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Supplier Development for TBL Outcomes: a survey on Brazilian based
organizations

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Supplier Development for TBL Outcomes: a survey on Brazilian based
organizations

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of Doctor of Science.

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Carpinetti

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*A minha avó Maura Gazeta Beloti
(In Memoriam)*

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EPÍGRAFE

“Ah, not in knowledge is happiness, but in
the acquisition of knowledge!”

Edgar Allan Poe

RESUMO

PEDROSO, C. B. **Supplier Development for TBL Outcomes: a survey on Brazilian based organizations**. 2019. 144 f. Tese (Doutorado) – Escola de Engenharia de São Carlos, Universidade de São Paulo, São Carlos, 2019.

As cadeias de suprimentos estão incorporando cada vez mais elementos sustentáveis como meio de atender à crescente conscientização do mercado e promover competitividade. Fornecedores desempenham um papel fundamental no aprimoramento dos resultados sustentáveis na cadeia de fornecimento, uma vez que são responsáveis pelas matérias-primas que serão incorporadas no produto final. Nesse contexto, o desenvolvimento de fornecedores pode melhorar as capacidades sustentáveis dos fornecedores, entregando melhores resultados a toda a cadeia de suprimentos. Esta pesquisa tem como objetivo explorar o Desenvolvimento de Fornecedores Sustentáveis para um melhor desempenho sustentável no nível da cadeia de suprimentos. Para atingir o objetivo geral da pesquisa, foi realizada uma revisão sistemática de literatura, seguida de uma revisão básica da literatura, a fim de identificar as práticas de desenvolvimento sustentáveis, fatores influenciadores e barreiras. A análise da revisão sistemática da literatura foi realizada com o apoio do software QDA Miner. Uma survey envolvendo organizações brasileiras foi realizada para investigar o impacto da adoção do Desenvolvimento de Fornecedores Sustentáveis no desempenho das organizações pesquisadas, tanto nos aspectos operacionais, ambientais e sociais. Os dados foram analisados usando a Modelagem de Equações Estruturais por Mínimos Quadrados Parciais através do software Smart PLS 3. Os resultados obtidos apontam que as práticas adotadas pelas organizações estão de acordo com o que sugere a literatura, destacando o papel do treinamento e compartilhamento de recursos como práticas importantes adotadas. Os fatores influenciadores mais impactantes para a adoção do Desenvolvimento de Fornecedores Sustentáveis são avaliação de fornecedores, a disponibilidade de recursos e a cultura sustentável no nível organizacional. Surpreendentemente, as barreiras parecem estar ligeiramente correlacionadas de forma negativa com adoção do Desenvolvimento de Fornecedores Sustentáveis. Pode-se concluir que a adoção do Desenvolvimento de Fornecedores Sustentáveis leva a melhorias em todas as dimensões da Sustentabilidade (Operacional, Ambiental e Social), embora o impacto no desempenho ambiental seja mais forte. Por sua vez, o desempenho ambiental pode levar a melhorias no desempenho social e operacional. Outra constatação interessante é que as organizações no contexto brasileiro estão adotando o Desenvolvimento de Fornecedores Sustentáveis por motivos internos, e não devido a pressões vindas do mercado e da comunidade local.

Palavras-chave: Desenvolvimento de Fornecedores Sustentáveis. Survey. Práticas. Barreiras.

Fatores de Sucesso. Modelagem de Equações Estruturais.

ABSTRACT

PEDROSO, C. B. **Supplier Development for TBL Outcomes: a survey on Brazilian based organizations**. 2019. 144 f. Tese (Doutorado) – Escola de Engenharia de São Carlos, Universidade de São Paulo, São Carlos, 2019.

Supply chains are increasingly incorporating sustainable elements as mean to meet intensified TBL awareness in the market and to promote competitiveness. Suppliers play a key role in enhancing Triple Bottom Line (TBL) outcomes in supply chain since they are responsible for raw materials that will be incorporated in the final product. Supplier Development (SD) can improve suppliers' TBL capabilities, improving TBL outcomes throughout the supply chain. This research aims to explore Triple Bottom Line Supplier Development (TBL SD) for an improved TBL performance at supply chain level. To address the research general purpose a systematic literature review was conducted, followed by a basic literature review, in order to identify TBL SD practices, enablers and barriers. The systematic literature analysis was performed with support of QDA Miner software. A survey was performed involving Brazilian buying organizations to investigate the impact of TBL Supplier Development on the organizations' performance at the operational, environmental and social dimensions. Data were analyzed using Partial Least Square Structural Equation Modeling (PLS SEM) through Smart PLS 3 software. The results obtained point that practices adopted by organizations are in accordance to what literature suggests, highlighting the role of training and resources sharing as important practices adopted. The most impactful enablers to enable TBL SD are supplier evaluation, resources availability, and TBL culture at organizational level. Surprisingly, barriers appeared to be only slightly negatively correlated to TBL SD Adoption. It can be concluded that TBL SD adoption leads to improvements in all TBL legs (Operational, Environmental, and Social) although the impact on environmental performance is stronger. In turn, it was found that enhanced environmental performance can lead to improvements in both social and operational performance. Another interesting finding is that organizations in the Brazilian context are adopting TBL SD for internal reasons, and not due to pressures coming from the local market and community.

Keywords: Triple Bottom Line Supplier Development (TBL SD). Survey. Practices. Barriers. Enablers. Structural Equation Modeling (PLS SEM).

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1 INTRODUCTION

Adopting supplier development (SD) to achieve Triple Bottom Line (TBL) sustainable results is important when an organization is involved in supply chains with increasing and stricter environmental and social requirements that are often mandated through regulation or demanded through customer pressure (DOU; ZHU; SARKIS, 2014; BAI; DHAHALE; SARKIS, 2016; YAWAR; KAUPPI, 2018). Organizations can rely on their supply base to achieve sustainable outcomes. They are likely to work with suppliers through the implementation of supplier development practices needed to improve their capabilities and TBL outcomes (BAI; SARKIS, 2010; DOU; ZHU; SARKIS, 2014). As part of supplier management, organizations often collaborate with suppliers to improve their processes and product manufacturing capabilities. This practice is known as supplier development (KRAUSE; ELLRAM, 1997a, 1997b; PRAXMARER-CARUS; SUCKY; DURST, 2013). Joint work between buying organizations and suppliers aiming to achieve TBL results is essential to long-term competitive advantage (AKMAN, 2015). However, designing development practices to achieve TBL outcomes, and implementing these practices across the supplier network is challenging (FU; ZHU; SARKIS, 2012; DOU; ZHU; SARKIS, 2014).

Suppliers can impact the entire supply chain by not adopting sustainable behaviors (LU; LEE; CHENG, 2012). Many suppliers lack the technological and managerial expertise as well as the resources needed to implement or even consider sustainability in their processes (EHRGOTT et al., 2013). Thus, more collaboration and development efforts are needed from the buying company in order to improve supplier performance (FU; ZHU; SARKIS, 2012; AKMAN, 2015; SCHMIDT; FOERSTL; SCHALTENBRAND, 2017). Supplier development for TBL outcomes is an effective way to achieve sustainability goals, through the improvement of suppliers TBL capabilities (GOLD; TRAUTRIMS; TRODD, 2015).

Incorporating TBL outcomes into supplier development goals is relatively new and the topic lacks both academic and managerial expertise on the subject (BAI; DHAHALE; SARKIS, 2016). The notion that supplier development could be used to improve environmental outcomes was first proposed by Bai and Sarkis (2010). Currently, most TBL related research on supplier development focuses only on the economic and environmental or the social dimension (BLOME;

HOLLOS; PAULRAJ, 2014; DOU; ZHU; SARKIS, 2014; SANCHA et al., 2015; SANCHA; LONGONI; GIMÉNEZ, 2015; SCHMIDT; FOERSTL; SCHALTENBRAND, 2017), leaving ample research opportunities in supplier development as a means to gain traction in achieving TBL sustainability across the supply chain.

Suppliers play an important and strategic role in supply chain performance since they provide inputs to other supply chain members. The input of one supplier becomes the output of another and a focus on sustainability by one impacts the other (FU; ZHU; SARKIS, 2012). Studies related to TBL practices in the context of emerging economy are still lacking (YANG; ZHANG, 2017). Exploring TBL SD in the Brazilian scenario can be insightful to other emerging economies that may have a similar economic structure, and also face oscillations and turmoil.

The importance of supplier development research lies in the fact that it is an effective way to improve suppliers' processes and products to ensure environmental and social capabilities and contribute to TBL sustainable supply chains (GOLD; TRAUTRIMS; TRODD, 2015). A change in the competitive landscape has occurred, where the focus is not only on cost or quality, but also on social and environmental elements (SANCHA; LONGONI; GIMÉNEZ, 2015). This has propelled supplier development practices to focus more on TBL outcomes. Focusing on TBL elements in supplier development can mitigate supply chain sustainability related risks and be a source of competitive advantage, particularly in the globalized context (BUSSE et al., 2016). An increasing number of companies are adopting environmental and social elements in the supplier selection process, but it is still necessary to motivate existing suppliers to enhance their environmental and social performance (AGAN et al., 2016).

A systematic literature review was conducted to investigate what is known about TBL SD, and to identify practices, enablers and barriers. Systematic literature review analysis was performed using QDA Miner software. Since there is a gap in TBL supplier development literature, enablers and barriers were extracted from Sustainable Supply Chain Management (SSCM) literature. Survey research was conducted to investigate the impact of practices, enablers and barriers on TBL SD adoption, as well the effect of TBL SD adoption on TBL organizational performance

1.1 Research Problem and Questions

Some research have investigated the supplier development activities that the buying organization should put into practice (BAI; SARKIS, 2010, 2016; FU; ZHU; SARKIS, 2012; DOU; ZHU; SARKIS, 2014; AWASTHI; KANNAN, 2016) which are selected based on the strategic priorities of the buying organization. Supplier development practices might also be implemented because of changing needs at the buying organization, for example increasing governmental regulations toward sustainability concerns. The buyer would then present the supplier with the new regulations and help them incorporate the adaptations and manage the change until the capability to perform the new task is achieved.

In situations in which environmental factors are being considered, some barriers can impact the adoption of environmental supplier development practices more severely. Some of these challenges include company size (i.e. small companies have fewer resources available), poor communication, cultural differences, complexity, and lack of top management support (FU; ZHU; SARKIS, 2012). When considering TBL supplier development (TBL SD) there are even more challenges as it encompasses environmental as well as social and economic dimensions. Identifying barriers is important because organizations can adapt their processes to overcome these challenges, particularly with the additional burden of TBL outcomes. Research focusing on TBL outcomes in supplier development efforts is limited.

Similarly, for any supplier development effort to achieve expected results, enablers need to be identified. Understanding the enablers associated with TBL supplier development can help organizations adopt and diffuse TBL outcomes, since these enablers help to mitigate existing barriers (ROUTROY; PRADHAN, 2014a). Given that literature do not present any study that explores the enablers that might enhance the adoption of TBL supplier development, studies that aim to bridge this gap are required. It is worthy to note that in this research, enablers is synonymous of success factors.

Although TBL SD adoption has been claimed as beneficial for both buying organization and suppliers, the effects of it on TBL performance are not clear. Considering that TBL SD adoption aims to provide improved performance regarding TBL outcomes, further investigation should be carried to better understand what is the impact of TBL SD adoption in TBL

organizational performance. It is important to make it clear what is the impact of TBL SD since it may encourage companies to adopt TBL oriented practices that can enhance their performance.

The overarching purpose of this research is, based on literature review, empirically verify the impact of TBL SD on organizational performance. Exploring the impact of TBL SD, especially in the context of developing economies such as Brazil, represents an important step towards building sustainable supply chains. In order to reach the overall research goal, the following research questions are proposed:

- (i) *What are the practices for TBL SD adoption?*
- (ii) *What are the enablers that support TBL SD adoption?*
- (iii) *What are the barriers that hinder TBL SD adoption?*
- (iv) *What is the impact of TBL SD on organizational performance?*

1.2 Research Objectives

The goal of this research is to investigate the impact of TBL SD adoption on organizational performance.

This research addresses practices to adopt TBL SD, barriers and enablers to TBL SD implementation, and the impact of the interactions of these elements on TBL performance in the supply chain. Considering this, the specific research goals are:

- To identify what are the practices that should be adopted in TBL SD implementation;
- To identify what are the enablers and barriers that impact TBL SD implementation;
- To investigate the impact of TBL SD adoption in TBL performance at the buying organization level.

1.3 Thesis structure

This research is presented as follows:

Chapter 1 brings the introduction, containing a brief contextualization about the topic, research problem and questions, and research objectives; chapter 2 develops the background of the topic, which includes the systematic literature review and the basic literature review; chapter 3 presents the hypothesis development, the methodology adopted, and details the survey design; chapter 4 presents the obtained results and discussions; and chapter 5 draws the conclusions and presents managerial and theoretical implications, research agenda, limitations and opportunities for future research.

2 LITERATURE REVIEW

2.1 Systematic Literature Review to Explore Supplier Development for TBL Outcomes

To better understand how TBL outcomes can be achieved through supplier development, a systematic literature review was conducted to bring in a broad perspective of the topic. While literature on supplier development related to the traditional or more operational improvements is vast, research on supplier development initiatives to improve TBL sustainability outcomes is lacking. An integrative literature review was applied, since this approach aims to address two types of topics: mature and new (TORRACO, 2005; GLIGOR; HOLCOMB, 2012). To merge the mature operational aspects with the new sustainability aspects, two branches of supplier development literature were covered: (i) literature on supplier development concerning traditional practices, enablers and barriers; and (ii) literature on social, economic and TBL supplier development.

Some research on supplier development treats TBL components separately, exploring environmental and social issues in isolation. Environmental supplier development encompasses all activities that the buying organization accomplishes in order to assist its suppliers in reducing their negative impact on the environment (EHRGOTT et al., 2013; AGAN et al., 2016). The development of socially responsible suppliers refers to the efforts made by the purchasing organization to improve the social aspects of its suppliers (LU; LEE; CHENG, 2012). Sustainable supplier development, in turn, involves the development of suppliers related to economic goals, environmental objectives (such as energy efficiency or waste reduction) and targets related to social and ethical dimensions (such as fair wages and absence of corruption) (BUSSE et al., 2016). The literature was thoroughly reviewed and interpreted to build the theoretical framework and the research agenda.

2.1.1 Conducting the Systematic Literature Review

Existing literature on TBL and supplier development was thoroughly assessed to provide evidence of the state of the art on the subject studied, identify gaps in the literature and help uncover opportunities for future research. The systematic literature review was conducted in order to answer the following research questions: (i) what are the primary practices, enablers and barriers to supplier development ?; (ii) what is known about TBL SD ? Vom Brocke et al. (2009) argue

that searching the literature is an increasingly complex task because of the growing number of publication databases present each year. A systematic literature review can help provide a comprehensive assessment of a specific base of literature (FISCHL; SCHERRER-RATHJE; FRIEDLI, 2014).

Supplier development for TBL outcomes is relatively new and not fully characterized in the literature. In order to bring greater consistency and replicability, the literature review was carried out using a systematic search. A systematic literature review is a method that helps locate research, select the appropriate and applicable manuscripts and evaluate their respective contributions (TRANFIELD et al., 2004; DENYER; TRANFIELD, 2009). Performing a systematic review can ensure that the data is analyzed and synthesized. This method assists in locating, selecting and evaluating existing research, allowing analysis, synthesizing data, exploring evidence and promoting clear conclusions. The systematic literature review procedure adopted was conducted in five steps as shown in Table 1 (COOPER, 1989; FISCHL; SCHERRER-RATHJE; FRIEDLI, 2014; SCHMELZLE; TATE, 2017):

Table 1- Literature review procedure

Steps	Description	Application in this research
Definition of review scope	The type of literature review is defined (COOPER, 1989; FISCHL; SCHERRER-RATHJE; FRIEDLI, 2014). The research focus covers both practical and theoretical outcomes.	The scope of this research is exploring the literature regarding supplier development for TBL outcomes and identifying gaps in the literature to suggest ways to move the research stream forward.
Topic conceptualization	Presents a broad idea of the topic under study (TORRACO, 2005; FISCHL; SCHERRER-RATHJE; FRIEDLI, 2014).	This research looks at the literature on what is known about supplier development for TBL outcomes. The research is based on supplier development practices aligned to TBL outcomes that are planned by the buying organization, primary barriers and enablers that the buying organizations face.
Literature search	Aims to locate papers, select and evaluate main contributions (TRANFIELD; DENYER; SMART, 2003; DENYER; TRANFIELD, 2009).	Supplier development for TBL outcomes is a relatively new topic, and it concerns a wide range of research fields, such as Operations Management, Supply Chain Management, Supplier Management. Databases used in the research were: Scopus, Web of Science and EBSCO. These databases were chosen because they present a wide content regarding the research topic, as well as operations management, in general (THOMÉ et al., 2012). Google Scholar was also used in this research to supplement the search and ensure that all existing articles were considered. Research on TBL in Supply Chain Management also started to emerge in the last decade. The period between 1990-2018 was chosen, because research on Supplier Development in general was very popular in the beginning of 1990 and the majority of papers date from that period. Further details are available on Figure 1.
Literature analysis and synthesis	Seeks to make association between the studies. It should not be a simple description of literature (DENYER; TRANFIELD, 2009).	Papers found were coded and analyzed through a qualitative data analysis software, QDA Miner was used for coding the papers based on the research questions. Codes were then created, in order to make it clear which were the practices, enablers and barriers in the context of both traditional and TBL supplier development. It was also possible to categorize papers found in two categories: (i) operational supplier development; (ii) supplier development for TBL outcomes (SD-TPL).
Research agenda	Papers are analyzed, highlights are summarized and research gaps are exposed (DENYER; TRANFIELD, 2009; FISCHL; SCHERRER-RATHJE; FRIEDLI, 2014).	Research gaps and opportunities for future research are now available.

Source: Elaborated by the author (2019)

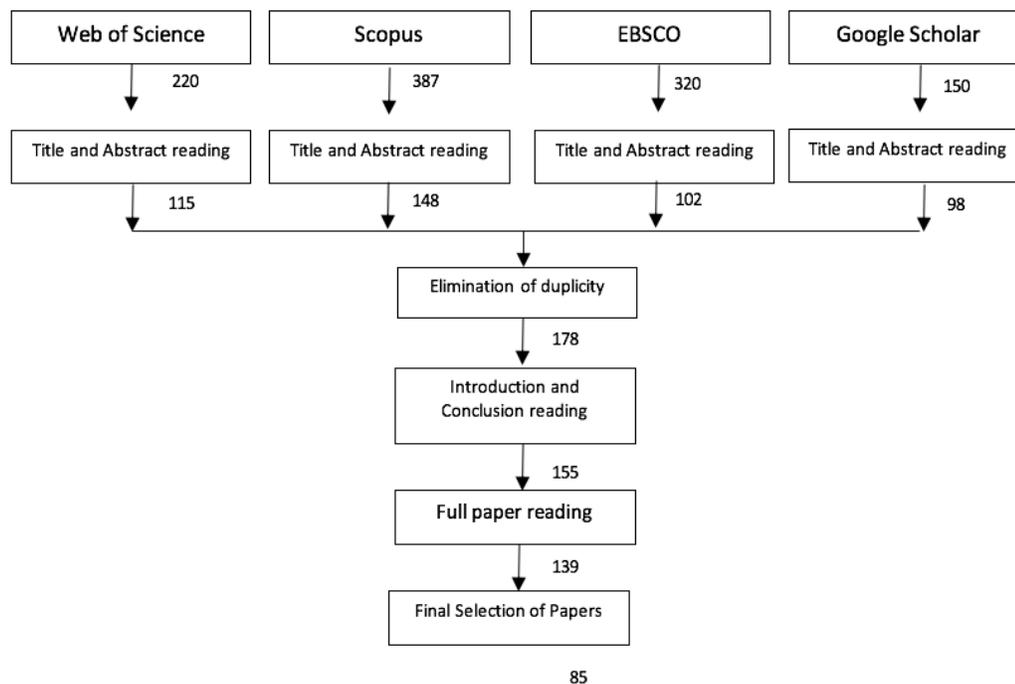
Several combinations of keywords and strings were set up in order to include as many relevant papers as possible (Table 2). The terms were all related to supplier development. The first search resulted in the following number of articles: Web of Science (220), Scopus (387), EBSCO (320) and Google Scholar (150) (see Figure 1). These databases were chosen due to their broad scope of papers belonging to Operations Management topic (THOMÉ et al., 2012). After applying the search strings in the databases used, duplicated papers were eliminated. The selection of manuscripts was made using the following steps, according to Tranfield, Denyer, and Smart (2003); Tranfield et al. (2004) and Denyer and Tranfield, (2009):

- Title and abstract reading;
- Introduction and conclusion reading;
- Full paper reading, and journal quality assessment;
- Evaluation of methodological rigor and contributions.

The inclusion criteria considered in the research were: (i) papers that dealt with supplier development problems and also involved TBL issues; (ii) papers concerning TBL in the context of Supply Chain Management; (iii) papers written in English (iv) papers published between 1990-2018.

The exclusion criteria applied in the research aimed to exclude the following papers: (i) conference papers; (ii) papers that were not directly related to the research topic, such as those dealing with Earlier Supplier Involvement and with Product Development; (iii) papers in languages other than English; (iv) duplicate papers; (v) papers related to supplier management topic, such as supplier evaluation and supplier selection; (vi) papers that focused on other associated topics in Operations Management literature, like Just in Time, Six Sigma, and QFD. After applying these filters, 85 papers were incorporated in the research.

Figure 1- Selection of Articles



Source: Elaborated by the author (2019)

Table 2- Keywords combination

Supplier Development	TBL	Constructs	Strings
Supplier development	Green	Success Factors	“Supplier Development” OR
Vendor development	Sustainability	Influential Factors	“Vendor Development” OR
Procurement development	Social Responsibility	Enablers	“Procurement development”
Purchasing development	CSR	Barriers	OR “Purchasing development”
Supply Chain Management	Environmental	Impediments	OR “Supply Chain Management”
Buyer-supplier relationship	Triple Bottom Line	Practices	OR “Buyer-supplier relationship”
	TBL	Program	AND “Green” OR “Sustainab*”
		Activities	OR “Social Responsibility”
		Efforts	OR “CSR” OR “Env*”
		Initiatives	OR “Triple Bottom Line”
			OR “TBL”

Continue

Supplier Development	TBL	Constructs	Strings
			“Supplier Development” OR “Vendor Development” OR “Procurement development” OR “Purchasing development” OR “Supply Chain Management” OR “Buyer- supplier relationship” AND “Success Factors” OR “Influential Factors” OR “Enablers” OR “Barriers” OR “Impediments” OR “Practices” OR “Program” OR “Activities” OR “Efforts” OR “Initiatives”

Source: Elaborated by the author (2019)

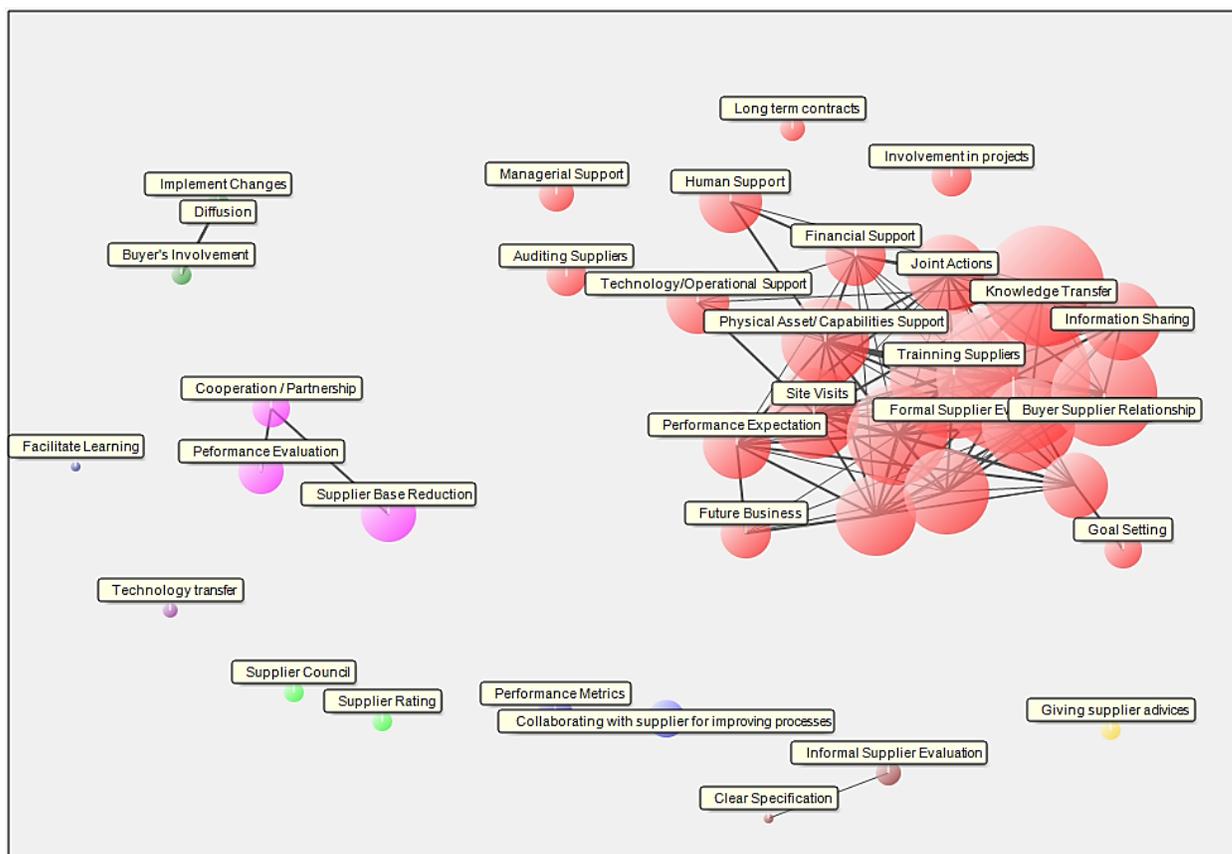
The next subsections will present the results obtained from a review of the literature concerning supplier development and improvement of the TBL dimensions. The operational dimension concerns the economic leg of TBL. A considerable part of the discovered literature covers the operational aspects of supplier development. In sequence, environmental and social practices are presented. QDA Miner software, suitable for qualitative data analysis was used for coding, analyzing and building relationships among the research constructs. These constructs do not appear in papers in a clear and distinguished way, rather they are connected and entwined.

2.1.2 Supplier Development: Operational Practices

The literature on Supplier Development primarily covers the practices adopted by organizations. Although there is plenty of research on these practices, the question about how buying organizations design supplier development programs remains unanswered. Attempts have been made, however literature on the subject is conflicting and not clear. Identifying operational practices represents the economic leg of the TBL. Practices were identified in the literature through the following question: “Is it an action that buying organizations perform to get better results from the supplier?” 38 total practices emerged that were related to TBL sustainability, with some of these practices being related to each other. Content analysis was used to perform the systematic literature analysis, suitable to analyze qualitative data (Bardin, 1977). Through the systematic literature review a pattern of practices emerged that could under different categories. After the

coding process, the most cited practices in the literature were identified, as well the connection between these practices. Figure 2 illustrates a cluster analysis followed by a co-occurrence analysis of these practices.

Figure 2- Operational supplier development practices cluster analysis and co-occurrence analysis



Source: Elaborated by the author (2019)

The cluster analysis groups practices that appear together in the papers, enabling a better understanding of the relationship among them. Practices are grouped according to their similarity. Clusters are assigned by different colors and grouped according to the similarities among practices. Another feature of figure 2 is the distinct link strength and the circle sizes, the greater the link strength, the more these practices appear together (for example, training suppliers and physical assets and capabilities support). The bigger the circle size, the more frequently the practice has been cited (such as knowledge transfer). This analysis indicates the primary practices including formal supplier evaluation and feedback, training suppliers, knowledge transfer, buyer supplier

relationship, direct incentives and investments are regularly encountered together. The red cluster on the right presents the most grouped and most frequent practices. This is an indication of the set of practices to include in supplier development when focused on improving operational performance. The most cited operational practices, including the number of occurrences, and the primary authors are shown in Table 3.

Table 3 - Supplier Development: Most Cited Operational Practices

Practice	Authors
Formal supplier evaluation and feedback (55)	(WATTS; HAHN, 1993; KRAUSE, 1997; KRAUSE; ELLRAM, 1997a, 1997b; KRAUSE; HANDFIELD; SCANNELL, 1998; HANDFIELD et al., 2000; KRAUSE; SCANNELL, 2002; HUMPHREYS; LI; CHAN, 2004; LI et al., 2007; BATSON, 2008; WAGNER; KRAUSE, 2009; WAGNER, 2010).
Training suppliers (48)	(HARTLEY; CHOI, 1996; KRAUSE, 1997; KRAUSE; ELLRAM, 1997a, 1997b; KRAUSE; HANDFIELD; SCANNELL, 1998; KRAUSE; RAGATZ; HUGHLEY, 1999; HANDFIELD et al., 2000; KRAUSE; SCANNELL, 2002; BATSON, 2008; SUCKY; DURST, 2013).
Knowledge transfer (34)	(HARTLEY; JONES, 1997; WAGNER; FILLIS; JOHANSSON, 2005; WILLIAMS, 2007; LI et al., 2007; GIANNAKIS, 2008; PHUSAVAT; KESS; TORKKO, 2008; WAGNER; KRAUSE, 2009; WAGNER, 2010; SUCKY; DURST, 2013; CHEN; ELLIS; HOLSAPPLE, 2015; KIM; HUR; SCHOENHERR, 2015).
Buyer supplier relationship (40)	(WATTS; HAHN, 1993; KRAUSE, 1997; KRAUSE; ELLRAM, 1997a, 1997b; KRAUSE; HANDFIELD; SCANNELL, 1998; KRAUSE; RAGATZ; HUGHLEY, 1999; QUAYLE, 2000; HUMPHREYS; LI; CHAN, 2004; HUMPHREYS et al., 2011; KUMAR; RAHMAN, 2016; JOSHI et al., 2017).
Direct incentives and investments (35)	(HARTLEY; CHOI, 1996; KRAUSE, 1997; KRAUSE; ELLRAM, 1997a; KRAUSE; SCANNELL, 2002; WAGNER, 2006, 2010; BAI; SARKIS, 2011; PRAXMARER-CARUS; SUCKY; DURST, 2013; SUCKY; DURST, 2013; DALVI; KANT, 2015).

Source: Elaborated by the author (2019)

Formal supplier evaluation and feedback aims to identify underperforming areas in suppliers and where SD practices should be designated. It also is helpful to evaluate suppliers' results regarding SD practices (KRAUSE; ELLRAM, 1997b). Training activities are important to develop suppliers' skills (HANDFIELD et al., 2000), and knowledge transfer enables buying organization and suppliers to share different types of information and knowledge (GIANNAKIS,

2008). Buyer supplier relationship leads to commitment and quality between buying organization and suppliers (YANG; ZHANG, 2017). Whereas direct incentives and investments increase suppliers' capabilities through cooperation and involvement between the buying organization and suppliers (KRAUSE, 1997).

The adoption of a single SD practice alone cannot lead to a successful SD implementation. SD practices should be combined in order to promote synergy and deliver positive performance (BAI; SARKIS, 2010). Since these practices seem to complement each other, buying organizations may adopt them simultaneously when developing suppliers.

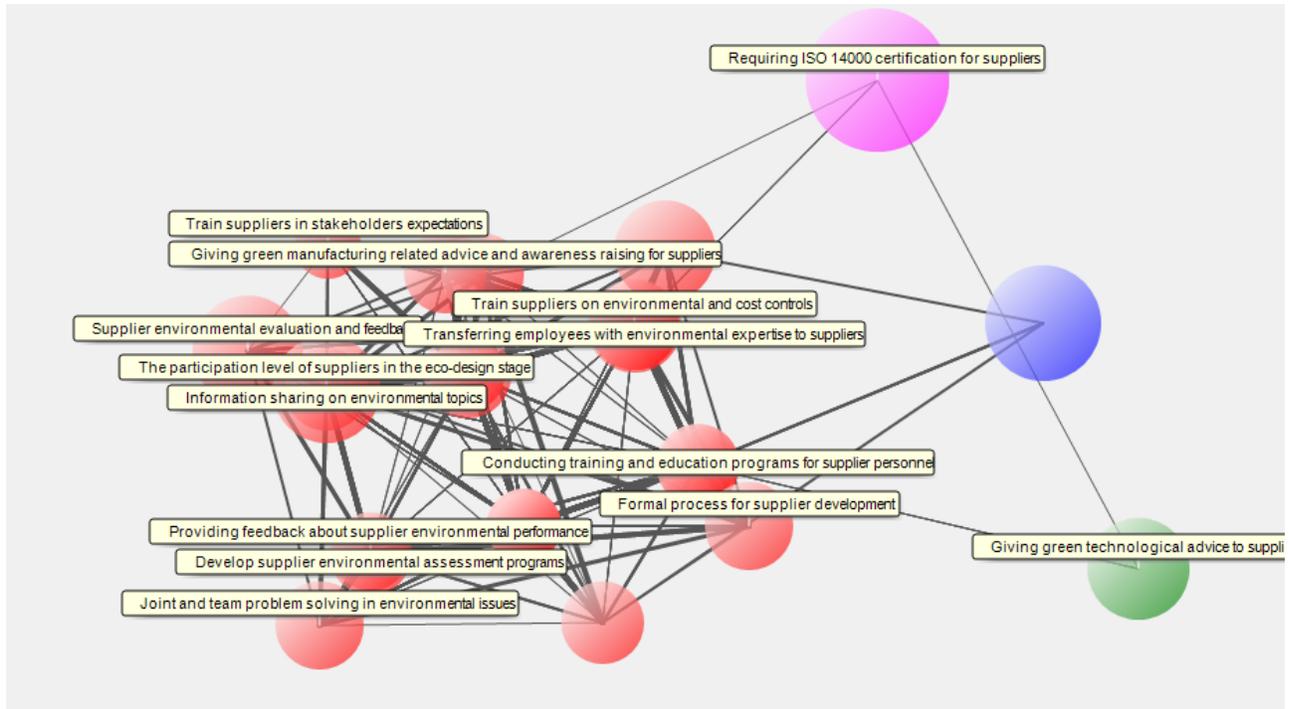
2.1.3 Supplier Development: Environmental Practices

Environmental supplier development practices were categorized by Bai and Sarkis, (2010) in three dimensions: green knowledge transfer and communication; investment and resource transfer; and management and organizational practices. Green knowledge transfer and communication involves training suppliers and sharing information on environmental aspects. Investment and resource transfer covers giving rewards to suppliers, investing in suppliers and transferring employees to suppliers to solve supplier environmental technical problems. Management and organizational practices includes (adopting environmental processes and certifications, creating support from top management, i.e. and requiring ISO 14000 certification for suppliers) (BAI; SARKIS, 2010).

The most cited practices and the relationship between them are available on figure 3. The broad links indicate that certain practices are highly interconnected. Those are seen in Figure 3 represented by the red circles. The following practices are intertwined in literature: management and organizational practices for environmental issues, joint and team problem solving in environmental issues, providing feedback about supplier environmental performance, formal process for supplier development, setting environmental targets for suppliers, participation of suppliers in the eco-design stage, supplier environmental evaluation and feedback, training users in environmental capabilities, giving green manufacturing related advice and awareness raising for suppliers, transferring employees with environmental expertise to suppliers. Because these practices appear together multiple times in literature available, it can be an indicator that these practices are important at an early stage of TBL supplier development implementation. It is important to note that as Bai and Sarkis (2010) were the first authors to mention environmental

supplier development practices, the following body of literature tended to build their work into the same practices the first authors cited. Table 4 contains the most frequently occurring environmental supplier development practices.

Figure 3 - Environmental supplier development practices literature cluster analysis and co-occurrence analysis



Source: Elaborated by the author (2019)

Table 4- Primary environmental supplier development practices

Practices	Examples of practices
Training suppliers, and sharing knowledge and information on environmental initiatives and communication	Training suppliers on environmental issues; evaluating suppliers on environmental dimension and providing feedback to them; auditing suppliers; and sharing information on environmental topics.
Investing resources in suppliers, and transferring resources to suppliers to solve environmental problems	Solve supplier environmental technical problems; transferring supplier employees with environmental expertise to buying firm; Supplier rewards and incentives for environmental performance.
Adopting environmental processes and certifications, creating support from top management and organizational practices	Create top management support for green practices at both buying organization and at suppliers' level; require that suppliers adopt ISO14000 certification; guarantee a cross-functional team to solve environmental issues.
Training suppliers to improve social performance and allocating experts to help suppliers with social issues	Train suppliers on social activities and needed skills; conduct site visits and allocate personnel to suppliers' facilities to improve the supplier's social capabilities.

Adapted from Bai; Sarkis, (2010).

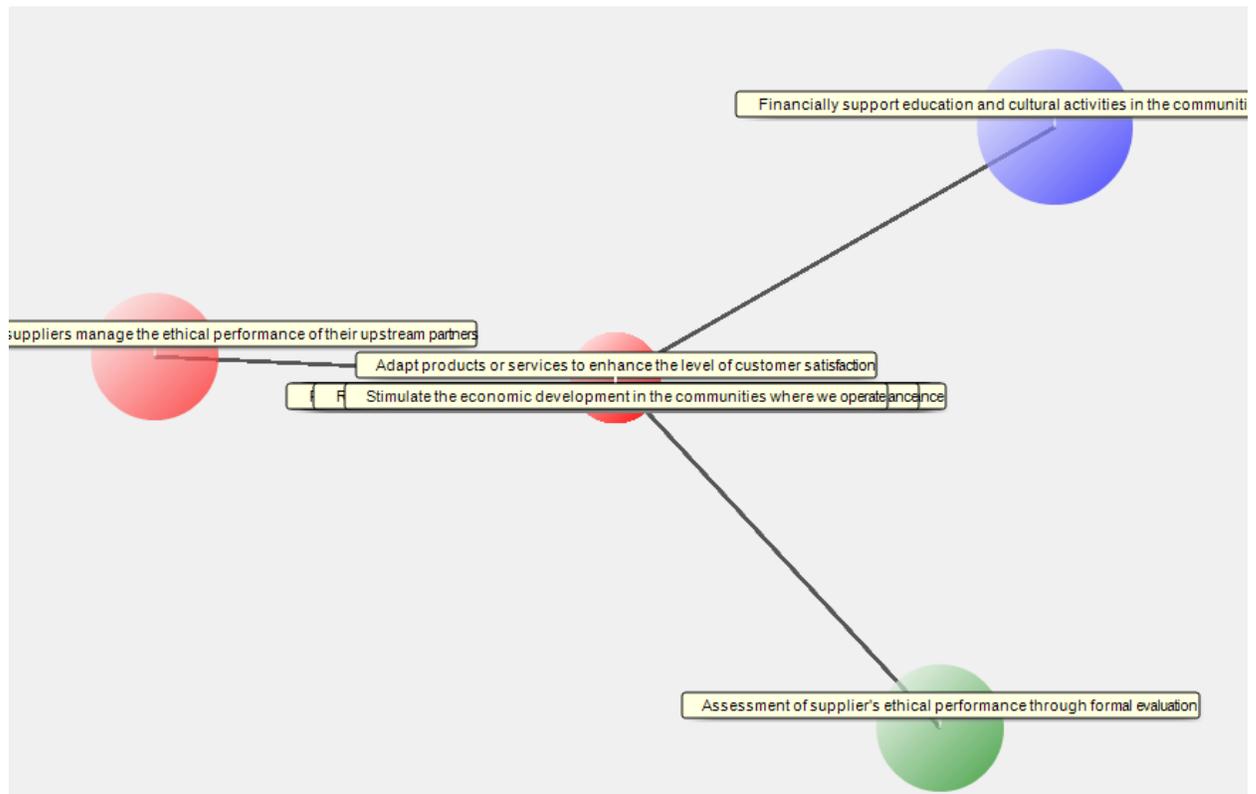
2.1.4 Supplier Development: Social Practices

Social supplier development practices were categorized by Lu, Lee and Cheng, (2012) in three groups, known as: socially responsible information sharing; socially responsible supplier evaluation; and socially responsible supplier development. Socially responsible information sharing implies information shared when implementing social concepts and practices and sharing social knowledge with suppliers, i.e. and transferring social knowledge to suppliers. Socially responsible supplier evaluation covers supplier evaluation on social issues, providing feedback and rewards to suppliers, i.e. auditing and feedback system to monitor suppliers' social practices implementation and outcomes. Socially responsible supplier development involves detecting suppliers' poor social performance and improving them, i.e. direct improvement efforts in suppliers' social practices implementation (LU; LEE; CHENG, 2012).

These practices are less explored by literature when compared to environmental and operational practices. QDA Miner software was also used to map the primary practices and to map how they are related to each other (Figure 4). Practices belonging to the same cluster (in red) were identified: pay attention to how suppliers manage the ethical performance of their upstream

partners, by closely monitoring them, stimulate the economic development in the communities where the company operates, employing locals, i.e., and financially support education and cultural activities in the communities where the company operates through direct actions with community. Another related social practice is assessment of supplier's ethical performance, in which suppliers' behavior regarding moral conduct are evaluated in order to prevent eventual problems. There are few social supplier development practices in literature because Lu, Lee and Cheng (2012) were the first authors to cite social supplier development practices, and more recent literature on the topic used the same set of practices. The primary social supplier development practices are shown in Table 5.

Figure 4- Social supplier development practices cluster analysis and co-occurrence analysis



Source: Elaborated by the author (2019)

Table 5- Primary social supplier development practices

Practices	Examples of practices
Discussing and implementing social concepts and sharing social knowledge with supplier	Provide and share knowledge with suppliers on social topics to improve ethical performance; communicate expected social and ethical behaviors and requirements in a clear and accurate way to suppliers.
Supplier evaluation on social issues, detecting suppliers' poor social performance, and giving feedback and rewards to suppliers	Evaluate and audit suppliers' ethical performance and provide feedback to them; require that suppliers adopt a social related certification.
Training suppliers to improve social performance and allocating experts to helps suppliers with social issues	Train suppliers on social activities and needed skills; conduct site visits and allocate personnel to suppliers' facilities to improve the supplier's social capabilities.

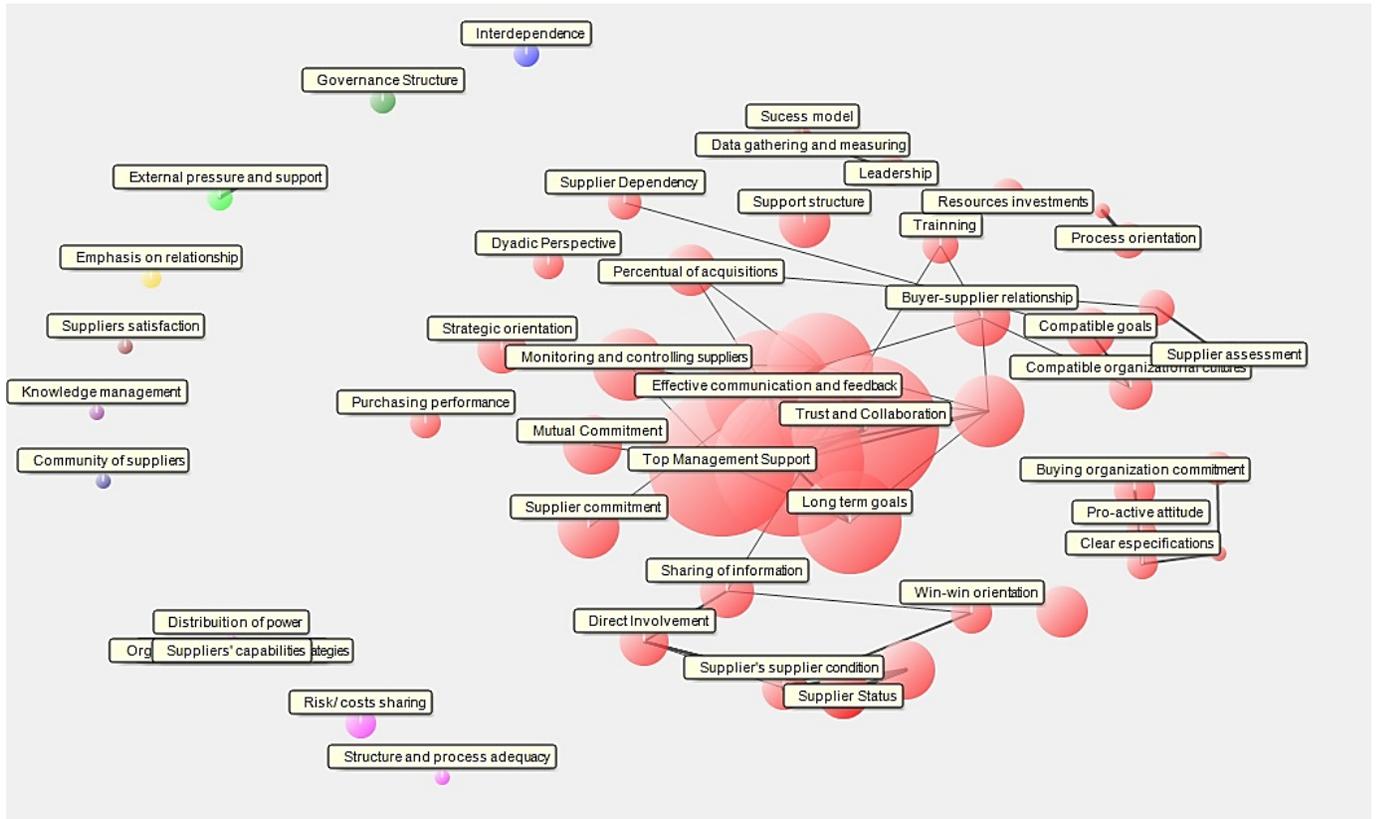
Adapted from Lu, Lee and Cheng (2012)

2.1.5 Enablers for supplier development

There are some enablers that allow for successful implementation of operational practices that were found in the literature. The practices discussed above are activities carried out by the buying organization to help suppliers improve operational performance. The enablers are critical for supplier development implementation, since they are elements that support buying organizations and suppliers that deploy supplier development practices with limited resources. These enablers require a commitment of resources, which means that organizations have to understand where to devote the appropriate resources in a way that will facilitate a successful implementation of those necessary development practices (ROUTROY; PRADHAN, 2014a; SANCHA; LONGONI; GIMÉNEZ, 2015).

There is little consensus in the literature regarding the group of enablers where resources should be allocated to ensure success (SUCKY; DURST, 2013). In total, 57 enablers were identified through the thorough review of the literature. Enablers were distinguished from practices, examining if a particular element facilitated the deployment of the practices. If this element was an activity itself it was classified as a practice, and if an element facilitated an activity deployment, it was classified as an influential factor. After that, enablers were coded and analyzed. The cluster analysis performed by QDA Miner containing the primary enablers and the interconnections are illustrated by Figure 5.

Figure 5- Enablers Cluster Analysis



Source: Elaborated by the author (2019)

Figure 5 shows the primary cluster and the most frequent enablers and how interconnected they are. Some enablers were found to be linked to each other in the literature review, then one primary group of enablers emerged, including: incentives and rewards, trust and collaboration, top management support, effective communication and feedback, long term goals, and cross-functional integration. This can be a good indicator that this set of enablers should jointly be carried out to achieve successful supplier development adoption. It seems that synergy is created when this set of enablers is supporting the implementation of the operational practices. For that, all of these enablers should be present together to enable supplier development practices adoption. Table 6 contains the most cited enablers found in literature. The complete list of enablers is available in Appendix D.

Table 6 - Supplier development: Primary Enablers

Enablers	Primary Authors
Incentives and rewards (40)	(HARTLEY; JONES, 1997; KRAUSE, 1997, 1999, KRAUSE; ELLRAM, 1997a, 1997b; KRAUSE; HANDFIELD; SCANNELL, 1998; HANDFIELD et al., 2000; KRAUSE; SCANNELL, 2002; HUMPHREYS; LI; CHAN, 2004; LI et al., 2007; WAGNER, 2010; ROUTROY; PRADHAN, 2013; CHEN; ELLIS; SURESH, 2016).
Trust and collaboration (28)	(HARTLEY; CHOI, 1996; HARTLEY; JONES, 1997; KRAUSE, 1997; KRAUSE; HANDFIELD; SCANNELL, 1998; DUNN; YOUNG, 2004; SAKO, 2004; HUMPHREYS; LI; CHAN, 2004; LI et al., 2007; HUMPHREYS et al., 2011; ROUTROY; PRADHAN, 2013; REZAEI; WANG; TAVASSZY, 2015).
Top management support (33)	(HARTLEY; CHOI, 1996; KRAUSE; ELLRAM, 1997b; KRAUSE; HANDFIELD; SCANNELL, 1998; KRAUSE, 1999; HANDFIELD et al., 2000; QUAYLE, 2000; MCGOVERN; HICKS, 2006; GOVINDAN; KANNAN; HAQ, 2010; BAI; SARKIS, 2011; ROUTROY; PRADHAN, 2013).
Effective communication and feedback (24)	(KRAUSE; ELLRAM, 1997a, 1997b; KRAUSE, 1999; WEN-LI et al., 2003; DUNN; YOUNG, 2004; HUMPHREYS; LI; CHAN, 2004; BATSON, 2008; GIANNAKIS, 2008; SHOKRI; NABHANI; HODGSON, 2010; PRAXMARER-CARUS; SUCKY; DURST, 2013; CHEN; ELLIS; SURESH, 2016).

Source: Elaborated by the author (2019)

Some practices and enablers are overlapping, which may mean that it is possible that when certain practices and enablers are placed together they can lead to a more successful supplier development process. While there is research exploring the enablers for operational supplier development, no research has explored the enablers for either environmental, social or TBL supplier development. There is a clear necessity to conduct research on enablers, for TBL outcomes with supplier development, since enablers are elements that can facilitate TBL supplier development adoption and can help overcome barriers that can impede obtaining success (ROUTROY; PRADHAN, 2013).

2.1.6 Barriers that can hinder supplier development

There is very little research that seeks to explore the barriers that hinder supplier development. Understanding the primary barriers is the first step to mitigation them. Also, it is important to comprehend the impact of barriers in supplier development process and develop

strategic actions to make them as weak as possible. Busse et al (2016) argue that although the term "barriers" is widely found in management literature, there is no definition for this term in the supplier development context. So, barriers are contextual factors that hinder an attempt at supplier development. As barriers to supplier development were plenty (76) the barriers that represented less than 0.1% of the cases (equal to 1 count in 1 case) were not considered. Table 7 contains the most cited barriers for supplier development. The complete list of barriers is available on Appendix E.

Table 7- Primary Barriers for supplier development

Barriers	Primary Authors
Few resources available (10)	(HARTLEY; CHOI, 1996; HANDFIELD et al., 2000; WAGNER; FILLIS; JOHANSSON, 2005; WILLIAMS, 2006; BATSON, 2008; WAGNER; KRAUSE, 2009; AHMED; HENDRY, 2012; MORTENSEN; ARLBJØRN, 2012; SUCKY; DURST, 2013; KUMAR; ROUTROY, 2017).
Poor communication (9)	(LASCELLES; DALE, 1990; KRAUSE; ELLRAM, 1997a, 1997b; KRAUSE; RAGATZ; HUGHLEY, 1999; WAGNER; FILLIS; JOHANSSON, 2005; AHMED; HENDRY, 2012; MORTENSEN; ARLBJØRN, 2012; SUCKY; DURST, 2013; KUMAR; ROUTROY, 2017).
Lack of organizational culture alignment (7)	(HANDFIELD et al., 2000; BATSON, 2008; GIANNAKIS, 2008; AHMED; HENDRY, 2012; MORTENSEN; ARLBJØRN, 2012; SUCKY; DURST, 2013; SUNIL KUMAR; ROUTROY, 2017).
Lack of buying organization's credibility (6)	(LASCELLES; DALE, 1990; KRAUSE; ELLRAM, 1997a, 1997b; AHMED; HENDRY, 2012; MORTENSEN; ARLBJØRN, 2012; SUCKY; DURST, 2013; KUMAR; ROUTROY, 2017).

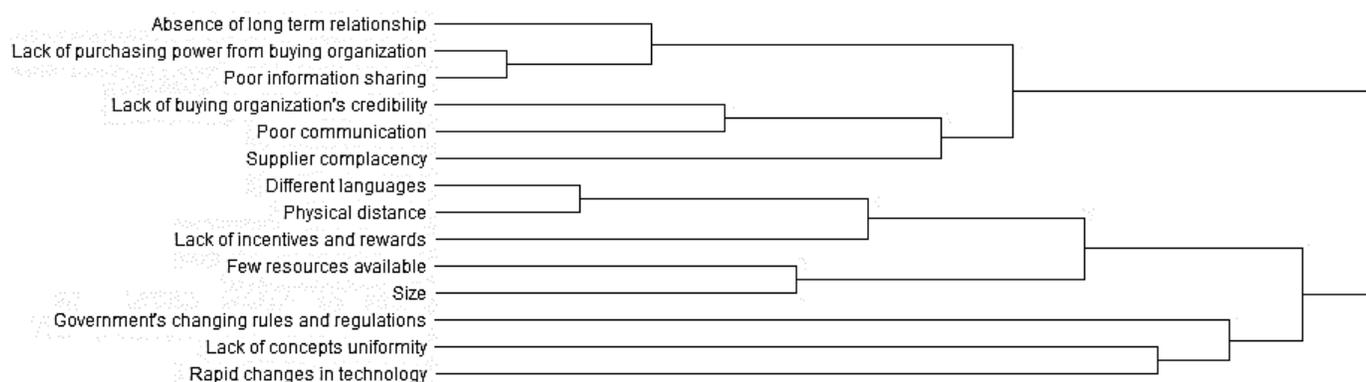
Source: Elaborated by the author (2019)

The most frequent barrier is "few resources available". Considering that supplier development essence lays on transferring resources, the fact that "few resources available" is the most cited barrier reinforce the awareness needed to manage resources under supplier development process. Poor communication is also a key barrier, pointing to the fact that efforts in terms of improving communication between buying organization and suppliers should be a priority in supplier development adoption. Lack of resources is largely related with firm size, since it can jeopardize supplier development adoption for buying organizations and suppliers (SUCKY; DURST, 2013). Organizations are often not aware of communication problems, thus feedback mechanisms should be reinforced (LASCELLES; DALE, 1990). Adaptation to local context may

mitigate problems related to culture misalignment between different organizations (BATSON, 2008). When the buying organization lacks purchase power, supplier development is likely to fail, since suppliers will be skeptical about it (KRAUSE; ELLRAM, 1997b).

Similarly to enablers, there is scarce research about barriers on supplier development context, especially for TBL purpose. It was not possible to detect any study investigating the barriers for environmental, social, or TBL supplier development. It is important to understand the primary barriers to TBL supplier development, because in TBL supplier barriers can be even greater, jeopardizing its adoption (AGAN et al., 2016; RODRÍGUEZ; GIMÉNEZ; ARENAS, 2016a; YAWAR; SEURING, 2017).

Figure 6- Primary supplier development barriers



Source: Elaborated by the author (2019)

Through a cluster and a co-occurrence analysis conducted on QDA Miner software it was possible to observe that certain barriers are related to each other (Figure 6). For instance, “different languages” is highly correlated to “physical distance” and “company size” is very correlated to “few resources available”. The barriers have different categorizations, for example, “different languages” and “physical distance” are grounded in cultural and special differences. “Company size” and “few resources available” are founded in resource restrictions. Identifying the root cause of barriers is critical to mitigate them and to achieve a successful supplier development adoption with minimal turmoil to either buyer or supplier (SUNIL KUMAR; ROUTROY, 2014).

2.1.1.7 TBL SD: a synthesis from Systematic Literature Review

The Triple Bottom Line (TBL) concept emerged in 1994, conceived by Elkington, (1994). Later, in 1997 the author's book "Cannibals with Forks", brought the perspective of "People, Planet and Profits", (also called "Social, Environmental and Economic") that aimed to support organizations to achieve TBL results (ELKINGTON, 2011). Each dimension is briefly described in the following paragraphs (LI et al., 2012; WILLARD, 2012; WILSON, 2015):

- Operational dimension: the organization's capacity of maintaining good financial health over time. It includes cost reduction, profitability, procurement practices, indirect economic impact, market presence and economic performance;
- Environmental dimension: preventing and repairing environmental damages that have already occurred. For that, actions in terms of reducing material, water and energy consumption in manufacturing process are required. Other environmental actions include: emission control, waste reduction, supplier evaluation, logistics, management systems, etc.;
- Social dimension: behavior toward employees and other stakeholders. This involves working conditions (like health and safety), relationship with suppliers, business ethics, investments in the community, human rights (child labor), and product responsibility (not harmful to costumers).

Suppliers are key to TBL success because most inputs used in the manufacturing process come from suppliers. Thus, in order to meet sustainability parameters, all suppliers must show sustainable outcomes (LU; LEE; CHENG, 2012). An appropriate relationship with suppliers is critical to achieve improved TBL outcomes in the supply chain (KUMAR; RAHMAN, 2016).

Supplier development for TBL outcomes has gained attention from researchers only recently due to the increased interest for TBL outcomes noticed in practice, in which stakeholder demands for sustainable supply chain have risen. Most of the studies on the topic treat environmental supplier development or social supplier development in isolation, although supplier development for TBL outcomes encompasses all three dimensions together (BUSSE et al., 2016). For supplier development efforts to achieve TBL outcomes, there should be contemplation of the operational (or financial) dimension, reported as operational capabilities, the environmental

dimension (i.e. waste reduction) and the social dimension (i.e. unfair wages) (BUSSE et al., 2016; TRAPP; SARKIS, 2016).

There is a clear tendency of organizations to face stakeholders' increasing demand for TBL outcomes, as the operating context changes and stakeholders' knowledge on sustainability increases (ANSETT, 2007). As technology advances, competitiveness standards change, requiring organizations to innovate constantly. The recent paradigm shift demands environmental and competitiveness to be considered jointly. This new perspective sets the competitive standard and how well organizations respond to it determines the sustainability of success (PORTER; LINDE, 1995). Added to environmental concern, social issues have emerged more recently, enhancing the pressure for organizations to incorporate social, environmental and economic responsibility into the organization and into supply chain management (TATE; ELLRAM; KIRCHOFF, 2010).

TBL can mean different things for different organizations, thus implementing sustainable related concepts can be challenging (BUSSE et al., 2016). TBL also demands the interaction of different functional areas, such as Purchasing, Operations, Sustainability and Supply Chain. Integrating the view of all these departments is challenging, managers can give preference to their own functional area's goals and focus on short term goals, leading to individualistic decisions and conflicts (LAWRENCE; LORSCH, 1967). Cross-functional integration can help to move from operational to TBL supplier development because it ties all areas involved.

Another consideration is the nature of the relationship of the buying organization with suppliers. Murfield and Tate (2017) affirm that environmental practice implementation can change the nature of the relationship with key suppliers from transactional to collaborative. One of the reasons for that is because organizations are trying to align their strategy with suppliers. Likewise, TBL supplier development aims to implement operational, environmental and social practices. This indicates that the nature of the relationship between buying organization and suppliers can change with TBL supplier development.

Organizations should detect underperforming points regarding TBL concept and put efforts to overcome them, adopting the most suitable practices, having the TBL concept in mind. Knowing what are the primary practices to be adopted is the first step to understand how to ensure TBL outcomes in supplier development.

2.1.8 TBL SD: key aspects

SD literature and TBL SD literature could not be classified in a homogenous manner. While there is plenty of research on SD literature, covering diverse aspects, like practices, enablers, barriers, and associated modules, in TBL SD literature practices are a prevalent topic, with few studies about antecedents. It is also not uncommon to find papers focusing on social aspect only, associated with another topics.

In the early times of SD, papers were centered on SD practices for operational purposes, analyzing which practices were more appropriate to be adopted by organizations in an exploratory way (KRAUSE; ELLRAM, 1997a; KRAUSE; HANDFIELD; SCANNELL, 1998; DUNN; YOUNG, 2004; BATSON, 2008; WAGNER, 2010). Later, studies started to focus on supplier evaluation for SD reasons, in which SD practices evaluation studies started to emerge in order to assess the best SD practices (BAI; SARKIS, 2011; ROUTROY; PRADHAN; SUNIL KUMAR, 2016). Other research emphasized enablers (CHIDAMBARANATHAN; MURALIDHARAN; DESHMUKH, 2009; ROUTROY; PRADHAN, 2014b), barriers (LASCELLES; DALE, 1990; HANDFIELD et al., 2000; KUMAR; ROUTROY, 2017), and specific practices, such as knowledge transfer (GIANNAKIS, 2008; PHUSAVAT; KESS; TORKKO, 2008; CHEN; ELLIS; HOLSAPPLE, 2015; KIM; HUR; SCHOENHERR, 2015), buyer-supplier relationship (KRAUSE; ELLRAM, 1997b; HUMPHREYS; LI; CHAN, 2004; JOSHI et al., 2017). Some other research presented comprehensive literature reviews (AHMED; HENDRY, 2012; SUCKY; DURST, 2013; DALVI; KANT, 2015; GLOCK; GROSSE; RIES, 2017).

A turning point in SD literature took place in the present decade. Environmental scarcity has intensified recently, being caused by the sudden economic growth and industrialization of many countries. Although the economic growth brought many benefits, it also implied in environmental damages. In line with this statement, it can be observed that from 2010 to now a new trend in supplier development publications was detected, in which papers started to focus on environmental, social issues, and TBL outcomes. Figure 7 presents the distribution of topics in supplier development literature along the years. A growth of publications has been seen in the last five years, in which a number of papers are focused on triple bottom line related issues. Opposed to SD literature for operational purposes, in which survey research trying to identify the most efficient practices was predominant, TBL SD applies artificial intelligence techniques (AI), such

as fuzzy set theory, optimization, and multi criteria decision-making methods (MCDM) in a greater extent to evaluate the best practices: Gray System Theory and DEMATEL (FU; ZHU; SARKIS, 2012); ANP and Gray System Theory (DOU; ZHU; SARKIS, 2014); Fuzzy Clustering Means (AKMAN, 2015); Fuzzy-DEMATEL (DOU; ZHU; SARKIS, 2015); and Rough Set Theory-Fuzzy Clustering Means (BAI; SARKIS, 2016). The list with triple bottom line, green and social research on supplier development is available on Table 8. Only TBL SD related papers were described, since they are the focus of this research.

Even when considering TBL supplier development related literature, many studies focus on practices. These studies try to identify what the performance of specific practices aiming to identify what are the best practices that should be adopted. While it is important to identify the practices performance itself, it is also valuable to investigate the impact of adoption on performance. Since the essence of adopting TBL supplier development is to provide better TBL results in the supply chain through suppliers improvements, it is critical to evaluate the impact of the adoption of these practices on organizational performance.

More recently, social aspects have been highlighted in literature, as the most recent papers found are focused in this topic. Non-governmental organizations, poverty reduction in supply chains, and small and medium enterprises are examples of topics studied related to social SD. This is due to the current events in which diverse companies went through, involving child labor, slavery, poor working conditions, etc. As supply chains have become more complex it has been more difficult to organizations to manage their supplier's practices, thus TBL SD has a critical role on managing these issues.

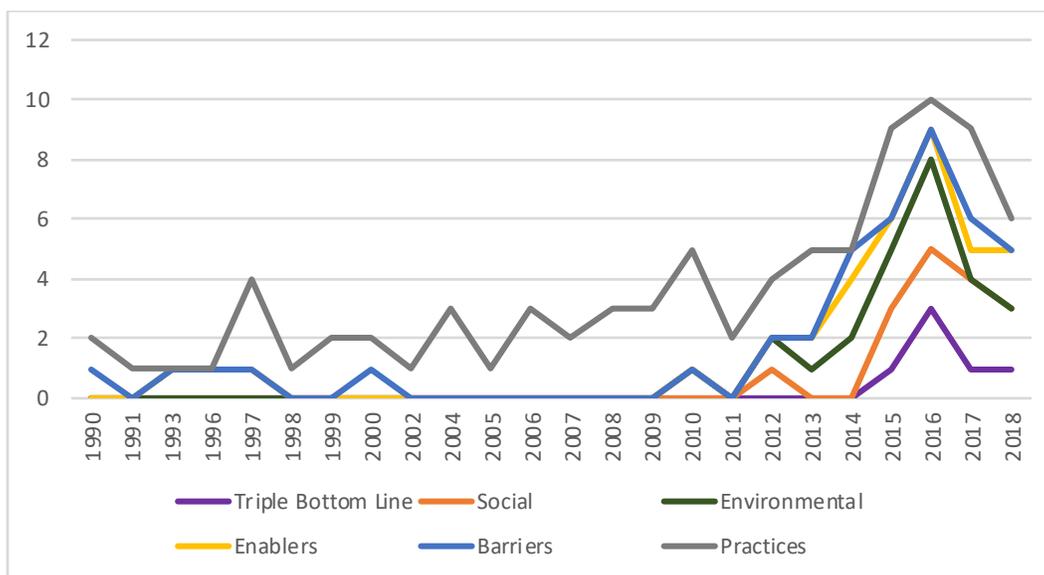
Another recurrent topic in TBL SD literature is what motivate companies to adopt TBL SD. Different research explore distinct antecedents, and the results cannot lead to a unique conclusion. For example, for environmental SD the following antecedents were studied: pressures from consumers, government, and middle management (EHRGOTT et al., 2013), buying organization's performance and top management support (BLOME; HOLLOS; PAULRAJ, 2014) and corporate social responsibility (AGAN et al., 2016). For TBL SD, country-specific external pressures and firm specific capabilities were investigated as antecedents (SANCHA; LONGONI; GIMÉNEZ, 2015).

Table 8- TBL supplier development related research

Authors	Topic	Methodology	Green	Social	TBL
(BAI; SARKIS, 2010)	Evaluate the performance of environmental supplier development practices	Rough set theory	√		
(FU; ZHU; SARKIS, 2012)	Evaluate the performance of environmental supplier development practices	Grey-based DEMATEL	√		
(LU; LEE; CHENG, 2012)	Evaluate the performance of social supplier development practices	Survey		√	
(EHRGOTT et al., 2013)	Antecedents to environmental supplier development	Survey	√		
(DOU; ZHU; SARKIS, 2014)	Evaluate the performance of social supplier development practices	Grey- based ANP	√		
(BLOME; HOLLOS; PAULRAJ, 2014)	Antecedents to environmental supplier development	Survey	√		
(SANCHA et al., 2015)	Evaluate the performance of social supplier development practices	Survey		√	
(AKMAN, 2015)	Supplier evaluation and selection for green supplier development	Fuzzy- C-means - VIKOR	√		
(DOU; ZHU; SARKIS, 2014)	Evaluate the performance of environmental supplier development practices	Fuzzy- DEMATEL	√		
(GOLD; TRAUTRIMS; TRODD, 2015)	Social issues in supplier development and in supply chain management	Literature review		√	
(SANCHA; LONGONI; GIMÉNEZ, 2015)	Antecedents to TBL supplier development	Survey			√
(KUMAR; RAHMAN, 2016)	Investigate supplier development as an antecedent to sustainable practice adoption in supply chain	Survey			√
(BAI; DHAVALÉ; SARKIS, 2016)	Evaluate the performance of environmental supplier development practices	Rough set theory- Fuzzy -C means	√		
(RODRÍGUEZ; GIMÉNEZ; ARENAS, 2016b)	How firms and nongovernmental organizations (NGOs) cooperate to develop supplier development practices for poverty alleviation	Case study		√	
(AWASTHI; KANNAN, 2016)	Evaluate the performance of environmental supplier development practices	NGT - VIKOR	√		
(RODRÍGUEZ; GIMÉNEZ; ARENAS, 2016a)	How nongovernmental organizations (NGOs) can implement supply management practices (including supplier development) for poverty alleviation	Case study		√	
(AGAN et al., 2016)	Investigate Social Corporate Responsibility (SCR) as an antecedent of environmental supplier development	Survey			√
(TRAPP; SARKIS, 2016)	Supplier evaluation and selection for green supplier development	Optimization	√		
(BUSSE et al., 2016)	Investigate what are the barriers to TBL supplier development in the global context	Case Study			√
(WU, 2017)	Investigate the links and influences of socially responsible supplier development and small and medium enterprises suppliers' sustainability-oriented innovations	Survey		√	
(ZHANG; PAWAR; BHARDWAJ, 2017)	Investigate the effects of supplier development practices on supply chain social responsibility	Case Study		√	
(YAWAR; SEURING, 2017)	Investigate the link between corporate social responsibility actions (including social supplier development) and performance outcomes	Literature review		√	
(YANG; ZHANG, 2017)	Investigate the impact of sustainable supplier management (including supplier development) on buyer-supplier performance from the buying organization perspective	Survey			√
(LIU et al., 2018)	Investigate the stakeholders influence on TBL SD	Case Study			√
(YAWAR; KAUPPI, 2018)	Understand what are the antecedents to social SD in a specific supply chain	Case Study		√	
(YAWAR; SEURING, 2018)	Investigate how social SD impacts supply chains performance	Case Study		√	

Source: Elaborated by the author (2019)

Figure 7- Topics distribution per year



Source: Elaborated by the author (2019)

2.2 Basic Literature Review

This section explores enablers and barriers to TBL Supplier Development based on Sustainable Supply Chain Management (SCCM) Literature.

2.2.1 TBL Supplier Development: an overview

Supplier Development is defined as any buying organization's efforts to increase the performance and/or capabilities of suppliers, aiming to meet long-term needs of the buying organization (KRAUSE, 1997; KRAUSE; ELLRAM, 1997a). Supplier development takes into account a supply chain perspective, instead of means to only improve the suppliers performance (HANDFIELD et al., 2000; BATSON, 2008). Supplier development gained attention as Toyota began to disseminate the concept, by joining a supplier association to support suppliers and improve their productivity (WAGNER, 2006). Other organizations seeking continuous improvement also started to encourage suppliers to improve their quality and productivity (LASCELLES; DALE, 1990). Buying organizations focused on reducing the number of suppliers and changed the relationship with them, from a transactional approach to a more collaborative and

strategic relationship (KRALJIC, 1983; MURFIELD; TATE, 2017). Buying organizations also began to grant long-term contracts to their suppliers, making supplier development attractive to all companies involved (LASCELLES; DALE, 1990; HARTLEY; CHOI, 1996; SUCKY; DURST, 2013). Supplier development is more commonly adopted by certain industry sectors, rather than others. The automotive sector, for example, is traditionally known for implementing supplier development practices (SUCKY; DURST, 2013).

In the current globalized context, characterized by a high volatility and competition, some suppliers do not have the necessary capabilities to provide competitive outcomes (NAGATI; REBOLLEDO, 2013). This is also true when considering TBL capabilities. The TBL concept encompasses the link among social, environmental and operational (also called financial or economic) dimensions. These dimensions should be considered together in decision-making process and planning (CARTER; ROGERS, 2008).

Suppliers are crucial links in the supply chain, since they are responsible for providing outputs to organizations, which include environmental and social impacts as well as economic. Downstream and upstream supply chain members are influenced by TBL decision making (LU; LEE; CHENG, 2012; AWASTHI; KANNAN, 2016). Supplier development for improving TBL performance is an effective way to prevent environmental and social issues and enhance suppliers' TBL capabilities (ROUTROY; PRADHAN, 2014a). For example, after Apple found that some of its suppliers were underperforming in TBL dimension, it started to conduct practices with suppliers in order to improve their TBL performance (CHEN; BAI, 2016).

The link between supplier development and the TBL concept lies on the fact that buying organizations invest in TBL practices, changing the way business is done, and spreading TBL practices to suppliers (BUSSE et al., 2016). TBL supplier development can be defined as supplier development processes that aim to improve suppliers' TBL capabilities (BUSSE et al., 2016). It attaches environmental and social aspects to the economic dimension. The environmental dimension involves goals, plans and mechanisms that create environmental responsibility to build and spread environmental related technologies (WINTER; KNEMEYER, 2013). The social dimension refers both to organizations and a wide range of stakeholders with different goals. The operational dimension provides efficiency and effectiveness in processes to allow for competitive advantage and profitability.

The literature related to supplier development has long focused on operational issues. The major part of this research emphasizes the practices used in supplier development efforts (KRAUSE; ELLRAM, 1997a, 1997b; KRAUSE; HANDFIELD; SCANNELL, 1998; KRAUSE; RAGATZ; HUGHLEY, 1999; QUAYLE, 2000; KRAUSE; SCANNELL, 2002; WEN-LI et al., 2003; DUNN; YOUNG, 2004; HUMPHREYS; LI; CHAN, 2004; WAGNER, 2006; BATSON, 2008; WAGNER; KRAUSE, 2009; SHOKRI; NABHANI; HODGSON, 2010; GOVINDAN; KANNAN; HAQ, 2010; HUMPHREYS et al., 2011; NAGATI; REBOLLEDO, 2013). Other research seeks to understand the enablers for the operational dimension of supplier development (WATTS; HAHN, 1993; HARTLEY; CHOI, 1996; KRAUSE; ELLRAM, 1997a, 1997b, ROUTROY; PRADHAN, 2013, 2014a; ROUTROY; SUNIL KUMAR, 2014; DALVI; KANT, 2015, 2017; ROUTROY; PRADHAN; SUNIL KUMAR, 2016), while, studies covering barriers are scarcer (LASCELLES; DALE, 1990; HANDFIELD et al., 2000; SUNIL KUMAR; ROUTROY, 2014, 2017).

Recently papers have started to explore supplier development adding the environmental dimension (BAI; SARKIS, 2010; FU; ZHU; SARKIS, 2012; EHRGOTT et al., 2013; BLOME; HOLLOS; PAULRAJ, 2014; DOU; ZHU; SARKIS, 2014, 2015; AKMAN, 2015; AWASTHI; KANNAN, 2016; BAI; DHAHALE; SARKIS, 2016; TRAPP; SARKIS, 2016), and some other papers have investigated the social aspect in supplier development (LU; LEE; CHENG, 2012; GOLD; TRAUTRIMS; TRODD, 2015; SANCHA et al., 2015; RODRÍGUEZ; GIMÉNEZ; ARENAS, 2016a, 2016b; WU; SANTOSO; ROAN, 2017; YAWAR; SEURING, 2017; ZHANG; PAWAR; BHARDWAJ, 2017). Some look at supplier development under the TBL concept (SANCHA; LONGONI; GIMÉNEZ, 2015; AGAN et al., 2016; BUSSE et al., 2016; KUMAR; RAHMAN, 2016; YANG; ZHANG, 2017). In general terms, this recent body of literature is centered on identifying the best supplier development practices, the antecedents, or how social issues could be mitigated. Thus, enablers and barriers still need to be identified in the TBL supplier development literature.

TBL supplier development includes a set of practices that buying organizations share with underperforming suppliers. Organizations need to adopt practices belonging to all TBL dimensions (operational, environmental and social) simultaneously in order to deliver TBL results. A gap analysis should be conducted to determine areas that need improvement. Through the systematic

literature review it was possible to categorize operational, environmental and social practices in distinct groups. Table 9 synthesizes TBL supplier development practices.

Table 9 - TBL supplier development practices

Dimension	Practices	Examples of practices
Operational	Formal supplier evaluation and feedback	Formal supplier evaluation and feedback; supplier certification; competitive pressure; performance expectation; goal setting.
	Training	Training suppliers; human support.
	Sharing knowledge	Knowledge transfer; information sharing; co-location.
	Close relationship with important suppliers	Buyer supplier relationship; communication; joint actions; future business.
	Direct incentives and resources investments	Direct incentives and investments; site visits; physical asset and capabilities support; technology and operational support; financial support.
Environmental	Training suppliers, and sharing knowledge and information on environmental initiatives and communication	Training suppliers on environmental issues; evaluating suppliers on environmental dimension and providing feedback to them; auditing suppliers; and sharing information on environmental topics.
	Investing resources in suppliers, and transferring resources to suppliers to solve environmental problems	Solve supplier environmental technical problems; transferring supplier employees with environmental expertise to buying firm; Supplier rewards and incentives for environmental performance.
	Adopting environmental processes and certifications, creating support from top management and organizational practices	Create top management support for green practices at both buying organization and at suppliers' level; require that suppliers adopt ISO14000 certification; guarantee a cross-functional team to solve environmental issues.
Social	Discussing and implementing social concepts and sharing social knowledge with suppliers	Provide and share knowledge with suppliers on social topics to improve ethical performance; communicate expected social and ethical behaviors and requirements in a clear and accurate way to suppliers.
	Supplier evaluation on social issues, detecting suppliers' poor social performance, and giving feedback and rewards to suppliers	Evaluate suppliers' ethical performance and provide feedback to them; require that suppliers adopt a social related certification.
	Training suppliers to improve social performance and allocating experts to help suppliers with social issues	Train suppliers on social activities and needed skills; conduct site visits and allocate personnel to suppliers' facilities to improve the supplier's social capabilities.

Source: Adapted from Bai and Sarkis (2010); Lu et al (2012).

2.2.2 Enablers for TBL Supplier Development

Enablers for supplier development can be described in terms of those elements that support the achievement of a successful implementation with the least efforts and resources possible (ROUTROY; PRADHAN, 2014a). In general, few studies have explored enablers for supplier development adoption, as most of the research on the subject focuses on practices. The literature often does not distinguish enablers from practices. In fact, some are overlapping, but actually represent different constructs. Enablers are elements that support practices adoption.

Supplier development presents the same nature of supply chain management, and in fact supplier development is critical for a sustainable supply chain management (EHRGOTT et al., 2013; AGAN et al., 2016). As previous research has not explored enablers for supplier development for TBL outcomes, literature on sustainable supply chain management was accessed in order to explore enablers of TBL sustainability as a foundation for the supplier development context. Table 10 categorizes the enablers and lists the predominant enablers found in the literature.

Table 10- Enablers for supplier development for TBL outcomes

Category	Enablers	Authors
Pressures (internal)	Employees' pressure	(KUMAR; RAHMAN, 2017).
	Top management support	(WITTSTRUCK; TEUTEBERG, 2012; LUTHRA; GARG; HALEEM, 2015; MANI; AGRAWAL; SHARMA, 2015; KUMAR; RAHMAN, 2017; SALIMIAN; RASHIDIRAD; SOLTANI, 2017; WU; SANTOSO; ROAN, 2017; YAWAR; SEURING, 2017; ZHANG; PAWAR; BHARDWAJ, 2017)
Pressures (external)	Customers' pressure	(LUTHRA; GARG; HALEEM, 2015; MANI; AGRAWAL; SHARMA, 2015; AGAN et al., 2016; GOPAL; THAKKAR, 2016; WU; SANTOSO; ROAN, 2017; ZHANG; PAWAR; BHARDWAJ, 2017)
	NGOs' pressure	(LUTHRA; GARG; HALEEM, 2015; MANI; AGRAWAL; SHARMA, 2015; AGAN et al., 2016; GOPAL; THAKKAR, 2016; RODRÍGUEZ; GIMÉNEZ; ARENAS, 2016b, 2016a; KUMAR; RAHMAN, 2017; WU; SANTOSO; ROAN, 2017; YAWAR; SEURING, 2017; ZHANG; PAWAR; BHARDWAJ, 2017)
	Media's pressure	(GOLD; TRAUTRIMS; TRODD, 2015; SANCHA; LONGONI; GIMÉNEZ, 2015; YAWAR; SEURING, 2017)
	Competitors' pressure	(WITTSTRUCK; TEUTEBERG, 2012; MANI; AGRAWAL; SHARMA, 2015; KUMAR; RAHMAN, 2017; WU; SANTOSO; ROAN, 2017)
	Community pressure	(MANI; AGRAWAL; SHARMA, 2015; AGAN et al., 2016; GOPAL; THAKKAR, 2016; KUMAR; RAHMAN, 2017; WU; SANTOSO; ROAN, 2017; YAWAR; SEURING, 2017)
	Firm image	(AKMAN, 2015; SANCHA; LONGONI; GIMÉNEZ, 2015; AGAN et al., 2016; WU, 2017; YAWAR; SEURING, 2017)
TBL Culture	Lack of resistance for TBL practices adoption	(MANI; AGRAWAL; SHARMA, 2015; KUMAR; RAHMAN, 2017)
	Voluntary sustainable initiatives	(GOPAL; THAKKAR, 2016)
	Organization's awareness towards issues	(MANI; AGRAWAL; SHARMA, 2015; KUMAR; RAHMAN, 2017)
	Environmental and Societal issues	(LUTHRA; GARG; HALEEM, 2015; WU; SANTOSO; ROAN, 2017; YAWAR; SEURING, 2017)
	Integrate social and environmental elements into the organization's policy	(SEURING; MÜLLER, 2008; LUTHRA; GARG; HALEEM, 2015)
	Adoption of standard processes	(WITTSTRUCK; TEUTEBERG, 2012; WU, 2017)
	Strategic planning	(LUTHRA; GARG; HALEEM, 2015; KUMAR; RAHMAN, 2017)
Training	(SEURING; MÜLLER, 2008; LUTHRA; GARG; HALEEM, 2015; BUSSE et al., 2016; YAWAR; SEURING, 2017)	
Resources	Resources sharing across supply chain	(KUMAR; RAHMAN, 2017)

Continue

Conclusion

Category	Enablers	Authors
	Internal Organizational Resources	(GOPAL; THAKKAR, 2016)
	Resource (Energy & Material) Efficiency	(WITTSTRUCK; TEUTEBERG, 2012; WU; SANTOSO; ROAN, 2017)
Buyer-supplier relationship	Common strategy	(WITTSTRUCK; TEUTEBERG, 2012)
	Mutual learning	(WITTSTRUCK; TEUTEBERG, 2012; GOPAL; THAKKAR, 2016)
	Strengthening Cooperation With Partners	(WITTSTRUCK; TEUTEBERG, 2012)
	Supply Chain integration	(SANCHA; LONGONI; GIMÉNEZ, 2015; GOPAL; THAKKAR, 2016; SALIMIAN; RASHIDIRAD; SOLTANI, 2017)
	Buyer-supplier relationship	(GOPAL; THAKKAR, 2016; YAWAR; SEURING, 2017)
	Trust and commitment	(AKMAN, 2015; KUMAR; RAHMAN, 2017; SALIMIAN; RASHIDIRAD; SOLTANI, 2017; YANG; ZHANG, 2017; YAWAR; SEURING, 2017)
	Long term partnership	(KUMAR; RAHMAN, 2017)
	Cross-functional integration	(BAI; SARKIS, 2010; LU; LEE; CHENG, 2012)
	Collaboration	(LU; LEE; CHENG, 2012; RODRÍGUEZ; GIMÉNEZ; ARENAS, 2016b; SALIMIAN; RASHIDIRAD; SOLTANI, 2017; YANG; ZHANG, 2017; YAWAR; SEURING, 2017; ZHANG; PAWAR; BHARDWAJ, 2017)
	Cross-contextual understanding	(BUSSE et al., 2016)
Evaluation	Certification (ISO 14001 SA8000)	(SEURING; MÜLLER, 2008; AKMAN, 2015; GOLD; TRAUTRIMS; TRODD, 2015; MANI; AGRAWAL; SHARMA, 2015; GOPAL; THAKKAR, 2016; WU; SANTOSO; ROAN, 2017).
	Monitoring and auditing	(SEURING; MÜLLER, 2008; AKMAN, 2015; GOLD; TRAUTRIMS; TRODD, 2015; AGAN et al., 2016; KUMAR; RAHMAN, 2017; YANG; ZHANG, 2017; YAWAR; SEURING, 2017).
	Benchmarking	(GOPAL; THAKKAR, 2016)
	Cost Reduction	(WITTSTRUCK; TEUTEBERG, 2012; KUMAR; RAHMAN, 2017; WU; SANTOSO; ROAN, 2017)
	Organization's financial health	(MANI; AGRAWAL; SHARMA, 2015)
	High cost for disposal of hazardous materials/components/products	(LUTHRA; GARG; HALEEM, 2015)
Communication	Supplier Satisfaction	(WITTSTRUCK; TEUTEBERG, 2012)
	Communication/ information sharing	(SEURING; MÜLLER, 2008; LUTHRA; GARG; HALEEM, 2015; SANCHA; LONGONI; GIMÉNEZ, 2015; BUSSE et al., 2016; GOPAL; THAKKAR, 2016; KUMAR; RAHMAN, 2017; YAWAR; SEURING, 2017).
	Transparency & Performance of Processes	(WITTSTRUCK; TEUTEBERG, 2012)
	IT support	(WITTSTRUCK; TEUTEBERG, 2012; LUTHRA; GARG; HALEEM, 2015; GOPAL; THAKKAR, 2016)

Source: Elaborated by the author (2019)

Enablers were grouped in six categories according to their similarities: pressures (external and internal), TBL culture, resources, buyer-supplier integration, evaluation, and communication. The importance of each category is discussed in the paragraphs below.

Pressures can be categorized as internal and external. As it is known, external and internal pressures come from different stakeholders' demands. These demands guide organizations' strategies, since the primary objective of an organization is to fulfill its stakeholders' needs (YAWAR; SEURING, 2017). External pressures come from diverse stakeholders' interests, which includes customers' pressure, NGOs' pressure, media's pressure, competitors' pressure, and community pressure. In turn, internal pressures are represented by employee's pressure and top management support. Top management has the role of creating commitment towards the adoption of TBL practices (KUMAR; RAHMAN, 2017). As organizations should represent consumers' needs, another important enabler is customers' pressure (ZHANG; PAWAR; BHARDWAJ, 2017). Consumer awareness has the role to bring more importance to TBL issues. The closer the organization is from the end consumer, more visible these TBL demands will be, making them easier to be managed (AGAN et al., 2016).

TBL culture is defined as the collective mental programming of the mind, which distinguishes the members of one organization from another (HOFSTEDE, 1991). In turn, TBL culture can be understood as the recognition of an organization towards the impact of the organization activities on the environment and at the society and the need to reduce negative impacts. The organizational beliefs and values reflects into decision making process (PAGELL; WU, 2009; MARSHALL et al., 2015). Incorporating environmental and social elements into the buying organization is essential to a TBL orientation (SEURING; MÜLLER, 2008). Elements like voluntary sustainable initiatives by the buying organization have a greater possibility to be diffused to suppliers, making the supply chain more TBL oriented (GOPAL; THAKKAR, 2016).

Resources investments are critical to TBL supplier development adoption (GOPAL; THAKKAR, 2016). Buying organizations can be reluctant to invest resources to supplier development (HANDFIELD et al., 2000), but they should consider that these resources investments are very likely to be translated in competitive advantage (SUNIL KUMAR; ROUTROY, 2017). Investing resources in suppliers under supplier development context can help organizations involved to achieve a closer and more cooperative relationship (KRAUSE, 1997).

Next, is buyer supplier relationship, that is key to create a partnership atmosphere, necessary to improve suppliers performance (SILLANPÄÄ; SHAHZAD; SILLANPÄÄ, 2015). Various studies on supplier development reinforce the role of buyer-supplier relationship as an important enabler to the process. In fact, buyer-supplier relationship is tied to supplier development concept. As buying organizations reduced their supply base, a more close and collaborative relationship with strategic suppliers started to be pursued. Suppliers with more propensity of having a long term relationship and more likely to award business in a long haul were designated to supplier development practices adoption (HARTLEY; CHOI, 1996). The very nature of supplier development lies on creating a context of long-term cooperation and mutual beneficial relationship in order to improve capabilities and competitiveness. Also, organizations that adopted supplier development are more aware of the importance of a strong buyer-supplier relationship (WATTS; HAHN, 1993). Supplier development require that buying organization and suppliers work in a collaborative way. This close partnership can result in an improved buyer-supplier relationship, which can lead to competitive advantage (LI et al., 2012). In the context of TBL supplier development, the need of cooperation between supply chain members is emphasized (AGAN et al., 2016).

Communication helps in terms of buyer-supplier integration (SEURING; MÜLLER, 2008). In terms of TBL, it helps to improve social orientation at organizational culture (YAWAR; SEURING, 2017), and to facilitate the incorporation of TBL activities across the supply chain (BAI; SARKIS, 2010; KUMAR; RAHMAN, 2017). Transparency, which is related to communication, requires information sharing between supply chain members, which is possible through mutual learning between buying organization and suppliers. IT support, in turn, has a critical role in enabling mutual learning and information sharing (WITTSTRUCK; TEUTEBERG, 2012).

Evaluating suppliers guarantees that the buying organization has an improved performance in various dimensions and keep suppliers motivated (AGAN et al., 2016; SALIMIAN; RASHIDIRAD; SOLTANI, 2017). Evaluation is crucial for both environmental supplier development and social supplier development, varying from auditing suppliers, providing evaluation and feedback, developing supplier assessment programs, and requiring environmental and social certification for suppliers, for instance (BAI; SARKIS, 2010; LU; LEE; CHENG, 2012). Concerning TBL supplier development, evaluating suppliers is vital for detecting underperforming

areas, and enables the organization to formulate strategies to overcome them (AKMAN, 2015). Given the diversity of evaluation category it can be noted that it occupies a key role in supplier development in general. Enablers are critical to mitigate barriers that can be present on TBL supplier development adoption (ROUTROY; PRADHAN, 2013). Although it is important to understand what the barriers to TBL supplier development are, they have not been explored by literature yet. The next subsection presents the primary barriers to TBL supplier development.

2.2.3 Barriers for TBL Supplier Development

Supplier development practices are actions in terms of activities that improve suppliers capabilities and can help organizations to achieve a more competitive supply chain (ROUTROY; PRADHAN; SUNIL KUMAR, 2016). Barriers are obstacles that impede communication or progress towards it (BUSSE et al., 2016). It is essential to identify the barriers to supplier development adoption, since these barriers make it difficult to implement practices that can have a positive effect on the buying organization and also on suppliers' performance (DALVI; KANT, 2015; AGAN et al., 2016).

Literature on barriers to supplier development is scarce and further investigation is needed, particularly in the case of TBL supplier development that can carry more turmoil when compared to supplier development for operational purposes. Research on barriers to supplier development for TBL outcomes is limited. The foundational piece is an investigation performed by Busse et al. (2016) that explored the barriers for supplier development for TBL, highlighting the globalized context. Challenges derived from globalization and dispersity among buying organizations and suppliers were investigated. Barriers to supplier development for TBL outcomes were found in the manuscript of Busse et al. (2016) as well as other related sustainable supply chain management literature. The barriers encountered are shown in Table 11.

Table 11- Barriers to supplier development for TBL outcomes

Category	Barriers	Authors
Resources	High costs	(SEURING; MÜLLER, 2008)
	Firm Size	(AGAN et al., 2016; RODRÍGUEZ; GIMÉNEZ; ARENAS, 2016a; SALIMIAN; RASHIDIRAD; SOLTANI, 2017; YAWAR; SEURING, 2017)
	Lack of resources	(LU; LEE; CHENG, 2012)
Culture	Cultural differences	(BUSSE et al., 2016; SALIMIAN; RASHIDIRAD; SOLTANI, 2017; YAWAR; SEURING, 2017)
	Socio-economic differences	(BUSSE et al., 2016)
	Spatial and linguistic distance	(BUSSE et al., 2016)
Complexity	Coordination complexity	(SEURING; MÜLLER, 2008; SANCHA; LONGONI; GIMÉNEZ, 2015)
	Complexity in sustainability concept	(Busse et al. 2016)
	Organizational complexity	(GOPAL; THAKKAR, 2016)
Internal Support	Lack of TBL awareness	(LU; LEE; CHENG, 2012; BUSSE et al., 2016)
	Lack of top management support	(BUSSE et al., 2016)
Communication	Insufficient communication in supply chain	(SEURING; MÜLLER, 2008)

Source: Elaborated by the author (2019)

Implementing supplier development initiatives that focus on TBL outcomes is a challenging process, since the adoption of TBL practices increases complexity. This complexity increases because of the cooperative efforts required to work with suppliers that are not in control of the buying organization (SANCHA; LONGONI; GIMÉNEZ, 2015). Even though TBL supplier development is a difficult process to implement, studies about barriers that can increase the challenge of implementation are limited in the existing literature. The categories of barriers are discussed in the paragraphs below.

Resources are key elements for supplier development, because its very nature lays on sharing resources between buying organization and suppliers (HANDFIELD et al., 2000; WAGNER; FILLIS; JOHANSSON, 2005). Resources designated to supplier development also includes human resources (like training employees), besides financial resources (SUCKY; DURST, 2013). However, resources are critical for supplier development, organizations are reluctant to allocate them to supplier development adoption, what can act as a barrier (HANDFIELD et al., 2000). In addition to that, when considering social supplier development,

organizations can fail to adopt it if they have few resources (like time and money) that are needed to make changes and improve capabilities (LU; LEE; CHENG, 2012).

Congruence between the buying organization's TBL culture and suppliers' TBL culture is an essential element to supplier development (SALIMIAN; RASHIDIRAD; SOLTANI, 2017). Cultural differences between buyers and suppliers has been found to be a barrier to TBL supplier development in the global market context. Specifically, spatial distance turns the buyer-supplier relationship weaker, and makes the communication process more costly and difficult. The linguistic distance also has a negative impact on communication, resulting in misunderstandings and inefficiency (BUSSE et al., 2016).

Organizational complexities such as relationships and large companies can act as a barrier to TBL practices adoption. Thus, TBL concerns must be considered at early stages of supply chain design in order to mitigate complexity issues (GOPAL; THAKKAR, 2016). Complexities regarding the concept of TBL can deteriorate goals setting, impeding TBL supplier development adoption. This kind of complexity is derived from different understandings or misinterprets of TBL concept from different groups (BUSSE et al., 2016).

The inexistence of internal support in the organization (lack of top management support and lack of TBL awareness) can jeopardize TBL supplier development adoption severely. Awareness to TBL issues can also be created to the integration of TBL culture in the buying organization (BUSSE et al., 2016). As top management support creates commitment, provides resources needed to supplier development, removes barriers, and rewards achievements, supplier development adoption is very likely to fail when top management support is lacking (CHEN; ELLIS; HOLSAPPLE, 2015).

Insufficient communication can hinder the adoption of TBL practices (SEURING; MÜLLER, 2008). In supplier development literature, lack of communication is one of the most mentioned barrier to supplier development practices adoption, being cited by diverse authors (KRAUSE; ELLRAM, 1997a, 1997b; KRAUSE; RAGATZ; HUGHLEY, 1999; WAGNER; FILLIS; JOHANSSON, 2005; AHMED; HENDRY, 2012; MORTENSEN; ARLBJØRN, 2012; SUCKY; DURST, 2013; SUNIL KUMAR; ROUTROY, 2017), Despite of this fact, communication has not been investigated in depth as a barrier to supplier development adoption.

2.2.4 TBL supplier development Performance

TBL performance can be defined as the performance of an organization in all TBL dimensions (operational, environmental and social). This definition also embraces the supply chain concept, since organizations are linked together along the supply chain, and TBL performance of one organization can impact other supply chain members (KUMAR; RAHMAN, 2016). As TBL supplier development is a relatively new topic in literature, studies concerning the metrics to measure TBL performance are not comprehensive. Kumar and Rahman (2016) made an initial attempt to derive TBL metrics from the sustainable supply chain management literature to measure TBL supplier development impact on organizational performance. This afforded a foundation of metrics.

The public press also offers some insights into TBL performance metrics for suppliers. Various companies have been using sustainability scorecards either as a way to improve themselves or to overcome sustainability scandals. Organizations measure suppliers in different criteria in order to assess their TBL results. While the research of Kumar and Rahman (2016) provides the theoretical foundation, sustainability scorecards from six different organization are used to align the existing performance metrics (Apple, P&G, Walmart, Philips, Natura Cosmetics and Siemens). Empirical scorecards were chosen, because they have already been used in practice by companies that have a TBL orientation. Economic category measures is based on Blome; Hollos; Paulraj (2014); Sancha; Longoni; Giménez (2015); Agan et al (2016); Kumar; Rahman, (2016). The primary metrics used by those companies were extracted and synthesized (Table 12).

Table 12 - TBL performance measurement

Category	What is measured
Environmental	Certified environmental management system
	Implementing local environmental legislation
	Adoption of sustainable practices
	Greenhouse Gas Emissions
	Water Management
	Energy Consumption
	Solid Waste
	Hazardous Substances
	Pollution Prevention
	Environmental Permits
Social	Combating corruption, bribery, frauds, and antitrust violations
	Grievance mechanisms, whistleblower protection and anonymous complaints
	Protection of intellectual property
	Prevention of Involuntary Labor
	Working Hours
	Working and Living Conditions
	Human Rights
	Equal Pay
	Child labor
	Forced labor
	Wages
	Prejudice, discrimination, and harassment
	Health and Safety Permits
	Industrial Hygiene
	Working with suppliers to solve TBL issues
	Investing in community development activities
Operational (Economic)	Improved product/service quality
	Reduced total costs
	Reduced delivery time to clients
	Reduced purchasing costs
	Improved innovativeness
Improved profitability	

Source: Elaborated by the author (2019)

In special, social issues can bring risks to supply chain, causing a negative reputation to all supply chain members. This phenomenon occurs because a spill-over effect takes place, transferring reputational elements across supply chain members. Suppliers are rarely blamed by a negative social conduct by end-consumers, generally reputation is attributed to the buying organization (LEMKE; PETERSEN, 2013). It is worth to note that reputation can be defined as the shared vision that a group of individuals have regarding a company' past actions and results that

determines the company's inclination to convey valued results to different stakeholders. Buying organizations are under reputational risk made by stakeholders' judgements regarding their TBL conduct (MANI; GUNASEKARAN; DELGADO, 2018).

Care should be taken when dealing with suppliers to protect the brand and reputation because supply chain members can also be a source of ethical problems related to sustainability practices that can negatively impact the entire chain (FU; ZHU; SARKIS, 2012). Generally, supplier development practices are derived out of necessity or a gap in performance identified by the buying company. In the case of the ethics violations for example the buying company might incorporate supplier workplace audits and changes to management processes. If the buying company detects poor performance on a given criteria, the buying firm will work together with the supplier to improve performance related to that specific issue (KRAUSE; ELLRAM, 1997b). Common reputation risks are discussed in Table 13.

Table 13- Reputation Risks

Reputation Risk	Description
Corporate Culture	Corporate culture is under reputation risk when the product orientation does not take into account the stakeholders' needs and interests. Example: outsourcing manufacturing processes to other locations, such as foreign countries aiming to avoid local laws and legislations (LEMKE; PETERSEN, 2013).
Brand Image	It is associated with publicity regarding the organizations' brand supporting groups of interests (such as governments, associations, etc.) whose ideas and philosophies are conflicting with environmental and social aspects. Example: linking the organization's brand to a public figure that is associated with illegal practices (LEMKE; PETERSEN, 2013)
Social Media	Social media, differs from regular media, mainly because it allows direct interaction between organizations and stakeholders (KAPLAN; HAENLEIN, 2010). Social media can cause a backlash effect on organization's reputation. Example: Mc Donald's released a campaign on Tweeter in 2012 in order to promote the brand, but unexpectedly unfair work conditions, food poisoning, and animal cruelty were exposed by social media's users, causing a negative effect (LYON; MONTGOMERY, 2013).

Source: Elaborated by the author (2019)

3 HYPOTHESIS AND RESEARCH METHODOLOGY

This section aims to present the research hypothesis development, the theoretical model, and the procedures taken during the survey research. The survey have as focus Brazilian companies, and it will be used to provide quantitative data to test the theoretical model and the research hypothesis.

3.1 Research hypothesis

Hypothesis development have as starting point the literature review that was conducted in this study. Based on the body of literature the research hypothesis are formulated and presented in the next paragraphs.

Enablers

Schmidt, Foerstl and Schaltenbrand (2017) state that the supply chain location of an organization can explain how Green Supply Chain Management practices adoption vary along the supply chain. Thus, the supply chain location of a given organization implies in a determined effect in green practices adoption. Likewise, Carbone; Moatti; Wood (2012) also affirm that the location of an organization within the supply chain influences the desirability of adopting and diffusing TBL outcomes. The primary idea is that stakeholders' pressures are greater towards the end customer, thus organizations located closer to end customers show higher levels of environmental practices. In turn, organizations that are affected by external stakeholders' pressures, such as customers, competitors, NGOs, and regulations, are more successful in adopting environmental practices (SCHMIDT; FOERSTL; SCHALTENBRAND, 2017). Diverse authors found evidence that external pressures can lead to environmental supplier development (AKMAN, 2015), to social supplier development (AGAN et al., 2016; RODRÍGUEZ; GIMÉNEZ; ARENAS, 2016a, 2016b; WU, 2017; YAWAR; SEURING, 2017; ZHANG; PAWAR; BHARDWAJ, 2017), and to TBL supplier development (SANCHA; LONGONI; GIMÉNEZ, 2015).

Internal pressures, such as top management support is an important influential factor to environmental supplier development (BLOME; HOLLOS; PAULRAJ, 2014). The focus of supply chain sustainability literature in general, lays on external pressures, Ehrgott et al., (2013) found

evidence that internal stakeholders are an important type of pressure to environmental practices adoption. Employees, like middle managers, for example, can put pressure for the organization to work in an environmental friendly way. In response, the buying organization can carry environmental practices, such as environmental supplier development. A pre-requisite for it is that employees' and organization's values be aligned (EHRGOTT et al., 2013).

Top management support is critical to incorporate TBL purchasing practices, since it influences the organizational culture, impacts the nature and scope of environmental practices in organizations, and coordinate the adoption of TBL practices (BLOME; HOLLOS; PAULRAJ, 2014; KUMAR; RAHMAN, 2017). Top management support has the key role of communicating the relevance of environmental practices, generating environmental values and maintaining them in the organization, establishing environmental activities and policies, and rewarding successful achievements (BLOME; HOLLOS; PAULRAJ, 2014). Furthermore, top management should set an example for employees and sponsor the process (BUSSE et al., 2016).

Organizations located in different parts of the world are subjected to different external pressures. Distinct pressures can lead organizations based in different countries to adopt distinct organizational practices. This is due to the contingencies encountered in specific regions (SANCHA; LONGONI; GIMÉNEZ, 2015). As highlighted by Seles et al (2018), during economic crises financial resources become scarce and those resources that used to be allocated to social and environmental issues are then destined to survive in the market. Also, the greater the level of sustainable practices adopted by firms in the country where the firm is located, the higher the pressure to adopt such practices (SANCHA; LONGONI; GIMÉNEZ, 2015). Similarly, organizations placed in developing economies, are still focusing on the “operational leg” of TBL, since they need to solve economic issues in order to not struggle in the market. In turn, the environmental and social TBL legs are underestimated by organizations located in developing economies. The country in which organizations are located can impact TBL supplier development adoption, since these organizations respond to the context they are inserted in different ways, causing them to adopt distinct organizational practices (SANCHA; LONGONI; GIMÉNEZ, 2015).

A TBL mindset should be integrated in the organizational culture to a successful TBL supplier development. For that, formal procedures need to be designed and processes should be aligned in the organization (BUSSE et al., 2016). The buying organization is commonly responsible for creating a TBL culture between supply chain members (KUMAR; RAHMAN, 2017).

Organizations that have a TBL oriented culture create a context in which decisions are taken considering the TBL impact of those decisions, and not only the operational leg. As TBL culturally oriented organizations aim to achieve TBL benefits, having this kind of culture orientation can facilitate TBL practices adoption (PAGELL; WU, 2009; MARSHALL et al., 2015).

Studies claim that organizations that lack resources needed to achieve more sustainable process and products, struggle to adopt TBL supplier development (CAO; ZHANG, 2011; AGAN et al., 2016; RODRÍGUEZ; GIMÉNEZ; ARENAS, 2016a; SALIMIAN; RASHIDIRAD; SOLTANI, 2017; YAWAR; SEURING, 2017). Firm size and availability of resources are interrelated constructs that can impact supplier development practices adoption. Small firms generally lack resources needed to improve underperforming processes. As supplier development is a resource focused process, companies that present less resources are more likely to struggle to adopt supplier development (WAGNER, 2006; WAGNER; KRAUSE, 2009). Small companies have insufficient qualified employees and other financial resources, causing them to have less environmental capabilities (AGAN et al., 2016) and are less inclined to have resources to be invested in environmental and social practices (SANCHA; LONGONI; GIMÉNEZ, 2015). Taking into account that organizations that present less resources have more difficulties in implementing supplier development for operational and environmental purpose, when considering TBL supplier development these obstacles can be even greater, because more resources are needed to solve social and environmental issues. In turn, more barriers are faced by organizations with few resources in TBL supplier development, making its adoption even more challenging.

Supplier development has been associated with a close relationship between buying organizations and suppliers. Since supplier base reduction started to take place, buying organizations began to work with strategic suppliers to establish a close relationship (KRAUSE; ELLRAM, 1997b; KRAUSE, 1999; HUMPHREYS; WONG; CHAN, 2003). As buyer-supplier relationship consolidate, there is a greater tendency of buying organizations to carry supplier development practices with suppliers (BATSON, 2008; SHAHZAD et al., 2016). Furthermore, Shahzad et al (2016) found that supplier development is critical to enhance buyer-supplier relationship.

Several research have emphasized the role of buyer-supplier relationship in the improvement of supply chains' TBL performance (SEURING; MÜLLER, 2008; JABBOUR et al., 2014; FLYNN; HUANG; ZHAO, 2015; KUMAR; RAHMAN, 2016). Yawar and Seuring (2017)

claim that the stronger is the buyer-supplier relationship, the easier it is to manage social issues in supply chains and to succeed in social supplier development adoption. Given that the intrinsic nature of supplier development that have been centered in managing strategic relationships with suppliers, and the contextual similarities between social supplier development (social) and TBL supplier development (operational, environmental and social), a close buyer-supplier relationship should also be beneficial for TBL supplier development. This means, the better the buyer-supplier relationship, more easily TBL supplier development can be adopted.

Supplier evaluation mechanisms are traditionally explored in supplier development literature (KRAUSE, 1997; KRAUSE; ELLRAM, 1997a, 1997b; HANDFIELD et al., 2000; KRAUSE; SCANNELL, 2002; HUMPHREYS; LI; CHAN, 2004; WAGNER, 2010). Evaluation is essential to identify critical areas that need improvements regarding TBL dimensions, and allows buying organizations to formulate strategies to overcome related problems (AKMAN, 2015). Monitoring suppliers and giving them feedback help to create pressure to suppliers to commit with TBL practices and incorporate them on their organizational strategy (BUSSE et al., 2016). Requiring certification from suppliers, such as ISO 14001, help them to incorporate and standardize environmental practices (BAI; SARKIS, 2010; FU; ZHU; SARKIS, 2012; AKMAN, 2015; DOU; ZHU; SARKIS, 2015; AWASTHI; KANNAN, 2016; BAI; DHAVALI; SARKIS, 2016; WU, 2017). Regarding social practices, ISO 26000 certification (an international standard for social responsibility) also promotes social practices adoption and standardization in suppliers (LU; LEE; CHENG, 2012).

Communication is largely recognized by supplier development literature as an important element to its implementation (KRAUSE, 1997; WAGNER; FILLIS; JOHANSSON, 2005; BATSON, 2008; WAGNER; KRAUSE, 2009; GOVINDAN; KANNAN; HAQ, 2010; HUMPHREYS et al., 2011). Communication can facilitate TBL practices adoption in the supply chain, being generally associated with other elements, such as joint problem solving, trust, commitment, and a strategic buyer-supplier relationship on long term (BAI; SARKIS, 2010; KUMAR; RAHMAN, 2017). A formal communication system enables buying organization and suppliers to share information about TBL issues (SANCHA; LONGONI; GIMÉNEZ, 2015). It has also been reported as an important enabler to TBL supplier development, since it reinforces feedback, making suppliers aware of their goal achievements (BUSSE et al., 2016).

Factors that enable TBL SD and support its implementation can lead to a successful TBL SD development (ROUTROY; PRADHAN, 2014a). The elements raised in literature review are beneficial and support TBL SD development. These elements (internal pressure, external pressure, TBL culture at organizational and at country level, resources availability, buyer-supplier integration, communication with suppliers, and suppliers evaluation) can be considered enablers, as they enable TBL SD adoption. Hence, hypothesis 1 is presented:

Hypothesis 1: Enablers positively impacts the implementation of TBL supplier development practices.

Barriers

Concerns towards sustainable habits are increasing in developing economies, such as Brazil, India and China (JABBOUR et al., 2017). Despite of this fact, these countries are still struggling to adopt TBL practices (TSENG et al., 2016; JABBOUR et al., 2018). As an example of this, Lu, Lee and Cheng (2012) cite the case in which some suppliers intentionally added melamine in milk products to pass chemical inspection in China. Mattel had to recall several products because its suppliers from China were using lead paint (SANCHA et al., 2015). Likewise, Zara suppliers' were found to be using slavery work in Brazil (FORBES, 2011). These real life examples give an idea of hostile situations emerging countries, like Brazil, face regarding TBL practices adoption. Through the literature review it was possible to identify that some barriers for TBL supplier development. Barriers are considered as elements that cause difficulties to adopt TBL SD, that means, they are obstacles to implement the process (BUSSE et al., 2016). Through the literature review it was possible to identify that few resources available, culture differences, complexity, lack of internal support and poor communication are considered as barriers to TBL SD.

Resources are necessary to adopt TBL SD, as they enhance suppliers' capabilities and promote improvements (LU; LEE; CHENG, 2012; SUCKY; DURST, 2013). Discrepancy between buying organization and suppliers concerning cultural issues can hinder TBL SD process. These differences can take the form of language differences, or even because they are located too far away from each other (BUSSE et al., 2016; SALIMIAN; RASHIDIRAD; SOLTANI, 2017). Complexity existing in certain organizational environments are also seem as barriers to TBL SD.

Misinterpretation about TBL concept, miscommunication are examples of complexity, and they should be mitigated in order to adopt TBL SD (BUSSE et al., 2016; GOPAL; THAKKAR, 2016). Internal support is important to TBL SD adoption, since it brings top management support that is essential to create commitment, make resources available, and build TBL awareness in the organization (CHEN; ELLIS; HOLSAPPLE, 2015; BUSSE et al., 2016). Likewise, poor communication can also hinder TBL SD adoption, by weakening the information exchange (SEURING; MÜLLER, 2008). Bearing in mind the statement exposed above the following hypothesis is developed:

Hypothesis 2: Barriers negatively impacts the implementation of TBL supplier development practices.

TBL performance

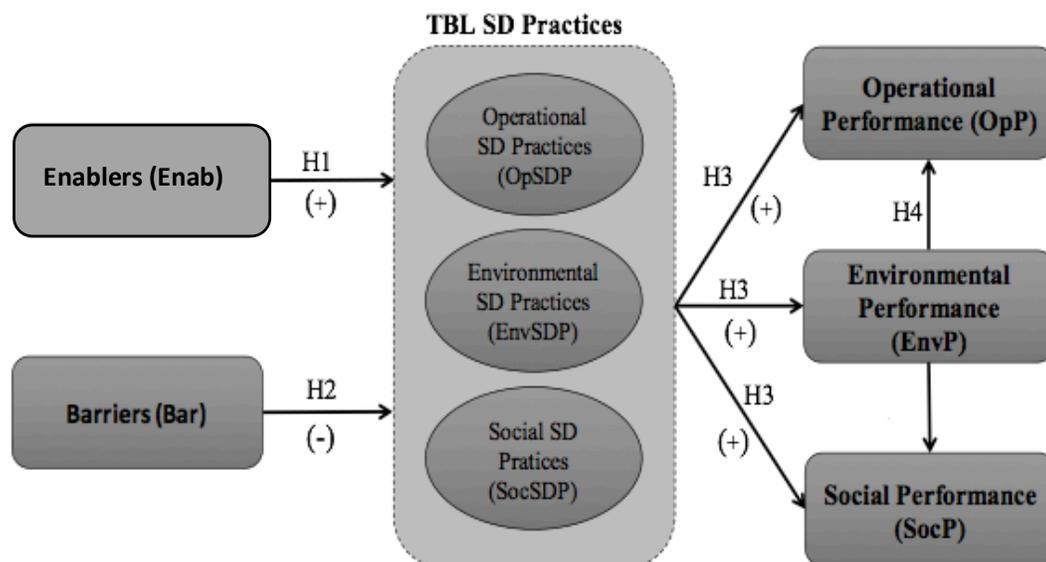
Supplier development for operational purposes is known to have a positive impact on supply chain operational performance, since many authors explored the economic effects of supplier development (KRAUSE; SCANNELL; CALANTONE, 2000; WEN-LI et al., 2003; HUMPHREYS; LI; CHAN, 2004; SÁNCHEZ-RODRÍGUEZ; HEMSWORTH; MARTÍNEZ-LORENTE, 2005; KRAUSE; HANDFIELD; TYLER, 2007; MODI; MABERT, 2007; NARASIMHAN; MAHAPATRA; ARLBJØRN, 2008; BATSON, 2008; CARR et al., 2008; SÁNCHEZ-RODRÍGUEZ, 2009; WAGNER; KRAUSE, 2009; WAGNER, 2010; HUMPHREYS et al., 2011; ARROYO-LÓPEZ; HOLMEN; BOER, 2012; LI et al., 2012; ASARE et al., 2013; NAGATI; REBOLLEDO, 2013). On the other hand, there are few studies on the effects of TBL supplier development on supply chain TBL performance. Existing research generally focus on one leg of TBL performance (either social or environmental). For example, Blome, Hollos and Paulraj (2014) found that environmental supplier development has a positive impact on suppliers' performance, as it can enable organizations to access resources and capabilities and combine them in order to achieve competitive advantage. Agan et al (2016) recognized that environmental supplier development affects positively buying organizations' financial performance and competitive advantage. Sancha et al (2015) found that social supplier development has a positive impact on suppliers' social performance and on buying organizations' operational performance.

The only research known to examine the effect of TBL supplier development practices adoption on supply chain TBL performance is the investigation of Kumar and Rahman (2016) that state that TBL supplier development practices adoption has a positive effect on social and environmental dimensions of the buying organization, but not in the operational dimension. Yet the studies on the subject are fragmented, existing research show that different supplier development purposes have a positive impact in distinct legs to TBL performance. This suggests that there are strong evidence that TBL supplier development practices adoption can be beneficial for TBL performance. Thus, the following hypothesis is formulated:

Hypothesis 3: TBL supplier development practices adoption has a positive impact in TBL performance.

The research framework based on the literature and on the hypothesis development is available on figure 8.

Figure 8- Research framework



Source: Elaborated by the author (2019)

3.2 Sample selection

To enable generalization of results a survey research approach was chosen (FLYNN et al., 1990; MENTZER, 2008). Through the survey, it was possible to gather data from 166 companies in order to test the research hypothesis. Brazilian companies that had at least some type of sustainable practices with suppliers in order to improve suppliers' outcomes were included in the sample. Only managers, specialists, coordinators, assistants, directors and other employees that were familiar with the research topic were selected. Then employees on the following area were contacted through e-mail to participate in the survey: supply chain managers, purchasing managers, sustainability managers and CSR managers (Corporate Social Responsibility). A data base containing the contact of Brazilian organizations belonging to different industrial sectors was used as primary source of data, since in Brazil there is no Supply Chain or Sustainability associations. Linked in was also used to spot potential participants, thus supply chain and sustainability related groups were accessed in order to look for managers that could participate in the research. Companies' selection occurred according to the criteria: (i) companies that are involved in sustainable initiatives; (ii) companies that have implemented supplier development initiatives; (iii) companies located in Brazil.

Initially 5000 contacts of companies belonging to different industrial sectors were contacted, and asked if they wanted to collaborate with the research. The database consisted of Brazilian companies from different industrial sectors and distinct sizes. Besides the database, 700 professionals from Linked in were also contacted to participate in the research. It was evidenced that only companies that conducted at least some sustainable activity with suppliers should answer the questionnaire. This criterion caused the number of answers response to decrease. Through the e-mails sent, the person was asked to participate in the research. If the person agreed to participate the questionnaire was sent via Qualtrics software link. All instructions on filling the questionnaire were given, including the estimate time to fill it out completely. It was also promised an executive summary contained the primary results of the research for those who would be willing to participate in the research (SELLTIZ; WRIGHTSMAN; COOK, 1987). Table 14 summarizes the amount of invitation and answers received. Companies belonging to automotive sector (12%), construction (10%), and chemical/ pharmaceutical sectors (6%) were predominant in this research. Also, 47% of the companies that participated in this research have more than 1.000 employees.

Data was collected during 2 months (August and September of 2018) and a final sample of valid 166 questionnaires were obtained. Response rates as low as 10% are common in electronic surveys (SHIH; FAN, 2008; SALEH; BISTA, 2017), thus, the response rate obtained can be considered adequate.

Table 14- Questionnaires received

Source	E-mails sent	Answers received	Valid Answers
Database	5000	202	161
Linked In	700	21	5

Source: Elaborated by the author (2019)

The total number of complete questionnaires received were 223. From this amount of answers, 166 were considered valid, other questionnaires were deleted either because they were incomplete or due to inadequacy. The remaining questionnaires answers were tabulated in an electronic spreadsheet to prepare raw input that was used in Smart PLS software version 3.

3.3 Questionnaire development

As a data collection instrument, a questionnaire was developed containing four parts: (i) TBL supplier development practices, including operational, environmental and social aspects; (ii) enablers that can contribute to TBL supplier development adoption (iii) barriers that may inhibit the process, and (iv) performance regarding operational, environmental and social aspects. The constructs used in this research are available in table 15.

Table 15- Research constructs

Criteria	Sub-Criteria	Code
Operational Practices (TBL_Oper)	Formal supplier evaluation and feedback	Q14_1
	Training	Q14_2
	Sharing Knowledge	Q14_3
	Close relationship with suppliers	Q14_4
	Direct incentives and resources	Q14_5
Environmental Practices (TBL_Environ)	Training and Information sharing	Q15_1
	Investing resources and sharing employees	Q15_2
	Processes, certification and top management support	Q15_3
Social Practices (TBL_Social)	Social concepts and sharing knowledge	Q16_1
	Evaluation, feedback and rewards	Q16_2
	Training and allocating employees	Q16_3
Enablers (Enab)	Sustainability Culture	Q7
	Resources available	Q8
	Relationship with suppliers	Q9
	Communication with suppliers	Q10
	Internal pressure	Q12
	Evaluation of suppliers	Q13
	Pressure at country level	Q6
	Pressure (community)	Q11
Barriers (Barr)	Few Resources	Q19_1
	Culture	Q19_2
	Complexity	Q19_3
	Internal support	Q19_4
	Communication	Q19_5
Environmental Performance (Env_Perf)	Adoption of environmental practices	Q20_1
	Greenhouse Gas Emission	Q20_2
	Water Management	Q20_3
	Energy Consumption	Q20_4
	Solid Waste	Q20_5
	Hazardous substances	Q20_5
	Pollution Prevention	Q20_7
Social Performance (Soc_Perf)	Reputation Risk	Q21_1
	Brand	Q21_2
	Social Media	Q21_3
Operational Performance (Oper_Perf)	Product/ service quality	Q22_1
	Total costs	Q22_2
	Delivery time to clients	Q22_3
	Purchasing costs	Q22_4
	Innovativeness	Q22_5
	Profitability	Q22_6

Source: Elaborated by the author (2019)

The scale used was a 5 points Likert scale to measure how a given barrier or influential factor was present in the organization, the scale assumed a form varying from 1 (very strong) to 5 (very weak). The most appropriate scales for measuring constructs are the 5 points and 7 points Likert, which are largely applied by researchers (RINDFLEISCH et al., 2008). Measures used

should be suitable to address the research constructs that may not be directly observable in a proper way (BOYER; SWINK, 2008). In turn, the variables used in the questionnaire were determined through the literature review.

Content validation is important, thus the domain of the construct should be well specified (CHURCHILL, 1979; MALHOTRA; GROVER, 1998). The questionnaire was pretested among academics aiming to detect problems in the questionnaire, and examine if the constructs were clear (FOWLER, 2009). The final questionnaire applied in the survey research is available in the Appendix. To increase response rate, reminders were sent to the contacts by e-mail (FROHLICH, 2002).

3.4 Data Analysis

SEM (Structural Equation Modeling) is a multivariate technique that involves factor analysis and multiple regression used to estimate a set of different multiple regression equations that are interdependent among each other by setting a structural model. PLS SEM (Partial Least Square – Structural Equation Modeling) is an alternative approach to traditional SEM, in which constructs are represented by elements based on factor analysis results, having no intention to create covariance between the items measured (HAIR et al., 2009).

PLS SEM was chosen as method in this research due to three main characteristics: (i) it is designed to explore data that are rich and is encountered at a primitive phase of development at the same time. That means, it is useful for theory development (HAIR et al., 2012), (ii) it is suitable for relatively small samples (CHIN; MARCOLIN; NEWSTEDE, 2003; REINARTZ; HAENLEIN; HENSELER, 2009; HAIR et al., 2012), (iii) it is ideal to deal with complex models that have many constructs, inner model relationships and indicator variables, using few data points. (iv) It is also able to incorporate both reflective and formative measures, at once (HAIR et al., 2012). Furthermore, it is widely used in Social Sciences and Management field of research (SARSTEDT et al., 2014).

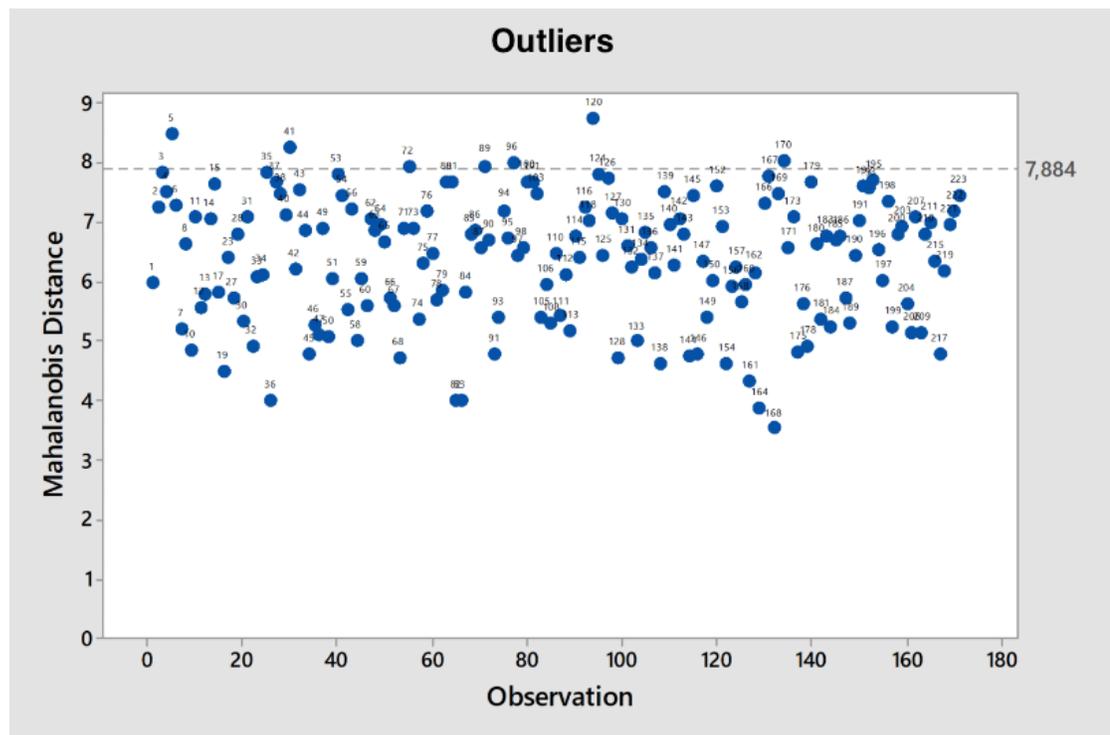
4 RESULTS

This section aims to provide details about the data analysis of the survey research conducted in this study and to describe the model construction process.

4.1 Outliers detection

Before building the model in Smart PLS, the presence of outliers was investigated through Mahalanobis distance using Minitab software. Mahalanobis distance considers the existing correlation in the data, being calculated using the inverse of the variance-covariance matrix of the data under analysis (MAESSCHALCK; JOUAN-RIMBAUD; MASSART, 2000). The initial number of questionnaires received answered in full was 223. After detecting the outliers, by applying Mahalanobis distance, the final amount of questionnaires was 166. All values above $d=7.884$ are considered outliers, than they were removed from the sample. Figure 9 shows the outliers detected through Mahalanobis distance.

Figure 9-Outliers detection through Mahalanobis distance

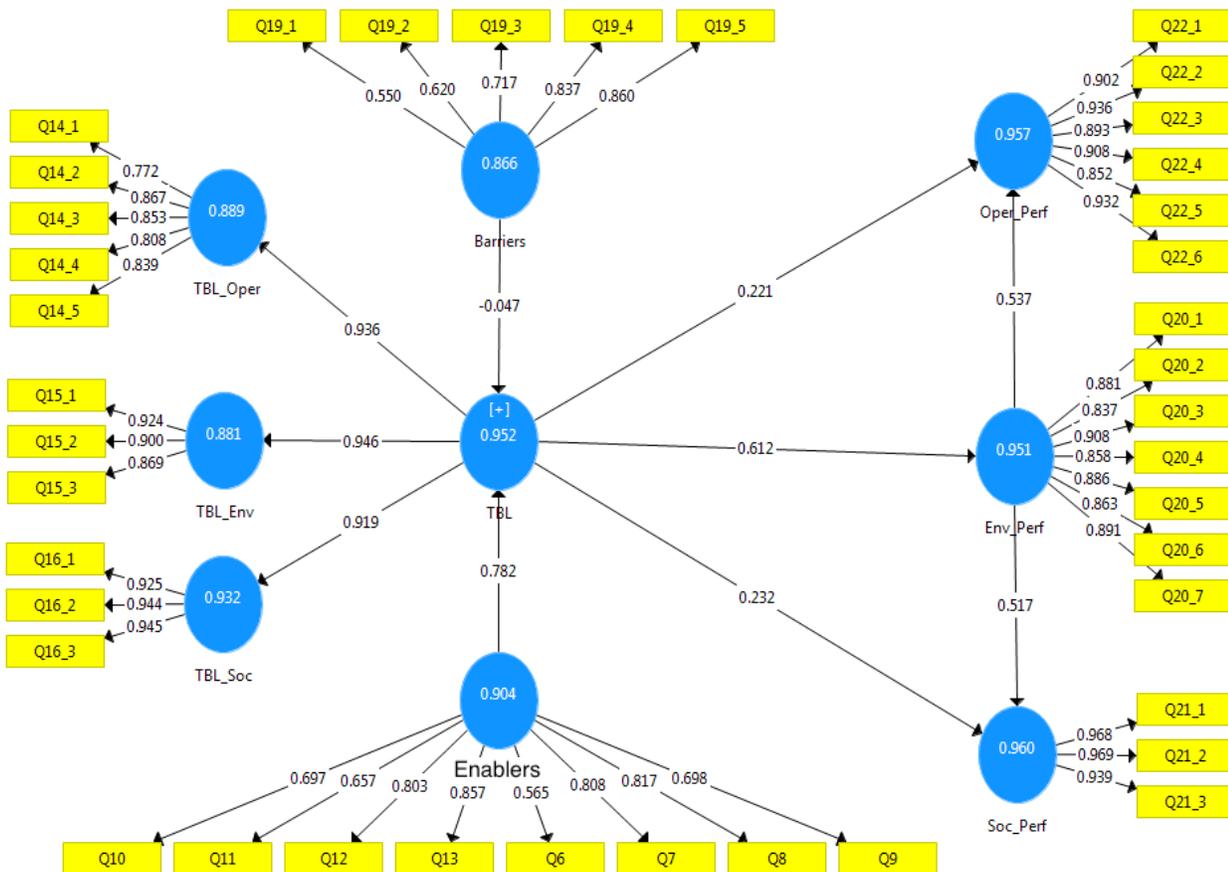


Source: Elaborated by the author (2019)

4.2 Results Analysis

The first step taken in the model results analysis was to build the model itself in Smart PLS software and attribute the relationship among the constructs. All parameters of the software remained unaltered. The model aims to evaluate how TBL supplier development practices, barriers, and enablers impact on TBL supplier development adoption and its impact on TBL performance. The model generated by the software can be found in Figure 10. The model was evaluated, in order to ensure that it meets all statistical parameters in two dimensions: (i) measurement criteria analysis, and (ii) structural model analysis. In the case that the statistical results are not satisfied, adjustments in the model should be made (REINARTZ; HAENLEIN; HENSELER, 2009; RINGLE; DA SILVA; BIDO, 2014).

Figure 10 - Original Model



Source: Elaborated by the author (2019)

Before testing the research hypothesis, the internal consistency, reliability, convergent validity, and discriminant validity of the constructs needed to be investigated (GLIGOR; HOLCOMB, 2012). The next subsections will be develop in order to address these points.

4.2.1 Reliability and Validity

While reliability represents the consistency of a measure, that means, when outcomes produced are consistent, validity is the extent to which a construct's indicators measure what they are supposed to measure (HAIR et al., 2012). Reliability and Validity measures are available on Table 16.

Table 16 - Reliability and Validity measures

Variables	Average Variance Extracted (AVE)	Cronbach's Alpha	Composite Reliability
Barriers	0.528	0.789	0.845
Env_Perf	0.766	0.949	0.958
Influ_Factors	0.553	0.882	0.907
Oper_Perf	0.818	0.955	0.964
Soc_Perf	0.919	0.956	0.971
TBL	0.672	0.951	0.957
TBL_Env	0.806	0.879	0.926
TBL_Oper	0.687	0.886	0.916
TBL_Soc	0.880	0.932	0.957

Source: Elaborated by the author (2019)

Convergent validity is ensured by evaluating AVE (Average Variance Extracted) of latent variables. AVE is the average percentage of variation explained (variance extracted) among a construct's items. An AVE of 0.5 or higher guarantees an adequate convergence. An AVE of less than 0.5 means that there are more errors remaining in the items than variance explained by the latent factor structure imposed on the measure (HAIR et al., 2012; WONG, 2013).

Table 17 analysis shows that all constructs presents AVE value \gg 0.50. Therefore, theoretically no adjustments are necessary. On the other hand, although the constructs "Influ_Factors" and "Barriers" present a satisfactory AVE value (respectively "0.553" and

“0.528”), there is still room for improvements, as these values could be higher for better results. This way, manifest variables with the lowest factorial loads were removed from the model. As AVE represents the average of the squared factorial loads, to leverage the AVE value, variables with low factorial loads should be excluded from the model (RINGLE; DA SILVA; BIDO, 2014). Figure 13 shows that the manifest variables Q19_1, Q19_2 (Barriers) and Q6, Q11 (Influ_Factors) present the lowest loads in the model, for this reason, they were deleted and the model was reanalyzed. The details are available on Table 17.

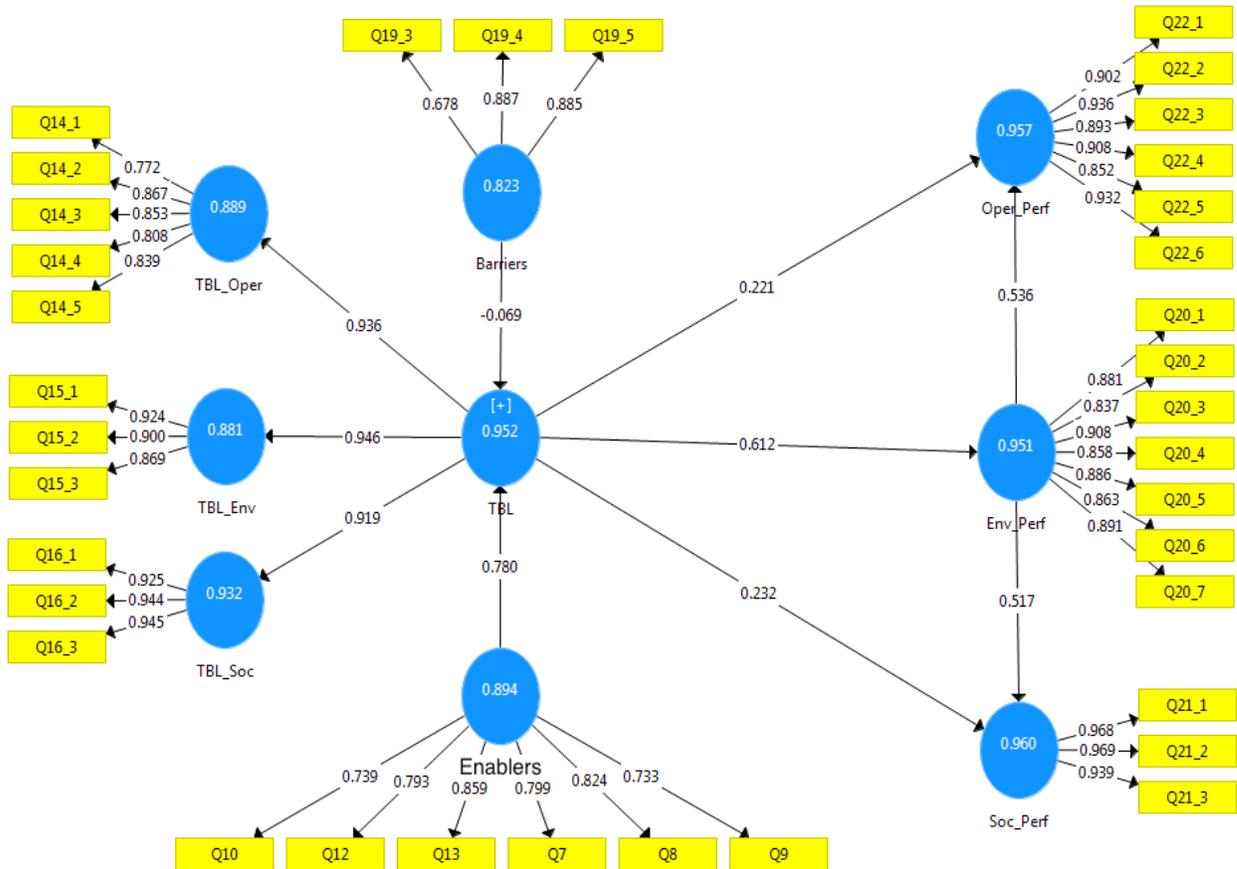
Table 17 - Excluded manifest variables

Manifest Variable	Factorial Load
Q19_1	0.550
Q19_2	0.620
Q6	0.565
Q11	0.657

Source: Elaborated by the author (2019)

After the adjustments being made in the model, new values emerged. The results are shown on table 18 and the model is available on Figure 11.

Figure 11- Adjusted Model



Source: Elaborated by the author (2019)

Table 18 - Reliability and Validity measures of the Adjusted Model

Variables	Average Variance Extracted (AVE)	Cronbach's Alpha	Composite Reliability
Barriers	0.676	0.763	0.861
Env_Perf	0.766	0.949	0.958
Influ_Factors	0.628	0.881	0.910
Oper_Perf	0.818	0.955	0.964
Soc_Perf	0.919	0.956	0.971
TBL	0.672	0.951	0.957
TBL_Env	0.806	0.879	0.926
TBL_Oper	0.687	0.886	0.916
TBL_Soc	0.880	0.932	0.957

Source: Elaborated by the author (2019)

Internal Consistency Reliability is assessed by “Cronbach’s alpha”, that is used to measure internal consistency reliability in social science research. Cronbach’s alpha ranges from 0 to 1, with values above 0.70 being accepted as a limit to reliability. Its adequacy for measuring intercorrelations among variables, makes it suitable for reliability evaluation. It verifies if the sample has no bias, or if the answers are reliable (HAIR et al., 2009; RINGLE; DA SILVA; BIDO, 2014). All Cronbach’s Alpha values obtained in the present analysis are satisfactory.

Another way to evaluate Internal Consistency Reliability is using Composite Reliability. It also aims to verify if the answers received are reliable and to examine if there is any bias in the sample. Values higher than 0.7 point out that composite reliability is present (AGUIRRE-URRETA; MARAKAS; ELLIS, 2013; RINGLE; DA SILVA; BIDO, 2014). The results analysis indicates that the composite reliability of all variables is appropriate, as they are higher than 0.7.

Indicator reliability is used to investigate the proportion of the variance of a determined indicator that can be explained by a latent variable. An outer loading higher than 0.4 is considered acceptable for exploratory research, inasmuch as outer loading values range from 0 to 1. HAIR; RINGLE; SARSTEDT, 2011; KWONG-KAY WONG, 2013). Outer loading analysis of each variable is available on Table 19. All obtained values are above 0.6, which indicates a good reliability.

For the latent variable “Barriers”, the manifest variable Q19_4 (Lack of internal support) with 0.887 load has the highest effect in building “Barriers” variable, followed by Q19_5 (Poor communication) with 0.885 load.

The manifest variables that cause most effect in building the variable “Environmental Performance” (Env_Perf) are: Q20_3 (Water Management) with 0.908 load; Q20_7 (Pollution Prevention) with 0.891 load; and Q20_5 (Solid Waste) with 0.886 load. “Enablers” is affected mostly by Q13 (Evaluation of suppliers) with 0.859 load and Q12 (Internal pressure) with 0.793 load.

In “Operational Performance” (Oper_Perf) the variables Q22_2 (Total costs) with 0.936 load; Q22_6 (Profitability) with 0.932 load; and Q22_4 (Purchasing costs) with 0.908 load cause the most effect on “Operational Performance” variable.

“Social Performance” (Soc_Perf) is affected mainly by Q21_2 (-Brand) with 0.969 load and Q22_1 (Reputation risk) with 0.968 load.

The variable “TBL SD adoption” (TBL) is mostly explained by Q15_1 (Training and information sharing for environmental reasons) with 0.885 load, Q16_3 (Training and allocating employees for social reasons) with 0.872, and Q16_1 (Social concepts and sharing knowledge for social reasons) with 0.869 load.

The variable “TBL Environmental practices” (TBL_Env) is effected mainly by Q15_1 (Training and information sharing for environmental reasons) and Q15_2 (Investing resources and training employees for environmental reasons) having 0.924 and 0.900 loads respectively.

“TBL Operational practices” (TBL_Oper) is affected mostly by Q14_2 (Training) Q14_3 (Sharing Knowledge) and Q14_5 (Direct incentives and resources), presenting the following loads 0.867, 0.853, and 0.839 in the same order.

In “TBL Social practices” (TBL_Soc) the variables Q16_3 (Training and allocating employees for social reasons) and Q16_2 (Evaluation, feedback and rewards for social reasons) explain most of the effect on it, with 0.945 and 0.944 respectively.

Table 19 - Outer loadings

Variables	Barriers	Env_Perf	Influ Factors	Oper_Perf	Soc_Perf	TBL	TBL_Env	TBL_Oper	TBL_Soc
Q10			0.739						
Q12			0.793						
Q13			0.859						
Q14_1								0.772	
Q14_1						0.717			
Q14_2								0.867	
Q14_2						0.842			
Q14_3								0.853	
Q14_3						0.769			
Q14_4								0.808	
Q14_4						0.718			
Q14_5								0.839	
Q14_5						0.820			
Q15_1							0.924		
Q15_1						0.885			
Q15_2							0.900		
Q15_2						0.846			
Q15_3							0.869		
Q15_3						0.814			
Q16_1									0.925
Q16_1						0.869			
Q16_2									0.944
Q16_2						0.845			
Q16_3									0.945
Q16_3						0.872			
Q19_3	0.678								
Q19_4	0.887								
Q19_5	0.885								
Q20_1		0.881							
Q20_2		0.837							
Q20_3		0.908							
Q20_4		0.858							
Q20_5		0.886							
Q20_6		0.863							
Q20_7		0.891							
Q21_1					0.968				
Q21_2					0.969				
Q21_3					0.939				
Q22_1				0.902					
Q22_2				0.936					
Q22_3				0.893					
Q22_4				0.908					
Q22_5				0.852					
Q22_6				0.932					
Q7			0.799						
Q8			0.824						
Q9			0.733						

Source: Elaborated by the author (2019)

4.2.2 Discriminant Validity

Discriminant validity has been widely applied to investigate relationships between latent variables. It is used to ensure that a determined construct measure is empirically unique and to verify if it represents the studied phenomena that other measures present in the model do not capture (HAIR et al., 2012; HENSELER; RINGLE; SARSTEDT, 2015). Cross Loading and Fornell Larcker criterion are presented as means to evaluate Discriminant Validity.

Cross Loading is obtained by calculating the correlations between latent variables component scores and other indicators that are placed besides its own block. The Latent Variable that is intended to measure should always present higher loads than other latent variables in each block of indicators (row) (CHIN, 1998). Table 18 illustrates the Cross Loading analysis made in this research. For instance, it can be noted in table 20 that the variable “Enablers” has a higher load than all other variables on the same row (Q7, Q8, Q9, Q10, Q12 and Q13). That means that Cross Loading evaluation delivered a satisfactory result for Discriminant Validity.

Table 20 - Cross Loading

	Barriers	Env_Perf	Influ_Factors	Oper_Perf	Soc_Perf	TBL	TBL_Env	TBL_Oper	TBL_Soc
Q10	-0,259	0,355	0,739	0,343	0,370	0,563	0,483	0,601	0,456
Q12	-0,473	0,487	0,793	0,413	0,408	0,615	0,568	0,593	0,548
Q13	-0,441	0,519	0,859	0,502	0,469	0,796	0,758	0,745	0,723
Q14_1	-0,334	0,521	0,660	0,504	0,411	0,717	0,648	0,772	0,542
Q14_2	-0,384	0,520	0,638	0,429	0,481	0,842	0,752	0,867	0,712
Q14_2	-0,384	0,520	0,638	0,429	0,481	0,842	0,752	0,867	0,712
Q14_3	-0,406	0,518	0,645	0,465	0,491	0,769	0,630	0,853	0,616
Q14_4	-0,383	0,510	0,722	0,476	0,541	0,718	0,616	0,808	0,522
Q14_5	-0,408	0,520	0,651	0,511	0,499	0,820	0,730	0,839	0,701
Q15_1	-0,404	0,520	0,705	0,470	0,448	0,885	0,924	0,776	0,802
Q15_1	-0,404	0,520	0,705	0,470	0,448	0,885	0,924	0,776	0,802
Q15_2	-0,376	0,426	0,609	0,385	0,355	0,846	0,900	0,728	0,775
Q15_3	-0,370	0,449	0,699	0,396	0,421	0,814	0,869	0,696	0,743
Q16_1	-0,425	0,560	0,702	0,493	0,475	0,869	0,791	0,742	0,925
Q16_2	-0,389	0,490	0,692	0,436	0,439	0,845	0,797	0,669	0,944
Q16_3	-0,363	0,480	0,633	0,389	0,386	0,872	0,839	0,703	0,945
Q16_3	-0,363	0,480	0,633	0,389	0,386	0,872	0,839	0,703	0,945
Q19_3	0,678	-0,235	-0,297	-0,243	-0,192	-0,252	-0,220	-0,247	-0,236
Q19_4	0,887	-0,422	-0,507	-0,375	-0,414	-0,460	-0,424	-0,448	-0,407
Q19_5	0,885	-0,301	-0,433	-0,281	-0,356	-0,410	-0,371	-0,408	-0,358
Q20_1	-0,403	0,881	0,576	0,657	0,650	0,579	0,510	0,579	0,513
Q20_2	-0,340	0,837	0,468	0,621	0,579	0,523	0,449	0,511	0,493
Q20_3	-0,329	0,908	0,581	0,591	0,583	0,584	0,504	0,592	0,516
Q20_4	-0,318	0,858	0,525	0,612	0,521	0,513	0,423	0,522	0,469
Q20_5	-0,325	0,886	0,560	0,534	0,543	0,520	0,441	0,543	0,445
Q20_6	-0,339	0,863	0,452	0,486	0,523	0,453	0,373	0,481	0,388
Q20_7	-0,387	0,891	0,570	0,587	0,617	0,555	0,458	0,581	0,487
Q21_1	-0,408	0,662	0,535	0,732	0,968	0,533	0,449	0,565	0,449
Q21_2	-0,423	0,651	0,539	0,737	0,969	0,534	0,442	0,571	0,448
Q21_3	-0,339	0,577	0,464	0,720	0,939	0,508	0,414	0,544	0,431
Q22_1	-0,378	0,659	0,540	0,902	0,742	0,527	0,442	0,568	0,428
Q22_2	-0,338	0,629	0,508	0,936	0,723	0,529	0,445	0,561	0,442
Q22_3	-0,342	0,580	0,461	0,893	0,618	0,471	0,400	0,484	0,415
Q22_4	-0,283	0,538	0,436	0,908	0,635	0,456	0,393	0,470	0,394
Q22_5	-0,359	0,605	0,500	0,852	0,702	0,476	0,394	0,493	0,420
Q22_6	-0,304	0,619	0,507	0,932	0,697	0,510	0,446	0,525	0,435
Q7	-0,482	0,616	0,799	0,487	0,483	0,612	0,547	0,613	0,534
Q8	-0,481	0,540	0,824	0,465	0,460	0,710	0,646	0,668	0,668
Q9	-0,277	0,365	0,733	0,362	0,340	0,529	0,493	0,541	0,425

Source: Elaborated by the author (2019)

Discriminant Validity is confirmed in the cases that a latent variable presents more variance in its associated indicator variables that it shares with other existing constructs of the model. For this to be true, each construct's average variance extracted (AVE) should be compared with its squared correlations with other constructs in the model. Squared AVE's value of each construct is compared with Pearson's correlations of other constructs. AVE's squared values should always be higher than the existing constructs correlations (rows and columns). As can be observed in Table 21 all constructs correlations values are above the respective AVE Squared values, then Fornell Lacker criteria is addressed (FORNELL; LARCKER, 1981; HENSELER; RINGLE; SARSTEDT, 2015).

Table 21- Fornell Larcker Criterion

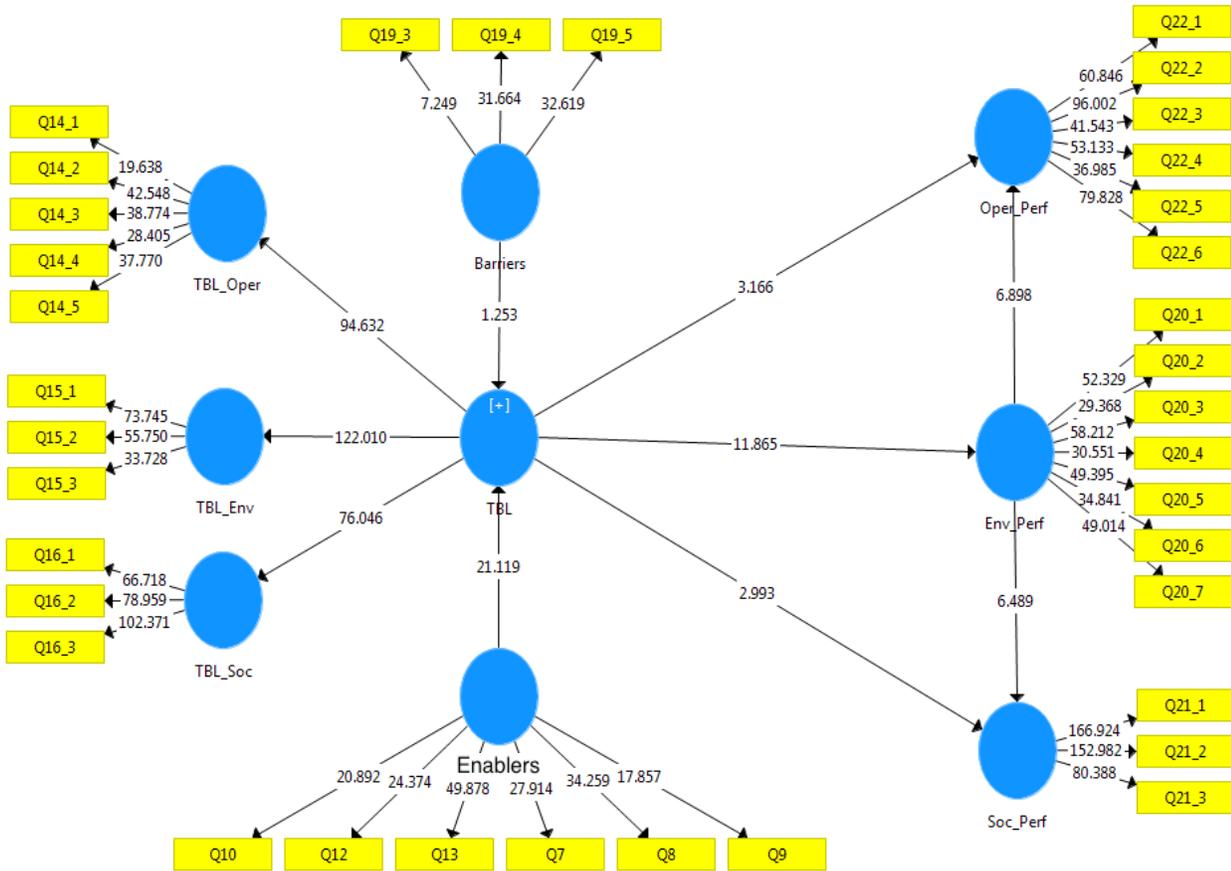
Variables	Barriers	Env_Perf	Influ Factors	Oper_Perf	Soc_Perf	TBL_ Env	TBL_ Oper	TBL _Soc
Barriers	0,822							
Env_Perf	-0,400	0,875						
Influ Factors	-0,515	0,612	0,792					
Oper_Perf	-0,371	0,672	0,546	0,904				
Soc_Perf	-0,409	0,659	0,536	0,761	0,959			
TBL_Env	-0,428	0,519	0,747	0,466	0,454	0,898		
TBL_Oper	-0,463	0,624	0,797	0,574	0,584	0,818	0,829	
TBL_Soc	-0,418	0,544	0,720	0,468	0,462	0,862	0,751	0,938

Source: Elaborated by the author (2019)

4.2.3 Correlations and regressions significance

As SEM involves Correlations and Linear regressions, existing relationships should be evaluated in order to investigate if those relationships are valid (statistically significant). Relationships are considered valid if $p \ll 0.05$. Smart PLS calculates T student test and not p values, therefore, the correct interpretation is: values higher than 1.96 are equal to p values $\ll 0.05$. It can be concluded that values higher than 1.96 demonstrate a valid relationship between the variables (HAIR et al., 2012). These values are available on Table 22. The procedure to obtain the relationship significances in Smart PLS is known as Bootstrapping (Figure 12).

Figure 12 - Adjusted Model - Bootstrapping



Source: Elaborated by the author (2019)

Table 22 - Significance analysis of the model

Variables	T Statistics	P Values	Signif	H1 Accepted
Barriers -> TBL	1.253	0.210	NS	NO
Env_Perf -> Oper_Perf	6.898	0.000	***	YES
Env_Perf -> Soc_Perf	6.489	0.000	***	YES
Influ_Factors -> TBL	21.119	0.000	***	YES
TBL -> Env_Perf	11.865	0.000	***	YES
TBL -> Oper_Perf	3.166	0.002	***	YES
TBL -> Soc_Perf	2.993	0.003	***	YES
TBL_Env -> TBL	122.01	0.000	***	YES
TBL_Oper -> TBL	94.632	0.000	***	YES
TBL_Soc -> TBL	76.046	0.000	***	YES

*p < .10. **p < .05. ***p < .01.

Source: Elaborated by the author (2019)

4.2.4 Predictive Validity

Pearson Correlation Coefficient is measured by R Squared, that indicates the endogenous variable's variance amount that can be explained by the model. R Squared values are considered small (0.196), medium (0.1304), and large (0.2592) (COHEN, 1992). Table 23 brings R Squared values found in this research. All variables present a R Squared higher than 0.2592, what means that the effects are large.

The R Squared value of 0.374 in "Environmental Performance" means that 37.4% of the variation present in this variable is caused by precedents variables. For "Operational Performance" and "Social Performance" these values are 48.1% and 46.8% respectively. 66.9% of the variation present in TBL SD Adoption variable is explained by precedents variables. 89.4% of the variation on "TBL Environmental Practices" can be explained by precedents variables. 87.6% of the variation on "TBL Operational Practices", and 84.4% of the variation in "TBL Social Performance" (TBL_Soc) are explained by their precedents variables.

Table 23- R Squared values

Variables	R Squared	Effect
Env_Perf	0.374	Large
Oper_Perf	0.481	Large
Soc_Perf	0.468	Large
TBL	0.669	Large
TBL_Env	0.894	Large
TBL_Oper	0.876	Large
TBL_Soc	0.844	Large

Source: Elaborated by the author (2019)

To ensure predictive validity Q Squared (Q^2) needs to be evaluated. It is also called Stone Geisser indicator, and it is used to verify the accuracy of the adjusted model. If Q^2 is larger than 0, the model is accurate. The nearer to 1, the more accurate a determined variable is. Q Squared evaluates the relative predictive relevance of a predictor variable on an endogenous variable. Q Squared values are obtained through Blindfolding procedure (HAIR et al., 2012). Table 24 illustrates Q^2 values obtained from the model. As can be observed all constructs present accuracy, as all of them are higher than 0.

Table 24 - Q Squared values

Variables	Q^2
Env_Perf	0.263
TBL_Env	0.682
Oper_Perf	0.364
TBL_Oper	0.563
Soc_Perf	0.402
TBL_Social	0.701

Source: Elaborated by the author (2019)

4.2.5 Effect size

In order to obtain the effect size, F Squared (F^2 or Cohen Indicator) is evaluated, aiming to assess each construct contribution to the model adjustment. It can be obtained by including and

excluding individual constructs (one by one) in the model. Reference values for F^2 are the following: a small effect occurs between 0.02 and 0.14; a medium effect is encountered when values obtained are between 0.15 and 0.34; and a large effect is found above 0.35 (COHEN, 1988; RINGLE; DA SILVA; BIDO, 2014). It can be seen on Table 25 that, as a result of the analysis, only medium and high effects can be considered a moderate effect. Medium effect is observed in Environmental Performance and Social Performance, and high effect is found in TBL SD Adoption and Environmental Performance; Enablers and TBL SD Adoption; Environmental Performance and Operational Performance; TBL SD Adoption and Environmental Practices; TBL SD Adoption and Operational Practices; and TBL SD Adoption and Social Practices. No effect was found in Barriers and TBL SD Adoption.

Table 25 - F Squared values

Variables	F²	Effect
Barriers → TBL	0.011	No effect
TBL → Env_Perf	0.597	High
Influ_Factors → TBL	1.350	High
TBL → Oper_Perf	0.059	Low
Env_Perf → Oper_Perf	0.347	High
Env_Perf → Soc_Perf	0.314	Medium
TBL → Soc_Perf	0.063	Low
TBL → TBL_Env	8.434	High
TBL → TBL_Oper	7.057	High
TBL → TBL_Soc	5.413	High

Source: Elaborated by the author (2019)

4.2.6 Path Coefficient

As a final analysis, the Path Coefficient is evaluated, in terms of linear regression' betas (β). Path coefficient varies from -1 and 1, the closer to 1, the stronger the positive relationship between the variables are. The same is true for negative values. On the other hand, values close to 0 are non significant. If the path coefficient is statistically significant its value indicates the extent to which the exogenous variable is associated with the endogenous variable. Reference values to assess the structural model intensity varies from the following ranges: 0.01 to 0.20 (very weak);

0.21 to 0.40 (weak); 0.41 to 0.70 (medium); 0.71 to 0.90 (strong); 0.90 to 1.0 (very strong) (HAIR et al., 2012; RINGLE; DA SILVA; BIDO, 2014). Table 26 shows the path coefficient results.

Table 26- Path Coefficient

Variables	Path Coefficient	Effect
Barriers → TBL	-0.069	Very weak
Env_Perf → Oper_Perf	0.536	Medium
Env_Perf → Soc_Perf	0.517	Medium
Influ_Factors → TBL	0.780	Strong
TBL_Env → TBL	0.946	Very Strong
TBL_Oper → TBL	0.936	Very Strong
TBL_Soc → TBL	0.919	Very Strong
TBL → Oper_Perf	0.221	Weak
TBL → Soc_Perf	0.232	Weak
TBL → Env_Perf	0.612	Medium

Source: Elaborated by the author (2019)

It can be seen a very strong relationship between the variables TBL Environmental Practices and TBL SD Adoption (0.946), between TBL Operational Practices and TBL SD Adoption (0.936), and between TBL Social Practices and TBL SD Adoption (0.919). A strong relationship is observed between Enablers and TBL SD Adoption (0.780).

A medium relationship occurs between TBL SD Adoption and Environmental Performance (0.612), between Environmental Performance and Operational Performance (0.536), and between Environmental Performance and Operational Performance (0.517). Existing, but although weak relationships are observed between the following variables: TBL SD Adoption and Operational Performance (0.221) and between TBL SD Adoption and Social Performance (0.232). Finally, a mild negative relationship was found between Barriers and TBL SD Adoption (-0.069).

4.3 Discussion

The results obtained will be discussed considering the literature on TBL supplier development. The discussion of the results will be guided aiming to explore the hypothesis. In the following paragraphs the research hypothesis will be tested and discussed. P value (statistical significance) will be evaluated to accept or to reject the hypothesis.

Hypothesis 1: Enablers positively impacts the implementation of TBL supplier development practices.

T Value obtained between Enablers and TBL SD Adoption is 21.119, and P value 0.000 indicating statistical significance. Hypothesis 1 is accepted, thus it can be concluded that Enablers impacts the implementation of TBL suppliers development practices in a positive way. This finding corroborates with literature (ROUTROY; SUNIL KUMAR, 2014) as enablers support TBL SD adoption and can promote a successful implementation. Also, in emerging economies, like Brazil, enablers may be seen as critical once they facilitate TBL SD adoption, and considering that TBL SD demand more efforts in terms of resources compared to the traditional SD implementation

Hypothesis 2: Barriers negatively impacts the implementation of TBL supplier development practices.

The values obtained for Barriers and TBL SD Adoption are: T value 1.253 and P value 0.210. These values are statistically non-significant, meaning that Hypothesis 2 should not be accepted. Literature claims that barriers are obstacles to TBL SD adoption, making its implementation more challenging (BUSSE et al., 2016). Despite this fact, this research has not found evidence that barriers has a negative impact on TBL SD adoption. An explanation for this may be the fact that organizations do not face barriers as a challenge for adopting TBL SD. Another reason for that may be because organizations realize barriers exist, but they are so engaged in implementing TBL SD that barriers are meaningless.

Hypothesis 3: TBL supplier development practices adoption has a positive impact in TBL performance.

TBL SD adoption and operational performance present T statistical value 3.166 and P value 0.002. TBL SD adoption and social performance demonstrate as result T value 2.993 and P value 0.003. The values for TBL SD adoption and environmental performance are T value 11.865 and P value 0.000.

TBL performance shows significance in the three dimensions analyzed (operational, social and environmental), thus hypothesis 3 is accepted, implicating that TBL supplier development practices adoption impacts TBL performance in a positive way.

Environmental Performance was found to have a positive impact in Operational Performance and to Social Performance. Implementing TBL SD adoption has shown to be positively correlated to Environmental performance. In turn, environmental performance can enhance operational and social performance as well.

The results suggest that organizations are gathering benefits from adopting TBL SD, mainly at the environmental dimension. Organizations may realize that TBL SD is more impactful at the environmental leg of TBL than on the operational and the social dimensions.

5 CONCLUSIONS

The emergence of increased concern with environmental and social issues has encouraged organizations to adopt sustainability practices in supplier management (DOU; ZHU; SARKIS, 2014; ZIMMER; FRÖHLING; SCHULTMANN, 2016). Suppliers are critical links for organizations, since they are responsible for providing materials and services, but more importantly, they are also responsible for providing inputs for buying organizations that align with the sustainability mission of that organization (AWASTHI; KANNAN, 2016). TBL SD plays a critical role in promoting TBL outcomes through the supply chain. Despite its importance, literature on TBL SD is still in early stages (BAI; DHAVALE; SARKIS, 2016).

This research aimed to investigate the impact of TBL SD adoption on organizational performance. To address the overall research goal a systematic literature review, followed by a basic literature review, and a survey research were conducted. The systematic literature review's purpose was to better understand TBL SD, identify research gaps, provide the theoretical framework and opportunities for future research. Systematic literature review also supported identifying the research constructs: practices, enablers and barriers to TBL supplier development. A complementary literature review helped to build enablers and barriers for TBL SD. In the survey 166 Brazilian organizations that had at least some form of TBL SD with suppliers participated in the study.

No previous study has contemplated the concept of TBL in supplier development in order to explore what is known about the topic. Presenting TBL outcomes are critical for the new standard of competition that is being consolidated in the market and are increasingly required for many reasons, such as competitiveness. The point is that companies cannot ignore this paradigm shift if they want to prosper in the globalized environment. Supplier development is an effective way of spreading TBL priorities across a supply chain, which, thus, should be aligned with the organization's strategy.

Through the quantitative approach it was shown that TBL SD adoption has a positive impact in all TBL dimensions (operational, environmental and social), considering that this effect is higher in the environmental dimension. In turn, it was found that environmental performance is correlated with social and operational performance. Thus, enhancing environmental performance can be beneficial for the other two TBL legs.

Enablers were found to have a positive influence in TBL SD adoption, meaning that these elements should be present for a successful implementation of the process. Although it was discovered that there is a negative correlation between barriers and TBL SD adoption there is not enough evidence to be statistically significant. Two explanations can be attributed to this phenomenon: first, organizations do not realize barriers as elements that hinder TBL SD adoption, or second, organizations are so committed in adopting TBL SD that barriers do not cause a negative impact on it.

5.1 Theoretical Implications

This research tried to address the main research gaps found through the systematic literature review, bringing contributions to the literature. Addressing these issues was key to understand the dynamics of the process. Each lacuna detected was explored and are detailed on the following paragraphs.

The present research tried to address the first gap identified in literature. By reviewing the literature it was possible to detect the primary TBL supplier development practices. QDA Miner software was essential to support the analysis of the primary practices and how they are clustered. The identification of TBL supplier development practices can be helpful as a starting point for organizations that wish to adopt the process.

This research treats TBL concept in an integrated way. The large number of papers on operational dimension of supplier development, and the limited research available on TBL supplier development, emphasize a clear gap in literature that needed to be covered. Not only research on TBL issues in supplier development is lacking, but also, frequently the TBL concept is taken in a fragmented way, referring to isolated dimensions, like, environmental or social dimension.

An important question that needed to be explored is how TBL supplier development adoption leads to an improved Supply Chain Management performance. In other words, what is the impact of TBL supplier development on the organizational performance. Measuring how each TBL dimension affects the buying organization itself and its suppliers is still a challenge. Part of this is because it is difficult to figure out what exactly should be measured.

It is critical to measure TBL supplier development outcomes, but metrics for such an end are virtually non-existent. What metrics should be used for measuring TBL supplier development

success in all TBL dimension (operational, environmental and social) still not fully clear. For example, should the same metrics be used both at suppliers and at buying organizations? Measuring the social dimension is very challenging. One of the reasons for that is because social issues are qualitative in nature and they are difficult to be measured. Examples of that include human rights, working and living conditions, prejudice, discrimination and harassment. Another point is that social dimension reflects on organizations' image and how to quantify it properly is a challenge.

Although many studies investigate supplier development practices in general, research exploring the enablers to supplier development are few, especially when considering TBL supplier development. Understanding what are the enablers that facilitate implementing TBL supplier development, increasing the chances of success and helping to mitigate existing barriers is critical. Implementing the right enablers to support TBL practices adoption can result in a process adoption with less struggles. This can be especially true for developing economies, in which instability is present in a greater extent.

Studies focusing on what are the barriers that can hinder the adoption of TBL supplier development are scarce (for both Operational and TBL supplier development). This research tried to identify the primary barriers to supplier development for TBL outcomes. Understanding the primary barriers both for the buying organization and for the suppliers should help to better identify the challenges faced by both sides, and to develop joint actions to overcome these barriers. Formulating strategies to fight barriers effectively is key to get a successful TBL supplier development adoption.

5.2 Managerial Implications

Considering that TBL concerns are becoming increasingly important in the current context, TBL supplier development plays a critical role in improving TBL outcomes. As TBL SD is a relatively recent topic, making knowledge available about what are the practices, enablers and barriers can help managers to take better decisions regarding TBL SD.

This study can contribute empirically by demonstrating that adopting TBL SD causes a positive impact on environmental, operational and social performance of many companies. It was also found that an enhanced environmental performance leads to improvements on operational and

social dimensions. This fact can encourage organizations wishing to adopt TBL SD regarding its effect on organizational performance.

Even though this research is conducted in a Brazilian environment, this research brings insights for developing economies. Considering that TBL SD is even more challenging in these environments, obtained results can be expanded to similar context, that have alike structure, economical oscillations, and financial scarcity. This picture from Brazilian context can be useful to TBL SD adoption in scenarios in which TBL awareness still not being the priority due to the focus on more basic issues like operational aspects (financial), although companies are starting to adhere TBL SD as an organizational strategy.

5.3 Limitations and Further Opportunities for Future Research

The first limitation of this research includes the fact that only buying organizations participated in this study. Organizational performance was assessed by asking the buying organization about the suppliers' performance. Ideally, suppliers should also be included in the research, but due to time restrictions it was not possible. As a second limitation, although this research examined pressures from country level and from community as external pressures, this study does not include the role of coercive pressures, such as governmental laws, and legislation.

This study also brings further opportunities for future research that were not detected while developing this study:

Dyadic perspective: Considering the suppliers perspective is essential in investigating TBL SD issues. As TBL SD is a joint effort conducted by buying organization and suppliers understanding suppliers' challenges and motivations to engage in TBL SD is critical to obtain improved results.

Upstream supply chain dissemination: TBL supplier development only makes sense if the whole upstream supply chain also delivers TBL outcomes. That means, in order to tier 1 supplier to achieve TBL results, it should spread TBL practices acquired from buying organization to its own suppliers. How these TBL supplier development practices are disseminated upstream in the

supply chain remain not understood. Since the alignment of the whole upstream supply chain with TBL initiatives is critical to TBL supplier development adoption, investigating how these practices are disseminated upstream should be valuable for achieving an actual TBL supply chain.

Antecedents for TBL supplier development: Part of existing research focus on investigating the role of mimetic, coercive and normative pressures to understand what motivates organizations to adopt TBL supplier development, environmental supplier development, or either social supplier development. There is still another form of pressure that need to be further investigated: the reputation of the organization. It is very likely that organizations adopt TBL supplier development in order to improve their own company image, mitigate risks associated with poor TBL performing suppliers and promote their brand in the marketing. It is worth to investigate if TBL supplier development assumes a strategic nature as means of gaining competitive advantage rather than responding to coercive and normative pressures.

Role of inter-organizational coordination mechanisms: Supplier development is known to be an inter-organizational process that demands efforts from both sides (buying organization and suppliers). Managing issues that occur at the inter-organizational level should be useful to better manage TBL supplier development practices. Investigating what are the inter-organizational coordination mechanisms that can support TBL supplier development adoption is equally desirable.

Role of cross-functional integration: Different from operational supplier development, TBL supplier development demands the joint effort from different functional areas in order to be successfully adopted, such as Supply Chain Management, Purchasing, Operations, Sustainability, CSR (Corporate Social Responsibility), among others. How these distinct functional areas work together to carry TBL supplier development adoption has not been investigated. What is the role of cross-functional integration in TBL supplier development is a prospective research topic. However, studies covering this gap are still lacking.

Supply Chain Resilience: Supplier development is critical to mitigate supply chain risks, such as disruptions. Underperforming suppliers can cause serious threatens to supply chain, in case they don't have the necessary capabilities. Improving poor suppliers' capabilities is critical to prevent disruptions. In special, TBL supplier development involves greater risks regarding environmental and social issues. Managing these risks through TBL supply development can help

building a more resilient supply chain. Exploring how TBL supplier development supports mitigating supply chain risks is a relevant research opportunity.

Intellectual property issue: A final consideration that has not been explored is how to prevent intellectual property issues under TBL supplier development context. Suppliers may be reluctant to be developed by buying organizations, once its process will need to be changed and molded by buying organization's interests. Supplier's competences that can be providing competitive advantage also need to be accessed by the buying organization. This can be challenging if the buying organization also works with a suppliers' competitor. Thus, how can suppliers protect their intelligence property while being in a supplier development process is a question that need to be addressed.

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APPENDIX A

Invitation Letter

IMPROVING SUPPLIERS' SUSTAINABILITY RESULTS

Dear participant,

My name is Carolina and I am a researcher at University of Sao Paulo and at University of Tennessee. I would like to invite you to participate in a global research project that aims to explore sustainable attitudes at your organization towards suppliers. I am Brazil's local collaborator in this project.

Our request. You are being contacted to respond to a survey that includes questions about sustainable attitudes. This survey should take approximately only 5 minutes to complete. In this survey you will be asked about individual perceptions of your organization's attitudes towards the improvement of suppliers' sustainable outcomes. Companies that have at least some form of sustainable attitudes with suppliers are welcomed to participate.

Confidentiality. All information provided will be kept strictly confidential. All data will only be located in a centralized research hub only assessable to the research team.

Benefits. For your participation in this project you will receive a personal feedback report about your organization's performance regarding sustainable results. Furthermore, there are no foreseeable risks or discomforts to you if you agree to participate in the study.

For further information. If you would like to know more about the project or the research team, please feel free to contact me Carolina.belotti@usp.br.

To participate. You can access your survey by clicking on the following link: https://utk.co1.qualtrics.com/jfe/form/SV_802xq1Ku77ANhAx

We thank you for spending your valuable time and effort in making this survey effective.

Sincerely,

Carolina Belotti Pedroso
PhD Candidate - University of Sao Paulo
Visiting Scholar - University of Tennessee
carolina.belotti@usp.br
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Luiz Cesar Ribeiro Carpinetti, PhD
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Wendy Tate, PhD
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Department of Marketing & Supply Chain Management

APPENDIX B
Survey Research

English ▼



IMPROVING SUPPLIERS' SUSTAINABILITY RESULTS

Welcome to the Improving Suppliers' Sustainability Results Survey, which is an initiative of the University of Tennessee in partnership with the University of Sao Paulo.

This study is intended for companies that have tried to improve suppliers' sustainable results.

Our goal with this survey is to understand how organizations implement sustainable practices to improve suppliers' results.

In the context of this research sustainability refers to financial, environmental and social aspects.

This study consists of 4 sections: general information about your company; sustainable practices and enablers; barriers; and performance. The whole process will last for approximately 5 minutes. This survey can be answered either in English or in Portuguese.

Your responses will be confidential and will be used for research purposes ONLY. We do not collect identifying information such as your name, email address, etc.

Each participant will receive a copy of our report containing the main outcomes of this study.

Feel free to contact us if you need any additional information. We will be happy to assist you. Please contact us under the following e-mail: carolina.belotti@usp.br

Continue

ELECTRONIC CONSENT:

Clicking on the “—>” button below indicates that:

- you have read the above information
- you voluntarily agree to participate
- at some point in your life, you worked at a business company

If you do not wish to participate in this research, please leave this website or close your web browser.

WE APPRECIATE YOUR EFFORT IN RESPONDING TO THIS SURVEY

Please, remember to provide responses that reflect what you actually think and believe and not what you think you should think or believe. Confidentiality is guaranteed.

Carolina Belotti Pedrosa

PhD Candidate - University of Sao Paulo

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Department of Industrial Engineering

Wendy Tate, PhD

Associate Professor, University of Tennessee

Department of Marketing & Supply Chain Management

Continue

1. GENERAL INFORMATION

Position:

Director	Coordinator	Specialist	Manager	Analyst	Other
<input type="radio"/>	<input type="text"/>				

2. Function

Supply Chain	Purchasing	Sustainability	CSR	Other
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

3. Industrial sector

- Automotive
- Electronics
- Chemical/ Pharmaceutical
- Mining
- Industrial equipment
- Steel production
- Tobacco
- Aerospace
- Brewing industry/ Beverages
- Food industry
- Textile industry
- Energy industry/ natural gas
- Metal
- Paper
- Telecommunications
- University
- Construction
- Banking & Financial
- Other

Continue

4. Country

5. Number of employees

less than 100

100-500

500-1000

more than 1000

PRACTICES AND ENABLERS

6. How do you view the sustainability orientation of the country in which your organization is headquartered ?

- not at all sustainable
- slightly sustainable
- somewhat sustainable
- moderately sustainable
- extremely sustainable

7. How do you view the sustainability culture of your organization?

- not at all sustainable
- slightly sustainable
- somewhat sustainable
- moderately sustainable
- extremely sustainable

Continue

8. How would you classify the investment of resources destined by your organization to improve supply chain sustainability ?

- Extremely low
 - Moderately low
 - Neutral
 - Moderately high
 - Extremely high
-

9. How would you classify the relationship of your company with important suppliers* ?

**Important suppliers: suppliers that your company have a close, strategic and long term relationship*

- Not close at all
 - Slightly close
 - Somewhat close
 - Moderately close
 - Extremely close
-

10. How would you classify the communication* of your company with important suppliers?

**Communication: Involves clear communication with suppliers, information is exchanged in a transparent way, and information is easily shared with suppliers.*

- Not frequent at all
- Slightly frequent
- Somewhat frequent
- Moderately frequent
- Extremely frequent

Continue

11. How would you classify the external pressure* suffered by your organization from customers, government, media, community and NGOs towards sustainability?

**External pressures: pressures made by customers, government, legislation, NGOs, and the community in general in order to the organization to adopt environmental and social practices.*

- Extremely low
 - Moderately low
 - Neutral
 - Moderately high
 - Extremely high
-

12. How would you classify the internal pressure* suffered by your organization from employees (like top management, and other employees) towards sustainability?

**Internal pressures: pressures made by internal employees in order to the organization to adopt environmental and social practices.*

- Extremely low
 - Moderately low
 - Neutral
 - Moderately high
 - Extremely high
-

13. How often does your company evaluate* suppliers' sustainability performance?

**Evaluation: Evaluating suppliers' performance regarding sustainable issues, monitoring, auditing them and demanding certifications.*

- Never
- Rarely
- Sometimes
- Often
- Always

Continue

14. How frequently does your company use the following activities to improve suppliers' financial performance?

	Never	Rarely	Sometimes	Often	Always
Formal supplier evaluation and feedback	<input type="radio"/>				
Training	<input type="radio"/>				
Sharing knowledge	<input type="radio"/>				
Close relationship with important suppliers	<input type="radio"/>				
Direct incentives and resources investments	<input type="radio"/>				

15. How frequently does your company use the following activities to improve suppliers' results?

	Never	Rarely	Sometimes	Often	Always
Training suppliers, and sharing information on environmental initiatives.	<input type="radio"/>				
Investing resources in suppliers, and transferring employees to suppliers to solve environmentally technical problems.	<input type="radio"/>				
Adopting environmental processes and certifications, creating support from top management.	<input type="radio"/>				

Continue

16. How frequently does your company use the following activities to improve suppliers' results?

	Never	Rarely	Sometimes	Often	Always
Discussing and implementing social concepts and sharing social knowledge with suppliers.	<input type="radio"/>				
Detecting suppliers' poor social performance and measuring suppliers' social performance, giving feedback and rewards to suppliers.	<input type="radio"/>				
Training suppliers to improve social performance and allocating experts to help suppliers with social issues	<input type="radio"/>				

17. Have you seen improvements in economic, environmental and social practices at the supplier since supplier development* initiatives were implemented?

**Sustainable supplier development: when your company help suppliers to improve their results in the following dimensions – environmental, social and financial.*

- Lots of improvements
- Moderate improvements
- Some improvements
- Slight improvements
- No improvements

Continue

18. Have you seen improvements in economic, environmental and social practices at your organization since supplier development* initiatives were implemented?

**Sustainable supplier development: when your company help suppliers to improve their results in the following dimensions – environmental, social and financial.*

- Lots of improvements
- Moderate improvements
- Some improvements
- Slight improvements
- No improvements

BARRIERS

19. Please, indicate whether each of the following attributes below impedes suppliers' sustainable results.

**Resources: Few resources are available to improve suppliers' sustainable results, making suppliers' sustainable results improvement more difficult.*

**Cultural differences: Suppliers' culture is very different from your company, making suppliers' sustainable results improvement more difficult.*

**Complexity: Coordinating activities with suppliers is challenging, making suppliers' sustainable results improvement more difficult. "Being sustainable" can mean different things, for different people at your company and for suppliers, making suppliers' sustainable results improvement more difficult.*

**Internal support: Your company is unconcerned with sustainable issues, making suppliers' sustainable results improvement more difficult. Top managers are unconcerned with sustainable issues, making suppliers' sustainable results improvement more difficult.*

**Communication: Communication is weak between your company and suppliers, and information sharing is difficult, making suppliers' sustainable results improvement more difficult.*

Continue

	Not a barrier	Somewhat of a barrier	Moderate barrier	Often barrier	Extreme barrier
Resources* (Examples: high costs, firm size, and lack of resources).	<input type="radio"/>				
Culture* (Examples: cultural differences, socio-economic differences, and location and linguistic distance).	<input type="radio"/>				
Complexity* (Examples: coordination complexity, complexity in sustainability concept, and organizational complexity).	<input type="radio"/>				
Internal Support* (Examples: lack of TBL awareness, and lack of top management support).	<input type="radio"/>				
Communication* (Example: Insufficient communication in supply chain).	<input type="radio"/>				
Other: <input type="text"/>	<input type="radio"/>				

Continue

PERFORMANCE

20. Based on the suppliers' sustainable results improvement, how would you judge your own company' performance regarding:

	Lots of improvements	Moderate improvements	Some improvements	Slight improvements	No improvements
Increased adoption of environmental practices	<input type="radio"/>				
Greenhouse Gas Emissions	<input type="radio"/>				
Water Management	<input type="radio"/>				
Energy Consumption	<input type="radio"/>				
Solid Waste	<input type="radio"/>				
Hazardous Substances	<input type="radio"/>				
Pollution Prevention	<input type="radio"/>				

21. Based on the suppliers' sustainable results improvement, how would you judge your own company' performance regarding:

	Lots of improvements	Moderate improvements	Some improvements	Slight improvements	No improvements
Reputation Risk	<input type="radio"/>				
Brand	<input type="radio"/>				
Social Media	<input type="radio"/>				

APPENDIX C

Primary supplier development practices (operational)

Practices	Primary Authors
Formal supplier evaluation and feedback (55)	(WATTS; HAHN, 1993; KRAUSE, 1997; KRAUSE; ELLRAM, 1997a, 1997b; KRAUSE; HANDFIELD; SCANNELL, 1998; HANDFIELD et al., 2000; KRAUSE; SCANNELL, 2002; HUMPHREYS; LI; CHAN, 2004; LI et al., 2007; BATSON, 2008; WAGNER; KRAUSE, 2009; WAGNER, 2010).
Training suppliers (48)	(HARTLEY; CHOI, 1996; KRAUSE, 1997; KRAUSE; ELLRAM, 1997a, 1997b; KRAUSE; HANDFIELD; SCANNELL, 1998; KRAUSE; RAGATZ; HUGHLEY, 1999; HANDFIELD et al., 2000; KRAUSE; SCANNELL, 2002; BATSON, 2008; SUCKY; DURST, 2013).
Knowledge transfer (34)	(HARTLEY; JONES, 1997; WAGNER; FILLIS; JOHANSSON, 2005; WILLIAMS, 2007; LI et al., 2007; GIANNAKIS, 2008; PHUSAVAT; KESS; TORKKO, 2008; WAGNER; KRAUSE, 2009; WAGNER, 2010; SUCKY; DURST, 2013; CHEN; ELLIS; HOLSAPPLE, 2015; KIM; HUR; SCHOENHERR, 2015).
Buyer supplier relationship (40)	(WATTS; HAHN, 1993; KRAUSE, 1997; KRAUSE; ELLRAM, 1997a, 1997b; KRAUSE; HANDFIELD; SCANNELL, 1998; KRAUSE; RAGATZ; HUGHLEY, 1999; QUAYLE, 2000; HUMPHREYS; LI; CHAN, 2004; HUMPHREYS et al., 2011; KUMAR; RAHMAN, 2016; JOSHI et al., 2017).
Direct incentives and investments (35)	(HARTLEY; CHOI, 1996; KRAUSE, 1997; KRAUSE; ELLRAM, 1997a; KRAUSE; SCANNELL, 2002; WAGNER, 2006, 2010; BAI; SARKIS, 2011; PRAXMARER-CARUS; SUCKY; DURST, 2013; SUCKY; DURST, 2013; DALVI; KANT, 2015).
Communication (32)	(WATTS; HAHN, 1993; KRAUSE, 1997; KRAUSE; ELLRAM, 1997a; KRAUSE; HANDFIELD; SCANNELL, 1998; WAGNER; FILLIS; JOHANSSON, 2005; MCGOVERN; HICKS, 2006; WILLIAMS, 2007; GOVINDAN; KANNAN; HAQ, 2010; HUMPHREYS et al., 2011; PRAXMARER-CARUS; SUCKY; DURST, 2013; ROUTROY; SUNIL KUMAR, 2014).
Site visits (32)	(HARTLEY; CHOI, 1996; HARTLEY; JONES, 1997; KRAUSE, 1997; KRAUSE; ELLRAM, 1997a; KRAUSE; HANDFIELD; SCANNELL, 1998; WAGNER, 2006; LI et al., 2007; GOVINDAN; KANNAN; HAQ, 2010; NAGATI; REBOLLEDO, 2013; CHEN; ELLIS; SURESH, 2016; GLOCK; GROSSE; RIES, 2017).
Physical asset and capabilities support (31)	(HARTLEY; CHOI, 1996; HARTLEY; JONES, 1997; KRAUSE, 1997; KRAUSE; ELLRAM, 1997a; KRAUSE; HANDFIELD; SCANNELL, 1998; LI et al., 2007; GOVINDAN; KANNAN; HAQ, 2010; NAGATI; REBOLLEDO, 2013; CHEN; ELLIS; SURESH, 2016; GLOCK; GROSSE; RIES, 2017).
Supplier certification (27)	(KRAUSE, 1997, 1999; KRAUSE; ELLRAM, 1997a; KRAUSE; HANDFIELD; SCANNELL, 1998; BATSON, 2008; GOVINDAN; KANNAN; HAQ, 2010; MORTENSEN; ARLBJØRN, 2012; ROUTROY; PRADHAN, 2014a; ROUTROY; SUNIL KUMAR, 2014; ROUTROY; PRADHAN; SUNIL KUMAR, 2016).
Competitive pressure (27)	(HARTLEY; CHOI, 1996; KRAUSE, 1997, 1999; KRAUSE; ELLRAM, 1997a; HANDFIELD et al., 2000; KRAUSE; SCANNELL, 2002; WAGNER, 2010, 2006; HUMPHREYS et al., 2011; NAGATI; REBOLLEDO, 2013; DOU; ZHU; SARKIS, 2015).
Joint actions (26)	(LASCELLES; DALE, 1990; HARTLEY; CHOI, 1996; HARTLEY; JONES, 1997; KRAUSE, 1997; HANDFIELD et al., 2000; HUMPHREYS; LI; CHAN, 2004; LI et al., 2007; WAGNER, 2011; PRAXMARER-CARUS; SUCKY; DURST, 2013; KUMAR; RAHMAN, 2016).
Information sharing (30)	(HARTLEY; JONES, 1997; KRAUSE; ELLRAM, 1997a; HANDFIELD et al., 2000; WAGNER; FILLIS; JOHANSSON, 2005; GIANNAKIS, 2008; BAI; SARKIS, 2011; PRAXMARER-CARUS; SUCKY; DURST, 2013; CHEN; ELLIS; HOLSAPPLE, 2015; DALVI; KANT, 2017).
Performance expectation (21)	(KRAUSE; ELLRAM, 1997a, 1997b; HANDFIELD et al., 2000; HUMPHREYS; LI; CHAN, 2004; WAGNER; FILLIS; JOHANSSON, 2005; LI et al., 2007; WAGNER, 2011; DALVI; KANT, 2015).
Co-location (23)	(KRAUSE; HANDFIELD; SCANNELL, 1998; KRAUSE, 1999; HANDFIELD et al., 2000; HUMPHREYS; LI; CHAN, 2004; WAGNER, 2006; LI et al., 2007; BATSON, 2008; WAGNER; KRAUSE, 2009; KURESHI; FAHEEM; ALI, 2009; BAI; SARKIS, 2011; HUMPHREYS et al., 2011; ROUTROY; PRADHAN, 2014a, 2013).

Technology and operational support (18)	(HARTLEY; CHOI, 1996; HARTLEY; JONES, 1997; KRAUSE, 1997; BATSON, 2008; WAGNER; KRAUSE, 2009; MORTENSEN; ARLBJØRN, 2012; AKMAN, 2015; DALVI; KANT, 2015; REZAEI; WANG; TAVASSZY, 2015).
Human support (13)	(HARTLEY; JONES, 1997; HUMPHREYS; LI; CHAN, 2004; WAGNER, 2006, 2011; LI et al., 2007; WAGNER; KRAUSE, 2009; DALVI; KANT, 2015, 2017; CHEN; ELLIS; SURESH, 2016).
Financial support (20)	(KRAUSE, 1997; WAGNER, 2006, 2010; LI et al., 2007; GIANNAKIS, 2008; GOVINDAN; KANNAN; HAQ, 2010; BAI; SARKIS, 2011; PRAXMARER-CARUS; SUCKY; DURST, 2013; SUCKY; DURST, 2013; KUMAR; RAHMAN, 2016).
Future business (14)	(KRAUSE, 1997; KRAUSE; ELLRAM, 1997a; KRAUSE; HANDFIELD; SCANNELL, 1998; WAGNER, 2006; CHIDAMBARANATHAN; MURALIDHARAN; DESHMUKH, 2009; HUMPHREYS et al., 2011; ROUTROY; PRADHAN, 2013; CHEN; ELLIS; HOLSAPPLE, 2015).
Goal setting (12)	(KRAUSE; HANDFIELD; SCANNELL, 1998; HUMPHREYS; LI; CHAN, 2004; HUMPHREYS et al., 2011; AHMED; HENDRY, 2012; MORTENSEN; ARLBJØRN, 2012).

APPENDIX D

Primary supplier development enablers (operational)

Enablers	Primary Authors
Incentives and rewards (40)	(HARTLEY; JONES, 1997; KRAUSE, 1997, 1999, KRAUSE; ELLRAM, 1997a, 1997b; KRAUSE; HANDFIELD; SCANNELL, 1998; HANDFIELD et al., 2000; KRAUSE; SCANNELL, 2002; HUMPHREYS; LI; CHAN, 2004; LI et al., 2007; WAGNER, 2010; ROUTROY; PRADHAN, 2013; CHEN; ELLIS; SURESH, 2016).
Trust and collaboration (28)	(HARTLEY; CHOI, 1996; HARTLEY; JONES, 1997; KRAUSE, 1997; KRAUSE; HANDFIELD; SCANNELL, 1998; DUNN; YOUNG, 2004; SAKO, 2004; HUMPHREYS; LI; CHAN, 2004; LI et al., 2007; HUMPHREYS et al., 2011; ROUTROY; PRADHAN, 2013; REZAEI; WANG; TAVASSZY, 2015).
Top management support (33)	(HARTLEY; CHOI, 1996; KRAUSE; ELLRAM, 1997b; KRAUSE; HANDFIELD; SCANNELL, 1998; KRAUSE, 1999; HANDFIELD et al., 2000; QUAYLE, 2000; MCGOVERN; HICKS, 2006; GOVINDAN; KANNAN; HAQ, 2010; BAI; SARKIS, 2011; ROUTROY; PRADHAN, 2013).
Effective communication and feedback (24)	(KRAUSE; ELLRAM, 1997a, 1997b; KRAUSE, 1999; WEN-LI et al., 2003; DUNN; YOUNG, 2004; HUMPHREYS; LI; CHAN, 2004; BATSON, 2008; GIANNAKIS, 2008; SHOKRI; NABHANI; HODGSON, 2010; PRAXMARER-CARUS; SUCKY; DURST, 2013; CHEN; ELLIS; SURESH, 2016).
Long term goals (17)	(KRAUSE; ELLRAM, 1997a; HANDFIELD et al., 2000; WEN-LI et al., 2003; HUMPHREYS; LI; CHAN, 2004; CHIDAMBARANATHAN; MURALIDHARAN; DESHMUKH, 2009; WAGNER; KRAUSE, 2009; GOVINDAN; KANNAN; HAQ, 2010; BAI; SARKIS, 2011; HUMPHREYS et al., 2011; ROUTROY; PRADHAN, 2013).
Cross-functional integration (17)	(HARTLEY; CHOI, 1996; KRAUSE; ELLRAM, 1997a, 1997b; KRAUSE; HANDFIELD; SCANNELL, 1998; HANDFIELD et al., 2000; QUAYLE, 2000; WEN-LI et al., 2003; HUMPHREYS; LI; CHAN, 2004; HUMPHREYS et al., 2011; SUCKY; DURST, 2013; AGAN et al., 2016).

APPENDIX E

Primary supplier development barriers (operational)

Barriers	Primary Authors
Few resources available (10)	(HARTLEY; CHOI, 1996; HANDFIELD et al., 2000; WAGNER; FILLIS; JOHANSSON, 2005; WILLIAMS, 2006; BATSON, 2008; WAGNER; KRAUSE, 2009; AHMED; HENDRY, 2012; MORTENSEN; ARLBJØRN, 2012; SUCKY; DURST, 2013; KUMAR; ROUTROY, 2017).
Poor communication (9)	(LASCELLES; DALE, 1990; KRAUSE; ELLRAM, 1997a, 1997b; KRAUSE; RAGATZ; HUGHLEY, 1999; WAGNER; FILLIS; JOHANSSON, 2005; AHMED; HENDRY, 2012; MORTENSEN; ARLBJØRN, 2012; SUCKY; DURST, 2013; KUMAR; ROUTROY, 2017).
Lack of organizational culture alignment (7)	(HANDFIELD et al., 2000; BATSON, 2008; GIANNAKIS, 2008; AHMED; HENDRY, 2012; MORTENSEN; ARLBJØRN, 2012; SUCKY; DURST, 2013; SUNIL KUMAR; ROUTROY, 2017).
Lack of buying organization's credibility (6)	(LASCELLES; DALE, 1990; KRAUSE; ELLRAM, 1997a, 1997b; AHMED; HENDRY, 2012; MORTENSEN; ARLBJØRN, 2012; SUCKY; DURST, 2013; KUMAR; ROUTROY, 2017).
Lack of trust (6)	(HANDFIELD et al., 2000; WAGNER; FILLIS; JOHANSSON, 2005; BATSON, 2008; AHMED; HENDRY, 2012; MORTENSEN; ARLBJØRN, 2012; KUMAR; ROUTROY, 2017).
Lack of supplier commitment (6)	(HANDFIELD et al., 2000; WAGNER; FILLIS; JOHANSSON, 2005; BATSON, 2008; AHMED; HENDRY, 2012; MORTENSEN; ARLBJØRN, 2012; KUMAR; ROUTROY, 2017).
Supplier complacency (5)	(LASCELLES; DALE, 1990; KRAUSE; ELLRAM, 1997b; MORTENSEN; ARLBJØRN, 2012; SUCKY; DURST, 2013; SUNIL KUMAR; ROUTROY, 2017).