, forecasting products returns, reverse logistics networks form secondary market perspective, and disposition decisions (GUIDE JR.; VAN WASSENHOVE, 2009; AGRAWAL; SINGH; MURTAZA, 2015).

A company can also chose outsourced of reverse logistics activity to external Logistics Service Provider (LSP), measure the reverse logistics activity costs (ROGERS; TIBBEN-LEMBKE, 1999; LAU; WANG, 2009; LAI; WU; WONG, 2013), and monitor recuperation and recycling systems to manage them more effectively (LI et al., 2015). Reverse supply chain also encompass job creation in reverse logistics activity, investments in employee training related to reverse

logistics activity, and ensure health and safety working conditions in reverse logistics activity (SARKIS; HELMS; HERVANI, 2010; STINDT, 2017).

3.2.3 Triple bottom line performance

Company's performance is normally measured by economic and financial indicators. However, the growing concern related to environmental protection, firm transparency, employee benefits and security concerns lead firms to change their supply chains models and to measure environmental and social performance (HONG; ZHANG; DING, 2017). These three types of performance consist on the triple bottom line approach of sustainability (ELKINGTON, 1997; KLEINDORFER; SINGHAL; VAN WASSENHOVE, 2005; CARTER; ROGERS, 2008; GRI, 2016). While economic performance is easy to measure, measuring environmental and social goals is a challenging task (GOLD; SEURING; BESKE, 2010).

3.2.3.1 Economic performance

Economic performance comprises physical and financial capital (ELKINGTON, 1997) such as production cost saving and productive improvement (RAO; HOLT, 2005; GIMENEZ; SIERRA; RODON, 2012; LUTHRA; GARG; HALEEM, 2016), machine costs, labor costs, material costs, capital stock, costs to retool machine, depreciation (NIKOLAOU; EVANGELINOS; ALLAN, 2013), environmental compliance costs (ZHU; SARKIS; LAI, 2013). The direct economic value generated, distributed, and retained includes revenues, operating costs, employee wages and benefits, payments to provides of capital, community investments, and the gains (GRI, 2016).

It encompasses cost reduction, new market opportunities, profit margin, net sales, market share (RAO; HOLT, 2005; SANTOS; BRITO, 2012), revenues, retained earnings, employee compensation (GRI, 2016), decrease of energy consumption costs, fee for waste treatment (PEROTTI et al., 2012; ZHU; SARKIS; LAI, 2013; PAULRAJ; BLOME, 2017), increase in productivity, firm's competitiveness, and profitability (LUTHRA; GARG; HALEEM, 2016), geographic breakdown of markets, costs of used and returned materials, percentage of contracts that were paid in accordance with aged terms, taxes paid broken down associated with reverse logistics procedures, subsidies associated with reverse logistics, donations to community, civil society, and other groups associated with reverse logistics (NIKOLAOU; EVANGELINOS; ALLAN, 2013).

3.2.3.2 Environmental performance

Environmental performance is often related to environmental compliance, biodiversity, products and services, transport, air emissions (GRI, 2016). Environmental dimension reaches hazardous, harmful, and toxic materials reduction, water and solid waste management, pollution

reduction, and energy conservation, land use, and decrease of frequency for environmental accidents (RAO; HOLT, 2005; GIMENEZ; SIERRA; RODON, 2012; ZHU; SARKIS; LAI, 2013).

It includes use of hazardous materials and components, air pollutant emissions, water and solid waste generation (ZHU; SARKIS; LAI, 2013), number of projects to protect improve/restore the environment, recycling level and reuse of residuals (SANTOS; BRITO, 2012), total of materials use, percentage of waste materials, direct energy use, total water use, location and size of land owned, greenhouse gas emissions, air emissions, total amount of waste, use of renewable energy sources, total recycling and reuse of water (NIKOLAOU; EVANGELINOS; ALLAN, 2013).

3.2.3.3 Social performance

Social dimension of sustainability is rarely considered in corporate practices and performance measurement (SARKIS; HELMS; HERVANI, 2010). Social issues often covered community relations, product safety, training and education initiatives, sponsorship, charitable donation, and employment of disadvantaged groups (ELKINGTON, 1997). It means company's commitment in corporate social responsibility practices (CSR) to provide equitable opportunities, encourage diversity, promote connectedness within and outside the community, ensure the quality of life and provide democratic processes and accountable governance structures (GIMENEZ; SIERRA; RODON, 2012).

It encompasses labor practices and decent work, such as employment, health and safety, training and education, diversity and opportunity; human rights as security practices, avoid child labor; society such as local community support; and product responsibility such as customer health and safety, products and services advertising, respect for privacy (GRI, 2016), reduction in environmental risks, contribution to environmental protection, corporate image improvement (LUTHRA; GARG; HALEEM, 2016), significant improvement in relations with community stakeholders, significant improvement in product image (ZAILANI et al., 2012), human rights (CARTER; ROGERS, 2008), community initiatives and philanthropy (CARTER; JENNINGS, 2002), overall customer satisfaction, customer repurchase rate, number of social and cultural projects sponsored in local community, employee turn-over rate, employee wages benefits and rewards policies, employment of minorities, lawsuits filled by employees, customers and regulatory agencies (SANTOS; BRITO, 2012). Therefore, social sustainability issues are related to internal human resources, external populations, stakeholder participation and macro social performance issues (LABUSCHAGNE; BRENT; CLAASEN, 2005; SARKIS; HELMS; HERVANI, 2010).

3.3 Hypothesis Development

3.3.1 Strategic orientation antecedent of sustainable initiatives

Firm orientation is the managerial perceptions, predispositions, tendencies, motivations, and desires that guide strategy formulation (MARIADOSS et al., 2016). It may facilitate the integration of various firm concerns into tactical and operational activities since the firm's strategic orientation reflects organizational beliefs, culture, and propensity regarding a specific issue (MARIADOSS et al., 2016). Organizational orientation has been considered as intangible strategic capabilities that allow a firm to achieve strategic goals because it represent strategic directions and behaviors that are implemented throughout the supply chain to create superior performance (KIRCHOFF; TATE; MOLLENKOPF, 2016).

Organizational orientations as antecedents to green SCM have been given little attention in the literature (KIRCHOFF; TATE; MOLLENKOPF, 2016). The strategic level of the company plays a key role in influencing the environmentally conscious manufacturing strategy in all organizational structures and designs (SARKIS, 2001). The supply chain management initiatives need to take into account green aspects on the totality of the supply chain in both an upstream and downstream direction (RAO; HOLT, 2005). Upstream, sustainable supply chains can improve supplier's environmental performance and downstream, sustainable supply chain can reduce environmental impacts of the products produced during their production, use, and disposal (HSU; TAN; ZAILANI, 2016).

Firm's strategic orientation are crucial for sustainable supply chain adoption because these practices demand substantial firm resources, are technically complex, and require top management skills (HSU; TAN; ZAILANI, 2016). Strategic formulation should consider the different organizational levels and seek integration internally and across supply chain partners (RALSTON et al., 2015). An organization's sustainability initiatives and its corporate strategy must be closely connected (CARTER; ROGERS, 2008). (NEUTZLING et al., 2018) argue that sustainability-oriented innovation such as product and organizational innovation lead to sustainable supply chain management. Strategic orientation can lead to sustainable practices in the supply chain (MARIADOSS et al., 2016).

Previous studies have investigate the relationships between strategic orientations and supply chain management initiatives, as shown in Table 7. Li et al. (2015) hypothesized the linkage between environmental orientation and green supply chain capabilities from high-tech companies in China. The authors distinguish green supply chain capabilities into green product design and green supply chain processes (green purchasing, green manufacturing, and green information system). The hypotheses linking environmental orientation to green supply chain constructs were statistically significant and positive.

Table 7: Previous studies related to strategic orientation as determinants of supply chain management initiatives

Reference	Strategic orientation	SCM initiatives	Method	Results
Testa e Iraldo (2010)	Innovation-led Reputation-led Efficiency-led Imitation-led	Supplier with: Green supply chain management Environmental Management System	Seven OECD countries; manufacturing facilities; survey sent to managers; response rates range from approximately 9% to 35% among countries, with a weighted mean of almost 25%; econometric binary probit model.	Reputation-led, innovation-led and imitation-led are significantly significant to determine the adoption of GSCM practices. Efficiency-led did not affect the adoption of GSCM practices.
Li et al. (2015)	Environmental orientation	Green product design Green supply chain process (GSCP)	China; high-tech companies; interviews with senior managers; survey with senior managers; n=256 (88%); confirmatory factor analysis; structural equation modeling using the maximum likelihood estimation.	Environmental orientation affect green supply chain constructs of GPD and GSCP, the results were statistically significant.
Mariadoss et al. (2016)	Environmental orientation Societal orientation Cultural orientation Local community orientation	Sustainable purchasing practices (SPPs) Sustainable supply practices (SSPs)	U.S.; manufacturing and service firms; survey with senior- and middle-level managers; n=149; exploratory factor analysis; confirmatory factor analysis; structural equation modeling.	Environmental and cultural orientations affect SPPs and SSPs, while local community orientation drives SPPs only in large firms.
Kirchoff, Tate e Mollenkopf (2016)	Supply chain orientation Environmental orientation	Green supply chain management - internal environmental management, green purchasing, cooperation with customers, Eco-design, investment recovery	U.S.; large manufacturing firms; online survey sent to 3,332 supply chain executives; 367 responses obtained; confirmatory factor analysis; structural equation modeling.	Environmental orientation leads to the adoption of green SCM.
Hsu, Tan e Zailani (2016)	Eco-reputation Eco-innovation	Green purchasing Green manufacturing Green packaging	Malaysia; EMS ISO 14001 certified manufacturing firms; survey; n=1245 (36.5%); confirmatory factor analysis; structural equation modeling.	Eco-reputation and Eco-innovation strategic orientation have a positive effect on green purchasing, green manufacturing and green packaging.

Mariadoss et al. (2016) proposed an integrative model that incorporates the relationships between a firm's orientations (environmental, societal, cultural, and local community orientations) and sustainable supply chain practices (sustainable purchasing practices - SPPs, and sustainable supply practices - SSPs). Their findings reveal that a firm's environmental and cultural orientations affect its SPPs and SSPs, while local community orientation drives SPPs only in large firms.

Kirchoff, Tate e Mollenkopf (2016) investigated antecedent roles of two strategic orientations, supply chain orientation (SCO) and environmental orientation (EO), on both the implementation and outcomes of green SCM practices. Results showed that environmental orientation leads to green SCM.

Hsu, Tan e Zailani (2016) investigated the impact of eco-reputation and eco-innovation orientation strategies on the deployment of sustainable supply chain initiatives in manufacturing firms in Malaysia. The results pointed out to eco-innovation and eco-reputation strategic orientations as theoretically important antecedents of sustainable supply chain initiatives.

Testa e Iraldo (2010) investigated the impact of four strategic approaches, innovation-led, efficiency-led, reputation-led, and imitation-led in green supply chain management (GSCM) initiatives and environmental management system (EMS) practices; they also investigated the impact of these initiatives and practices on environmental and competitive performance. They used single indicators to represent each strategic orientation in the econometric model to measure the impact of the strategic orientation on GSCM and EMS practices. Their results show reputation-led is the most effective in stimulating the adoption of GSCM initiatives; imitation-led and innovation-led influence the adoption of GSCM initiatives; and the efficiency-led was the only hypothesis not confirmed in the model, indicating that the objective of reducing costs or economizing resources does not seem to be a determinant for the adoption of GSCM practices.

Previous studies indicated that strategic orientations lead firms to adopt green or sustainable supply chain management initiatives in forward and reverse activities. We are interested in three strategic orientations introduced by Testa e Iraldo (2010): innovation-led, reputation-led, and efficiency-led. Hence, it is hypothesized that:

H1. An innovation-led strategic orientation has a positive effect on a firm's adoption of forward supply chain initiatives.

H2. An innovation-led strategic orientation has a positive effect on a firm's adoption of reverse supply chain initiatives.

H3. An reputation-led strategic orientation has a positive effect on a firm's adoption of forward supply chain initiatives.

H4. An reputation-led strategic orientation has a positive effect on a firm's adoption of reverse supply chain initiatives.

H5. An efficiency-led strategic orientation has a positive effect on a firm's adoption of forward supply chain initiatives.

H6. An efficiency-led strategic orientation has a positive effect on a firm's adoption of

reverse supply chain initiatives.

3.3.2 Sustainable initiatives antecedent of triple bottom line performance

Pressures led firms to consider environmental and social issues into their supply chains in order to reduce impacts on the environment and the people (AMBEC; LANOIE, 2008; SEURING, 2013; AHI; SEARCY, 2013). Companies that align their supply chains initiatives in accordance with environmental and social goals, beyond economics, can create sustainability performance. Adopting environmental improvements encourages entrepreneurial efforts to innovate and deploy more efficient production systems as well as may result in improvements in productivity and environmental performance (FLORIDA, 1996).

Green supply chain practices lead to increased competitiveness, better economic and environmental performance due savings in raw materials, water and energy usage, decreased use of environmentally hazardous waste that lead to reduced costs for waste disposal, compliance with regulation, reduced pollution, improved resource utilization, reuse of materials and recycling initiatives (RAO; HOLT, 2005). Greening the supply chains would firms achieve cost savings, enhance sales, market share, and exploit new market opportunities to lead to greater profit margin (RAO; HOLT, 2005; HSU; TAN; ZAILANI, 2016).

The design and development of products from the concepts of sustainability and innovation can prevent pollution and reduce environmental problems (CHEN, 2001). Pursuing green manufacturing also helps firms lower their raw material costs, gain production efficiency, reduce environmental and occupational safety expenses, and improve their corporate image (ZHU; SARKIS; LAI, 2007). Thus, green manufacturing helps firms achieve profit growth and increase their market share (HSU; TAN; ZAILANI, 2016).

Activities such as reducing packaging, improving working conditions in warehouses, using more fuel efficient transportation, and requiring suppliers to undertake environmental and social programs can reduce costs while also improving corporate reputation (CARTER; ROGERS, 2008).

Green initiatives such as using environmentally-friendly raw materials, cleaner production, preventing pollution, reducing wastes and air emissions through different phases like purchasing, production and distribution lead to improvements in environmental performance, cost savings, reduce risks of non-compliance, enhance corporate image, competitive advantage and marketing exposure (RAO; HOLT, 2005). Companies can attract and retain environmentally conscious customers and employees by offering environmental-friendly products (JAYARAMAN; LUO, 2007).

Equally important these studies and the literature as a whole have generally ignored the social component of sustainability (KLEINDORFER; SINGHAL; VAN WASSENHOVE, 2005; PAGELL; WU, 2009). Sustainable supply chain management initiatives in forward and reverse activities should include economic aspects such as practice to reduce costs and improve profits as well as environmental and social aspects related to prevent pollution and contribute to em-

ployees, customers and community health, safety, and satisfaction (ZHU; SARKIS; LAI, 2013; LUTHRA; GARG; HALEEM, 2016; MANI et al., 2016).

The corporate, social and environmental responsibility of the firms have become part of strategic goals and objectives of both manufacturing and service organizations and have contributed to the improvement of bottom line (AGERON; GUNASEKARAN; SPALANZANI, 2012). The integration of the three dimensions of sustainability into the practices of the supply chain is SSCM's fundamental characteristic to improve the company's competitiveness and profitability in the short and long term (CARTER; ROGERS, 2008; AHI; SEARCY, 2013). The social results of firm's operating practices have long been neglected but are increasingly receiving the attention of managers and researchers (MANI et al., 2016). Meeting environmental and social standards along all stages of the supply chain can leads firms to achieve sustainability performance (SEURING, 2013).

Previous studies have investigate the relationships between green or sustainable supply chain management initiatives and business performance, as shown in Table 8. Carter, Kale e Grimm (2000) explored the effect of environmental purchasing on firm performance. They sent a survey to purchasing executives members of the National Association of Purchasing Management (NAPM) in the U.S. The results showed that environmental purchasing is positively related to firm performance. Rao e Holt (2005) explored ISO14001 certified companies in South East Asia and found that greening the different phases of the supply chain leads to an integrated green supply chain, which leads to competitiveness and economic performance.

Zhu e Sarkis (2004) examined the relationships between green supply chain management (GSCM) practices (internal environmental management, external GSCM, investment recovery, and Eco-design) and performance. They sent a survey to Chinese manufacturing enterprises. The results indicated that GSCM practices tended to have win-win relationships in terms of environmental and economic performance.

Testa e Iraldo (2010) investigated the impact of green supply chain management (GSCM) initiatives and environmental management system (EMS) practices on environmental and competitive performance. Their results show reputation-led is the most effective in stimulating the adoption of GSCM initiatives; imitation-led and innovation-led influence the adoption of GSCM initiatives; and the efficiency-led was the only hypothesis not confirmed in the model, indicating that the objective of reducing costs or economizing resources does not seem to be a determinant for the adoption of GSCM practices.

Zailani et al. (2012) investigated the extent of implementation of sustainable supply chain management practices (environmental purchasing and sustainable packaging) and the outcomes of these practices on sustainable supply chain performance (economic, environmental, social, and operational). They conducted a survey with manufacturing firms in Malaysia. The study found that environmental purchasing has a positive effect on economic, social, and operational outcomes, whereas sustainable packaging has a positive effect on environmental, economic and social outcomes.

Table 8: Previous studies related to forward supply chain initiatives as determinants of business performance

Reference	Forward initiatives	Performance	Method	Results
Carter, Kale e Grimm (2000)	Environmental purchasing	Net income Costs of goods sold	U.S.; companies members of the NAPM; survey sent to managers; n=437 (41.7%); confirmatory factor analysis; ordinary least squares equation.	Environmental purchasing construct is positively related to net income, and negatively related to cost of goods sold.
Zhu e Sarkis (2004)	GSCM practices: Internal environmental management External GSCM Investment recovery Eco-design	Environmental performance Economic performance	China; manufacturing enterprises; n=186; factor analysis; bivariate correlation; multivariate regression analysis.	Direct relationships between GSCM practices overall and economic and environmental performance.
Rao e Holt (2005)	Greening inbound Greening production Greening outbound	Competitiveness Economic performance	South East Asia; ISO14001 certified companies; n=52; structural equation modeling.	Greening the different phases of the supply chain leads to an integrated green supply chain, which ultimately leads to competitiveness and economic performance.
Testa e Iraldo (2010)	Green supply chain management Environmental Management System	Environmental performance Business competitiveness performance	Seven OECD countries; manufacturing facilities; survey sent to managers; response rates range from approximately 9% to 35% among countries; econometric binary probit model.	GSCM practices improve suppliers environmental performance and affects suppliers profits.
Zailani et al. (2012)	Environmental purchasing Sustainable packaging	Economic performance Environmental performance Social performance Operational performance	Malaysia; large manufacturing companies; survey; n=105 (26.2%); factor analysis to measure the constructs; multiple regression analysis to estimate the relationships.	Environmental purchasing affects social, economic, and operational performance. Sustainable packaging affects social, economic, and environmental performance.
Green Jr. et al. (2012)	Green purchasing Cooperation with customers Eco-design Investment recovery	Environmental performance Operational performance Organizational performance	U.S.; manufacturing managers; n=159; structural equations modeling.	Cooperation with customers, Eco-design, and investment recovery affects positively environmental performance.
Jabbour et al. (2014)	Green purchasing Collaboration with customers	Green performance	Brazil; ISO 14001 certified companies; n=95; structural equations modeling using partial least squares.	The adoption of GSCM practices influences the environmental performance of firms.

Table 8: Previous studies related to forward supply chain initiatives as determinants of business performance (*Continued...*)

Reference	Forward initiatives	Performance	Method	Results
Li et al. (2015)	Green product design (GPD) Green supply chain process (GSCP)	Environmental performance Financial performance	China; high-tech companies; interviews with senior managers; survey with senior managers; n=256 (88%); confirmatory factor analysis; structural equation modeling using the maximum likelihood estimation.	GDP has a significant relationship with environmental performance but it do not affect financial performance. GSCP has a statistically significant relationship with environmental and financial performance.
Kirchoff, Tate e Mollenkopf (2016)	Green supply chain management	Cost efficiency Customer effectiveness Environmental differentiation	U.S.; large manufacturing firms; online survey; n=367; confirmatory factor analysis; structural equation modeling.	GSCM has positive relationship with cost efficiency, customer effectiveness, and environmental differentiation.
Tan et al. (2016)	Green production Green purchasing Investment recovery	Firm competitiveness: delivery, price, and quality	Malaysia; ISO 14001 certified manufacturing companies; survey; n=114 (21.3%); partial least squares; structure model using the bootstrapping approach.	Both green production and green purchasing have a direct effect on firm competitiveness. Investment recovery has no relationship with firm competitiveness.
Vanalle et al. (2017)	GSCM practices: Internal environmental management Eco-design Green purchasing Customer cooperation Investment recovery	Economic performance Environmental performance Operational performance	Brazil; automotive supply chain; n=, partial least squares structural equation modeling	Economic and environmental performance of the studied supply chain is positively related to the adoption of GSCM practices.
Hong, Zhang e Ding (2017)	SSCM practices SC Dynamic Capabilities	Economic performance Environmental performance Social performance	China; manufacturing firms; n=209; structural equation modeling.	The results reveal that SSCM practices have a significant positive effect on all three dimensions of performances.
Paulraj, Chen e Blome (2017)	SSCM practices: Sustainable product design Sustainable process design Supply-side sustainability collaboration Demand-side sustainability collaboration	Economic performance Environmental performance	U.S.; manufacturing firms; n=145; survey; polynomial regression.	SSCM initiatives play a central role in enhancing a firm's environmental and financial performance.

Green Jr. et al. (2012) found that economic and environmental performance of the studied U.S. manufacturing supply chain is positively related to the adoption of GSCM practices. Jabbour et al. (2014) investigated Brazilian firms with ISO 14001 and they found that green purchasing affects positively green/environmental performance.

Li et al. (2015) hypothesized the linkage between green supply chain (green product design and green supply chain processes) and performance (environmental and financial) from high-tech companies in China. The results showed a significant relationship between green supply chain processes and environmental and financial performance. The relationship between green product design and environmental performance was significant, but it may not have a direct impact on financial performance.

Tan et al. (2016) examined the influence of green supply chain management (GSCM) practices, such as green production, green purchasing, investment recovery, on firm competitiveness. They conducted a survey with manufacturing firms in Malaysia. The results reveal that both green production and green purchasing have a direct effect on firm competitiveness. However, investment recovery has no relationship with firm competitiveness. A discussion and suggestions for future research are included.

Vanalle et al. (2017) investigated Brazilian automotive industries and they found that the economic and environmental performance of the studied supply chain is positively related to the adoption of GSCM practices. Paulraj, Chen e Blome (2017) investigated supply-chain firms in Germany and their results shows that SSCM initiatives play a central role in enhancing a firm's environmental and financial performance.

Thus, based on these arguments, it is hypothesized that:

H7. Forward supply chain initiatives are positively associated with economic performance.

H8. Forward supply chain initiatives are positively associated with environmental performance.

H9. Forward supply chain initiatives are positively associated with social performance.

Product take-back can be a profit center because recovery strategies for end-of-life products such as reverse logistics, closed-loop supply chains, industrial ecology, and life cycle assessment (LCA) can represent an environmental liability, or an economic opportunity, or both (GEYER; JACKSON, 2004). Recovery value from used products can provide returns on investments (JAYARAMAN; LUO, 2007). Reverse logistics provides strategic cost savings, it can increase a firm's productivity and profitability, improve long-term return on investment (ROI) to protect stakeholders' interest and it has been seen as a way to firms achieve the goals of sustainable development (DOWLATSHAH, 2000).

Previous studies have investigate the relationships between reverse supply chain initiatives and business performance, as shown in Table 9. Nikolaou, Evangelinos e Allan (2013) proposed an integrated model for introducing Corporate Social Responsibility (CSR) and sustainability issues in reverse logistics systems as a means of developing a complete performance framework model. It provided some standard and broadly accepted procedures based on the GRI guidelines

to evaluate a firm's social performance of reverse logistics systems.

Table 9: Previous studies related to reverse supply chain initiatives as determinants of business performance

Reference	Reverse initiatives	Performance	Method	Results
Nikolaou, Evangelinos e Allan (2013)	Reverse logistics social responsibility	Economic performance Environmental performance Social performance	Numerical examples - firm A and firm B; hypothetical data.	This paper proposed a methodological framework to evaluate the social responsibility of reverse logistics based on the TBL approach (GRI guidelines). It provided some standard and broadly accepted procedures to evaluate a firm's social performance of reverse logistics systems.
Lai, Wu e Wong (2013)	Reverse logistics practices: waste management, recycling, reuse, materials recovery, and design for reverse logistics	Operational performance Financial performance Social performance	China; exported-oriented manufacturers; survey; n=134 (16.7%); seemingly unrelated regressions (SUR).	The results indicated that the adoption of RL practices by Chinese manufacturers generates substantial environmental and financial gains,but not social benefits.
Cannella, Bruccoleri e Framinan (2016)	Reverse logistics's factors: remanufacturing lead-time, return rate of recycled products, reverse order policy, and number of supply chain tiers	Operational costs	Review of the literature by adopting systematic review framework; System Dynamics (SD) modeling.	The results showed that companies have to invest in returns management, not only to accept the advocated challenge of sustainable operations, but also because feeding the production - distribution system with product returns flow will improve the SC dynamic performance.

Lai, Wu e Wong (2013) investigated how reverse logistics practices (RL), such as waste management, recycling, reuse, reprocessing, materials recovery, and design for RL, are related to organizational bottom line with respect to operational, financial, and social performance outcomes. The results indicated that the adoption of RL practices by Chinese manufacturers generates substantial environmental and financial gains, but not social benefits.

Cannella, Bruccoleri e Framinan (2016) analyzed the relationships between some reverse logistics' factors (remanufacturing lead-time, return rate of recycled products, reverse order policy, and number of supply chain tiers) on the order and inventory variance amplification. Results showed that closed-loop supply chain (CLSC) outperforms a forward supply chains; companies have to invest in returns management, not only to accept the advocated challenge of sustainable operations, but also because feeding the production–distribution system with product returns flow will improve the SC dynamic performance; reducing remanufacturing lead-time and promoting information transparency may be crucial to improve CLSC dynamics; reducing

unnecessary operational members can affect costs costs.

Thus, based on these arguments, it is hypothesized that:

H10 Reverse supply chain initiatives are positively associated with economic performance.

H11. Reverse supply chain initiatives are positively associated with environmental performance.

H12. Reverse supply chain initiatives are positively associated with social performance.

We are proposing research model and hypothesis to verify the relationships between strategic orientations, sustainable supply chain management initiatives, and triple bottom line performance, as shown in Figure 5.

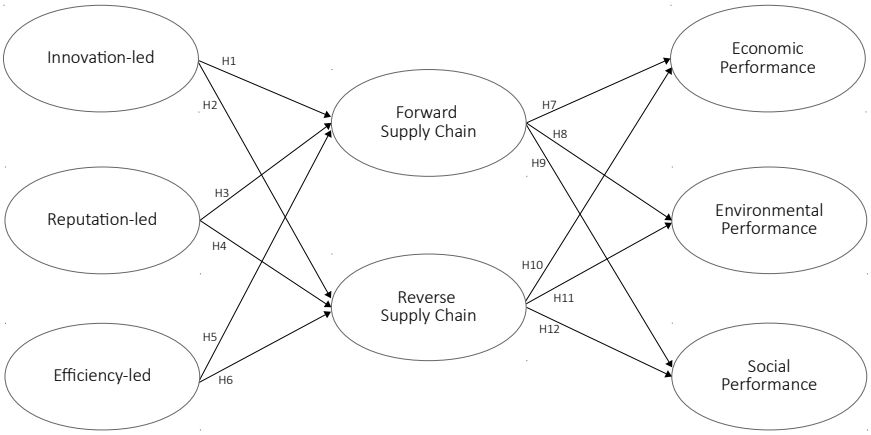

Figure 5: Research model and hypothesis

This study aims to validate eight constructs and understand the relationships between them. Each construct will be measure by a number of indicators. Strategic orientation constructs are innovation-led, efficiency-led, and reputation-led developed to understand the strategic goals a firm pursue in order to guide its strategic management.

Sustainable supply chain management initiatives (SSCM) encompass forward and reverse supply chain initiatives. Forward supply chain initiatives include activities of product design and development, purchasing, manufacturing, packaging and distribution. Reverse supply chain initiatives include activities of product and packaging collection/take back, returned product use, product and packaging disposal, and other reverse logistics management activities. We aim to understand the firms operations management.

Triple bottom line performance encompass economic, environmental, and social performance. We are interested in know which variables can measure these constructs, specially social performance that have received little attention for the researchers.

3.4 Methodology

A survey questionnaire was developed to validate the constructs and to measure the impacts of the strategic orientations on on sustainable supply chain management (SSCM) initiatives, and the impacts of SSCM initiatives on triple bottom line performance outcomes from automotive sector in the United States. Our research project, namely is "Corporate Strategic Orientations, Sustainable Supply Chain Initiatives, and Business Performance in the U.S. Automotive Industry", received approval from IIT Institutional Review Board (IRB) to conduct survey to human participants (see Appendix A). We are using multiple indicators to measure each research construct based on relevant literature.

3.4.1 Instrument development

The design process for the questionnaire consisted of two stages. The first stage utilized an extended review of the literature in order to identify major issues related to the strategic orientations of innovation-led, reputation-led, and efficiency-led; sustainable supply chain management initiatives in forward and reverse flows; and triple bottom line performance and its economic, environmental, and social dimensions. The initial questionnaire design also incorporated input from experts in both the strategic, environmental and operations fields and survey research specialists. This development stage is important to ensure the questionnaire content validity.

The second stage of questionnaire development included a pilot study with 20 valid responses from automotive manufacturing industries. The aim of the pre-test was to determine the validity and accuracy of how the questions addressed practices in the industry. The feedback resulted in some minor alterations to the questionnaire before the formal investigation.

The questionnaire is comprise of five sections (see Appendix B): (1) introduction to the survey and consent term; (2) information on strategic orientations of innovation-led, reputation-led and efficiency-led; (3) information on sustainable supply chain management in forward and reverse flows; (4) items related to triple bottom line performance; and (5) company and participant information. The questionnaire targeted line supervisors, managers, engineers, and upper managers within automotive manufacturing companies in the United States.

The first section invites the respondent to answer the questions by introducing the researches involved, the research objective, and expected results. The respondent should agree and consent to participate in the study. We also used two questions to verify the respondent qualify for the survey: i) respondent age to check if he/she is over 18 years old, and ii) respondent job title to check if he/she is line supervisor, manager, engineer, or from upper management.

We selected 92 indicators to measure the eight research constructs based on relevant literature. A summary of the number of questions used in each construct is shown in Table 10. For the constructs we used a 5-point Likert-type scale.

Table 10: Number of indicators

Subjects	Constructs	No.
Strategic Orientations	Innovation-led	10
	Reputation-led	10
	Efficiency-led	10
Sustainable Supply Chain Management	Forward Supply Chain Initiatives	26
	Reverse Supply Chain Initiatives	17
Triple Bottom Line Performance	Economic performance	06
	Environmental performance	06
	Social performance	07
Total		**92**

The second section asks to the respondents to rate 30 questions related to strategic orientations of innovation-led, reputation-led, and efficiency-led. Each strategic orientation has ten questions. We use the scale where 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree (HSU; TAN; ZAILANI, 2016). The innovation-led, reputation-led, and efficiency-led strategic orientations goals considered in this study, as well as the references, are shown in Table 11.

Table 11: Listing of strategic orientations and literature sources

Cod.	Strategic orientations indicators	References
	Innovation-led goals (IN)	
IN1	Our new products are always on the cutting edge of technology	Ho (2014)
IN2	Top managers in my firm place a strong emphasis on R&D, technological leadership and innovation	Baldwin e Johnson (1996), OECD (2005)
IN3	Developing and/or adopting advanced manufacturing technologies is key to my firm's competitive success	Gunday et al. (2011), Prajogo (2016)
IN4	My firm earns the bulk of its sales revenue from new product lines or services, and/or new markets (i.e., geographies)	Zhang e Li (2010), Gunday et al. (2011)
IN5	Management actively seeks innovative ideas	Ho (2014)
IN6	Management views employee learning as an investment, not an expense	Ho (2014)
IN7	Workers are encouraged to voice new ideas for new product development and process improvements	Ho (2014)
IN8	My firm pays close attention to consumer preferences and respond quickly to meet these needs	OECD (2005), Ho (2014)
IN9	My firm engages with customers (via customer forums, crowd sourcing, product advisory councils, social listening on Twitter, Facebook, etc.), and uses information on customer experiences to drive innovation in new product development	OECD (2005), Ho (2014)
IN10	Developing and fostering long-term relationships with suppliers, universities and other sources of new technologies is paramount to maintaining our competitive advantage in the future	OECD (2005), Ho (2014)
	Reputation-led goals (RP)	
RP1	My firm stands behind its products and services	McWilliams e Siegel (2001)
RP2	My firm segments markets precisely and then tailors products to match exactly the demands of those niches	Treacy e Wiersema (1993)
RP3	Top managers in my firm are willing to spend now to build customer loyalty for the long term	Treacy e Wiersema (1993)
RP4	Our managers emphasize empowering employees working close to customers, as well as hiring and training employees, with the skills required to respond to individual customer needs	Treacy e Wiersema (1993), McWilliams e Siegel (2001)
RP5	We measure customer satisfaction systematically and frequently	Treacy e Wiersema (1993)
RP6	Our organizational culture is one that makes ethical behavior, fair business practices and transparency top priorities	Carroll (1991), Harjoto e Jo (2011), Jizi et al. (2013)
RP7	Human-capital development is seen as a key commodity necessary for my firm's continued success	Roberts e Dowling (2002), Maloni e Brown (2006)
RP8	Senior management is committed to maintaining a work environment that shows concern for employees' safety, and for treating and rewarding employees fairly and equitably	Carroll (1991)
RP9	Senior managers in my firm believe programs aimed at reducing greenhouse gas emissions, improving energy efficiency, waste management, and water conservation make a positive contribution to our firm's short-and-long-term value	Carter e Jennings (2002), Maloni e Brown (2006)
RP10	My firm is actively engaged in the community, as sponsor of community involvement projects, cultural activities, and/or philanthropic projects	Carroll (1979), Fombrun e Shanley (1990), Maloni e Brown (2006)

Table 11: Listing of strategic orientations and literature sources (*Continued...*)

Cod.	Strategic orientations indicators	References
	Efficiency-led goals (EF)	
EF1	Our business objectives are to deliver products and services to customers at competitive prices and with minimal inconvenience	Treacy e Wiersema (1993)
EF2	Top managers in my firm emphasize efficiency and reliability across all levels, functions, and divisions	Treacy e Wiersema (1993), Mahsud, Yukl e Prussia (2011)
EF3	Our strategy for competitive advantage is built around information systems that emphasize integration and low-cost transaction processing	Treacy e Wiersema (1993)
EF4	Senior managers in my firm believe advanced manufacturing technologies improve products (quality) and processes (productivity, yield, and lower costs), and make a positive contribution to our firm' short-and-long term value	Treacy e Wiersema (1993), Ebben e Johnson (2005)
EF5	We measure the performance of key processes and benchmark costs of operations systematically and frequently	Talluri (2000), Hervani, Helms e Sarkis (2005), Tseng et al. (2014)
EF6	Retaining key talent and maintaining workforce stability is seen as a key commodity necessary for my firm's continued success	Treacy e Wiersema (1993)
EF7	Management views operational excellence as critical to meeting customer expectations	Treacy e Wiersema (1993), Kotabe (1998)
EF8	My firm pays close attention to our supply base, how we manage and engage with suppliers in order to retain our competitive advantage in the market	Huo et al. (2016)
EF9	Senior managers in my firm view sustainability programs (tied to fuel use, emissions, water use, energy and waste management practices) as a direct reflection of, or complement to, efficiency and organizational discipline	Szekely e Knirsch (2005)
EF10	Senior management in my firm dedicate time and resources to devise robust (i.e., proactive) and agile (i.e., reactive) strategies to reduce the impact of potential disruptions, such as natural disasters, industrial accidents, supply disruptions, terrorist attacks, etc.	Szekely e Knirsch (2005), Mahsud, Yukl e Prussia (2011)

The third section ask to respondents to rate 43 questions related to the sustainable supply chain management initiatives, 26 questions to measure forward initiatives and 17 questions to measure reverse initiatives. We use the scale where 1 = not considering it, 2 = planning to consider, 3 = considering it currently, 4 = initiating implementation, 5 = implementing successfully (ZHU; SARKIS; LAI, 2008; LUTHRA; GARG; HALEEM, 2016). The forward and reverse supply chain initiatives of a firm and the related reference are shown in Table 12.

Table 12: Listing of sustainable supply chain initiatives and literature sources

Cod.	Sustainable Supply Chain Initiatives	References
	Forward Supply Chain Initiatives (FSC)	
FSC1	Design products with fewer parts; substituting heavier part with lighter ones	Fuller e Ottman (2004)
FSC2	Design products with reusable parts	Hsu et al. (2013)
FSC3	(Re)Design products to deliver same functionality with less material	Fuller e Ottman (2004)
FSC4	Design product to minimize resource use (energy, water, time)	Fuller e Ottman (2004), Zhu e Sarkis (2004)
FSC5	Design products to minimize scrap and waste (hazardous and non-hazardous)	Fuller e Ottman (2004), Zhu, Sarkis e Lai (2013)
FSC6	Collaborates with suppliers to improve product/service design	Zhu e Sarkis (2004)
FSC7	Develop design for disassembly program (e.g., with accessible parts for ease of disassembly, or using minimal welds, screws, clinches and snaps)	Fuller e Ottman (2004), Zhu e Sarkis (2004), Luthra, Garg e Haleem (2016)
FSC8	Institute design for recycling program (e.g., using safe materials, ease of material separation, etc.)	Fuller e Ottman (2004), Zhu e Sarkis (2004), Luthra, Garg e Haleem (2016)
FSC9	Source from environmentally friendly suppliers	Zhu e Sarkis (2004), Rao e Holt (2005)
FSC10	Encourage suppliers to use recycled materials	Wu, Ding e Chen (2012), Zhu, Sarkis e Lai (2013)
FSC11	Procure energy efficient, recyclable raw materials	Hsu et al. (2013), Blome, Hollos e Paulraj (2014)
FSC12	Employ lean manufacturing techniques (e.g., just-in-time, continuous improvement, etc.)	Luthra, Garg e Haleem (2016)
FSC13	Adopt total quality management and/or six-sigma quality initiatives	Dasgupta (2003), Lee e Chang (2010), Luthra, Garg e Haleem (2016)
FSC14	Use information technology to integrate data across internal and partners' systems (i.e., using EDI)	Clark e Hammond (1997), Fleischmann et al. (2000)
FSC15	Engage in business process reengineering initiatives	Clark e Hammond (1997), Loch (1998), Wang, Chan e Pauleen (2010)
FSC16	(Re)Design manufacturing processes to improve resource usage (energy and water) and reduce waste	Zhu e Sarkis (2004), Li et al. (2015)
FSC17	Outsource manufacturing to lower cost countries	Kumar e Samad Arbi (2007)
FSC18	Adopt advanced manufacturing processes (e.g. rapid prototyping, automation, robotics production, etc.)	Kao et al. (1995), Ahmed, Montagno e Firenze (1996), Chen e Small (1994), Dangayach e Deshmukh (2005), Ford e Despeisse (2016)
FSC19	Minimize the use of packing materials	Fuller e Ottman (2004), Rao e Holt (2005)
FSC20	Use reusable packing materials	Fuller e Ottman (2004), Rao e Holt (2005), Hsu, Tan e Zailani (2016)

Table 12: Listing of sustainable supply chain initiatives and literature sources (*Continued...*)

Cod.	Sustainable Supply Chain Initiatives	References
FSC21	Use of degradable materials	Rao e Holt (2005), Perotti et al. (2012), Zhu, Sarkis e Lai (2013)
FSC22	Engage with third-party logistics (3PL) providers	Stadtler (2005), Plambeck (2012), Ji, Gunasekaran e Yang (2014)
FSC23	Use cross-docking to consolidate less than truckload (LTL) shipments	Stadtler (2005), Plambeck (2012), Ji, Gunasekaran e Yang (2014)
FSC24	Conduct carbon footprint analysis	Plambeck (2012)
FSC25	Invest in natural gas or hybrid vehicle ground fleet	Luthra, Garg e Haleem (2016)
FSC26	Engaged in emissions reduction initiatives (e.g. logistics routes optimization, transport load and speed optimization)	Li et al. (2015), Plambeck (2012)
	Reverse Supply Chain Initiatives (RSC)	
RSC1	Customer return program implementation	Savaskan, Bhattacharya e Van Wassenhove (2004)
RSC2	Establish mail-in program	Savaskan, Bhattacharya e Van Wassenhove (2004)
RSC3	Partner with a third party collector	Savaskan, Bhattacharya e Van Wassenhove (2004)
RSC4	Collect used packaging from customers	Hsu et al. (2013)
RSC5	Disassembly for reuse as raw material	Thierry et al. (1995)
RSC6	Refurbish product for sale in secondary market(s)	Thierry et al. (1995)
RSC7	Use returned parts as spare parts for warranty claims	Blischke e Murthy (1992), Krikke, Blanc e Velde (2004)
RSC8	Disassembly for sale as scrap	Zhu e Sarkis (2004)
RSC9	Procedures for recycling end-of-life product/components	Thierry et al. (1995)
RSC10	Procedures for recycling packaging	Hsu et al. (2013)
RSC11	Procedures for handling hazardous materials for end-of-life products	Luthra, Garg e Haleem (2016)
RSC12	Procedures for the storage of waste	Hu, Sheu e Huang (2002)
RSC13	Appropriate treatment of waste disposal procedures	Thierry et al. (1995)
RSC14	Appropriate dumping of waste disposal	Thierry et al. (1995)
RSC15	Outsource of reverse logistics activity to external Logistics Service Provider (LSP)	Lau e Wang (2009)
RSC16	Adopt reverse logistics software; or embed reverse logistics module to existing ERP system	Li et al. (2015)
RSC17	Measure of reverse logistics activity costs	Lau e Wang (2009)

The forth section ask to respondent to rate 19 questions related to the economic, environmental and social performance. We use the scale where 1 = much worse than competitors, 2 = somewhat worse, 3 = about the same, 4 = somewhat better, and 5 = much better than competitors (SANTOS; BRITO, 2012; HO, 2014; LI et al., 2015). The triple bottom line performance (TBL) indicators of a firm and related reference are shown in Table 13.

Table 13: Listing of triple bottom line performance and literature sources

Cod.	Performance indicators	References
	Economic performance (EC)	
EC1	Net revenue growth	Rao e Holt (2005), Santos e Brito (2012), GRI (2016), Luthra, Garg e Haleem (2016)
EC2	Market share growth	Rao e Holt (2005), Santos e Brito (2012)
EC3	Return on assets	Rao e Holt (2005), Santos e Brito (2012), Nikolaou, Evangelinos e Allan (2013)
EC4	Return on investments	Rao e Holt (2005), Santos e Brito (2012)
EC5	Stock price improvement	Santos e Brito (2012), Nikolaou, Evangelinos e Allan (2013)
EC6	Market value added (market value/equity)	Rao e Holt (2005), Santos e Brito (2012)
	Environmental performance (EN)	
EN1	Use of hazardous materials and components	Zhu, Sarkis e Lai (2008), Zhu, Sarkis e Lai (2013)
EN2	Air pollutant emissions	Zhu, Sarkis e Lai (2008), Zhu, Sarkis e Lai (2013)
EN3	Water and solid waste generation	Zhu, Sarkis e Lai (2008), Zhu, Sarkis e Lai (2013)
EN4	Number of projects to protect, improve/restore the environment	Zhu, Sarkis e Lai (2008), Santos e Brito (2012)
EN5	Recycling level and reuse of residuals	Santos e Brito (2012)
EN6	Frequency of environmental accidents (e.g., spills)	Zhu, Sarkis e Lai (2008), Zhu, Sarkis e Lai (2013)
	Social performance (SO)	
SO1	Overall customer satisfaction	Santos e Brito (2012)
SO2	Customer repurchase rate	Santos e Brito (2012)
SO3	Number of social and cultural projects sponsored in local community	Carter e Jennings (2002), Santos e Brito (2012), GRI (2016)
SO4	Employee turn-over rate	Santos e Brito (2012)
SO5	Employee wages, benefits and rewards policies	Santos e Brito (2012), GRI (2016)
SO6	Employment of minorities	GRI (2016), Santos e Brito (2012)
SO7	Lawsuits filed by employees, customers and regulatory agencies	Santos e Brito (2012), Luthra, Garg e Haleem (2016)

The fifth section captures the demographic details about the respondents and organization type. Information encompass number of employees, firm's age, sales turnover, length of service, for example. Over the questionnaire we included other questions to capture information related to the importance of the constructs and topics investigated, firm's compliance with international standards (ISO certifications), presence of some types of corporate board positions, and the familiarity with the triple bottom line definition.

3.4.2 Sampling and data collection

The chosen sample population for this study is composed of American firms belonging to the automotive industry sector. To validate eight constructs related to corporate strategic orientation, sustainable supply chain management initiatives, and triple bottom line performance, and verify the relationship between them, we conducted survey with automotive manufacturing industries in the United States.

The final questionnaire has been sent by e-mail where the automobile firms panelists. In the e-mails, an introduction to the survey's purpose and expected outputs were included and the respondents were asked to answer all the questions. A self-administered online survey was employed via Qualtrics, US-based commercial online survey hosting company. We obtained the original sample randomly from Qualtrics panel book database. We targeted supervisor/managers or plus levels as the respondents to ensure that the survey questions were answered based on accurate knowledge of the strategic orientation, supply chain management, performance of the firms. The survey was run in August and September 2018. After the sent the survey to 2300 firms, 210 completed questionnaires were received. The response rate was 9.13%.

3.4.3 Data analysis techniques

The 210 collected data was analyzed using statistical softwares MPlus Version 8 and SPSS. First we analyze descriptive statistics of the indicators. We measured mean, median, standard deviation, skewness, and kurtosis to know the characteristics of the data. Our sample size is grater than 200 and it attend to requirements established by the literature (HAIR et al., 2010).

Second, for statistical testing of the results, we relied on confirmatory factor analysis (CFA). CFA model included covariances between all pairs of latent factors. It highlights the constructs of unidimensionality, reliability, and validity (HAIR et al., 2010). CFA was conducted for reliability testing to evaluate the accuracy of responses by assessing the internal stability and consistency of questionnaire constructs (HAIR et al., 2010).

Confirmatory factor analysis (CFA) was used to verify the validity of the structure (NOVAK; HOFFMAN; YUNG, 2000). A confirmatory structural model then specifies the causal relations of the constructs to one another, as posited by some theory (ANDERSON; GERBING, 1988). Following Anderson e Gerbing (1988), the first assessment should be whether any structural model exists that has an acceptable goodness-of-fit. Thus, we began by fitting a Confirmatory Factor Analysis (CFA) model that included covariances between all pairs of latent factors. The base model for the CFA included the latent factors and measured variables for innovation-led, reputation-led, efficiency-led, forward supply chain, reverse supply chain, economic performance, environmental performance, and social performance. Overall goodness-of-fit can be measured by: RMSEA values about or below 0.05 indicate a close fit of the model of model in relation to degrees of freedom, and values below 0.08 indicate a reasonable fit; comparative fit

index (CFI) has the minimum value of 0.95 suggested.

Third, collected data has been further analyzed by structural equation modeling analysis (SEM) to estimate the study hypothesis. SEM is a family of statistical models that seek to explain the relationships among multiple variable. It use equations depict all of the relationships among constructs (the dependent and independent variables) involved in the analysis. Constructs are unobservable or latent factors represented by multiple variables. SEM's foundation lies in two familiar multivariate techniques: factor analysis and multiple regression analysis (HAIR et al., 2010). Maximum likelihood estimation was used to fit the CFA model. Multiple regression analysis has been used to know the impacts of strategic orientation to implement SSCM, and if such SSCM affects triple bottom line performance outcomes. We measured the overall goodness-of-fit for the structural equations using the same indicators from CFA.

3.5 Results and Discussion

3.5.1 Sample profile

Table 14 summarize the firm profile. Most of the companies consulted are between 25-50 years (39%), followed by 11-25 years (28%), 51-100 years (13.8%), less than 5 years (6.7%), 6-10 years (6.2%), and more than 100 years (6.2%). Summarizing, 41% of the companies are less then 25 years old and 59% are more then 26 years old. This information points to the maturity of the companies researched.

Most of the companies have between 100-500 employees (22.9%), followed by those that have 1,000-5,000 (20%), 500-1,000 (17.1%). Summarizing, 48.1% of the companies has less than 500 employees and 61.9% has more than 500 employees.

Table 14: Firm profile information

Demographics	Categories	No.	%	Cum. %
Age of firm	Less than 5 years	14	6.7	6.7
	6-10 years	13	6.2	12.9
	11-25 years	59	28.1	41.0
	26-50 years	82	39.0	80.0
	51-100 years	29	13.8	93.8
	More than 100 years	13	6.2	100.0
	Total	210	100.0	
Number of employees	Less than 50	27	12.9	12.9
	50-100	26	12.4	25.2
	100-500	48	22.9	48.1
	500-1,000	36	17.1	65.2
	1,000-5,000	42	20.0	85.2
	5,000-10,000	13	6.2	91.4
	10,000-25,000	6	2.9	94.3
	More than 25,000	12	5.7	100.0
	Total	210	100.0	
Annual sales turnover	Less than US$500,000	15	7.1	7.1
	Between US$500,000 and US$5 million	34	16.2	23.3
	Between US$5 million and US$25 million	40	19.0	42.4
	Between US$25 and US$50 million	28	13.3	55.7
	Between US$50 million and US$100million	33	15.7	71.4
	More than US$100 million	60	28.6	100.0
	Total	210	100.0	

Table 15 shows the respondent profile. Most of the respondents are manager (49%), followed by the employees who have positions in the upper management (36.7%). With regard to length of service, most respondents have between 6 and 10 years of company (32.4%), followed by those between 11 and 20 years (27.1) and people between 3 and 5 years (21.5%).

Regarding education level, most respondents have Bachelor's Degree (43.8%), Master's Degree (20%), Associate's Degree (19.5%), and High School/GED (15.7%). Only one person has less than High School and one with Doctoral Degree. Finally, 61% of respondents are men and 49% are women.

Table 15: Respondent profile information

Demographics	Categories	No.	%
Job title	Upper Management	77	36.7
	Engineer	11	5.2
	Manager	103	49.0
	Line Supervisor	19	9.0
	Total	210	100.0
Length of service	Less than 2 years	17	8.1
	3-5 years	45	21.4
	6-10 years	68	32.4
	11-20 years	57	27.1
	More than 20 years	23	11.0
	Total	210	100.0
Education level	Less than High School	1	0.5
	High School/GED	33	15.7
	Associate's Degree	41	19.5
	Bachelor's Degree	92	43.8
	Master's Degree	42	20.0
	Doctoral Degree	1	0.5
	Total	210	100.0
Gender	Male	128	61.0
	Female	82	39.0
	Total	210	100.0

We asked some questions to verify the stage of adoption of some ISO, as can be seen in Table 16. The statistics showed that 65.7% of the companies have adopted ISO 9001 quality management; 38.6% have ISO 14001 environmental management; 26.2% have ISO 26000 social responsibility; 37.6% have ISO 31000 risk management; and 48.1% has ISO 45001 occupational health and safety. These information indicate high number of firms concerning with quality management and occupational health and safety, but a lower number of companies with environmental and social standardization.

Table 16: Descriptive statistics of the ISO adoption

ISO - Management	Stage of adoption	No.	%
ISO 9001	No: Not Initiated/Not Adopted	36	17.1
(Quality management)	In progress: Early Stages of Adoption	36	17.1
	Yes: Successfully Adopted	138	65.7
	Total	210	100.0
ISO 14001	No: Not Initiated/Not Adopted	75	35.7
(Environmental management)	In progress: Early Stages of Adoption	54	25.7
	Yes: Successfully Adopted	81	38.6
	Total	210	100.0
ISO 26000	No: Not Initiated/Not Adopted	96	45.7
(Social responsibility)	In progress: Early Stages of Adoption	59	28.1
	Yes: Successfully Adopted	55	26.2
	Total	210	100.0
ISO 31000	No: Not Initiated/Not Adopted	72	34.3
(Risk management)	In progress: Early Stages of Adoption	59	28.1
	Yes: Successfully Adopted	79	37.6
	Total	210	100.0
ISO 45001	No: Not Initiated/Not Adopted	61	29.0
(Occupational health and safety)	In progress: Early Stages of Adoption	48	22.9
	Yes: Successfully Adopted	101	48.1
	Total	210	100.0

Table 17 shows the descriptive statistics for the firms board positions with respect to innovation, operations, sustainability, and customer services. Most of the companies have Chief Operating Officer (71.4%) while 31.9% have Chief Innovation Officer, 19% have Chief Customer Officer, 13.8% have Chief Sustainability Officer, and 15.7% have none of these board positions.

Table 17: Descriptive statistics of the board positions

Board positions	No.	%
Chief Innovation Officer	67	31.9
Chief Operating Officer	150	71.4
Chief Sustainability Officer	29	13.8
Chief Customer Officer	40	19.0
Any Other CEO	19	9.0
None of the above	33	15.7

Table 18 shows the descriptive statistics for two questions of the survey. In the first question, we asked to the respondents which descriptions matches their firm's strategic orientation. The responses showed that innovation-led was indicated for 39%, reputation-led for 32.4%, and

efficiency-led 28.6%.

In the second question we asked to the respondents if they were familiar with the "triple bottom line performance". The responses pointed out to the low number of respondents that are very familiar (16.2%) or extremely familiar with the concept (13.3%). Most of the respondents are slightly familiar (23.8%) or not familiar at all (23.8%). This statistics indicate little respondents knowledge related to the concept of sustainability represented by the triple bottom line approach of economic, environmental and social dimensions.

Table 18: Level of awareness of the strategic orientation and triple bottom line concepts

	Description	No.	%
Strategic orientation	Innovation-led	82	39.0
	Reputation-led	68	32.4
	Efficiency-led	60	28.6
	Total	210	100.0
Triple bottom line	Not familiar at all	50	23.8
	Slightly familiar	50	23.8
	Moderately familiar	48	22.9
	Very familiar	34	16.2
	Extremely familiar	28	13.3
	Total	210	100.0

Table 19 shows the descriptive statistics for the level of importance of forward supply chain initiatives. Product design and development initiatives are considered very important for 34.8% of the respondents and extremely important for 39%. Purchasing initiatives are considered very important for 41.9% of the respondents and extremely important for 34.8%. Manufacturing initiatives are considered very important for 28.6% of the respondents and extremely important for 62.4%. Packaging initiatives are considered very important for 38.6% of the respondents and extremely important for 30%. Distribution and transportation initiatives are considered very important for 36.7% of the respondents and extremely important for 40.5%. These information demonstrate the high importance of all forward supply chain initiatives, especially for manufacturing initiatives once we are targeting automotive manufacturing industries.

Table 19: Level of importance of the forward supply chain initiatives

Forward supply chain initiatives	Level of importance	No.	%
Product design and development	Not at all important	5	2.4
	Slightly important	12	5.7
	Moderately important	38	18.1
	Very important	73	34.8
	Extremely important	82	39.0
	Total	210	100.0
Purchasing	Not at all important	2	1.0
	Slightly important	6	2.9
	Moderately important	41	19.5
	Very important	88	41.9
	Extremely important	73	34.8
	Total	210	100.0
Manufacturing	Not at all important	0	0
	Slightly important	4	1.9
	Moderately important	15	7.1
	Very important	60	28.6
	Extremely important	131	62.4
	Total	210	100.0
Packaging	Not at all important	4	1.9
	Slightly important	17	8.1
	Moderately important	45	21.4
	Very important	81	38.6
	Extremely important	63	30.0
	Total	210	100.0
Distribution and transportation	Not at all important	3	1.4
	Slightly important	7	3.3
	Moderately important	38	18.1
	Very important	77	36.7
	Extremely important	85	40.5
	Total	210	100.0

Table 20 shows the descriptive statistics for the level of importance of reverse supply chain initiatives. Product and packaging collection initiatives are considered not at all important for 21% of respondents and slightly important for 12.4%. Such initiatives are very important for 20.5% of respondents and extremely important for 27.1%. Returned product use initiatives are considered not at all important for 13.3% of respondents and slightly important for 11.9%. Such initiatives are very important for 30.5% of respondents and extremely important for 30%. Product and packaging disposal initiatives are considered not at all important for 11.9% of respondents and slightly important for 9%. Such initiatives are very important for 29.5% of respondents and extremely important for 30.5%. Reverse logistics management initiatives are

considered not at all important for 16.6% of respondents and slightly important for 10%. Such initiatives are very important for 23.8% of respondents and extremely important for 27.9%. In summary, returned product use and product and packaging disposal are very/extremely important for the respondents, following by reverse logistics management and product and packaging collection.

Table 20: Level of importance of the reverse supply chain initiatives

Reverse supply chain initiatives	Level of importance	No.	%
Product and packaging collection	Not at all important	44	21.0
	Slightly important	2	12.4
	Moderately important	40	19.5
	Very important	43	20.5
	Extremely important	57	27.1
	Total	210	100.0
Returned product use	Not at all important	28	13.3
	Slightly important	25	11.9
	Moderately important	30	14.3
	Very important	64	30.5
	Extremely important	63	30.0
	Total	210	100.0
Product and packaging disposal	Not at all important	25	11.9
	Slightly important	19	9.0
	Moderately important	40	19.0
	Very important	62	29.5
	Extremely important	64	30.5
	Total	210	100.0
Reverse logistics management	Not at all important	37	17.6
	Slightly important	21	10.0
	Moderately important	56	26.7
	Very important	50	23.8
	Extremely important	46	21.9
	Total	210	100.0

3.5.2 Descriptive statistics

The assessment of the normality of variables involved checking the shape (i.e. skewness and kurtosis) of the distribution. The mean scores of skewness and kurtosis are 0 when the distribution is normal, while a skew index greater then 3 and kurtosis index greater than 10 indicates severe non-normality (KLINE, 2011). We calculated mean, median and standard deviation (SD) for the constructs variables data in order to know the data characteristics. The following tables report the skewness, kurtosis, mean, median, and standard deviation of all variables of each construct proposed.

Table 21 presents the descriptive statistics for strategic orientations constructs. It shows the skewness and kurtosis of the variables are bellow 3 and 10 respectively, suggesting multivariate normality. The higher mean of agreement in innovation-led questions were observed in IN3 (4.19), "Developing and/or adopting advanced manufacturing technologies is key to my firm's competitive success". In reputation-led the higher mean was question RP1 (4.59), "My firm stands behind its products and services". In efficiency-led the it was question EF1 (4.31), "Our business objectives are to deliver products and services to customers at competitive prices and with minimal inconvenience."

Table 21: Descriptive statistics of the strategic orientations items

Construct	Variable	Skewness	Kurtosis	Mean	Median	SD
Innovation-led	IN1	-0.907	0.498	3.81	4.00	1.036
	IN2	-0.991	0.539	3.92	4.00	1.018
	IN3	-1.185	0.916	4.19	4.00	0.979
	IN4	-0.558	-0.634	3.57	4.00	1.161
	IN5	-1.092	0.647	4.03	4.00	1.053
	IN6	-1.041	0.416	3.90	4.00	1.120
	IN7	-1.133	0.841	4.03	4.00	1.051
	IN8	-1.029	0.487	4.11	4.00	0.999
	IN9	-0.826	-0.083	3.77	4.00	1.161
	IN10	-1.315	1.398	4.15	4.00	1.000
Reputation-led	RP1	-2.257	6.083	4.59	5.00	0.754
	RP2	-1.237	1.506	4.16	4.00	0.924
	RP3	-0.806	-0.018	4.05	4.00	0.962
	RP4	-0.953	0.309	3.96	4.00	1.080
	RP5	-1.208	1.105	4.24	4.00	0.928
	RP6	-1.033	0.489	4.03	4.00	1.060
	RP7	-0.673	-0.266	3.86	4.00	1.035
	RP8	-1.266	1.056	4.18	4.50	1.029
	RP9	-0.707	-0.236	3.82	4.00	1.108
	RP10	-0.895	0.042	3.83	4.00	1.164
Efficiency-led	EF1	-1.435	2.037	4.31	5.00	0.905
	EF2	-1.299	1.494	4.23	4.00	0.917
	EF3	-0.951	0.345	3.94	4.00	1.072
	EF4	-1.033	0.885	4.08	4.00	0.963
	EF5	-1.183	1.259	4.12	4.00	0.940
	EF6	-1.190	0.723	4.10	4.00	1.089
	EF7	-1.288	1.478	4.27	4.50	0.905
	EF8	-1.059	1.258	4.16	4.00	0.871
	EF9	-0.679	-0.251	3.72	4.00	1.121
	EF10	-0.818	0.007	3.83	4.00	1.102

Note: n=210

Table 22 shows the descriptive statistics for forward supply chain and reverse supply chain initiatives. It shows the skewness and kurtosis of the variables are bellow 3 and 10 respectively, suggesting multivariate normality. In the forward supply chain questions, the higher mean of

level of implementation for product design and development was FSC5 (3.81), “Design product to minimize resource use (energy, water, time)”; for purchasing was question FSC11 (3.59), “Procure energy efficient, recyclable raw materials”; manufacturing was question FSC12 (3.90), “Employ lean manufacturing techniques (e.g., just-in-time, continuous improvement, etc.)”; packaging was question FSC20 (3.65), “Use reusable packaging materials”; manufacturing was question FSC22 (3.42), “Engage with third-party logistics (3PL) providers.”

In the reverse supply chain questions, the higher mean of level of implementation for product and packaging collection/take-back was RSC (3.52), “Customer return program implementation”; returned product use was question RSC10 (3.57), “Procedures for recycling packaging”; product and packaging disposal was question RSC (4.09), “Appropriate dumping of waste disposal”; other reverse logistics management initiatives RSC17 (3.00), “Measure of reverse logistics activity costs.”

Table 22: Descriptive statistics of the sustainable supply chain initiatives

Construct	Variable	Skewness	Kurtosis	Mean	Median	SD
Forward SC	FSC1	0.194	-1.471	3.09	2.00	1.521
	FSC2	-1.079	-0.464	3.09	3.00	1.539
	FSC3	-0.055	-1.650	3.46	2.00	1.415
	FSC4	0.376	-1.433	3.53	2.00	1.370
	FSC5	-0.063	-1.604	3.81	2.00	1.324
	FSC6	-0.375	-1.538	3.85	2.00	1.320
	FSC7	0.270	-1.095	3.29	3.00	1.523
	FSC8	-0.943	0.408	3.61	4.00	1.418
	FSC9	-0.759	0.448	3.36	4.00	1.445
	FSC10	-1.436	1.636	3.35	5.00	1.499
	FSC11	-0.686	-0.067	3.59	4.00	1.459
	FSC12	-0.939	0.644	3.90	4.00	1.309
	FSC13	-0.194	-1.384	3.59	3.00	1.406
	FSC14	-0.199	-1.439	3.61	3.00	1.380
	FSC15	-0.507	-1.051	3.43	4.00	1.365
	FSC16	-0.608	-0.825	3.55	4.00	1.407
	FSC17	-0.899	-0.374	3.00	4.00	1.694
	FSC18	-0.977	-0.235	3.44	4.00	1.454
	FSC19	-0.359	-1.316	3.65	4.00	1.333
	FSC20	-0.673	-0.854	3.64	4.00	1.487
	FSC21	-0.391	-1.176	3.38	4.00	1.567
	FSC22	-0.401	-1.272	3.42	4.00	1.564
	FSC23	-0.573	-1.089	3.13	4.00	1.598
	FSC24	-1.068	0.017	2.91	4.00	1.581
	FSC25	-0.689	-0.807	2.61	4.00	1.607
	FSC26	-0.677	-0.752	3.07	4.00	1.565
Reverse SC	RSC1	-0.544	-0.904	3.52	4.00	1.507
	RSC2	-0.649	-0.874	2.85	4.00	1.665
	RSC3	-0.065	-1.677	2.86	3.00	1.600
	RSC4	-0.556	-1.027	2.92	4.00	1.620
	RSC5	-0.729	-0.617	3.13	4.00	1.599
	RSC6	-0.677	-1.010	3.06	4.00	1.618
	RSC7	-0.354	-1.425	3.07	4.00	1.670
	RSC8	-0.504	-1.279	3.21	4.00	1.667
	RSC9	-0.190	-1.528	3.43	3.00	1.552
	RSC10	0.039	-1.554	3.57	3.00	1.534
	RSC11	0.338	-1.503	3.80	2.00	1.502
	RSC12	-0.134	-1.519	3.94	3.00	1.423
	RSC13	-0.240	-1.340	4.01	3.00	1.418
	RSC14	-0.602	-0.903	4.09	4.00	1.353
	RSC15	-0.659	-0.684	2.93	4.00	1.598
	RSC16	-0.307	-1.053	2.85	3.00	1.535
	RSC17	-0.605	-1.100	3.00	4.00	1.595

Note: n=210

Table 23 presents the descriptive statistics for triple bottom line performance. It shows the skewness and kurtosis of the variables are bellow 3 and 10 respectively, suggesting multivariate normality. In the economic performance questions, the higher mean of the performance level compared to the competitors was question EC6 (3.89), "Market value added (market value/equity)"; for the environmental performance was EN6 (4.05) "Frequency of environmental accidents (e.g., spills)"; for the social performance was SO1 (4.17), "Overall customer satisfaction."

Table 23: Descriptive statistics of the triple bottom line performance items

Performance Constructs	Variable	Skewness	Kurtosis	Mean	Median	SD
Economic	EC1	0.081	-1.649	3.86	3.00	0.869
Performance	EC2	0.044	-1.578	3.80	3.00	0.881
	EC3	0.002	-1.609	3.81	3.00	0.854
	EC4	-0.176	-1.528	3.79	3.00	0.888
	EC5	-0.127	-1.588	3.71	3.00	0.946
	EC6	-0.130	-1.650	3.89	3.00	0.860
Environmental	EN1	-0.235	-1.609	3.81	4.00	0.939
Performance	EN2	-0.452	-1.327	3.78	4.00	0.917
	EN3	-0.597	-1.168	3.82	4.00	0.860
	EN4	-0.922	-0.687	3.67	4.00	0.970
	EN5	-1.097	-0.243	3.88	5.00	0.899
	EN6	-1.219	0.033	4.05	5.00	0.887
Social	SO1	-1.330	0.397	4.17	5.00	0.835
Performance	SO2	0.011	-1.564	4.12	3.00	0.855
	SO3	0.074	-1.495	3.59	3.00	1.037
	SO4	-0.035	-1.564	3.67	3.00	1.054
	SO5	-0.291	-0.468	3.69	4.00	1.009
	SO6	-0.348	-0.180	3.76	4.00	0.989
	SO7	-0.227	-0.431	4.06	4.00	0.969

Note: n=210

3.5.3 Constructs measurement: confirmatory factor analysis (CFA)

Before testing the structural model, confirmatory factor analysis (CFA) was needed to test the measurement theory and find out how well the theoretical specification of the constructs matches the actual data (HAIR et al., 2010). Structural equation modeling (SEM), which combines confirmatory factor analysis and multiple regression analysis, was chosen because it has an ability to represent latent constructs in multiple dependence relationships while accounting for measurement error at the same time.

CFA and SEM was performed in Mplus 8 using the maximum likelihood estimation (MLE) method because it proven to be fairly robust to violations of normality. moreover, it produces reliable results in comparison with other techniques (HAIR et al., 2010). A typical sample size in studies where SEM is used is about 200 because this number corresponds to the approximate median sample size in surveys of published articles which SEM results are reported. This

recommendation is not standard practice, but it highlights the fact that analyzing small samples in SEM is problematic (KLINE, 2011).

This subsection presents the construct validity by using Mplus 8. Table 24 shows the fit indices used to measure the reliability of the constructs. Model good fit is indicated for non-significant Chi-squared (p>0.5), CFI ant TLI indices greater than 0.95, RMSEA lower than 0.05, and lower SRMR. In order to verify construct reliability we measured Cronbach's Alpha. It indicate if the variables measure the construct and values higher than 0.6 is a good is expected (HAIR et al., 2010). We estimate standardized parameters.

Table 24: Fit indices used in this study

Fit indices	Description	Traditional cut-off value
Chi-square (χ^2) and degree of freedom (df)	It is a test of statistical significance between the observed and estimated covariances matrices.	Insignificant p value (p > 0.05)
Normalized chi-square (χ^2/df)	It is a sample ratio of χ^2 to df where 3 or below indicates good fit	(χ^2/df) < 3
Comparative fit index (CFI)	It ins an improved version of NFI, as it is less sensitive to model complexity. It ranges between 0 and 1, with higher values indicating better fit.	CFI > 0.95
Trucker lewis index (TLI) or Non Normed-Fit Index (NNFI)	It is preferable for smaller samples. The bigger TLI value indicated better fit for the model.	TLI > 0.95
RMSEA	It corrects for model complexity and sample size. Lower values indicate better fit.	RMSEA < 0.05
SRMR	Biased upward, use other indices. Lower values indicate better fit.	SRMR < 0.05

Sources: Hair et al. (2010), Martrínez-López, Grázquez-Abad e Sousa (2013).

Strategic Orientations

Model fit for innovation-led construct is showed in Table 25. We developed ten (10) questions to measure if the firms pursue innovation strategic orientation in their products, processes, marketing and operational processes. A first analysis shows that the model proposed has not good fit. We proceeded a process to eliminate some questions by analyzing the modification indices from MPlus Software. We examined the correlations between the covariance errors. For each variable excluded, a new model was estimated until the model achieve a good fit. Results shows that by eliminating six questions, IN1, IN3, IN4, IN5, and IN6, the model showed a good fit. It shows that model IN_CFA5 with 6 questions was confirmed as innovation-led construct. Cronbach's Alpha is 0.86.

Table 25: Model fit for innovation-led strategic orientation

Model	χ^2/df (p)	CFI	TLI	RMSEA	SRMR	Cronbach's Alpha	Variables deleted
IN_CFA1 (10 items)	198.312/35=5.66 (0.00)	0.859	0.819	0.149	0.064	0.91	None
IN_CFA2 (9 items)	121.938/27=4.52 (0.00)	0.899	0.866	0.129	0.054	0.90	IN6
IN_CFA3 (8 items)	77.831/20=3.89 (0.00)	0.927	0.898	0.117	0.049	0.89	IN3
IN_CFA4 (7 items)	37.578/14=2.68 (0.00)	0.965	0.948	0.090	0.034	0.88	IN1
IN_CFA5* (6 items)	15.042/9=1.67 (0.09)	0.988	0.980	0.057	0.028	0.86	IN5

* indicates the accepted final model.

Figure 6 shows the 6 variables integrating innovation-led construct. Variable IN10, "Developing and fostering long-term relationships with suppliers universities, and other resources of technologies in paramount to maintaining our competitive advantage in the future", have greater impact on innovation-led construct (0.785), following by question IN8 (0.780) "My firm pays close attention to consumer preferences and respond quickly to meet these needs", question IN7 (0.738) "Workers are encouraged to voice new ideas for new product development and process improvements", question IN9 (0.723) "My firm engages with customers (via customer forums, crowd sourcing, product advisory councils, social listening on Twitter, Facebook, etc.), and uses information on customer experiences to drive innovation in new product development", question IN4 (0.647) "Developing and fostering long-term relationships with suppliers, universities and other sources of new technologies is paramount to maintaining our competitive advantage in the future", question IN2 (0.635) "Top managers in my firm place a strong emphasis on R&D, technological leadership and innovation".

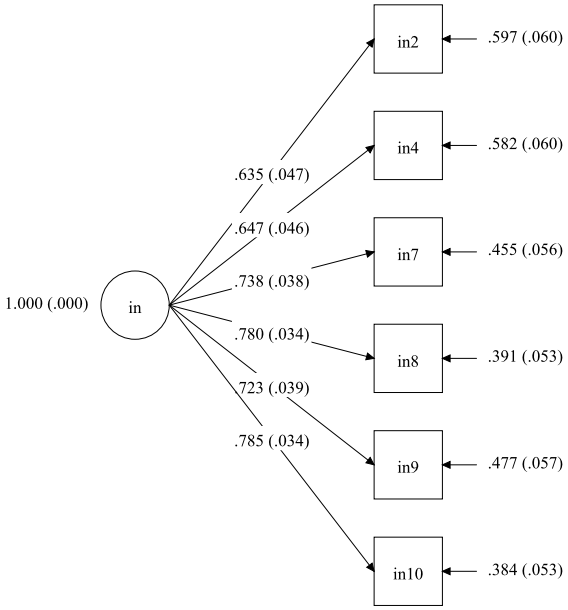

Figure 6: CFA model for innovation-led strategic orientation

Model fit for reputation-led construct is showed in Table 26. We developed ten (10) questions to measure if the firms pursue reputation strategic orientation. Results shows that by eliminating four questions, RP2, RP3, RP6, and the RP10 the model showed a good fit. It shows that model RP_CFA5 with 6 questions was confirmed as reputation-led construct. Cronbach's Alpha is 0.84.

Table 26: Model fit for reputation-led strategic orientation

Model	χ^2/df (p)	CFI	TLI	RMSEA	SRMR	Cronbach's Alpha	Variable deleted
RP_CFA1	160.450/35=4.58	0.881	0.847	0.131	0.060	0.90	None
(10 items)	(0.00)						
RP_CFA2	114.667/27=4.25	0.907	0.876	0.124	0.053	0.90	RP10
(9 items)	(0.00)						
RP_CFA3	64.749/20=3.23	0.946	0.925	0.103	0.038	0.89	RP2
(8 items)	(0.00)						
RP_CFA4	35.047/14=2.50	0.968	0.951	0.085	0.034	0.87	RP3
(7 items)	(0.00)						
RP_CFA5*	13.435/9=1.49	0.991	0.984	0.048	0.028	0.84	RP6
(6 items)	(0.14)						

* indicates the accepted final model.

Figure 26 shows the 6 variables integrating reputation-led construct. Question RP4 (0.831), "Our managers emphasize empowering employees working close to customers", have greater impact on reputation-led construct, following by question RP7 (0.821) "Human-capital development is seen as a key commodity", question RP8 (0.727) "Senior management is committed to maintaining a work environmental that shows concern for employee's safety", question

RP5 (0.669) “We measure customer satisfaction systematically and frequently”, question RP9 (0.622) “Senior managers in my firm believe programs aimed at reducing greenhouse gas emission, improving energy efficiency, waste management, and water conservation”, question RP1 (0.444) “My firm stands behind its products and services.”

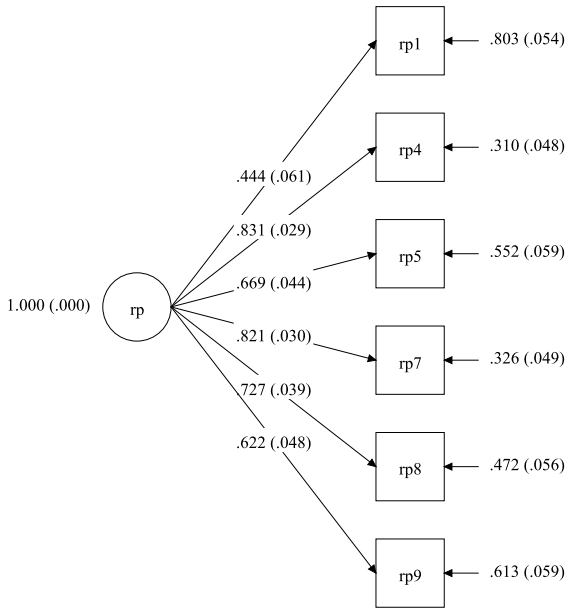

Figure 7: CFA model for reputation-led strategic orientation

Model fit for efficiency-led construct is showed in Table 27. We developed ten (10) questions to measure if the firms pursue efficiency strategic orientation. Results shows that by eliminating three questions, EF3, EF9, and EF10 the model showed a good fit. It shows that model EF_CFA4 with six questions was confirmed as reputation-led construct. Cronbach’s Alpha is 0.87.

Table 27: Model fit for efficiency-led strategic orientation

Model	χ^2/df (p)	CFI	TLI	RMSEA	SRMR	Cronbach’s Alpha	Variable deleted
EF_CFA1	126.498/35=3.61	0.909	0.883	0.112	0.054	0.90	None
(10 items)	(0.00)						
EF_CFA2	74.290/27=2.75	0.942	0.922	0.091	0.045	0.89	EF9
(9 items)	(0.00)						
EF_CFA3	44.561/20=2.23	0.965	0.950	0.076	0.036	0.88	EF10
(8 items)	(0.00)						
EF_CFA4*	20.32/14=1.45	0.989	0.983	0.046	0.026	0.87	EF3
(7 items)	(0.12)						

* indicates the accepted final model.

Figure 8 shows the 7 variables integrating efficiency-led construct. Variable EF2 (0.785) “Top managers in my firm emphasize efficiency and reliability across all levels, functions, and

divisions", have greater impact on efficiency-led construct, following by question EF4 (0.736) "Senior managers in my firm believe advanced manufacturing technologies improve products (quality) and processes (productivity, yield, and lower costs), and make a positive", question EF8 (0.723) "My firm pays close attention to our supply base, how we manage and engage with suppliers in order to retain our competitive advantage in the market", question EF7 (0.679) "Management views operational excellence as critical to meeting customer expectations", question EF6 (0.673) "Retaining key talent and maintaining workforce stability is seen as a key commodity necessary for my firm's continued success", question EF1 (0.653) "Our business objectives are to deliver products and services to customers at competitive prices and with minimal inconvenience", and question EF5 (0.645) "We measure the performance of key processes and benchmark costs of operations systematically and frequently."

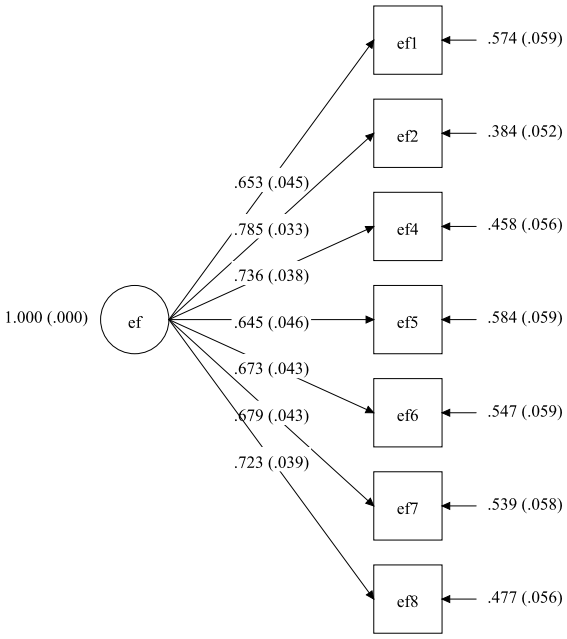

Figure 8: CFA model for efficiency-led strategic orientation

Sustainable Supply Chain Management Initiatives

Model fit for forward supply chain initiatives construct is showed in Table 9. We developed 26 questions to measure firm's forward supply chain initiatives adoption. We looked at each group of variables described in the literature review. Results for forward supply chain indicate that the model achieve a good fit by eliminating 17 questions: FSC1, FSC2, FSC3, FSC5, FSC7, FSC9, FSC10, FSC11, FSC13, FSC15, FSC17, FSC20, FSC21, FSC23, FSC24, FSC25, FSC26. It shows that model FSC_CFA18 with 9 questions was confirmed as forward supply chain construct. Cronbach's Alpha is 0.90.

Table 28: Model fit for forward supply chain initiatives

Model	χ^2/df (p)	CFI	TLI	RMSEA	SRMR	Cronbach's Alpha	Variable deleted
FSC_CFA1 (26 items)	1115.924/299=3.73 (0.00)	0.793	0.775	0.114	0.065	0.96	None
FSC_CFA2 (25 items)	926.307/275=3.37 (0.00)	0.821	0.804	0.106	0.062	0.96	FSC10
FSC_CFA3 (24 items)	819.206/252=2.98 (0.00)	0.831	0.815	0.104	0.062	0.96	FSC26
FSC_CFA4 (23 items)	730.786/230=3.18 (0.00)	0.842	0.826	0.102	0.060	0.96	FSC25
FSC_CFA5 (22 items)	660.113/209=3.16 (0.00)	0.848	0.832	0.101	0.059	0.95	FSC11
FSC_CFA6 (21 items)	572.432/189=3.03 (0.00)	0.863	0.847	0.098	0.057	0.95	FSC20
FSC_CFA7 (20 items)	500.167/170=2.94 (0.00)	0.873	0.858	0.096	0.054	0.95	FSC13
FSC_CFA8 (19 items)	437.326/152=2.88 (0.00)	0.882	0.867	0.095	0.054	0.95	FSC3
FSC_CFA9 (18 items)	374.874/135=2.78 (0.00)	0.895	0.881	0.092	0.052	0.95	FSC22
FSC_CFA10 (17 items)	330.886/119=2.78 (0.00)	0.894	0.878	0.092	0.054	0.94	FSC15
FSC_CFA11 (16 items)	278.540/104=2.68 (0.00)	0.903	0.888	0.089	0.053	0.94	FSC5
FSC_CFA12 (15 items)	237.080/90=2.63 (0.00)	0.912	0.897	0.088	0.051	0.93	FSC2
FSC_CFA13 (14 items)	187.641/77=2.44 (0.00)	0.926	0.913	0.083	0.049	0.93	FSC21
FSC_CFA14 (13 items)	145.796/65=2.24 (0.00)	0.939	0.927	0.077	0.047	0.92	FSC24
FSC_CFA15 (12 items)	110.512/54=2.05 (0.00)	0.955	0.945	0.071	0.040	0.92	FSC17
FSC_CFA16 (11 items)	77.990/44=1.77 (0.00)	0.970	0.963	0.061	0.036	0.92	FSC1
FSC_CFA17 (10 items)	60.431/35=1.73 (0.00)	0.975	0.968	0.059	0.034	0.92	FSC9
FSC_CFA18* (9 items)	35.983/27=1.33 (0.12)	0.989	0.986	0.04	0.030	0.90	FSC7

* indicates the accepted final model.

Figure 9shows the forward supply chain construct and the significant relationship with 9 variables. Question FSC16 "(Re)Design manufacturing processes to improve resource usage (energy and water) and reduce waste", have greater impact on forward supply chain construct (0.831), following by FSC4 (0.758) "Design product to minimize resource use (energy, water, time)", FSC8 (0.757) "Institute design for recycling program (e.g., using safe materials, ease of

material separation, etc.)", FSC14 (0.733) "Use information technology to integrate data across internal and partners' systems (i.e., using EDI)", FSC6 (0.711) "Collaborates with suppliers to improve product/service design", FSC18 (0.675) "Adopt advanced manufacturing processes (e.g. rapid prototyping, automation, robotics production, etc.)", FSC12 (0.636) "Employ lean manufacturing techniques (e.g., just-in-time, continuous improvement, etc.)", FSC19 (0.626) "Minimize the use of packing materials", FSC22 (0.545) "Engage with third-party logistics (3PL) providers."

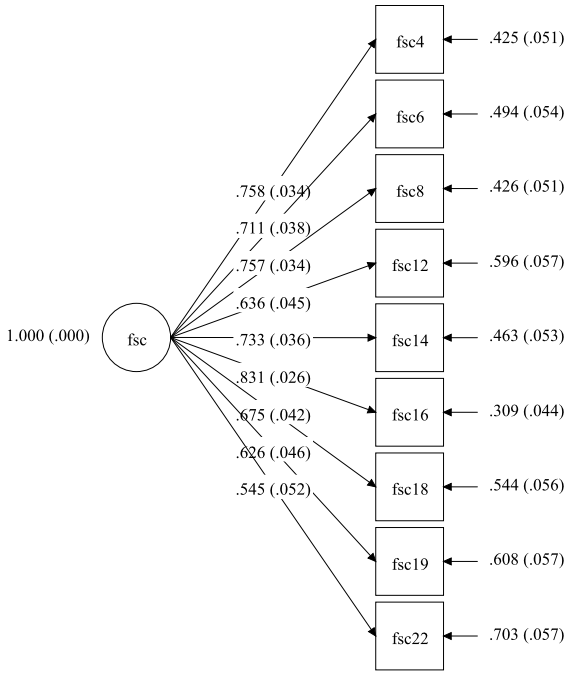

Figure 9: CFA model for forward supply chain initiatives

Model fit for reverse supply chain initiatives construct is showed in Table 29. We developed 17 questions to measure if the firms adopt forward supply chain management. Results for reverse supply chain indicate that the model achieve a good fit by eliminating 11 questions: RSC5, RSC6, RSC7. RSC8, RSC9, RSC11, RSC12, RSC13, RSC14, RSC15, RSC17. It shows that model RSC_CFA12 with 6 questions was confirmed as forward supply chain construct. Cronbach's Alpha is 0.87.

Table 29: Model fit for reverse supply chain initiatives

Model	χ^2/df (p)	CFI	TLI	RMSEA	SRMR	Cronbach's Alpha	Variable deleted
RSC_CFA1	1172.576/119=9.85	0.614	0.559	0.205	0.123	0.94	None
(17 items)	(0.00)						
RSC_CFA2	890.073/104=8.17	0.675	0.624	0.190	0.103	0.93	RSC14
(16 items)	(0.00)						
RSC_CFA3	609.976/90=6.78	0.753	0.711	0.166	0.081	0.93	RSC12
(15 items)	(0.00)						
RSC_CFA4	472.459/77=6.14	0.779	0.739	0.156	0.078	0.93	RSC17
(14 items)	(0.00)						
RSC_CFA5	333.064/65=5.12	0.834	0.801	0.140	0.063	0.93	RSC13
(13 items)	(0.00)						
RSC_CFA6	235.919/54=4.70	0.868	0.838	0.127	0.058	0.92	RSC9
(12 items)	(0.00)						
RSC_CFA7	168.751/44=3.83	0.894	0.868	0.116	0.054	0.91	RSC15
(11 items)	(0.00)						
RSC_CFA8	111.071/35=3.17	0.924	0.902	0.102	0.048	0.90	RSC8
(10 items)	(0.00)						
RSC_CFA9	70.754/27=2.62	0.948	0.930	0.088	0.044	0.89	RSC5
(9 items)	(0.00)						
RSC_CFA10	41.130/20=2.06	0.971	0.959	0.071	0.037	0.88	RSC6
(8 items)	(0.00)						
RSC_CFA11	27.153/14=1.94	0.980	0.970	0.067	0.031	0.88	RSC11
(7 items)	(0.02)						
RV_CFA12*	11.638/9=1.29	0.995	0.992	0.037	0.021	0.87	RSC7
(6 items)	(0.23)						

* indicates the accepted final model.

Figure 10 shows the reverse supply chain performance construct and the significant relationship with 6 variables. Question RSC2 "Establish mail-in program" have greater impact on reverse supply chain construct (0.833), following by question RSC3 (0.799) "Partner with a third party collector", question RSC4 (0.756) "Collect used packaging from customers" , question RSC16 (0.742) "Adopt reverse logistics software; or embed reverse logistics module to existing ERP system", question RSC1 (0.628) "Customer return program implementation", question RSC10 (0.605) "Procedures for recycling packaging."

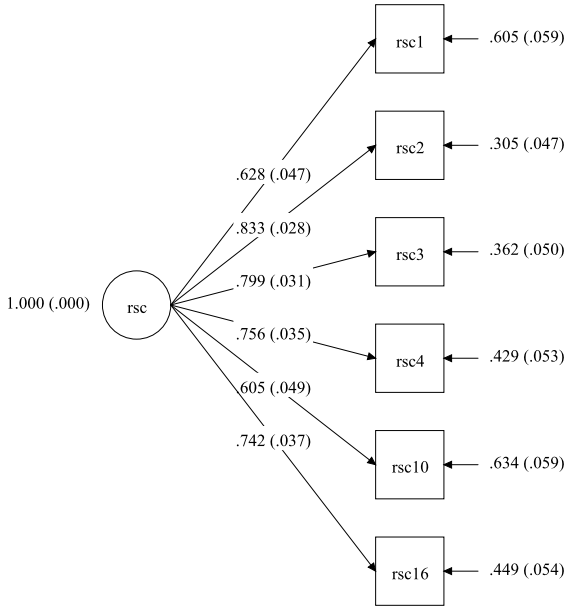

Figure 10: CFA model for reverse supply chain initiatives

Triple Bottom Line Performance

Model fit for economic performance construct is showed in Table 30. We developed 6 questions to measure if the firms have a better performance from their competitors. Results for economic performance construct indicated that the model achieve a good fit by eliminating two questions: EC1 and EC3. It shows that model EC_CFA3 with 4 questions was confirmed as economic performance construct. Cronbach's Alpha is 0.85.

Table 30: Model fit for economic performance

Model	χ^2/df (p)	CFI	TLI	RMSEA	SRMR	Cronbach's Alpha	Variable deleted
EC_CFA1	46.391/9=5.15	0.947	0.912	0.141	0.035	0.90	None
(6 items)	(0.00)						
EC_CFA2	18.640/5=3.73	0.974	0.948	0.114	0.026	0.88	EC1
(5 items)	(0.00)						
EC_CFA3*	0.669/2=0.334	1.000	1.011	0.000	0.007	0.85	EC3
(4 items)	(0.72)						

* indicates the accepted final model.

Figure 11 shows the economic performance construct and the significant relationship with 4 variables. Question EC6 "Market value added", have greater impact on economic performance construct (0.875), following by question EC5 (0.762) "Stock price improvement", question EC4 (0.762) "Return on investments", question EC2 (0.720) "Market share growth."

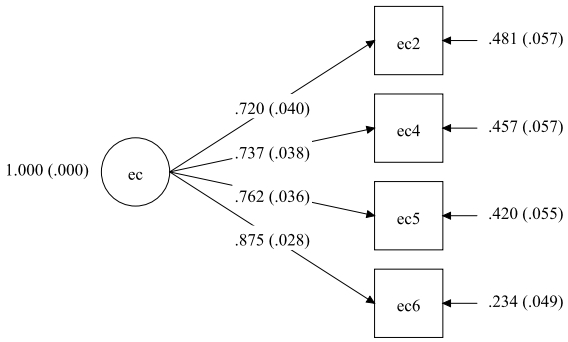

Figure 11: CFA model for economic performance

Model fit for environmental performance construct is showed in Table 31. We developed 6 questions to measure if the firms have a better performance from their competitors. Results for environmental performance construct indicated that the model achieve a good fit by eliminating two questions: EN5 and EN1. It shows that model EN_CFA3 with 4 questions was confirmed as environmental performance construct. Cronbach's Alpha is 0.87.

Table 31: Model fit for environmental performance

Model	χ^2/df (p)	CFI	TLI	RMSEA	SRMR	Cronbach's Alpha	Variable deleted
EN_CFA1	81.448/9=9.05	0.903	0.838	0.196	0.052	0.90	-
(6 items)	(0.00)						
EN_CFA2	15.495/5=3.10	0.981	0.962	0.100	0.027	0.88	EN5
(5 items)	(0.00)						
EN_CFA3*	2.662/2=1.331	0.998	0.995	0.04	0.013	0.87	EN1
(4 items)	(0.26)						

* indicates the accepted final model.

Figure 12 shows the environmental performance construct and the significant relationship with 4 variables. Question EN2 "Air pollutant emissions", have greater impact on environmental performance construct (0.855), following by EN3 (0.823) "Water and solid waste generation", EN4 (0.738) "Number of projects to protect, improve/restore the environment", EN6 (0.730) "Frequency of environmental accidents (e.g., spills)."

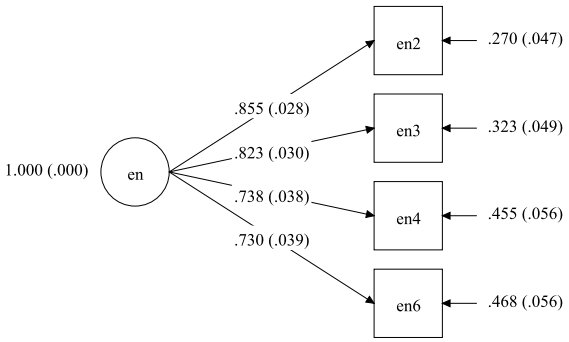

Figure 12: CFA model for environmental performance

Model fit for social performance construct is showed in Table 32. We developed 7 questions to measure if the firms have a better performance from their competitors. By eliminating question SO_2, the model showed good fit. Model SO_CFA2 with 5 questions was confirmed as social performance construct. Cronbach's Alpha is 0.82.

Table 32: Model fit for social performance

Model	χ^2/df (p)	CFI	TLI	RMSEA	SRMR	Cronbach's Alpha	Variable deleted
SO_CFA1	63.157/14=4.51	0.899	0.848	0.129	0.055	0.84	-
(7 items)	(0.00)						
SO_CFA2*	6.162/9=0.68	1.000	1.013	0.000	0.019	0.82	SO2
(6 items)	(0.72)						

* indicates the accepted final model.

Figure 13 shows the social performance construct and the significant relationship with the variables. Question SO4 "Employee turn-over rate", have higher impact on social performance (0.741), following by question SO3 (0.699) "Number of social and cultural projects sponsored in local community", question SO5 (0.691) "Employee wages, benefits and rewards policies", question SO6 (0.630) "Employment of minorities", question SO7 (0.626) "Lawsuits filed by employees, customers, and regulatory agencies", and question SO1 (0.581) "Overall customer satisfaction."

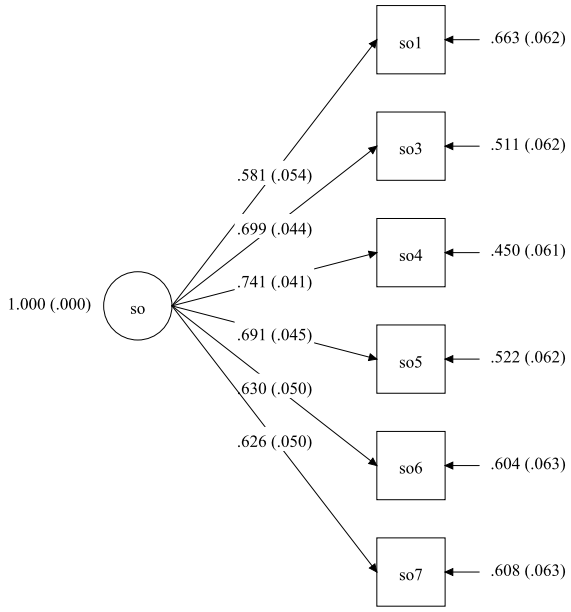

Figure 13: CFA model for social performance

3.5.4 Full model modification process

Table 33 shows the CFA results for the integrated model with the eight constructs. The refining indicate the need to delete variables in order to model fit. The results shows 13 variables deleted due covariance error correlations: RP4, EF6, EF1, IN2, RSC2, EN3, FSC8, FSC6, SO5, RSC3, RSC1, RP1, and RP6. CFI index is 0.931 and RMSEA is 0.049 indicating the good fit measurement of the model.

Table 33: Model Modification Process for Purifying the Measurement Model

Model	CFI	RMSEA	Variables Deleted
CFA1	0.838	0.067	–
CFA2	0.844	0.066	RP4
CFA3	0.853	0.064	EF6
CFA4	0.866	0.062	EF1
CFA5	0.875	0.060	IN2
CFA6	0.882	0.059	RSC2
CFA7	0.882	0.059	EN3
CFA8	0.887	0.058	FSC8
CFA9	0.890	0.058	FSC6
CFA10	0.898	0.057	SO5
CFA11	0.907	0.054	RSC3
CFA12	0.914	0.053	RSC1
CFA13	0.926	0.049	RP1
CFA14	0.931	0.049	RP9

3.5.5 Hypothesis testing: structural equation modeling (SEM)

The CFA14 model is used to estimate the hypothesis developed in this study. Table 34 shows the model modification process for purifying the theoretical model showed the necessity for drop efficiency-led construct from the model due not convergence problem. The final model presented good fit indices of CFI (0.928) and RMSEA (0.052) .

Table 34: Model Modification Process for Purifying the Theoretical Model

Model	df	Chi-square	CFI	RMSEA	RMSEA 90% CI	SRMR	Model Modifications
Base Model	-	-	-	-	-		Not converge (none - base model)
Step 1 (Final Model)	391	615.609	0.928	0.052	(0.044 0.060)	0.052	Drop: efficiency-led construct

The standardized parameter estimates are shown in Figure 14 for the estimation of the theoretical model. Besides efficiency-led constructs, the remaining constructs were validated in the integrated model. Innovation-led construct is measured by 5 variables: IN4 “Developing and fostering long-term relationships with suppliers, universities and other sources of new technologies is paramount to maintaining our competitive advantage in the future”, IN7 “Workers are encouraged to voice new ideas for new product development and process improvements”, IN8 “My firm pays close attention to consumer preferences and respond quickly to meet these needs”, IN9 “My firm engages with customers (via customer forums, crowd sourcing, product advisory councils, social listening on Twitter, Facebook, etc.), and uses information on customer experiences to drive innovation in new product development”, and IN10, “Developing and fostering long-term relationships with suppliers universities, and other resources of technologies in paramount to maintaining our competitive advantage in the future.”

Reputation-led construct is measured by 3 variables: RP5 “We measure customer satisfaction systematically and frequently”, RP7 “Human-capital development is seen as a key commodity”, question RP8 (0.727) “Senior management is committed to maintaining a work environmental that shows concern for employee’s safety.”

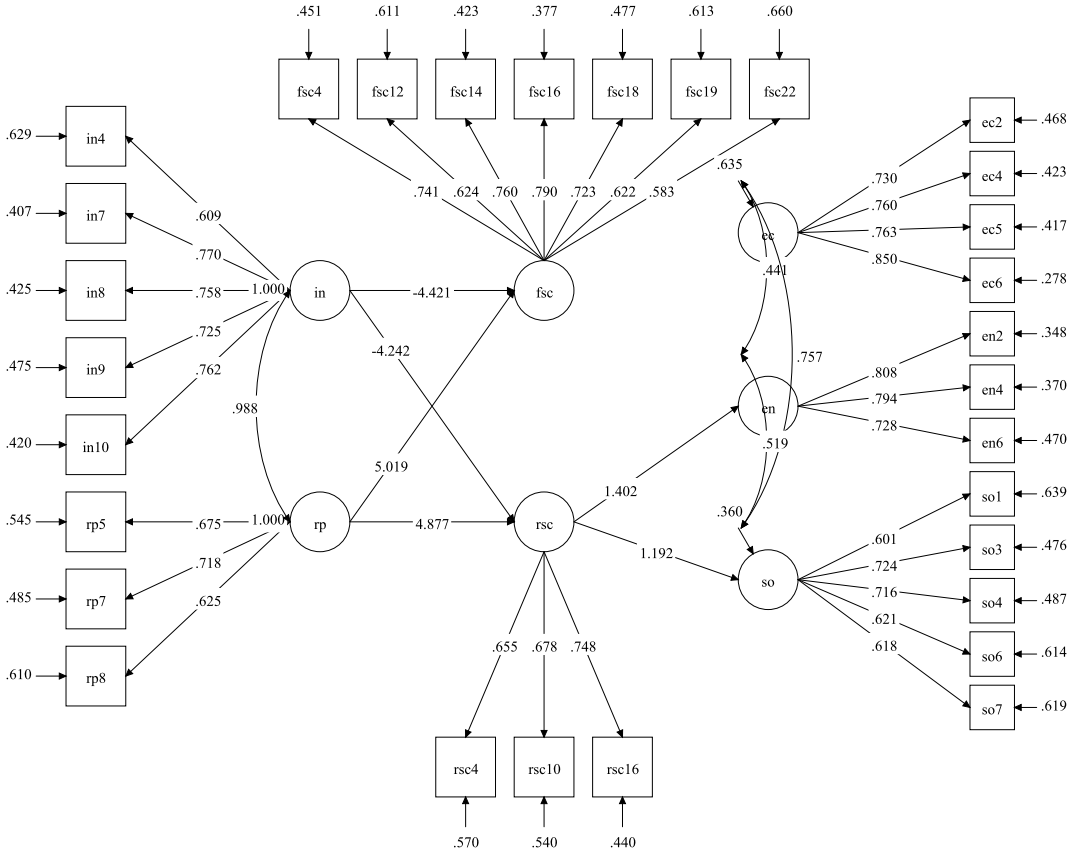

Figure 14: Revised theoretical model

Forward supply chain construct is measured by 7 variables: FSC4 “Design product to minimize resource use (energy, water, time)”, FSC12 “Employ lean manufacturing techniques (e.g., just-in-time, continuous improvement, etc.)”, FSC14 “Use information technology to integrate data across internal and partners’ systems (i.e., using EDI)”, FSC16 “(Re)Design manufacturing processes to improve resource usage (energy and water) and reduce waste”, FSC18 “Adopt advanced manufacturing processes (e.g. rapid prototyping, automation, robotics production, etc.)”, FSC19 “Minimize the use of packing materials”, and FSC22 “Engage with third-party logistics (3PL) providers.”

Reverse supply chain construct is measured by 3 variables: RSC4 “Collect used packaging from customers”, RSC10 “Procedures for recycling packaging”, and RSC16 (0.742) “Adopt reverse logistics software; or embed reverse logistics module to existing ERP system.”

The triple bottom line performance constructs were validated. Economic performance construct is measured by 4 variables EC2 “Market share growth”, EC4 “Return on investments”, EC5 “Stock price improvement”, EC6 “Market value added.” Environmental performance construct is measured by 3 variables: EN2 “Air pollutant emissions”, EN4 “Number of projects to protect, improve/restore the environment”, and EN6 (0.730) “Frequency of environmental accidents (e.g., spills).” Finally, social performance construct is measured by 5 variables: SO1 “Overall customer satisfaction”, SO3 “Number of social and cultural projects sponsored in lo-

cal community", SO4 "Employee turn-over rate", have higher impact on social performance, SO6 "Employment of minorities", question SO7 "Lawsuits filed by employees, customers, and regulatory agencies."

Looking at the results for the revised theoretical model, a half part the hypothesis were supported (see 14). The direct path to forward supply chain from of innovation-led (H1) was significant, but negative. The direct path to reverse supply chain from innovation-led (H2) was significant and negative. This result differ from Testa e Iraldo (2010) . They found a positive relationship between eco-innovation and green supply chain management practice.

The direct path to forward supply chain from reputation-led (H3) was significant and positive. The direct path to reverse supply chain from reputation-led (H4) was significant and positive. Testa e Iraldo (2010) also found a positive relationship between eco-reputation and green supply chain management practice.

The direct path to forward supply chain from efficiency-led (H4) and the direct path to reverse supply chain from efficiency-led (H5) were not tested due the theoretical model purification. Efficiency-led construct was drop off the model due convergence error in the model. Testa e Iraldo (2010) did not found a significant relationship between eco-effiency and green supply chain management practice.

The direct path from forward supply chain to economic performance (H7), environmental performance (H8), and social performance (H9) were not significant in the model. The direct path to economic performance from reverse supply chain (H10) was not significant. The direct path to environmental performance from reverse supply chain (H11) was significant and positive. The direct path to social performance from reverse supply chain (H12) was significant and positive. Lai, Wu e Wong (2013) found that reverse logistics practices could positively influence a manufacturing enterprise's environmental and financial performance; reuse and design for reverse logistics could generate a significant positive performance impact in all three TBL performance dimensions; only practicing waste management cannot improve a manufacturer's operational and financial performance and may even hurt its social performance; and recycle, reprocess, and recovery practices improve financial performance but have not contributed to the improvement of social performance.

3.6 Conclusions

This study proposed a theoretical model to investigate the relationships between strategic orientations, sustainable supply chain management initiatives and triple bottom line performance. In particular, it aim to test if strategic orientations of innovation-led, reputation-led, and efficiency-led are antecedents of the adoption of forward and reverse supply chain initiatives , and in turn, if such practices are antecedents of economic, environmental, and social performance.

The results for the integrated model indicated the validation of seven constructs. Efficiency-

led was dropped off form the theoretical model due convergence error. The remaining constructs were validated after several purification tests. Innovation-led construct variables include goals to establish good relationships with sources of new technologies and stakeholders, encourage workers and customers to participate in new product development and process innovations, and focus on customer preferences and needs. Reputation-led construct variables encompass goals to measure customer satisfaction, to develop human-capital, and to guarantee employee's safety. It focus in firm's good practices related to improve the relationships with customers and employees.

Forward supply chain indicators focus on product design and development to minimize resource use during product usage, lean manufacturing techniques, information systems to integrate data across internal and partners, improve resource usage by re-design manufacturing processes, adopt advanced manufacturing processes, minimize packaging materials and to engage with third-party logistics providers. Reverse supply chain indicators are related to the collection of used packaging from customer, procedures for recycling packaging, and adoption of reverse logistics practices of existing ERP system.

Triple bottom line performance indicators showed that economic performance focus on market share growth, return on investments, stock price improvement, and market value added. Environmental performance indicators focus on air pollutant emissions, number of projects to protect the environment, and environmental accidents. Social performance indicators focus on customer satisfaction, projects sponsored in local community, employment of minorities, and lawsuits filled by employees, customers, and regulatory agencies.

This study shows a relationship between strategic orientations of innovation-led and reputation led on forward and reverse supply chain initiatives. Innovation-led has a negative impact on initiatives, while reputation-led has a positive impact. In particular, it shows the direct relationship between reverse supply chain initiatives with social and environmental performance. Decision makers can use these findings to establish strategic orientations in their firms as well as to implement sustainable initiatives, especially in reverse supply chain. Firm's should become more responsible for used products, and this practices generate good benefits for the environment and public health and well-being.

This study reveals the reverse supply chain have contributed to improve environmental and social performance indicators in the U.S. automotive industry. This results evidence the importance of collect, recover and give an appropriated waste disposal for used products. Moreover, the results shows that innovation-led goals do not lead companies to adopt SSCM initiatives. But, reputation-led goals are leading companies to adopt more sustainable initiatives.

4 Discussão

Esta tese teve como objetivo desenvolver e testar um modelo teórico sobre as relações entre as orientações estratégicas de inovação, reputação e eficiência, as práticas da gestão da cadeia de suprimentos sustentável nas atividades dos fluxos para frente e reverso, e a performance medida pelo triple bottom line através das dimensões econômica, ambiental e social da sustentabilidade. Para investigar a existência das relações entre tais assuntos, desenvolveu-se o Artigo I, intitulado "*A Framework of Strategic Orientations, Sustainable Supply Chain Management Initiatives and Triple Bottom Line Performance*". O objetivo do artigo foi desenvolver um framework conceitual para mostrar as possíveis relações existentes entre os conceitos de orientações estratégicas, práticas da gestão da cadeia de suprimentos sustentável e a performance medida pelo triple bottom line.

A revisão da literatura resultou na elaboração de três proposições reunidos em um modelo conceitual. A primeira afirma que as empresas devem considerar em suas estratégias e operações aspectos dos ambientes interno e externo. Recursos internos físicos, humanos, financeiros e tecnológicos, bem como as instituições e os stakeholders (clientes, funcionários, acionistas, sociedade) exercem influência no modo como as empresas operam. A segunda aponta que as orientações estratégicas de inovação, reputação e eficiência são antecedentes à adoção das práticas de gestão da cadeia de suprimentos sustentável. Por fim, a terceira indica que a adoção de práticas sustentáveis na cadeia de suprimentos para frente e reversa leva a melhorias na performance empresarial medida pelas dimensões econômica, ambiental e social.

Para testar as relações apontadas pelo Artigo I, desenvolveu-se o Artigo II, intitulado "*Strategic Orientations, Sustainable Supply Chain Management Initiatives and Triple Bottom Line Performance: empirical evidences from U.S. automotive industry*". Este artigo revisou a literatura para desenvolver um modelo teórico integrado a ser testado empiricamente. Foram elaboradas 12 hipóteses para mostrar as possíveis relações entre as orientações estratégicas de inovação, reputação e eficiência, as práticas da gestão da cadeia de suprimentos sustentável nos fluxos para frente e reverso, e a performance medida pelo triple bottom line através das dimensões econômica, ambiental e social da sustentabilidade. Um instrumento de pesquisa survey foi elaborado com 92 indicadores para medir os oito construtos propostos. Outras perguntas foram feitas com o objetivo de captar o perfil do entrevistado e da empresa. A pesquisa survey foi realizada com 210 industrias manufatureiras do setor automotivo nos Estados Unidos.

Os resultados da análise fatorial confirmatória mostram que os oito constructos propostos foram validados individualmente. A estimação do modelo integrado através da modelagem de equações estruturais indicam a validação integrada dos oito constructos. Contudo, os constructos das orientações estratégicas de inovação e reputação foram validados, enquanto que o constructo de eficiência foi removido do modelo devido a falta de convergência na estimação. Os constructos das práticas da cadeia de suprimentos para frente e da cadeia de suprimentos reversa foram confirmados. Por fim, as três dimensões da performance da sustentabilidade tam-

bém foram validadas.

O teste do modelo indicou seis hipóteses como significativas. A orientação estratégica de inovação possui uma relação negativa com a cadeia de suprimentos para frente (H1) e com a cadeia de suprimentos reversa (H2). Este resultado difere de Testa e Iraldo (2010) que encontraram uma relação positiva entre eco-inovação práticas verdes.

A orientação estratégica de reputação apresentou uma relação positiva com ambas as práticas da cadeia de suprimentos para frente (H5) e cadeia de suprimentos reversa (H6). Essa relação também foi apontada por Testa e Iraldo (2010) que encontraram uma relação positiva entre eco-reputação e práticas verdes.

A orientação estratégica de eficiência foi removida do modelo devido a falta de convergência do modelo, de modo que as hipóteses H5 e H6 não foram testadas. Além disso, as práticas da cadeia de suprimentos para frente não apresentaram relação significativa com o triple bottom line performance (H7, H8 e H9).

A cadeia de suprimentos reversa apresentou uma relação positiva e significativa com a performance ambiental (H11) e com a performance social (H12), mas não apresentou relação significativa com a performance econômica (H10). Lai, Wu e Wong (2013) encontraram uma relação positiva das práticas de logística reversa com a performance financeira e ambiental. Nesse sentido, este estudo apresenta um avanço ao apontar uma relação da cadeia de suprimentos reversa com aspectos sociais, ainda pouco explorado na literatura.

Este estudo traz algumas inovações. A estrutura de tese permitiu o aprofundamento da revisão da literatura sobre os conceitos. Isso permitiu um aprofundamento sobre os conceitos dos assuntos estudados, bem como compreensão do estado da arte. Como resultado, foi possível verificar as lacunas ainda pouco exploradas e construir um modelo teórico. A partir desse aprofundamento foi possível propor e testar empiricamente um modelo teórico que traz novas orientações estratégicas, considera as atividades reversas na cadeia de suprimentos e integra estratégia, operações e desempenho empresarial.

5 Considerações Finais

Equilibrar ações empresariais voltadas pra melhorar os lucros e a competitividade com ações para proteger o ambiente e preservar a vida das pessoas é um grande desfio. As empresas estão sendo pressionadas internamente e externamente por instituições reguladoras, governos, consumidores, funcionários e sociedade em geral para estabelecer uma gestão estratégica e adotar práticas operacionais que considerem as dimensões econômica, ambiental e social da sustentabilidade.

Nesse sentido, esta teve buscou investigar relações entre aspectos estratégicos e operacionais das empresas, bem como de performance. O objetivo foi desenvolver e testar um modelo teórico entre orientações estratégicas de inovação, reputação e eficiência, práticas de gestão da cadeia de suprimentos sustentável para frente e reversa, e triple bottom line performance. Esta tese foi organizada em dois artigos.

O primeiro artigo consistiu na revisão da literatura indicou três relações. A primeira diz respeito a relação das orientações estratégicas com o contexto interno e externo da organização. A segunda aponta as orientações estratégicas como antecedentes das práticas de gestão da cadeia de suprimentos sustentável. Por fim, a terceira indica que as práticas de gestão da cadeia de suprimentos sustentável são antecedentes do triple bottom line performance. O modelo conceitual proposto é amplo e oferece a oportunidade de relacionar os diferentes conceitos e gerar estudos futuros.

O segundo artigo buscou desenvolver um modelo teórico e o teste empírico das hipóteses. Um instrumento de pesquisa survey foi desenvolvido e enviado a indústrias manufatureiras do setor automotivo dos Estados Unidos. Os resultados da estimação do modelo integrado através da modelagem de equações estruturais indicam uma relação significativa e negativa entre a orientação estratégica de inovação e as práticas da cadeia de suprimentos para frente e cadeia de suprimentos reversa. A orientação estratégica de reputação apresentou uma relação significativa e positiva com as práticas da cadeia de suprimentos para frente e cadeia de suprimentos reversa. A cadeia de suprimentos reversa apresentou relação significativa e positiva com a performance ambiental e social.

Os resultados trazem implicações práticas importantes. A relação positiva da orientação estratégica de reputação com as práticas da cadeia de suprimentos denotam a influência de tais objetivos nas práticas empresariais. A relação negativa da orientação estratégica de inovação com as práticas da cadeia de suprimentos denotam que os objetivos estratégicos de inovação no setor automotivo não estão contribuindo para a adoção de práticas que considerem a sustentabilidade.

Tais resultados mostram que as empresas americanas do setor automotivo têm seguido orientações estratégicas de inovação e reputação. Contudo, tais orientações estratégicas apresentam diferentes impactos na cadeia de suprimentos. Os objetivos de inovação perseguidos estão desestimulando a adoção das práticas da cadeia de suprimentos sustentável, enquanto que os

objetivos de reputação estimulam a adoção das práticas sustentáveis. Além disso, as práticas reversas da cadeia de suprimentos das empresas automotivas impactam positivamente na prevenção de impactos ambientais e sociais.

A relação positiva das práticas da cadeia de suprimentos reversas na performance ambiental e social é um importante resultado. Denota o importante papel que as empresas possuem em impactar, através de suas operações, em questões ambientais como na redução da emissão de gases poluentes, redução de acidentes ambientais e no aumento de projetos que objetivam proteção do ambiente, e em questões sociais como a satisfação do consumidor, projetos realizados na comunidade local, na contratação de minorias, e na redução de processos judiciais.

Algumas limitações encontradas foram baixo número de respondentes dado os recursos e tempo disponíveis para a realização da pesquisa. Isso impactou na produção dos resultados, uma vez que muitas variáveis precisaram ser retiradas para o ajuste do modelo. Outras limitações foram o baixo número de estudos que investigam as orientações estratégicas de inovação, reputação e eficiência e do número de respondentes ao instrumento de pesquisa survey.

Este estudo traz algumas contribuições. Primeira, propõe a definição das orientações estratégicas de inovação, reputação e eficiência. Segunda, apresenta uma revisão da literatura sobre as práticas de gestão da cadeia de suprimentos sustentável, integrando as atividades nos fluxos para frente e reversos. Terceira, apresentou uma revisão da literatura sobre os indicadores utilizados para medir o triple bottom line performance. Quinta, propõe um modelo integrado de estratégias, práticas e performance empresarial para verificar se as orientações estratégicas levam a adoção de práticas da cadeia de suprimentos sustentável, e se tais práticas contribuem para a performance medida pelo triple bottom line.

As novidades deste estudo são a construção e validação dos constructos das orientações estratégicas de inovação, reputação e eficiência; a inclusão das práticas da cadeia de suprimentos reversa como parte integrante das práticas de gestão da cadeia de suprimentos sustentável; o esforço de medir a dimensão sustentável da cadeia de suprimentos; e a proposição e teste de um modelo integrado de orientações estratégicas, práticas de gestão da cadeia de suprimentos sustentável e triple bottom line performance.

As relações propostas entre conceitos podem servir como guia para gestores no estabelecimento de estratégias a serem perseguidas, na adoção de iniciativas sustentáveis e no estabelecimento de metas a serem alcançadas. Tomadores de decisão podem usar essas descobertas para estabelecer orientações estratégicas em suas empresas, bem como para implementar iniciativas sustentáveis, especialmente cadeia de mantimentos. As empresas devem se tornar mais responsáveis pelos produtos usados, e isso gerar benefícios para o meio ambiente e a saúde e o bem-estar das pessoas.

Finalmente, pesquisas futuras podem testar os constructos e relações propostas em outras indústrias, setores da economia ou países, como o Brasil, com o objetivo de comparação. Podem investigar diferentes relações entre os constructos que não foram exploradas neste estudo como o impacto direto das orientações estratégicas no triple bottom line performance. Outras relações

entre os assuntos abordados podem ser desenvolvidas e testadas como a relação direta entre orientações estratégicas e performance empresarial.

Referências

ABBEY, J. D.; GUIDE JR., V. D. R. A typology of remanufacturing in closed-loop supply chains. *International Journal of Production Research*, v. 56, n. 1-2, p. 374–384, 2017. 38, 39, 62

AGERON, B.; GUNASEKARAN, A.; SPALANZANI, A. Sustainable supply management: an empirical study. *International Journal of Production Economics*, v. 140, n. 1, p. 168–182, 2012. 36, 51, 65, 74

AGRAWAL, S.; SINGH, R. K.; MURTAZA, Q. A literature review and perspectives in reverse logistics. *Resources, Conservation and Recycling*, v. 97, p. 76–92, 2015. 41, 66, 67

AHI, P.; SEARCY, C. A comparative literature analysis of definitions for green and sustainable supply chain management. *Journal of Cleaner Production*, v. 52, p. 329–341, 2013. 17, 18, 27, 37, 51, 57, 73, 74

AHMED, N. U.; MONTAGNO, R. V.; FIRENZE, R. J. Operations strategy and organizational performance: an empirical study. *International Journal of Operations & Production Management*, v. 16, p. 41–53, 1996. 84

AMBEC, S.; LANOIE, P. Does it pay to be green? A systematic overview. *Academy of Management Perspectives*, v. 22, n. 4, p. 45–62, 2008. 27, 57, 73

ANDERSON, J. C.; GERBING, D. W. Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, v. 103, n. 3, p. 411–423, 1988. 87

ANSARI, Z. N.; KANT, R. A state-of-art literature review reflecting 15 years of focus on sustainable supply chain management. *Journal of Cleaner Production*, v. 142, p. 2524–2543, 2017. 37

ARORA, P.; RAVI, D. Corporate governance and corporate social responsibility (CSR): the moderating roles of attainment discrepancy and organization Slack. *Corporate Governance: An International Review*, v. 19, n. 2, p. 136–152, 2011. 61

BAI, C.; SARKIS, J.; WEI, X.; KOH, L. Evaluating ecological sustainable performance measures for supply chain management. *Supply Chain Management*, v. 17, n. 1, p. 78–92, 2012. 16, 19, 27

BALDWIN, J. R.; JOHNSON, J. Business strategies in more- and less-innovative firms in Canada. *Research Policy*, v. 25, n. 5, p. 785–804, 1996. 32, 33, 35, 60, 82

BANERJEE, S. B. Corporate environmentalism: the construct and its measurement. *Journal of Business Research*, v. 55, n. 3, p. 177–191, 2002. 16, 26, 32

BANKER, R. D.; MASHRUWALA, R.; TRIPATHY, A. Does a differentiation strategy lead to more sustainable financial performance than a cost leadership strategy. *Management Decision*, v. 52, n. 5, p. 872–896, 2014. 36

BARNETT, M. L.; JERMIER, J. M.; LAFFERTY, B. A. Corporate reputation: the definitional landscape. *Corporate Reputation Review*, v. 9, n. 1, p. 26–38, 2006. 34, 60

BARNEY, J. Firm resources and sustained competitive advantage. *Journal of Management*, v. 17, n. 1, p. 99–120, 1991. 16, 26, 50

BEAMON, B. M. Measuring supply chain performance. *International Journal of Operations & Production Management*, v. 19, n. 3, p. 275–292, 1999. 17, 38, 56

BLISCHKE, W. R.; MURTHY, D. N. P. Product warranty management - I: a taxonomy for warranty policies. *European Journal of Operational Research*, v. 62, n. 2, p. 127–148, 1992. 67, 85

BLOME, C.; HOLLOS, D.; PAULRAJ, A. Green procurement and green supplier development: antecedents and effects on supplier performance. *International Journal of Production Research*, v. 52, n. 1, p. 32–49, 2014. 18, 40, 64, 84

CANNELLA, S.; BRUCCOLERI, M.; FRAMINAN, J. M. Closed-loop supply chains: what reverse logistics factors influence performance? *International Journal of Production Economics*, v. 175, p. 35–49, 2016. 78

CARROLL, A. B. A three-dimensional conceptual model of corporate performance. *Academy of Management Review*, v. 4, n. 4, p. 497–505, 1979. 34, 82

CARROLL, A. B. The pyramid of corporate social responsibiiity: toward the moral management of organizational stakeholders. *Business Horizons*, v. 34, n. 4, p. 39–48, 1991. 34, 82

CARTER, C. R.; EASTON, P. L. Sustainable supply chain management: evolution and future directions. *International Journal of Physical Distribution & Logistics Management*, v. 41, n. 1, p. 46–62, 2011. 37

CARTER, C. R.; JENNINGS, M. M. Social responsibility and supply chain relationships. *Transportation Research Part E*, v. 38, n. 1, p. 37–52, 2002. 61, 69, 82, 86

CARTER, C. R.; KALE, R.; GRIMM, C. M. Environmental purchasing and firm performance: an empirical investigation. *Transportation Research Part E: Logistics and Transportation Review*, v. 36, n. 3, p. 219–228, 2000. 40, 46, 47, 63, 74, 75

CARTER, C. R.; ROGERS, D. S. A framework of sustainable supply chain management: moving toward new theory. *International Journal of Physical Distribution & Logistics Management*, v. 38, n. 5, p. 360–387, 2008. 17, 27, 37, 43, 46, 51, 57, 68, 69, 70, 73, 74

CHEN, C. Design for the environment: a quality-based model for green product development. *Management Science*, v. 47, n. 2, p. 250–263, 2001. 73

CHEN, C.-C.; SHIH, H.-S.; SHYUR, H.-J.; WU, K.-S. A business strategy selection of green supply chain management via an analytic network process. *Computers & Mathematics with Applications*, v. 64, n. 8, p. 2544–2557, 2012. 63

CHEN, I. J.; SMALL, M. H. Implementing advanced manufacturing technology: an integrated planning model. *Omega*, v. 22, n. I, p. 91–103, 1994. 84

CLARK, T. H.; HAMMOND, J. H. Reengineering channel reordering processes to improve total supply-chain performance. *Production and Operations Management*, v. 6, n. 3, p. 248–265, 1997. 84

COOPER, M. C.; LAMBERT, D. M.; PAGH, J. D. Supply chain management: more than a new name for logistics. *The International Journal of Logistics Management*, v. 8, n. 1, p. 1–14, 1997. 16, 17, 27, 36

COX, A. Power, value and supply chain management. *Supply Chain Management: An International Journal*, v. 4, n. 4, p. 167–175, 1999. 16, 19, 27

DAMANPOUR, F. Organizational innovation: a meta-analysis of effects of determinants and moderators. *Academy of Management Journal*, v. 34, n. 3, p. 555–590, 1991. 32, 33, 59

DAMANPOUR, F.; GOPALAKRISHNAN, S. The dynamics of the adoption of product and process innovations in organizations. *Journal of Management Studies*, v. 38, n. 1, p. 45–65, 2001. 32, 33

DANGAYACH, G.; DESHMUKH, S. Advanced manufacturing technology implementation: evidence from Indian small and medium enterprises (SMEs). *Journal of Manufacturing Technology Management*, v. 16, n. 5, p. 483–496, 2005. 84

DASGUPTA, T. Using the six-sigma metric to measure and improve the performance of a supply chain. *Total Quality Management & Business Excellence*, v. 14, n. 3, p. 355–366, 2003. 35, 84

DE BAKKER, F.; NIJHOF, A. Responsible chain management: A capability assessment framework. *Business Strategy and the Environment*, v. 11, n. 1, p. 63–75, 2002. 38

DE GIOVANNI, P. Do internal and external environmental management contribute to the triple bottom line? *International Journal of Operations and Production Management*, v. 32, n. 3, p. 265–290, 2012. 43, 44

DIFRANCESCO, R. M.; HUCHZERMEIER, A. Closed-loop supply chains: a guide to theory and practice. *International Journal of Logistics Research and Applications*, v. 19, n. 5, p. 443–464, 2016. 66

DIMAGGIO, P. J.; POWELL, W. W. The New Institutionalism in Organizational Analysis. In: ____. Chicago: University of Chicago Press, 1983. cap. Introduction, p. 1–38. 16, 26

DOWLATSHAH, S. Developing a theory of reverse logistics. *Interfaces*, v. 30, n. 3, p. 143–155, 2000. 38, 77

DOWLATSHAHI, S. A cost-benefit analysis for the design and implementation of reverse logistics systems: case studies approach. *International Journal of Production Research*, v. 48, n. 5, p. 1361–1380, 2010. 66

DUBEY, R.; GUNASEKARAN, A.; PAPADOPOULOS, T.; CHILDE, S. J.; SHIBIN, K. T.; WAMBA, S. F. Sustainable supply chain management: framework and further research directions. *Journal of Cleaner Production*, v. 142, p. 1119–1130, 2017. 18, 37, 65

EBBEN, J. J.; JOHNSON, A. C. Efficiency, flexibility, or both? Evidence linking strategy to performance in small firms. *Strategic Management Journal*, v. 26, p. 1249–1259, 2005. 36, 61, 83

ELKINGTON, J. *Cannibals with forks: the triple bottom line of 21st century*. Oxford: Capstone, 1997. 17, 26, 27, 43, 45, 56, 68, 69

ELLRAM, L. M.; COOPER, M. C. Supply chain management, partnership, and the shipper-third party relationship. *The International Journal of Logistics Management*, v. 1, n. 2, p. 2–10, 1990. 16, 17, 27

FARRELL, M. J. The measurement of productive efficiency. *Journal of the Royal Statistical Society*, v. 120, n. 3, p. 253, 1957. 35

FLEISCHMANN, M.; KRIKKE, H. R.; DEKKER, R.; FLAPPER, S. D. P. A characterisation of logistics networks for product recovery. *Omega*, v. 28, n. 6, p. 653–666, 2000. 17, 39, 41, 56, 84

FLORIDA, R. Lean and green: The move to environmentally conscious manufacturing. *California Management Review*, v. 39, n. 1, p. 80–105, 1996. 73

FOMBRUN, C.; SHANLEY, M. What's in a name? Reputation building and corporate strategy. *Academy of Management Journal*, v. 33, n. 2, p. 233–258, 1990. 34, 60, 82

FORD, S.; DESPEISSE, M. Additive manufacturing and sustainability: an exploratory study of the advantages and challenges. *Journal of Cleaner Production*, v. 137, p. 1573–1587, 2016. 84

FREEMAN, R. E. *Strategic management: A stakeholder Approach*. New York: Cambridge University Press, 2010. 16, 26

FULLER, D. A.; OTTMAN, J. A. Moderating unintended pollution: the role of sustainable product design. *Journal of Business Research*, v. 57, n. 11, p. 1231–1238, 2004. 39, 40, 63, 65, 84

GATIGNON, H.; XUEREB, J. M. Strategic orientation of the firm and new product performance. *Journal of Marketing Research*, v. 34, n. 1, Special Issue on Innovation and New Products, p. 77–90, 1997. 16, 26, 31, 32

GATZERT, N. The impact of corporate reputation and reputation damaging events on financial performance: empirical evidence from the literature. *European Management Journal*, v. 33, n. 6, p. 485–499, 2015. 61

GENERAL ELECTRIC. A new kind of industrial company. *GE 2014 Annual Report*, p. 1–256, 2014. 33

GENERAL ELECTRIC. Leading a digital industrial era. *2016 Annual Report*, p. 1–264, 2016. 33

GEYER, R.; JACKSON, T. Supply loops and their constraints: the industrial ecology of recycling and reuse. *California Management Review*, v. 46, n. 2, p. 55–73, 2004. 41, 77

GIMENEZ, C.; SIERRA, V.; RODON, J. Sustainable operations: Their impact on the triple bottom line. *International Journal of Production Economics*, v. 140, n. 1, p. 149–159, 2012. 44, 68, 69

GLOVER, J. L.; CHAMPION, D.; DANIELS, K. J.; DAINTY, A. J. An Institutional Theory perspective on sustainable practices across the dairy supply chain. *International Journal of Production Economics*, n. 152, p. 102–111, 2014. 16, 26

GOLD, S.; SEURING, S.; BESKE, P. Sustainable supply chain management and inter-organizational resources: A literature review. *Corporate Social Responsibility and Environmental Management*, v. 17, n. 4, p. 230–245, 2010. 43, 68

GOMES, C. M.; KNEIPP, J. M.; KRUGLIANSKAS, I.; DA ROSA, L. A. B.; BICHUETI, R. S. Management for sustainability in companies of the mining sector: An analysis of the main factors related with the business performance. *Journal of Cleaner Production*, v. 84, n. 1, p. 84–93, 2014. 44

GOPAL, P. R. C.; THAKKAR, J. A review on supply chain performance measures and metrics: 2000-2011. *International Journal of Productivity and Performance Management*, v. 61, n. 5, p. 518–547, 2012. 43

GOPAL, P. R. C.; THAKKAR, J. Sustainable supply chain practices: An empirical investigation on Indian automobile industry. *Production Planning and Control*, 2015. 44, 47

GOTSI, M.; WILSON, A. M. Corporate reputation: seeking a definition. *Corporate Communications: An International Journal*, v. 6, n. 1, p. 24–30, 2001. 33, 34

GOVINDAN, K.; KHODAVERDI, R.; JAFARIAN, A. A fuzzy multi criteria approach for measuring sustainability performance of a supplier based on triple bottom line approach. *Journal of Cleaner Production*, v. 47, p. 345–354, 2013. 44, 46

GOVINDAN, K.; SOLEIMANI, H.; KANNAN, D. Reverse logistics and closed-loop supply chain: a comprehensive review to explore the future. *European Journal of Operational Research*, v. 240, n. 3, p. 603–626, 2015. 38, 39, 62

GREEN JR., K. W.; ZELBST, P. J.; MEACHAM, J.; BHADAURIA, V. S. Green supply chain management practices: impact on performance. *Supply Chain Management: An International Journal*, v. 17, p. 290–305, 2012. 40, 44, 47, 75, 77

GRI. *Consolidated set of GRI sustainability reporting standards 2016*. Amsterdam, The Netherlands, 2016. 443 p. Disponível em: <https://www.globalreporting.org/standards/gri-standards-download-center/?g=0ca1da26-85d3-43bc-8c1d-ca4e81977b69>. 43, 44, 45, 51, 68, 69, 86

GRINSTEIN, A. The relationships between market orientation and alternative strategic orientations: a meta-analysis. *European Journal of Marketing*, v. 42, n. 1/2, p. 115–134, 2008. 16, 26, 32

GUIDE JR., V. D. R.; HARRISON, T. P.; VAN WASSENHOVE, L. N. The challenge of closed-loop supply chains. *Interfaces*, v. 33, n. 6, p. 3–6, 2003. 66, 67

GUIDE JR., V. D. R.; VAN WASSENHOVE, L. N. Managing product returns for remanufacturing. *Production and Operations Management*, v. 10, n. 2, p. 142–155, 2001. 17, 56

GUIDE JR., V. D. R.; VAN WASSENHOVE, L. N. The reverse supply chain. *Harvard Business Review*, n. I, p. 1–3, 2002. 17, 27, 38, 66

GUIDE JR., V. D. R.; VAN WASSENHOVE, L. N. The evolution of closed-loop supply chain research. *Operations Research*, v. 57, n. 1, p. 10–18, 2009. 17, 27, 38, 67

GUNDAY, G.; ULUSOY, G.; KILIC, K.; ALPKAN, L. Effects of innovation types on firm performance. *International Journal of Production Economics*, v. 133, n. 2, p. 662–676, 2011. 33, 59, 60, 82

GUPTA, S.; MALHOTRA, N. K.; CZINKOTA, M.; FOROUDI, P. Marketing innovation: a consequence of competitiveness. *Journal of Business Research*, v. 69, n. 12, p. 5671–5681, 2016. 60

HAIR, J. F.; BLACK, W. C.; BABIN, B. J.; ANDERSON, R. E.; TATHAM, R. L. *Multivariate Data Analysis*. New Jersey: Prentice Hall, 2010. 87, 88, 98, 99

HAMBRICK, D. C.; MASON, P. A. Upper echelons: the organization as a reflection of its top managers. *Academy of Management Review*, v. 9, n. 2, p. 193–206, 1984. 16, 26, 56

HARJOTO, M. A.; JO, H. Corporate governance and CSR nexus. *Journal of Business Ethics*, v. 100, n. 1, p. 45–67, Apr 2011. 61, 82

HART, S. A natural resource based view of the firm. *Academy of Management Review*, v. 20, n. 4, p. 986–1014, 1995. 17, 26, 56

HASSINI, E.; SURTI, C.; SEARCY, C. A literature review and a case study of sustainable supply chains with a focus on metrics. *International Journal of Production Economics*, v. 140, n. 1, p. 69–82, 2012. 27, 37

HENRIQUES, I.; SADORSKY, P. The determinants of an environmentally responsive firm: an empirical approach. *Journal of Environmental Economics and Management*, v. 30, n. 3, p. 381–395, 1996. 38

HERVANI, A. A.; HELMS, M. M.; SARKIS, J. Performance measurement for green supply chain management. *Benchmarking: An International Journal*, v. 12, n. 4, p. 330–353, 2005. 38, 49, 57, 58, 62, 83

HITT, M. A.; DACIN, M. T.; TYLER, B. B.; PARK, D. Understanding the differences in Korean and U. S. Executives' strategic orientations. *Strategic Management Journal*, v. 18, n. 2, p. 159–167, 1997. 56

HO, W. Y. *Multiple strategic orientations and business performance: a comprehensive investigation of high-tech firms*. Tese (Doutorado) — The University of Adelaide Business Scholl, out. 2014. 82, 85

HONG, J.; ZHANG, Y.; DING, M. Sustainable supply chain management practices, supply chain dynamic capabilities, and enterprise performance. *Journal of Cleaner Production*, v. 172, p. 3508–3519, 2017. 27, 43, 44, 47, 48, 49, 57, 58, 68, 76

HSU, C.-C.; TAN, K.-C.; ZAILANI, S. H. M. Strategic orientations, sustainable supply chain initiatives, and reverse logistics: empirical evidence from an emerging market. *International Journal of Operations & Production Management*, v. 36, n. 1, p. 86–110, 2016. 18, 19, 31, 40, 41, 42, 47, 48, 51, 52, 57, 58, 63, 64, 65, 70, 71, 72, 73, 81, 84

HSU, C.-C.; TAN, K.-C. T.; ZAILANI, S. H. M.; JAYARAMAN, V. Supply chain drivers that foster the development of green initiatives in an emerging economy. *International Journal of Operations & Production Management*, v. 33, n. 6, p. 656–688, 2013. 18, 19, 38, 39, 40, 42, 62, 63, 64, 67, 84, 85

HU, T.-L.; SHEU, J.-B.; HUANG, K.-H. A reverse logistics cost minimization model for the treatment of hazardous wastes. *Transportation Research Part E: Logistics and Transportation Review*, v. 38, n. 6, p. 457–473, 2002. 67, 85

HUO, B.; YE, Y.; ZHAO, X.; ZHU, K. Supply chain quality integration: a taxonomy perspective. *International Journal of Production Economics*, 2016. 62, 83

ISO. Switzerland: International Standard, 2015. 50

JABBOUR, A. B. L. d. S.; JABBOUR, C. J. C.; LATAN, H.; TEIXEIRA, A. A.; OLIVEIRA, J. H. C. de. Quality management, environmental management maturity, green supply chain practices and green performance of Brazilian companies with ISO 14001 certification: direct and indirect effects. *Transportation Research Part E: Logistics and Transportation Review*, v. 67, p. 39–51, 2014. 18, 40, 44, 46, 47, 49, 57, 58, 75, 77

JAYARAMAN, V.; LUO, Y. Creating competitive advantages through new value creation: a reverse logistics perspective. *Academy of Management Perspectives*, v. 21, n. 2, p. 56–73, 2007. 17, 27, 38, 73, 77

JI, G.; GUNASEKARAN, A.; YANG, G. Constructing sustainable supply chain under double environmental medium regulations. *International Journal of Production Economics*, v. 147, n. PART B, p. 211–219, 2014. 66, 85

JIMENEZ-JIMÉNEZ, D.; SANZ-VALLE, R. Innovation, organizational learning, and performance. *Journal of Business Research*, v. 64, n. 4, p. 408–417, 2011. 59

JIZI, M. I.; SALAMA, A.; DIXON, R.; STRATLING, R. Corporate governance and corporate social responsibility disclosure: evidence from the US banking sector. *Journal of Business Ethics*, v. 125, n. 4, p. 601–615, 2013. 61, 82

KAO, C.; CHEN, L. H.; WANG, T. Y.; KUO, S.; HORNG, S. D. Productivity improvement: efficiency approach vs effectiveness approach. *Omega*, v. 23, n. 2, p. 197–204, 1995. 84

KHOR, K. S.; UDIN, Z. M. Impact of reverse logistics product disposition towards business performance in Malaysian E&E Companies. *Journal of Supply Chain and Customer Relationship Management*, v. 2012, p. 1–19, 2012. 67

KIRCHOFF, J. F.; TATE, W. L.; MOLLENKOPF, D. A. The impact of strategic organizational orientations on green supply chain management and firm performance. *International Journal of Physical Distribution & Logistics Management*, v. 46, n. 3, p. 269–292, 2016. 47, 48, 59, 70, 71, 72, 76

KLEINDORFER, P. R.; SINGHAL, K.; VAN WASSENHOVE, L. N. Sustainable operations management. *Production and Operations Management*, v. 14, n. 4, p. 482–492, 2005. 17, 27, 38, 43, 45, 46, 57, 62, 68, 73

KLINE, R. B. *Principles and practice of structural equation modeling*. Third. New York: The Guilford Press, 2011. 94, 99

KLINE, S. J.; ROSENBERG, N. An overview of innovation. *European Journal of Innovation Management*, v. 38, p. 275–305, 1986. 33

KNIGHT, K. E. A descriptive model of the intra-firm innovation process. *The Journal of Business*, v. 40, n. 4, p. 478, 1967. 59

KNIGHT, P.; JENKINS, J. O. Adopting and applying eco-design techniques: a practitioners perspective. *Journal of Cleaner Production*, v. 17, n. 5, p. 549–558, 2009. 40, 63

KOTABE, M. Efficiency vs. effectiveness orientation of global sourcing strategy: a comparison of U.S. and Japanese multinational companies. *Academy of Management Perspectives*, v. 12, n. 4, p. 107–119, 1998. 61, 83

KRIKKE, H.; BLANC, I. le; VELDE, S. van de. Product modularity and the design of closed-loop supply chains. *California Management Review*, v. 46, n. 2, p. 23–39, 2004. 67, 85

KRIKKE, H.; BLOEMHOF-RUWAARD, J. M.; VAN WASSENHOVE, L. N. Concurrent product and closed-loop supply chain design with an application to refrigerators. *International Journal of Production Research*, v. 41, n. 16, p. 3689–3719, 2003. 38, 39, 41, 62

KRIKKE, H.; HOFENK, D.; WANG, Y. Revealing an invisible giant: a comprehensive survey into return practices within original (closed-loop) supply chains. *Resources, Conservation and Recycling*, v. 73, p. 239–250, 2013. 66

KUMAR, S.; Samad Arbi, A. Outsourcing strategies for apparel manufacture: a case study. *Journal of Manufacturing Technology Management*, v. 19, n. 1, p. 73–91, 2007. 84

KUSHWAHA, G. S.; SHARMA, N. K. Green initiatives: A step towards sustainable development and firm's performance in the automobile industry. *Journal of Cleaner Production*, n. 121, p. 116–129, 2016. 44, 47

LABUSCHAGNE, C.; BRENT, A. C.; CLAASEN, S. J. Environmental and social impact considerations for sustainable project life cycle management in the process industry. *Corporate Social Responsibility and Environmental Management*, v. 12, p. 38–54, 2005. 46, 69

LAI, K. H.; WU, S. J.; WONG, C. W. Y. Did reverse logistics practices hit the triple bottom line of Chinese manufacturers? *International Journal of Production Economics*, v. 146, n. 1, p. 106–117, 2013. 18, 19, 40, 42, 47, 48, 66, 67, 78, 113, 116

LAU, K. H.; WANG, Y. Reverse logistics in the electronic industry of China: a case study. *Supply Chain Management: An International Journal*, v. 14, n. 6, p. 447–465, 2009. 42, 67, 85

LEE, M. C.; CHANG, T. Developing a lean design for Six Sigma through supply chain methodology. *International Journal of Productivity and Quality Management*, v. 6, n. 4, p. 407–434, 2010. 84

LEE, S. M.; Tae Kim, S.; CHOI, D.; KIM, S. T.; CHOI, D. Green supply chain management and organizational performance. *Industrial Management & Data Systems*, v. 112, n. 8, p. 1148–1180, 2012. 18, 38, 44

LI, H.; ATUAHENE-GIMA, K. Product innovation strategy and the performance of new technology ventures in China. *Academy of Management Journal*, v. 44, n. 6, p. 1123–1134, 2001. 32

LI, S.; JAYARAMAN, V.; PAULRAJ, A.; SHANG, K. chung. Proactive environmental strategies and performance: role of green supply chain processes and green product design in the Chinese high-tech industry. *International Journal of Production Research*, v. 54, n. 7, p. 2136–2151, 2015. 18, 19, 27, 40, 41, 43, 44, 45, 47, 48, 49, 57, 58, 64, 65, 66, 67, 70, 71, 76, 77, 84, 85

LI, S.; RAGU-NATHAN, B.; RAGU-NATHAN, T. S.; RAO, S. S. The impact of supply chain management practices on competitive advantage and organizational performance. *Omega*, v. 34, n. 2, p. 107–124, 2006. 17, 18, 38, 44, 56

LINTON, J. D.; KLASSEN, R.; JAYARAMAN, V. Sustainable supply chains: an introduction. *Journal of Operations Management*, v. 25, n. 6, p. 1075–1082, 2007. 17, 37, 66

LOCH, C. Operations management and reengineering. *European Management Journal*, v. 16, n. 3, p. 306–317, 1998. 84

LUMPKIN, G. T.; DESS, G. G. Clarifying the entrepreneurial orientation construct and linking it to performance. *The Academy of Management Review*, v. 21, n. 1, p. 135–172, 1996. 16, 26, 32

LUTHRA, S.; GARG, D.; HALEEM, A. The impacts of critical success factors for implementing green supply chain management towards sustainability: an empirical investigation of Indian automobile industry. *Journal of Cleaner Production*, v. 121, p. 142–158, 2016. 18, 19, 27, 38, 40, 41, 44, 45, 46, 49, 51, 57, 58, 62, 63, 64, 65, 66, 67, 68, 69, 74, 83, 84, 85, 86

MAHSUD, R.; YUKL, G.; PRUSSIA, G. E. Human capital, efficiency, and innovative adaptation as strategic determinants of firm performance. *Journal of Leadership & Organizational Studies*, v. 18, n. 2, p. 229–246, 2011. 35, 61, 62, 83

MALONI, M. J.; BROWN, M. E. Corporate social responsibility in the supply chain: an application in the food industry. *Journal of Business Ethics*, v. 68, n. 1, p. 35–52, 2006. 18, 38, 61, 82

MANI, V.; GUNASEKARAN, A.; PAPADOPOULOS, T.; HAZEN, B.; DUBEY, R. Supply chain social sustainability for developing nations: evidence from India. *Resources, Conservation and Recycling*, v. 111, p. 42–52, 2016. 18, 19, 46, 51, 56, 57, 74

MANU, F. A.; SRIRAM, V. Innovation, marketing strategy, environment, and performance. *Journal of Business Research*, v. 35, n. 1, p. 79–91, 1996. 16, 26, 31, 58, 60

MARIADOSS, B. J.; CHI, T.; TANSUHAJ, P.; POMIRLEANU, N. Influences of Firm Orientations on Sustainable Supply Chain Management. *Journal of Business Research*, v. 69, n. 9, p. 3406–3414, 2016. 47, 48, 51, 58, 59, 70, 71, 72

MARTRÍNEZ-LÓPEZ, F. J.; Grázquez-Abad, J. C.; SOUSA, C. M. P. Structural equation modelling in marketing and business research: Critical issues and practical recommendations. *European Journal of Marketing*, v. 47, n. 1/2, p. 115–152, 2013. 99

MASOUMIK, S. M.; ABDUL-RASHID, S. H.; OLUGU, E. U.; RAJA GHAZILLA, R. A. Sustainable supply chain design: a configurational approach. *The Scientific World Journal*, v. 2014, p. 01–16, 2014. 37

MAYYAS, A.; QATTAWI, A.; OMAR, M.; SHAN, D. Design for sustainability in automotive industry: a comprehensive review. *Renewable and Sustainable Energy Review*, v. 16, n. 4, p. 1845–1862, 2012. 63

MCWILLIAMS, A.; SIEGEL, D. Corporate social responsibility: a theory of the firm perspective. *Academy of Management Review*, v. 26, n. 1, p. 117–127, 2001. 34, 60, 82

MELNYK, S. A.; SROUFE, R. P.; CALANTONE, R. Assessing the impact of environmental management systems on corporate and environmental performance. *Journal of Operations Management*, v. 21, n. 3, p. 329–351, 2003. 44

MENTZER, J. T.; KEEBLER, J. S.; NIX, N. W.; SMITH, C. D.; ZACHARIA, Z. G. Defining supply chain management. *Journal of Business Logistics*, v. 22, n. 2, p. 1–25, 2001. 16, 17, 27, 36

MEREDITH, J. Theory Building through Conceptual Methods. *International Journal of Operations & Production Management*, v. 13, n. 5, p. 3–11, 1993. 28

NAPOLITANO, G. Industrial research and sources of innovation: a cross-industry analysis of Italian manufacturing firms. *Research Policy*, v. 20, n. 2, p. 171–178, 1991. 32

NARVER, J. C.; SLATER, S. F. The effect of a market orientation on business profitability. *Journal of Marketing*, v. 54, n. 4, p. 20–35, 1990. 16, 26, 31

NEUTZLING, D. M.; LAND, A.; SEURING, S.; NASCIMENTO, L. F. M. do. Linking sustainability-oriented innovation to supply chain relationship integration. *Journal of Cleaner Production*, Elsevier BV, v. 172, p. 3448–3458, jan 2018. 70

NIKOLAOU, I. E.; EVANGELINOS, K. I.; ALLAN, S. A reverse logistics social responsibility evaluation framework based on the triple bottom line approach. *Journal of Cleaner Production*, v. 56, p. 173–184, 2013. 42, 44, 45, 47, 48, 66, 68, 69, 77, 78, 86

NOBLE, C. H.; SINHA, R. K.; KUMAR, A. Market orientation and alternative strategic orientations: a longitudinal assessment of performance implications. *Journal of Marketing*, v. 66, n. 4, p. 25–39, 2002. 31

NOVAK, T. P.; HOFFMAN, D. L.; YUNG, Y.-F. Measuring the Customer Experience in Online Environments: A Structural Modeling Approach. *Marketing Science*, v. 19, n. 1, p. 22–42, 2000. 87

OECD. *Oslo Manual Guidelines for Collecting and Interpreting Innovation Data*. Paris, France: OECD and Eurostat, 2005. 1–166 p. 32, 33, 59, 60, 82

OKE, A.; PRAJOGO, D. I.; JAYARAM, J. Strengthening the innovation chain: the role of internal innovation climate and strategic relationships with supply chain partners. *Journal of Supply Chain Management*, v. 49, n. 4, p. 43–58, 2013. 59

PAGELL, M.; SHEVCHENKO, A. Why research in sustainable supply chain management should have no future. *Journal of Supply Chain Management*, v. 50, n. 1, p. 44–55, 2014. 37

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*, v. 45, n. 2, p. 37–56, 2009. 27, 37, 45, 57, 73

PAULRAJ, A. Understanding the relationships between internal resources and capabilities, sustainable supply management and organizational sustainability. *Journal of Supply Chain Management*, v. 47, n. 1, p. 19–37, 2011. 18, 19, 40, 44, 45, 46

PAULRAJ, A.; BLOME, C. Plurality in environmental supply chain mechanisms: differential effects on triple bottom line outcomes. *International Journal of Operations & Production Management*, v. 37, n. 8, p. 1010–1030, 2017. 18, 19, 27, 44, 57, 68

PAULRAJ, A.; CHEN, I. J.; BLOME, C. Motives and performance outcomes of sustainable supply chain management practices: a multi-theoretical perspective. *Journal of Business Ethics*, 2015. 39, 40

PAULRAJ, A.; CHEN, I. J.; BLOME, C. Motives and performance outcomes of sustainable supply chain management practices: a multi-theoretical perspective. *Journal of Business Ethics*, v. 145, n. 2, p. 239–258, 2017. 18, 38, 44, 47, 76, 77

PEROTTI, S.; ZORZINI, M.; CAGNO, E.; MICHELI, G. J. L. Green supply chain practices and company performance: the case of 3PLs in Italy. *International Journal of Physical Distribution & Logistics Management*, v. 42, n. 7, p. 640–672, 2012. 18, 19, 40, 41, 42, 43, 44, 45, 47, 65, 68, 85

PISANO, G. P. You need an innovation strategy. *Harvard Business Review*, p. 44–54, jun 2015. 31

PLAMBECK, E. Reducing greenhouse gas emissions through operations and supply chain management. *Energy Economics*, v. 34, p. S64–S74, 2012. 65, 66, 85

PORTER, M. E. *Competitive strategy: techniques for analyzing industries and competitors: with a new introduction*. [S.l.]: Free Press, 1980. 397 p. 16, 26, 32, 35

PORTER, M. E. What is strategy? *Harvard Business Review*, v. 74, n. 6, p. 61–78, November-December 1996. 31, 35, 36, 61

PRAJOGO, D. I. The strategic fit between innovation strategies and business environment in delivering business performance. *International Journal of Production Economics*, v. 171, p. 241–249, 2016. 59, 82

PRAJOGO, D. I.; AHMED, P. K. Relationships between innovation stimulus, innovation capacity, and innovation performance. *R&D Management*, v. 36, n. 5, p. 499–515, 2006. 32, 59

RALSTON, P. M.; BLACKHURST, J.; CANTOR, D. E.; CRUM, M. R. A structure-conduct-performance perspective of how strategic supply chain integration affects firm performance. *Journal of Supply Chain Management*, v. 51, n. 2, p. 47–64, 2015. 50, 70

RAO, P.; HOLT, D. Do green supply chains lead to competitiveness and economic performance? *International Journal of Operations & Production Management*, v. 25, n. 9, p. 898–916, 2005. 18, 27, 39, 40, 41, 42, 43, 44, 46, 47, 49, 57, 58, 63, 64, 65, 66, 67, 68, 69, 70, 73, 74, 75, 84, 85, 86

RAO, P. H. Measuring environmental performance across a green supply chain: a managerial overview of environmental indicators. *Vikalpa*, v. 39, n. 1, p. 57–74, 2014. 44, 47

ROBERTS, P. W.; DOWLING, G. R. Corporate reputation and sustained superior financial performance. *Strategic Management Journal*, v. 23, n. 12, p. 1077–1093, 2002. 34, 60, 82

ROGERS, D. S.; TIBBEN-LEMBKE, R. *Going backwards: reverse logistics trends and practices*. Reno, NV: University of Nevada, 1999. 41, 63, 66, 67

ROGERS, D. S.; TIBBEN-LEMBKE, R. An examination of reverse logistics practices. *Journal of Business Logistics*, v. 22, n. 2, p. 129–148, 2001. 66

SANTOS, J. B.; BRITO, L. A. L. Toward a subjective measurement model for firm performance. *BAR - Brazilian Administration Review*, v. 9, n. Special Issue, p. 95–117, may 2012. 43, 44, 45, 46, 68, 69, 85, 86

SARKIS, J. Manufacturing's role in corporate environmental sustainability? Concerns for the new millennium. *International Journal of Operations & Production Management*, v. 21, n. 5/6, p. 666–686, 2001. 41, 66, 70

SARKIS, J.; GONZALEZ-TORRE, P.; ADENSO-DIAZ, B. Stakeholder pressure and the adoption of environmental practices: The mediating effect of training. *Journal of Operations Management*, v. 28, n. 2, p. 163–176, 2010. 16, 18, 26, 40, 42, 50

SARKIS, J.; HELMS, M. M.; HERVANI, A. A. Reverse logistics and social sustainability. *Corporate Social Responsibility and Environmental Management*, v. 17, n. 6, p. 337–354, 2010. 45, 46, 56, 68, 69

SARKIS, J.; ZHU, Q.; LAI, K. H. An organizational theoretic review of green supply chain management literature. *International Journal of Production Economics*, v. 130, n. 1, p. 1–15, 2011. 16, 17, 26, 27, 33, 36, 50

SASIKUMAR, P.; KANNAN, G. Issues in reverse supply chains, part I: end-of-life product recovery and inventory management - an overview. *International Journal of Sustainable Engineering*, v. 1, n. 3, p. 154–172, 2008. 66

SASIKUMAR, P.; KANNAN, G. Issues in reverse supply chains, part II: reverse distribution issues - an overview. *International Journal of Sustainable Engineering*, v. 1, n. 4, p. 234–249, 2008. 66

SAVASKAN, R. C.; BHATTACHARYA, S.; VAN WASSENHOVE, L. N. Closed-loop supply chain models with product remanufacturing. *Management Science*, v. 50, n. 2, p. 239–252, 2004. 41, 66, 67, 85

SCHUMPETER, J. *The theory of economic development: an inquiry into profits, capital, credit, interest, and the business cycle*. Cambridge, Mass: Harvard University Press, 1934. 255 p. 32

SEURING, S. A review of modeling approaches for sustainable supply chain management. *Decision Support Systems*, v. 54, n. 4, p. 1513–1520, 2013. 51, 73, 74

SEURING, S.; MÜLLER, M. From a literature review to a conceptual framework for sustainable supply chain management. *Journal of Cleaner Production*, v. 16, n. 15, p. 1699–1710, 2008. 17, 27, 37, 51, 57

SHAHARUDIN, M. R.; ZAILANI, S.; TAN, K. C. Barriers to product returns and recovery management in a developing country: investigation using multiple methods. *Journal of Cleaner Production*, v. 96, p. 220–232, 2015. 66

SHI, V. G.; KOH, S. C. L.; BALDWIN, J.; CUCCHIELLA, F. Natural resource based green supply chain management. *Supply Chain Management: An International Journal*, v. 17, n. 1, p. 54–67, 2012. 44

SINKULA, J. M.; BAKER, W. E.; NOORDEWIER, T. A framework for market-based organizational learning: linking values, knowledge, and behavior. *Journal of the Academy of Marketing Science*, v. 25, n. 4, p. 305–318, 1997. 32

SLATER, S. F. S.; OLSIN, E. M.; HULT, G. T. M. The moderating influence of strategic orientation on the strategy formation capability - performance relationship. *Strategic Management Journal*, v. 27, n. 12, p. 1221–1231, 2006. 31

SRIVASTAVA, S. K. Green supply-chain management: a state-of-the-art literature review. *International Journal of Management Reviews*, v. 9, n. 1, p. 53–80, 2007. 17, 27, 36, 38, 57, 62, 63, 64

STADTLER, H. Supply chain management and advanced planning - basics, overview and challenges. *European Journal of Operational Research*, v. 163, n. 3, p. 575–588, 2005. 66, 85

STARBUCKS. *Global Social Impact Performance Report*. [S.l.], 2016. 24 p. Disponível em: <https://www.starbucks.com/responsibility/global-report>. 35

STINDT, D. A generic planning approach for sustainable supply chain management - how to integrate concepts and methods to address the issues of sustainability? *Journal of Cleaner Production*, v. 153, p. 146–163, 2017. 17, 18, 37, 38, 39, 41, 57, 62, 63, 64, 68

SU, Z.; YANG, D.; YANG, J. The match between efficiency/flexibility strategy and organisational culture. *International Journal of Production Research*, v. 50, n. 19, p. 5317–5329, 2012. 35

SZEKELY, F.; KNIRSCH, M. Responsible leadership and corporate social responsibility: Metrics for sustainable performance. *European Management Journal*, v. 23, n. 6, p. 628–647, 2005. 46, 61, 83

TALBOT, S.; LEFEBVRE, E.; LEFEBVRE, L.-A. Closed-loop supply chain activities and derived benefits in manufacturing SMEs. *Journal of Manufacturing Technology Management*, v. 18, n. 6, p. 627–658, 2007. 39, 40, 42

TALLURI, S. Benchmarking method for business-process reengineering and improvement. *International Journal of Flexible Manufacturing Systems*, v. 12, n. 4, p. 291–304, 2000. 62, 83

TAN, C. L.; ZAILANI, S. H. M.; TAN, S. C.; SHAHARUDIN, M. R. The impact of green supply chain management practices on firm competitiveness. *International Journal of Business Innovation and Research*, v. 11, n. 4, p. 539–558, 2016. 40, 46, 47, 76, 77

TAN, K.; KANNAN, V. R.; HANDFIELD, R. B.; GHOSH, S. Supply chain management: an empirical study of its impact on performance. *International Journal of Operations & Production Management*, v. 19, n. 10, p. 1034–1052, 1999. 17, 38, 56

TANG, C. S.; ZHOU, S. Research advances in environmentally and socially sustainable operations. *European Journal of Operational Research*, v. 223, n. 3, p. 585–594, 2012. 40, 42, 63

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*, v. 18, n. 10, p. 953– 962, 2010. 16, 18, 19, 21, 26, 32, 44, 47, 48, 49, 51, 52, 57, 58, 59, 71, 72, 74, 75, 113, 116

THIERRY, M.; SALOMON, M.; VAN NUNEN, J.; VAN WASSENHOVE, L. Strategic issues in product recovery management. *California Management Review*, v. 37, n. 2, p. 114–135, 1995. 17, 27, 38, 39, 41, 42, 49, 57, 58, 66, 67, 85

TRANFIELD, D.; DENYER, D.; SMART, P. Towards a Methodology for Developing Evidence-informed Management Knowledge. *British Journal of Management*, v. 14, p. 207–222, 2003. 28

TREACY, M.; WIERSEMA, F. Customer intimacy and other value disciplines customer intimacy and other value disciplines. *Harvard Business Review*, p. 84–93, jan/feb 1993. 34, 60, 61, 62, 82, 83

TSENG, M. L.; TAN, K. H.; LIM, M.; LIN, R. J.; GENG, Y. Benchmarking eco-efficiency in green supply chain practices in uncertainty. *Production Planning and Control*, v. 25, p. 1079–1090, 2014. 62, 83

TSOULFAS, G. T.; PAPPIS, C. P. A model for supply chains environmental performance analysis and decision making. *Journal of Cleaner Production*, v. 16, n. 15, p. 1647–1657, 2008. 65

UNDP. *Goal 12: Responsible consumption and production*. 2018. (accessed August 8, 2018). Disponível em: <http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-12-responsible-consumption-and-production.html>. 25

UNITED NATIONS. Declaration of the United Nations Conference on the Human Environment, Stockholm 1972. *United Nations Environment Programme*, UN Doc., A, p. 77, 1972. 15

UNITED NATIONS. Agenda 21. In: *United Nations Conference on Environment and Development (UNCED)*. [S.l.: s.n.], 1992. p. 351. 15

UNITED NATIONS. *Transforming our world: The 2030 agenda for sustainable development*. [S.l.], 2015. 1–41 p. 15, 25, 38

U.S. BUREAU OF ECONOMIC ANALYSIS. *Table 1. U.S. Value Added by Industry*. 2018. (accessed July 20, 2018). Disponível em: <https://www.bea.gov/>. 22

U.S. BUREAU OF LABOR STATISTICS. *Manufacturing NAICS 31-33 - Workforce Statistics*. 2018. (accessed July 20, 2018). Disponível em: <https://www.bls.gov/iag/tgs/iag31-33.htm>. 22

U.S. CENSUS BUREAU. *2017 NAICS - North American Industry Classification System*. 2017. (accessed July 20, 2018). Disponível em: <https://www.census.gov/eos/www/naics/2017NAICS/2017_NAICS_Manual.pdf>. 22

U.S. ENVIRONMENTAL PROTECTION AGENCY. *Regulatory Information by Sector*. 2018. (accessed July 21, 2018). Disponível em: <https://www.epa.gov/regulatory-information-sector/automotive-sectors-naics-336-4231-8111>. 22

UTTERBACK, J. M.; ABERNATHY, W. J. A dynamic model of process and product innovation. *Omega*, v. 3, n. 6, p. 639–656, 1975. 33, 59

VANALLE, R. M.; GANGA, G. M. D.; GODINHO FILHO, M.; LUCATO, W. C. Green supply chain management: an investigation of pressures, practices, and performance within the Brazilian automotive supply chain. *Journal of Cleaner Production*, v. 151, p. 250–259, 2017. 40, 44, 45, 47, 76, 77

VOSS, G. B.; VOSS, Z. G. Strategic orientation and firm performance in an artistic environment. *Journal of Marketing*, v. 64, n. 1, p. 67–83, 2000. 31

WALMART. *2017 Annual Report*. [S.l.], 2017. Disponível em: <http://stock.walmart.com>. 35

WANG, W. Y. C.; CHAN, H. K.; PAULEEN, D. J. Aligning business process reengineering in implementing global supply chain systems by the SCOR model. *International Journal of Production Research*, v. 48, n. 19, p. 5647–5669, 2010. 84

WCED. *Report of the World Commission on Environment and Development: Our Common Future*. Oxford, 1987. 300 p. Disponível em: <http://www.un-documents.net/wced-ocf.htm>. 15, 26, 43, 56

WOLF, J. Sustainable supply chain management integration: a qualitative analysis of the german manufacturing industry. *Journal of Business Ethics*, v. 102, n. 2, p. 221–235, Aug 2011. 37

WOLF, J. The relationship between sustainable supply chain management, stakeholder pressure and corporate sustainability performance. *Journal of Business Ethics*, v. 119, n. 3, p. 317–328, Feb 2014. 18, 44, 47

WU, G.-C.; DING, J.-H.; CHEN, P.-S. The effects of GSCM drivers and institutional pressures on GSCM practices in Taiwan's textile and apparel industry. *International Journal of Production Economics*, v. 135, p. 618–636, 2012. 38, 64, 84

YANG, C. L.; LIN, S. P.; CHAN, Y. H.; SHEU, C. Mediated effect of environmental management on manufacturing competitiveness: an empirical study. *International Journal of Production Economics*, v. 123, n. 1, p. 210–220, 2010. 33

YOUNG, S.; THYIL, V. Corporate social responsibility and corporate governance: role of context in international settings. *Journal of Business Ethics*, v. 122, n. 1, p. 1–24, 2014. 61

ZAILANI, S.; JEYARAMAN, K.; VENGADASAN, G.; PREMKUMAR, R. Sustainable supply chain management (SSCM) in Malaysia: a survey. *International Journal of Production Economics*, v. 140, n. 1, p. 330–340, 2012. 18, 19, 27, 40, 41, 44, 45, 46, 47, 49, 57, 58, 64, 65, 69, 74, 75

ZAIRI, M. Business process management: a boundaryless approach to modern competitiveness. *Business Process Management Journal*, v. 3, n. 1, p. 64–80, 1997. 35

ZHANG, Y.; LI, H. Innovation search of new ventures in a technology cluster: The role of ties with service intermediaries. *Strategic Management Journal*, v. 31, n. 1, p. 88–109, 2010. 59, 82

ZHU, Q.; SARKIS, J. Relationships between operational practices and performance among early adopters of green supply chain management practices in Chinese manufacturing enterprises. *Journal of Operations Management*, v. 22, n. 3, p. 265–289, 2004. 17, 18, 19, 27, 36, 39, 40, 44, 45, 46, 47, 63, 64, 66, 67, 74, 75, 84, 85

ZHU, Q.; SARKIS, J. The moderating effects of institutional pressures on emergent green supply chain practices and performance. *International Journal of Production Research*, v. 45, n. 18-19, p. 4333–4355, 2007. 40, 44

ZHU, Q.; SARKIS, J.; LAI, K. Green supply chain management: pressures, practices and performance within the Chinese automobile industry. *Journal of Cleaner Production*, v. 15, n. 11, p. 1041–1052, 2007. 18, 27, 40, 45, 57, 64, 73

ZHU, Q.; SARKIS, J.; LAI, K. Confirmation of a measurement model for green supply chain management practices implementation. *International Journal of Production Economics*, v. 111, n. 2, p. 261–273, 2008. 40, 44, 45, 83, 86

ZHU, Q.; SARKIS, J.; LAI, K.-h. Institutional-based antecedents and performance outcomes of internal and external green supply chain management practices. *Journal of Purchasing and Supply Management*, v. 19, n. 2, p. 106–117, 2013. 40, 44, 45, 47, 49, 51, 58, 63, 64, 65, 67, 68, 69, 74, 84, 85, 86

A Apêndice - IRB Approval

ILLINOIS INSTITUTE OF TECHNOLOGY
INSTITUTIONAL REVIEW BOARD
Patrick W. Corrigan, Psy.D., Chair

TO: Elizabeth Durango-Cohen

RE: Corporate Strategic Orientations, Sustainable Supply Chain Initiatives, and Business Performance in the U.S. Automotive Industry

PROTOCOL #: IRB 2018-076

DATE APPROVED: August 13, 2018

The Institutional Review Board (IRB) reviewed and approved, via expedited procedure as authorized by 45 CFR 46.110(b)(1) the above-named protocol which will involve human subjects.

Basis of Determination (DHHS Expedited Review Category):

Category 7: Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Recommendation: ☒ **Approval**

Important: Keep this letter with your records. Your approval number, shown above, should be used in all correspondence with the IRB office so that we can identify your project. The IRB would like to call your attention to some of your obligations as principal investigator. Any changes in the funding of this research or changes in the protocol, or in its procedures; any change of principal investigator or other research personnel, or any significant adverse effects or injury to subjects must be reported to the IRB immediately. If your project uses a paper consent form, only the informed consent form stamped and dated by the IRB Executive Officer can be reproduced and used in this study. IIT policy and federal regulations require the retention of all records relating to the IRB and to human subjects activities for at least five years after completion of the research. Records, including applications, amendments, signed consent forms, and collected data, must be accessible for inspection at any time and for copying by authorized representatives of IIT, HHS, or the specific agencies sponsoring the research.

Please be aware that your current IRB approval is valid for two years from the date shown above. It is your responsibility to notify the IRB if a study's funding status changes. You must notify the IRB if you receive external funding for this study at any point. You must submit a renewal application for IRB review prior to the expiration in order to obtain IRB approval for the next approval period. If the current approval expires and you do not obtain approval for another approval period, research on this study, including subject enrollment, must cease until you regain approval. If you have questions about your obligations as principal investigator, please contact the Office of Research Compliance at (312) 567-7141 or irb@iit.edu.

Note that the IRB application form is continually being refined by the members of the IRB. Please always use the latest version, available online at https://research.iit.edu/orcpd/human-subjects-irb.

Sincerely,

Patrick W. Corrigan, Psy.D., Chair
Institutional Review Board

Office of Research Compliance
Phone: 312-567-7141
Email: irb@iit.edu

B Apêndice - Survey Instrument

Introduction and Survey Consent Form

IIT Stuart School of Business
ILLINOIS INSTITUTE OF TECHNOLOGY

Please complete this survey for a Doctoral Study:

Corporate Strategic Orientations, Sustainable Supply Chain Initiatives and Business Performance in the U.S. Automotive Industry

This is a survey for research being done by Professor Elizabeth Durango-Cohen, Professor Siva Balasubramanian and Graduate Student Janaina Ottonelli of the Stuart School of Business at the Illinois Institute of Technology.

This survey is designed to investigate how a firm's strategic orientation impacts its adoption of sustainable supply chain initiatives, and whether adopting such initiatives impacts a firm's economic, environmental and social performance in the automotive industry. The results will provide new insights related to strategic management and operational practices.

Filling out the questionnaire takes 15-20 minutes at most. The survey is composed mainly of statements that can be answered quickly. Participation in the survey is voluntary and you may withdraw from this study at any point in time.

You should only take part in the survey if you are over 18 years old and your current job position is manager (or above title). Please complete the entire survey to the best of your ability, because we will not be able to use partially completed surveys for analysis.

Please be assured that all responses to the survey will be anonymous. The report will only show aggregate industry trends. No person or organization will be identified in any publications arising from this study.

If you have any questions about this survey research or its results please contact:

- Professor Elizabeth Durango-Cohen: edc@iit.edu or 312.906.6579, or
- Graduate Student Janaina Ottonelli: jottonelli@stuart.iit.edu

If you have any questions, concerns, or complaints about your rights as a participant in this study, please contact the Illinois Institute of Technology Institutional Review Board at 312-567-7141 or via email at irb@iit.edu.

You may print this information sheet for your future reference. If you agree with the above terms and consent to participate in the study, select "I agree and consent" below.

- ○ I agree and consent
- ○ I do not wish to participate in this survey

Respondent_Qualify

Before we begin, we would like to make sure you qualify for our study.

If you are over 18 years old, select "I certify that I am 18 years of age or older" below:

- ○ I certify that I am 18 years of age or older
- ○ I am under 18 years old

Which of the following best describes your job position?

- ○ Upper Management – General Manager, Director, Vice-President or C-Suite Level Executive
- ○ Engineer – Design, Manufacturing, Process, Quality, Mechanical, Industrial, Test, Field Service, Sales Engineer
- ○ Manager – Distribution, Transportation, Warehouse, Supply Chain, Manufacturing, Materials Management, Purchasing, Engineering, Sales, Program, Call Center Manager
- ○ Line Supervisor – Production, Quality Control, Testing
- ○ Sale/Service – Sales Representative, Customer Relationship Specialist, Call Center Agent
- ○ Materials Management Worker – Buyer, Pricing Analyst, Driver, Inventory Clerk, Purchasing Clerk
- ○ Skilled Worker – Assembly, Manufacturing/Production, Quality inspector, Warehouse/Material Handling, Shipping/Receiving Worker, Service Technician, Mechanic

Strategic_Orientation

How much do you agree with the following statements regarding your firm?

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Our new products are always on the cutting edge of technology	○	○	○	○	○
Top managers in my firm place a strong emphasis on R&D, technological leadership and innovation	○	○	○	○	○
Developing and/or adopting advanced manufacturing technologies is key to my firm's competitive success	○	○	○	○	○
My firm earns the bulk of its sales revenue from new product lines or services, and/or new markets (i.e., geographies)	○	○	○	○	○

How much do you agree with the following statements regarding your firm?

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Management actively seeks innovative ideas	○	○	○	○	○
Management views employee learning as an investment, not an expense	○	○	○	○	○
Workers are encouraged to voice new ideas for new product development and process improvements	○	○	○	○	○
My firm pays close attention to consumer preferences and respond quickly to meet these needs	○	○	○	○	○
My firm engages with customers (via customer forums, crowd sourcing, product advisory councils, social listening on Twitter, Facebook, etc.), and uses information on customer experiences to drive innovation in new product development	○	○	○	○	○
Developing and fostering long-term relationships with suppliers, universities and other sources of new technologies is paramount to maintaining our competitive advantage in the future	○	○	○	○	○

How much do you agree with the following statements regarding your firm?

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
My firm stands behind its products and services	○	○	○	○	○
My firm segments markets precisely and then tailors products to match exactly the demands of those niches	○	○	○	○	○
Top managers in my firm are willing to spend now to build customer loyalty for the long term	○	○	○	○	○
Our managers emphasize empowering employees working close to customers, as well as hiring and training employees, with the skills required to respond to individual customer needs	○	○	○	○	○
We measure customer satisfaction systematically and frequently	○	○	○	○	○

How much do you agree with the following statements regarding your firm?

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Our organizational culture is one that makes ethical behavior, fair business practices and transparency top priorities	○	○	○	○	○
Human-capital development is seen as a key commodity necessary for my firm's continued success	○	○	○	○	○
Senior management is committed to maintaining a work environment that shows concern for employees' safety, and for treating and rewarding employees fairly and equitably	○	○	○	○	○
Senior managers in my firm believe programs aimed at reducing greenhouse gas emissions, improving energy efficiency, waste management, and water conservation make a positive contribution to our firm's short-and-long-term value	○	○	○	○	○
My firm is actively engaged in the community, as sponsor of community involvement projects, cultural activities, and/or philanthropic projects	○	○	○	○	○

How much do you agree with the following statements regarding your firm?

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Our business objectives are to deliver products and services to customers at competitive prices and with minimal inconvenience	○	○	○	○	○
Top managers in my firm emphasize efficiency and reliability across all levels, functions, and divisions	○	○	○	○	○
Our strategy for competitive advantage is built around information systems that emphasize integration and low-cost transaction processing	○	○	○	○	○
Senior managers in my firm believe advanced manufacturing technologies improve products (quality) and processes (productivity, yield, and lower costs), and make a positive contribution to our firm' short-and-long term value	○	○	○	○	○
We measure the performance of key processes and benchmark costs of operations systematically and frequently	○	○	○	○	○

How much do you agree with the following statements regarding your firm?

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Retaining key talent and maintaining workforce stability is seen as a key commodity necessary for my firm's continued success	○	○	○	○	○
Management views operational excellence as critical to meeting customer expectations	○	○	○	○	○
My firm pays close attention to our supply base, how we manage and engage with suppliers in order to retain our competitive advantage in the market	○	○	○	○	○
Senior managers in my firm view sustainability programs (tied to fuel use, emissions, water use, energy and waste management practices) as a direct reflection of, or complement to, efficiency and operational excellence	○	○	○	○	○
Senior management in my firm dedicate time and resources to devise robust (i.e., proactive) and agile (i.e., reactive) strategies to reduce the impact of potential disruptions, such as natural disasters, industrial accidents, supply disruptions, terrorist attacks, etc.	○	○	○	○	○

Which of the following descriptions most closely matches your firm's strategic orientation?

Innovation-led	Reputation-led	Efficiency-led
○	○	○

Please indicate the corporate board positions your firm has:

(please select all that apply)

- ☐ Chief Innovation Officer
- ☐ Chief Operating Officer
- ☐ Chief Sustainability Officer
- ☐ Chief Customer Officer
- ☐ Any other CEO level officer their firm has with respect to innovation/operations/sustainability/customer service, etc. Please specify: _____
- ☐ None of the Above

Please indicate your firm's stage of adoption with respect to the following certifications:

	No: Not Initiated/Not Adopted	In progress: Early Stages of Adoption	Yes: Successfully Adopted
ISO 9001 Quality management	○	○	○
ISO 14001 Environmental management	○	○	○
ISO 26000 Social responsibility	○	○	○
ISO 31000 Risk management	○	○	○
ISO 45001 Occupational health and safety	○	○	○

Are you familiar with the concept of '**triple bottom line**' for the management of manufacturing organizations? Triple bottom line include: economic (financial) measures for the company, social measures for employees, stakeholders and the society in which the company exists, and environmental measures for the long-term survival of the earth.

Not familiar at all	Slightly familiar	Moderately familiar	Very familiar	Extremely familiar
○	○	○	○	○

Sustainable_Supply_Chain_Management

How important is the following forward supply chain initiatives in your firm?

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
Product design and development	○	○	○	○	○
Purchasing	○	○	○	○	○
Manufacturing	○	○	○	○	○
Packaging	○	○	○	○	○
Distribution and transportation	○	○	○	○	○

Please indicate the extent of the adoption of the following product design and development initiatives in your firm:

	Not considering it	Planning to consider	Considering it currently	Initiating implementation	Implementing successfully
Design products with fewer parts; substituting heavier part with lighter ones	○	○	○	○	○
Design products with reusable parts	○	○	○	○	○
(Re)Design products to deliver same functionality with less material	○	○	○	○	○
Design product to minimize resource use (energy, water, time)	○	○	○	○	○
Design products to minimize scrap and waste (hazardous and non-hazardous)	○	○	○	○	○
Collaborates with suppliers to improve product/service design	○	○	○	○	○
Develop design for disassembly program (e.g., with accessible parts for ease of disassembly, or using minimal welds, screws, clinches and snaps)	○	○	○	○	○
Institute design for recycling program (e.g., using safe materials, ease of material separation, etc.)	○	○	○	○	○

Please indicate the extent of the adoption of the following purchasing initiatives in your firm:

	Not considering it	Planning to consider	Considering it currently	Initiating implementation	Implementing successfully
Source from environmentally friendly suppliers	○	○	○	○	○
Encourage suppliers to use recycled materials	○	○	○	○	○
Procure energy efficient, recyclable raw materials	○	○	○	○	○

Please indicate the extent of the adoption of the following manufacturing initiatives in your firm:

	Not considering it	Planning to consider	Considering it currently	Initiating implementation	Implementing successfully
Employ lean manufacturing techniques (e.g., just-in-time, continuous improvement, etc.)	○	○	○	○	○
Adopt total quality management and/or six-sigma quality initiatives	○	○	○	○	○
Use information technology to integrate data across internal and partners' systems (i.e., using EDI)	○	○	○	○	○
Engage in business process reengineering initiatives	○	○	○	○	○
(Re)Design manufacturing processes to improve resource usage (energy and water) and reduce waste control (waste and air emissions generation)	○	○	○	○	○
Outsource manufacturing to lower cost countries	○	○	○	○	○
Adopt advanced manufacturing processes (e.g. rapid prototyping, automation, robotics)	○	○	○	○	○

Please indicate the extent of the adoption of the following packaging initiatives in your firm:

	Not considering it	Planning to consider	Considering it currently	Initiating implementation	Implementing successfully

	Not considering it	Planning to consider	Considering it currently	Initiating implementation	Implementing successfully
Minimize the use of packing materials	○	○	○	○	○
Use reusable packing materials	○	○	○	○	○
Use of degradable materials	○	○	○	○	○

Please indicate the extent of the adoption of the following distribution and transportation initiatives in your firm:

	Not considering it	Planning to consider	Considering it currently	Initiating implementation	Implementing successfully
Engage with third-party logistics (3PL) providers	○	○	○	○	○
Use cross-docking to consolidate less than truckload (LTL) shipments	○	○	○	○	○
Conduct carbon footprint analysis	○	○	○	○	○
Invest in natural gas or hybrid vehicle ground fleet	○	○	○	○	○
Engaged in emissions reduction initiatives (e.g. logistics routes optimization, transport load and speed optimization)	○	○	○	○	○

How important is the following reverse supply chain initiatives in your firm?

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
Product and packaging collection/take-back	○	○	○	○	○
Returned product use (disassembly, reuse refurbishing, recycling)	○	○	○	○	○
Product and packaging disposal	○	○	○	○	○
Reverse logistics management activities	○	○	○	○	○

Please indicate the extent of the adoption of the following product and packaging collection/take-back initiatives in your firm:

	Not considering it	Planning to consider	Considering it currently	Initiating implementation	Implementing successfully
Customer return program implementation	○	○	○	○	○
Establish mail-in program	○	○	○	○	○
Partner with a third party collector	○	○	○	○	○
Collect used packaging from customers	○	○	○	○	○

Please indicate the extent of the adoption of the following returned product use initiatives in your firm:

	Not considering it	Planning to consider	Considering it currently	Initiating implementation	Implementing successfully
Disassembly for reuse as raw material	○	○	○	○	○
Refurbish product for sale in secondary market(s)	○	○	○	○	○
Use returned parts as spare parts for warranty claims	○	○	○	○	○
Disassembly for sale as scrap	○	○	○	○	○
Procedures for recycling end-of-life product/components	○	○	○	○	○
Procedures for recycling packaging	○	○	○	○	○

Please indicate the extent of the adoption of the following product and packaging disposal initiatives in your firm:

	Not considering it	Planning to consider	Considering it currently	Initiating implementation	Implementing successfully
Procedures for handling hazardous materials for end-of-life products	○	○	○	○	○
Procedures for the storage of waste	○	○	○	○	○

	Not considering it	Planning to consider	Considering it currently	Initiating implementation	Implementing successfully
Appropriate treatment of waste disposal procedures	○	○	○	○	○
Appropriate dumping of waste disposal	○	○	○	○	○

Please indicate the extent of the adoption of the following reverse logistics management activities in your firm:

	Not considering it	Planning to consider	Considering it currently	Initiating implementation	Implementing successfully
Outsource of reverse logistics activity to external Logistics Service Provider (LSP)	○	○	○	○	○
Adopt reverse logistics software; or embed reverse logistics module to existing ERP system	○	○	○	○	○
Measure of reverse logistics activity costs	○	○	○	○	○

TBL_Performance

For the following performance indicators, please rate your firm's performance in relation to your main competitors over the last 3 years.

	Much worse than competitors	Somewhat worse	About the same	Somewhat better	Much better than competitors
Net revenue growth	○	○	○	○	○
Market share growth	○	○	○	○	○
Return on assets	○	○	○	○	○
Return on investment	○	○	○	○	○
Stock price improvement	○	○	○	○	○
Market value added (market value/equity)	○	○	○	○	○

For the following performance indicators, please rate your firm's performance in relation to your main competitors over the last 3 years.

	Much worse than competitors	Somewhat worse	About the same	Somewhat better	Much better than competitors
Use of hazardous materials and components	○	○	○	○	○
Air pollutant emissions	○	○	○	○	○
Water and solid waste generation	○	○	○	○	○
Number of projects to protect, improve/restore the environment	○	○	○	○	○
Recycling level and reuse of residuals	○	○	○	○	○
Frequency of environmental accidents (e.g., spills)	○	○	○	○	○

For the following performance indicators, please rate your firm's performance in relation to your main competitors over the last 3 years.

	Much worse than competitors	Somewhat worse	About the same	Somewhat better	Much better than competitors
Overall customer satisfaction	○	○	○	○	○
Customer repurchase rate	○	○	○	○	○
Number of social and cultural projects sponsored in local community	○	○	○	○	○
Employee turn-over rate	○	○	○	○	○
Employee wages, benefits and rewards policies	○	○	○	○	○
Employment of minorities	○	○	○	○	○
Lawsuits filed by employees, customers, and/or regulatory agencies	○	○	○	○	○

Demographics

How old is your firm?

- ○ Less than 5 years
- ○ 6-10 years
- ○ 11-25 years
- ○ 26-50 years
- ○ 51-100 years
- ○ More than 100 years

How many employees does your firm have?

- ○ Less than 50
- ○ 50-100
- ○ 100-500
- ○ 500-1,000
- ○ 1,000-5,000
- ○ 5,000-10,000
- ○ 10,000-25,000
- ○ More than 25,000

Annual sales turnover?

- ○ Less than US$500,000
- ○ Between US$500,000 and US$5 million
- ○ Between US$5 million and US$25 million
- ○ Between US$25 and US$50 million
- ○ Between US$50 million and US$100million
- ○ More than US$100 million

How long have you worked at firm?

- ○ Less than 2 years
- ○ 3-5 years
- ○ 6-10 years
- ○ 11-20 years
- ○ More than 20 years

What is the highest level of education you have completed?

- ○ Less than High School
- ○ High School/GED
- ○ Associate's Degree
- ○ Bachelor's Degree
- ○ Master's Degree
- ○ Doctoral Degree

What is you gender?

- ○ Male
- ○ Female
- ○ Other