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ARTICLE

Cultural traits, infrastructure and feedback mechanisms as barriers to supply chain management in Brazil

Traços culturais, infraestrutura e mecanismos de reforço como barreiras para a gestão de cadeias de suprimento no Brasil

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Abstract: The supply chain management (SCM) practices have been consolidated as important tools for increasing productivity and, consequently, business competitiveness. This study shows that peculiar aspects of culture and infrastructure in Brazil become barriers to collaboration and integration, which helps to justify the country's difficulty in inserting its companies into global supply chains. Based on the content analysis of interviews with prominent SCM executives in the country, this work formulates a SCM model contextualized to the Brazilian reality covering three cultural traits and three infrastructural traits. Fourteen propositions offer a fine-grained analysis of feedback mechanisms between said traits that perpetuate the gap between SCM theory and the Brazilian practice, hindering the advancement of SCM in Brazil. The model offers a guide for companies that aim to unclog the bottlenecks to allow the country's participation in the complex 'dance' of the global SCM.

Keywords: Supply chain management; Culture; Infrastructure; Brazil.

Resumo: As práticas associadas à gestão integrada da cadeia de suprimentos, ou *supply chain management* (SCM), têm se consolidado como importantes ferramentas para o aumento da produtividade e, consequentemente, da competitividade empresarial. Este estudo mostra que aspectos peculiares da cultura e da infraestrutura no Brasil aparecem como barreiras para colaboração e integração entre empresas, o que ajuda a justificar a dificuldade do país de inserir suas empresas nas cadeias de suprimentos globais. A partir da análise de conteúdo de entrevistas com executivos destacados da área de SCM no país, este trabalho formula um modelo de SCM contextualizado à realidade brasileira, com três traços culturais e três traços infraestruturais. 14 proposições detalham os mecanismos de reforço entre estes traços que perpetuam a distância entre a teoria SCM e a prática brasileira, impedindo o avanço do SCM no Brasil. O modelo serve de guia para empresas que visem destravar amarras e permitir a participação do país na complexa 'dança' do SCM global.

Palavras-chave: Gestão da cadeia de suprimentos; Cultura; Infraestrutura; Brasil.

1 Introduction

The supply chain management (SCM) paradigm arises at the end of the 1980s and gains strength in the following decades with the understanding that companies compete not as isolated entities, but as supply networks with suppliers and customers (Mentzer et al., 2001), as globally organizations integrated in a non-linear fashion in successive adaptive cycles (Wieland, 2021). Effective integration within this network is able to significantly improve operational efficiency (Frohlich and Westbrook, 2001), becoming an important enabler for the digitalization of the supply chain (Martins et al., 2020). Understanding the barriers that may exist for SCM practices become appropriate and fundamental for countries such as Brazil at a time when the low productivity is discussed, when growth is being stunted, and when there is difficulty of being inserted into global trade and stop being merely a supporting agent and supplier of basic inputs.

Despite studies showing that Brazilian companies began to use the term "integrated logistics" in the early 1990s (Lavalle, 1995), we still have a long way ahead of us until reaching the maturity of the model proposed by Bowersox et al. (1992) that proposed that an integrated logistics system to provide a competitive advantage should have three dimensions: formalization of the logistic functions, authority, and planning in order to obtain a orchestration of the process; performance monitoring that allows the systematization of control and continuous improvement; and adoption of information technology to ensure greater precision and agility in the decision process (Tiwari, 2020).

In the 1990s, Brazilian companies advanced a great deal in structuring their logistic activities (Figueiredo et al., 2003), but despite the intended benefits from collaborative practices in the supply chain (Fawcett et al., 2008), adopting cooperation policies has always presented a series of challenges for companies (Lockamy & McCormack, 2004; Martins et al., 2020). One of the main difficulties in the business relationship is related to the existing cultural barriers (Fawcett et al., 2015; Chu, 2020), which hinder building relationships of trust (Canen & Canen, 2005). Furthermore, Fawcett et al. (2008, 2015) also highlighted infrastructural issues as obstacles to the full adoption of SCM initiatives. These barriers need to be studied in order to make full use of the benefits intended to be reached when adopting SCM.

In Brazil, much is said about the "Brazil cost," a generic term used to address the structural, bureaucratic, and cultural difficulties that restrict economic growth. The most recent evaluations available on the competitiveness of countries made by national and international bodies illustrate the challenge and the need to seek solutions:

- 56th (/160 countries) in logistical competitiveness (Banco Mundial, 2018);

- 71st (/141 countries) in global competitiveness ranking (World Economic Forum, 2019);

- 17th (/18 countries) in competitiveness ranking of similar emerging countries (CNI, 2020).

These rankings consider factors such as availability, cost of capital, infrastructure, logistics, tax burden, education, technology, and labor. Barriers in the country are noticeable such as tax costs and infrastructure problems, as well as a legislation that hinders better performance as in the case of port operations (ABTP, 2020). Illustrating the effects of these inefficiencies, news about the difficulties in getting the grain crop to market, queues in ports, food waste, and low productivity in the industry are commonplace in Brazilian news channels.

The adoption of integration and collaboration practices, as recommended by SCM, plays a fundamental role in reducing Brazil's low competitiveness, which makes it important to understand the peculiar Brazilian aspects that may hinder and/or facilitate adopting these practices. The purpose of this work is therefore to answer the following research question:

"**How do cultural and infrastructural peculiarities in Brazil interact and create barriers for supply chain integration?**"

2 Theoretical Milestone

2.1 Collaboration across the supply chain

Even without a consensus on the definition of SCM, "integration," "coordination," and "collaboration," appear as key terms (Näslund and Williamson, 2010; Freitas et al., 2019) for important authors and trade associations, according to Chart 1.

Chart 1. SCM Definitions.

Source	SCM Definition
Simchi-Levi et al. (2003)	SCM is a set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed in the right quantities, to the right locations and at the right time, in order to minimize system-wide costs while satisfying service level requirements.
Stock et al. (2009)	SCM is the management of a network of relationships within a firm and between interdependent organizations and business units consisting of material suppliers, purchasing, production facilities, logistics, marketing, and related systems that facilitate the forward and reverse flow of materials, services, finances and information from the original producer to final customer with the benefits of adding value, maximizing profitability through efficiencies, and achieving customer satisfaction.
Council of SCM Professionals (2009)	SCM encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all Logistics Management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. In essence, Supply Chain Management integrates supply and demand management within and across companies.
Lakshmanasamy & Anil (2015)	SCM has emerged to cope with a complex environment to plan, manage, coordinate, and integrate business activities, seeking to meet customer requests while striving for better competitive advantages.
Wieland (2021)	SCM should be rethought from its linear and fixed structure to a new paradigm of successive adaptive cycles where organizations connect globally in a non-linear manner, as in a dance, allowing to deal with the new complexities and risks,

Therefore, to understand the barriers to the effective adoption of SCM in Brazil and how they are interrelated calls for understanding the barriers to "integration," "coordination," and "collaboration" between companies in the Brazilian context.
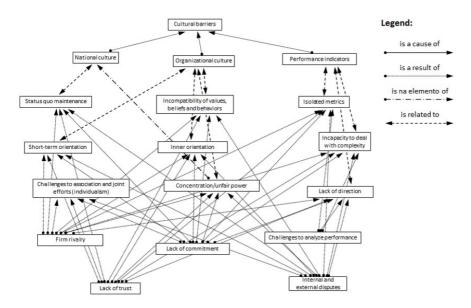
2.2 Barriers to collaboration along the supply chain

Despite the numerous benefits sought with integrated supply chain management, managers need to be aware of the challenges associated with implementing collaborative practices with business partners (Freitas et al., 2019; Frohlich & Westbrook, 2001). From the review by Leuschner et al. (2013), the barriers to SCM were organized into two dimensions: culture and infrastructure.
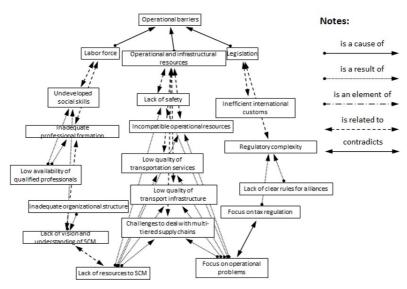
Cultural barriers. It is common for relationships between companies to be based on the attempt to maximize the margin in transactions. Bargains by price, an "arm wrestle match" at the end of the month, and the need to meet sales quotas/targets are an impediment to collaboration. This type of relationship generates friction and wear over time and creates an antagonistic and opportunistic behavior pattern in the actors involved. And pressures for immediate results make it difficult to change the focus from competition—short-term gains—to sharing information and joint decisions—long-term gains (Chu, 2020; Freitas et al., 2019). Understanding how the traits of Brazilian culture are able to contribute to deepening or mitigating antagonistic and competitive behaviors may be decisive for SCM practices (Fawcett et al., 2008).

Infrastructure barriers. Adopting a policy of collaboration requires a great effort to generate forecasts, reach a consensus, prepare orders, and mobilize operations (Tiwari, 2020; Wanke & Ferreira, 2006). Furthermore, limitations in the external environment such as inadequate infrastructure (Moavenzadeh et al., 2013), problems in legislation (Power, 2005), and unskilled labor (Van Hoek et al., 2002) may make it even more difficult to integrate supply chains. The reality of the infrastructure in Brazil and its relations with the other peculiar Brazilian characteristics are fundamental to understanding the barriers to SCM in the country.

The revised complete listing for this theoretical framework is found in Appendix 1 (Supplementary Material) and has been conducted with the support of the Atlas.TI textual analysis software. Each term or expression with an idea associated with the concept of SCM, its possible practices, tools, benefits, and barriers were registered in the tool, indexing the source article and categorizing the relationships identified and explained by each author. Based on these records, Atlas.TI was able to build "webs" that represent these relationships that are grouped into two dimensions—culture and infrastructure—as shown in Figure 1 and Figure 2.

Figure 1. Map of relations between cultural barriers with SCM. Source: the authors with support from Atlas.TI software.

Figure 2. Map of relations between infrastructure barriers with SCM. Source: the authors with support from Atlas.TI software.

The initial revision of barriers to SCM in the cultural and infrastructural aspects was based in the SCM literature. Since SCM literature is predominantly based on North Global companies, this review was complemented by studies that characterize the peculiarities of Brazilian culture and infrastructure. To achieve this objective, the review of the theoretical framework combined references of Brazilian culture often consulting seminal studies from the 1970s, 1980s, and 1990s with more recent studies that promote the discussion of the impacts of Brazilian culture and infrastructure on business management in general and on SCM specifically.

2.3 Brazilian supply chain context

2.3.1 Brazilian culture

Chu & Wood (2008) point out that understanding how the peculiarities of Brazilian culture impact management is based on Brazil's historical, cultural, social, and economic formation. Brazilian national culture can be characterized by the large distance of power, by more collective behaviors than individualistic, and the pressing need to avoid uncertainties (Chu, 2020; O'Keefe & O'Keefe, 2004). It could also be characterized by the central position in relation to masculinity/femininity with a slight inclination to female values, which would lead to a low orientation to results (Hofstede, 2001).

2.3.2 Brazilian infrastructure

In July 2018, the World Bank disclosed its new edition of the report that evaluated the logistics and efficiency of the transportation infrastructure in 160 countries from the perception of more than 1,000 entrepreneurs from around the world (Arvis et al., 2014). In it, Brazil dropped down one position in relation to 2016, ranked 56th, lagging behind other Latin

American countries such as Chile, Mexico, and Argentina. It should be pointed out that the country has seen its performance fall in most of the questions evaluated by the research such as the quality of transport infrastructure, its services, the efficiency of the customs clearance process, cargo tracking, keeping to delivery deadlines, and the ease of finding freight at competitive prices. Germany, Sweden, and Belgium held the top three positions, in that order. In its 2020 report, the World Bank chose not to present a new ranking between countries.

The latest Global Competitiveness Report, 2019, corroborates these results and presents an even more dramatic situation placing the Brazilian transport infrastructure in 85th position among the 141 nations evaluated (World Economic Forum, 2019). Analyzing each transport mode separately, Brazil was ranked in 116th position in the quality of its highways, 86th position in the efficiency of its rail services, 104th position in the efficiency of its port services, and 85th position in the efficiency of its air transport services.

The traits of Brazilian culture and infrastructure, which are not covered by traditional SCM literature, are summarized in Chart 2. To counterbalance these peculiar elements of the Brazilian context alongside the consensus in SCM makes it possible to identify the barriers that prevent the development of SCM practices in Brazil.

Chart 2. Traits of Brazilian culture and infrastructure.

	Brazilian trait	Description
Brazilian culture	"Jeitinho"	The Brazilian style or "jeitinho" is the way found to weasel out of impersonal forms, especially laws and norms that govern personal relations (Da Matta, 1991). It is an ambiguous mechanism that allows reconciling personalist and formalistic characteristics found in the Brazilian people (Holanda & Cândido, 1978) and according to the reading of Chu & Wood (2008, p. 4), it allows for a "double reading, which may mean a conformist behavior of living with the unjust and unacceptable status quo and can be seen as a way of surviving daily life, a recourse of cultural resistance," which is corroborated by Lee Park et al. (2018).
	Inequality of power and hierarchy	In Brazil it is common for people to judge themselves with special rights who exempt themselves from following the same laws and generalizing norms made "for others" that led to the creation of the popular expression: "Do you know who you are talking to?" (Chu & Wood, 2008). For Freire (1998), the inequality that exists in the master-slave relations of the Brazilian colonial society profoundly marked the country's social construct, resulting in this behavioral pattern. Inequality also found in the organizational environment with a strong hierarchical structure and autocratic decision-making processes (Freitas et al., 2019; Chu & Wood, 2008; Chu, 2020)
	Flexibility	For Chu & Wood (2008, p. 4), "the flexibility that permeates behaviors in organizations in the country translates into people's adaptability and creativity." This characteristic results largely from the need to deal with the most diverse crises of a political, social, and/or economic nature (Budde et al., 2019). This flexibility, which allows rapid adaptation to new situations, discourages following recipes and manuals (Chu, 2020). Activities that require a notion of order, constancy, and precision, so well executed by some nations, in Brazil are often downplayed and considered of minor importance, suffering from adaptations, "jeitinhos," and shortcuts (Holanda & Cândido, 1978; Vieira et al., 2002; Nicodemo, 2014)
	Plasticity	According to Holanda & Cândido (1978), the Portuguese colonizer is different from other colonizers because of the absence of a feeling of racial superiority, which favored miscegenation and the genuine interest in the new and exotic. This plasticity favors the easy adoption of foreign practices and customs, as can be seen by the agricultural techniques used in the colony that were strongly influenced by the Indian and African practices (Nicodemo, 2014). For Chu & Wood (2008, p. 4), "historically and traditionally, adopting foreign concepts and references in management by the organizations in Brazil is made without criticism, which reveals the high degree of permeability of the nation to what is developed abroad. However, it is necessary to emphasize that such assimilation may occur in some cases only superficially, deceiving a less attentive observer and indicating a facade behavior."
	Personalism	Lomnitz (2009) highlights the importance of the networks of family members, friends, and acquaintances for solving problems and/or obtaining some kind of advantage or privilege in Latin American societies. Personal relationships and interests stand out in general and community interests (Chu, 2020), using informal mechanisms to pass legal limits, reserved for the "anonymous, isolated citizen without relations" (Chu & Wood, 2008, p. 5)
	Formalism	Existence of a large number of laws, rules, norms, and procedures that seek to reduce risk, ambiguity, and uncertainty, increasing control over people's behavior and action (Lee Park et al., 2018; Barros & Prates, 1996). Apparently contrary to personalism, these characteristics seem to be compatible through the "jeitinho," as proposed by Da Matta (1991), resulting in discrepancies between what is written and what is actually done (Chu & Wood, 2008). This characteristic results in the creation of a number of activities and control mechanisms in organizations (Barros & Prates, 1996).

Chart 2. Continued...

Brazilian trait		Description
Brazilian infrastructure	Legal and tax complexity	The complexity of legislation and taxation in Brazil can be organized into five themes: complexity, legal vulnerability, customs, tax wars, and regulation (Moraes & Souza, 2014)
	Poor quality of transport infrastructure	Inefficiency of the customs clearance process, cargo tracking, delivery deadlines, and ease of finding freight at competitive prices, aggravated by the imbalance between transport modes with an excessive concentration on the road modal (Marchetti & Ferreira, 2012)
	Inadequate professional training	Shortage of professionals with quantitative training and less experience than peers in other countries (experience of 11 years in Brazil versus 20 years in the US - Ferreira, 2013)

3 Research method

3.1 Qualitative research

Although the literature on SCM is extensive, there is still little analysis about the difficulties of implementing these initiatives in the Brazilian scenario, which justifies this research being of an exploratory nature (Freitas et al., 2019; Gil, 2008). As for the means, this research used a qualitative methodology to be able to achieve the objectives it has proposed. Qualitative methods have been used when the study object cannot be perfectly defined *a priori,* which is a characteristic of exploratory studies, particularly in studies on SCM that aim to understand manager behavior, such as in Silva et al. (2020) and Touboulic et al. (2018).

In this work, it was considered that a specific case could hardly be found where it would be possible to observe the influence of all the peculiar Brazilian aspects on the integration of the supply chain, so we then opted for a set of semi-structured interviews with executives from the SCM area who were submitted to the hermeneutic method of content analysis for building the propositions based on SCM in Brazil. With this we expected to obtain as many propositions as possible, answering the question presented in the best way possible.

The semi-structured interview is characterized by using basic questions supported by theories and hypotheses related to the research theme, and that when answered by the informant, allow the formulation of new hypotheses and consequently new questions (Triviños, 1987). Triviños (1987) also states that this method of data collection is useful not only in describing the phenomenon, "but also in explaining and understanding its totality". The research carried out the following steps: (a) validation of the script of questions and assessment of the "Judge", (b) pilot interview, and (c) interview with the sample.

3.2 Sample collection and profile

Data collection was performed through face-to-face interviews in Rio de Janeiro and in São Paulo or by a virtual conference platform (Skype) when holding face-to-face meetings was impossible in the case of interviewees who were located in the US or Europe. The interviews lasted between 38 and 75 minutes without any interruptions or other complications with only the interviewee and the interviewer present.

Up until the data collection date, the respondents were responsible for the SCM area in Brazil, though some were even responsible for all Latin America or the Americas, in companies listed in the last ranking published by Gartner, *Supply Chain Top* 25, in the Food & Beverage, Electronics, Hygiene & Cleaning, Clothing, Computing, and Automotive

segments. A control interview was conducted with the SCM Vice-President of a large Brazilian company with global operations and recognized with several national awards in SCM in order to assess whether the company's origin could significantly influence the executive's view, which was discarded. All executives interviewed for this work were Brazilian, but have at least four years of professional experience working abroad, which allows us to compare business practices in Brazil with other countries. It is also important to point out that their answers were based on their entire business trajectory in SCM and not just the position and company at the time of the interview. There were six men and two women with ages ranging from 38 to 65 years old, as summarized in Table 1.

Table 1. Summary of the study's corpus.

Interview	Interviewee's location	Means used	Duration (minutes)	Pages transcribed	No. of verbalizations
Interview 1	Brazil	Face-to-face	62	21	76
Interview 2	Peru	Video conference	40	14	34
Interview 3	Brazil	Face-to-face	38	12	43
Interview 4	USA	Video conference	75	32	71
Interview 5	Brazil	Video conference	50	19	41
Interview 6	Brazil	Video conference	53	14	39
Interview 7	Europe	Video conference	43	15	45
Interview 8	Brazil	Conference call	40	15	29

Using theoretical exhaustion as a way of deciding when to interrupt the data collection, each interview was fully transcribed with cuts only of language errors and analyzed thoroughly in search of new elements of analysis based on the elements mapped in Figures 1 and 2 and in Chart 2. When new analysis elements were not found, the scheduling of new interviews was closed, which took place after the eighth interview, according to Figure 3.
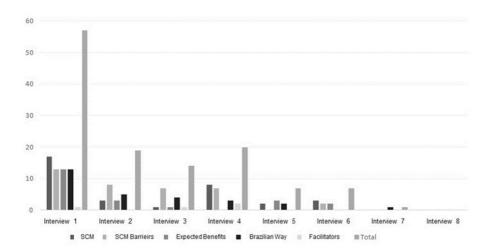

Figure 3. Theoretical exhaustion observed after eight interviews. Source: the authors.

3.3 Content analysis

Content analysis has been widely used in qualitative research in the fields of social sciences, health, psychology, education, and organizations over the past decades, including in the area of SCM, as in Nascimento & Silva (2020). Bardin (2011, p. 38) designated the term "content analysis" as "a set of techniques of communication analysis in order to obtain by systematic procedures and description objectives, the content of the indicator messages (quantitative or not), allowing the inference of knowledge related to the conditions of production and reception (inferred variables) of these messages". For Godoy (1995), in this methodology of analysis, the researcher seeks to understand the attributes and patterns that are behind the fragments of the message analyzed, which obliges him to understand the direct meaning of communication and to seek, through an effort to get "outside of oneself", a new meaning in what has been said, that is, a new message.

The content analysis was supported by Atlas.TI software, a tool widely used to assist in examining textual material (Bandeira-de-Mello, 2006). According to abductive reasoning, the study started from the deductive stage of literature review that generated 183 codes (main elements synthesized in Figures 1 and 2 and in Chart 2), which were later complemented by the inductive process of analysis of the interviews that generated 127 verbalizations. The contrast between the theoretical framework and the content analysis generated a set of theoretical propositions that finalize this study. Figure 4 presents a methodological guide that describes the abductive course beginning in reviewing the theoretical framework, advancing to the data analysis, and culminating in the conceptual model, besides also indicating that part of this process, each Appendix (Supplementary Material) supports with detail and transparency of the content analysis.
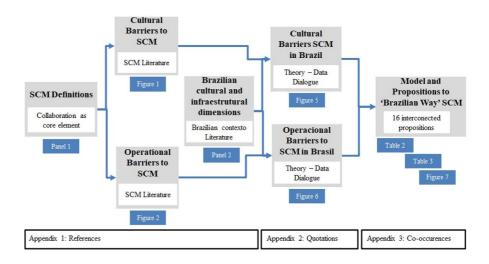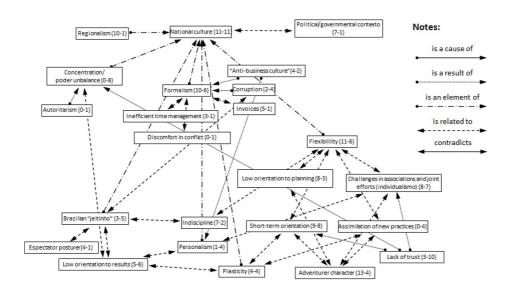

Figure 4. Methodological guide of the study. Source: the authors.

4 Analysis and propositions
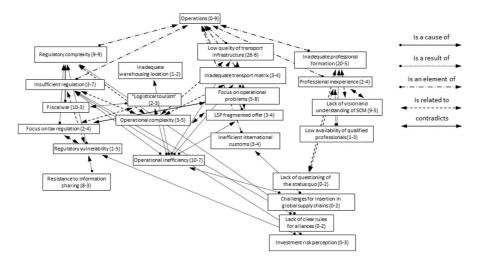
4.1 Cultural barriers

The peculiar aspects of Brazilian culture are summarized in Figure 5. The intricate network of relationships built in the literature review was enriched with codes that emerged from the interviews such as "invoice" and "indiscipline," which made it possible to illustrate and characterize some concepts, but also brought new elements such as "regionalism" and the need to observe the "political/governmental context". Within the keys, the first algorithm represents the number of verbalizations in the interviews and the second algorithm represents the number of aspects related to the term. Together they help to understand the relative strength of each code.

Figure 5. Map of relations between cultural aspects with content analysis. Source: the authors with support from Atlas.TI software.

4.2 Infrastructure barriers

In the case of infrastructure barriers, it was also possible to confirm the relevance of some aspects such as the tax war and logistical tourism based on the joint analysis of the network of relationships built on the literature review on peculiar aspects of operations in Brazil and the codification carried out later, as presented in Figure 6. Unlike the cultural aspects whose interviews brought relevant new aspects regarding what had been presented in the literature review, the infrastructural issues seem well mapped by literature, which suggests that studies on culture in SCM are still less frequent or that infrastructural problems are more evident and/or relevant.

Figure 6. Map of relations between infrastructure aspects with content analysis. Source: the authors with support from Atlas.TI software.

4.3 Combined analysis of cultural and infrastructure aspects

Table 2 presents the verbalizations count for each analysis class: four cultural dimensions and three infrastructural dimensions. In the discourse of the interviewees, the results highlight the cultural aspects of flexibility and the adventurous character of the Brazilian, as well as the country's infrastructure problems.

Table 2. Analysis class and verbalizations count.

	E1	E2	E3	E4	E5	E6	E7	E8	TT
Brazilian Culture									
Flexible Adventure: traits related mainly to the flexibility and plasticity of Brazilian culture and consequently to the main characteristics of the "adventurous character"	6	1	7	17	0	7	6	6	50
Bureaucratic Formalization: recurrent characteristics and situations in the discourses that are associated with formalist aspects of Brazilian culture, almost always mentioned negatively.	3	0	8	1	3	2	1	2	20
Unproductive "jeitinho": aspects resulting from personalism and the Brazilian way of doing things, which appeared throughout the interviewee discourses, always negatively.	8	6	0	6	1	0	4	2	27
Tangent Aspects: topics that emerged spontaneously in the interviewee discourses and are complementary to the analysis of Brazilian cultural peculiarities.	4	6	1	1	1	0	1	3	17
Brazilian Infrastructure									
Limiting Infrastructure: an item that brings together the main topics associated with aspects of the infrastructure of operations in Brazil, almost always criticized in the verbalizations.	11	7	10	4	3	2	7	5	49
Unfair Complexity: relevant aspects associated with the results of the Brazilian legal and tax issues in SCM, present in the interviewee statements.	9	4	6	5	3	1	4	4	36
Shortage of Professionals: presents highlighted traits in the verbalizations about the level of education and experience of SCM professionals in Brazil.	5	3	5	9	1	6	2	0	31

Next, Table 3 of co-occurrence was put together, meaning that a new count was performed, only now crossing the classes two by two and measuring the number of verbalizations that were referenced to both classes concomitantly. This analysis makes it possible to infer some non-explicit relationships in the content, formulating new propositions from possible interpretations for these references.

Table 3. Co-occurrence of verbalizations between classes.

	Tangent Aspects	Flexible Adventure	Shortage of Professionals	Bureaucratic Formalization	Limiting Infrastructure	Unfair Complexity	Unproductive "jeitinho"
Tangent Aspects	-						
Flexible Adventure	1	-					
Shortage of Professionals	3	1	-				
Bureaucratic Formalization	1	3	1	-			
Limiting Infrastructure	2	2	2	5	-		
Unfair Complexity	1	4	1	6	16	-	
Unproductive "jeitinho"	3	15	1	2	2	0	-

4.4 Contextualized SCM model

The inferred relationships between the analysis classes summarized in Tables 2 and 3 were condensed in Figure 7, which makes it possible to recognize more easily the three cultural dimensions, the three infrastructural dimensions, and the recurrent mechanisms that perpetuate practices, behaviors, rules, and resources recurrently criticized by the interviewees and by literature as ultimately preventing the advancement of SCM in Brazil. The study also points to an exception of a mitigating mechanism where cultural traits help to deal with problems in the transport infrastructure and complex regulation.
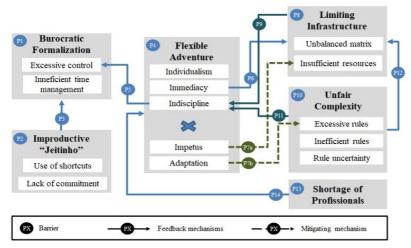

Figure 7. Model (and Theoretical Propositions) of Brazilian Way SCM. Source: the authors.

Even though there are some positive verbalizations about Brazilians' capacity to cope with adverse situations and the ability to adapt and adopt new practices, which in the view of some executives interviewed is fundamental for SCM, much of the peculiar characteristics of Brazil appear as barriers to the integrated management of the supply chain, highlighting the cultural characteristics of formalism and flexibility, inadequate vocational training, the precariousness of the transport infrastructure, and the complex tax legislation.

Cultural contextualization of SCM in Brazil. The first set of aspects with an impact on SCM in Brazil, identified in this work as "bureaucratic formalization," is related to the formalist characteristic of the national culture condensed into bureaucratic requirements and inefficient use of time. The analysis reinforces how the bureaucratic requirements existing in Brazil make SCM difficult in the country, resulting in inefficiencies and making it difficult to coordinate actions across the supply chain. Another expression of formalism is the reference made to using redundant control mechanisms, considered necessary to deal with the lack of commitment and indiscipline, but that contribute to the inefficient use of time, which can be considered as a disadvantage to SCM insofar as a greater agility of chain response is required, complementing the findings of Freitas et al. (2019) on cultural barriers to collaborative initiatives. The importance of bureaucracy as a first barrier contrasts with studies on collaboration and SCM focused on companies in the northern hemisphere (Touboulic et al., 2018) or multi-country studies (Frohlich & Westbrook, 2001) that tend to focus on the challenges of relationships between company agents or technology adoption, respectively, and overlook the regulatory framework.

Proposition 1: The bureaucratic formalization expressed in excessive control and in the inefficient use of time is a cultural barrier to SCM practices.

The second set of peculiar cultural traits refers to possible consequences from what in Portuguese is called "jeitinho brasileiro", meaning the Brazilian style of finding a way through, a loophole, bending the rules, which is a behavior described by Da Matta (1991) and Chu (2020) that could also be a quality of flexibility that would allow a reconciliation of personalism and formalism present in Brazilian culture, but whose analysis of the corpus content of this work was closer to the resignification proposed by Chu & Wood (2008) who presented a predominantly negative view of this "jeitinho". The first consequence identified in the "jeitinho" is using shortcuts to circumvent difficulties and challenges, which although being less intense in the interviewee discourses than other barriers associated with cultural peculiarities, also seems to be relevant. Despite a possible positive initial impression as an artifact to deal with the challenges that arise in supply chain management, the tone used leaves no doubt that it is a criticism of failing to face problems and the lack of a consistent and systematic execution. Another consequence of the Brazilian "jeitinho" for SCM identified in this study is the lack of commitment presented as a problem for corporate management in general (Chu & Wood, 2008; Chu, 2020) and particularly for SCM practices, which require a strong commitment from those involved.

The first reinforcement mechanism identified deals with the relation of the impact of the unproductive "jeitinho" on strengthening the bureaucratic formalization that demands management control mechanisms to deal with low productivity from the low level of commitment. Confirming the literature (Moavenzadeh et al., 2013), the analysis showed that the bureaucratic requirements and excessive rules pave the way for corruption, which may represent an important barrier to SCM since distortions are caused in the competition between companies and, due to the legal risk, discourage

the exchange of information between companies. The reinforcement between the unproductive "jeitinho" and bureaucracy has a parallel with studies that demonstrate the negative effect that a short-term view can have on initiatives to implement lean methodology, which is also based on integration (Erthal et al., 2021). The short-term view dialogs with the relationship between "jeitinho" and bureaucracy.

Proposition 2: The unproductive "jeitinho," characterized by using shortcuts and lack of commitment, is a trait of the Brazilian culture that hinders SCM practices;

Proposition 3: The unproductive "jeitinho" requires additional control mechanisms, amplifying bureaucratic obstacles to SCM practices.

The last set of peculiar cultural aspects is characterized here as "flexible adventure" resulting from flexibility and plasticity, as described by Holanda & Cândido (1978) and Chu (2020) and present in the interviews as individualism, immediacy, indiscipline, adaptability, and impetus. Despite studies by Hofstede (2001) and O'Keefe & O'Keefe (2004) situate the Brazilian culture as more collectivist than individualistic, the results of the content analysis pointed out individualism as a characteristic present in the country's culture and an important barrier, confirming the analysis of the behavioral barriers of Freitas et al. (2019). It was also possible to infer that individualism is partly responsible for the preference for proprietary systems, which makes integration between companies difficult, as pointed out by Fawcett et al. (2007). The trace of immediacy again dialogs with the short-term orientation (Lacerda, 2011; O'Keefe & O'Keefe, 2004; Chu, 2020) and appeared in the discourse of several interviewees as a significant obstacle to adopting SCM practices in Brazil. Another cultural characteristic perceived by Brazilian executives as restrictive to SCM practices is indiscipline, which completes the adventurous character (Nicodemo, 2014) and the low orientation toward long-term planning (O'Keefe & O'Keefe, 2004).

In addition to being a problem in itself, indiscipline present in "flexible adventure" generates a second reinforcement mechanism. To deal with it, additional control mechanisms are created, something characterized as undesirable for an effective SCM, which corroborates the lack of orientation for the relationship (Freitas et al., 2019). Together, propositions 3 and 5 perpetuate "bureaucratic formalization" as a fundamental barrier to SCM practices in Brazil. This reinforcement mechanism exposes the relationship between culture and regulation, a dimension little explored in SCM studies (Marques et al., 2021).

In addition to its undesirable characteristic, the immediacy of "flexible adventure" is related to the poor quality of transport infrastructure, whose long-term investments are put off by adopting short-term policies, aggravating the infrastructure problems mentioned by Marchetti & Ferreira (2012) and Assis et al. (2017). This third reinforcement mechanism compromises the result of long-term oriented initiatives (Erthal et al., 2021).

Proposition 4: The traits of individualism, immediacy, and indiscipline present in the Brazilian culture form the negative side of the cultural aspect "flexible adventure", placing themselves as barriers to SCM practices;

Proposition 5: Indiscipline as a trait of the Brazilian "flexible adventure" leads to creating additional control mechanisms, amplifying the bureaucracy as an obstacle to SCM practices;

Proposition 6: The cultural trait of immediacy reinforces low investments in transport infrastructure, amplifying barriers to SCM practices.

In contrast to the reinforcement mechanisms, the cultural dimension of the "flexible adventure" (Nicodemo, 2014) offers two traits that can contribute to SCM practices, The first is the impetus, which has a direct relationship with insufficient and precarious operational resources. In addition to being a virtue itself, one can assume that impetus is a cultural characteristic that allows dealing with operational constraints posed by limited infrastructure. The second positive trait is adaptability, which is directly related to some infrastructural barriers in Brazil such as insufficient and precarious resources and excessive rules. The executive discourse shows that adaptability is an important artifact to deal with these restrictive aspects (Chu, 2020). The positive impacts of the "flexible adventure" dimension are characterized as mitigating mechanisms, highlighting favorable traits of the Brazilian culture for management (Tanure & Duarte, 2005) and offering a direction for SCM implementations.

Proposition 7(a-b): Impetus and adaptability are cultural traits of the Brazilian "flexible adventure" that favor SCM practices by allowing to deal with insufficient and precarious operational resources and excessive rules.

Infrastructure for SCM in Brazil. Most Brazilian infrastructure characteristics are obstructive to the integrated management of the supply chain. The first set of peculiar aspects of operations in Brazil is related to transport infrastructure, which was much criticized by the executives interviewed. Reinforcing the study of Marchetti & Ferreira (2012) and Assis et al. (2017), this work reinforces criticisms regarding the unbalanced transport matrix and precarious and insufficient resources. The unbalanced transport matrix refers to the fact that cargo handling in Brazil is concentrated in the road modal with a relative low participation of other modes. The main impact of this distortion for SCM would be a reduction in productivity and increase in costs across the chain. In addition to the unbalanced transport matrix, it is possible to deduce the scarcity of infrastructure resources in general, such as the inability of land port accesses to receive the volume to be moved or the unavailability of railway lines in some regions of the country, which results in a loss of efficiency and overload of the road modal, confirming Assis et al. (2017).

A fourth reinforcement mechanism was identified: the limiting infrastructure feeding the cultural aspect of indiscipline. The precarious infrastructure reinforces the indiscipline as an antithesis of the execution of the actions planned since the uncertainties resulting from the impoverished infrastructure generate disbelief in the value of long-term planning activities, validating cultural and behavioral aspects raised by Freitas et al. (2019). The identification of a mechanism where the infrastructure reinforces the culture, after proposition 6 where culture prevents long-term infrastructure improvements emphasizes culture and infrastructure as two key components for SCM collaboration (Leuschner et al., 2013), but here completing the design of a vicious cycle identified in this study:

Proposition 8: The unbalanced transport matrix and insufficient resources characterize a "limiting infrastructure" for SCM practices;

Proposition 9: The "limiting infrastructure" reinforces the cultural aspect of indiscipline, amplifying barriers to SCM practices.

The second set of infrastructural aspects refers to the combined characteristics in the term "unjust complexity" depicting the legal and tax complexities existing in Brazil (Moraes & Souza, 2014): excessive rules, rules that generate inefficiencies and uncertainties in the rules. In addition to the complexity and inefficiencies associated with legislation and taxation, frequent changes in the rules creates uncertainties. The "unjust complexity" is a problem for

understanding the rules, especially when many of them seem to be counterintuitive. This nebulous environment favors a lack of transparency, the adoption of non-ethical practices (Marques et al., 2021), and makes it difficult to take decisions and to build long-term agreements, which are fundamental to the effective SCM.

A new reinforcement mechanism was identified in line with previous propositions that dialog with the excessive focus on the short term. Excessive rules with their contradictions discourage compliance with all legal obligations, reinforcing the cultural aspect of indiscipline. The unjust complexity also favors individualistic and immediate behaviors, thus emphasizing the flexible adventure in the Brazilian culture that is obstructive to SCM practices and restricts the implementation of long-term oriented projects (Erthal et al., 2021).

Beyond the complexity, current tax legislation causes enormous inefficiencies such as "logistical tourism" and "fiscal war". It is urgent to consider the complex tax legislation and its impacts on any logistic network analysis in Brazil. In line with Moraes & Souza (2014), this makes it difficult to manage the supply chain as companies often opt for decisions that benefit them individually in the short term. Once again, new reinforcement mechanisms are identified. The first mechanism comes from the legal complexity of strengthening the infrastructure that has been precarized, since the unnecessary displacement of loads contributes to the excessive use of the transport infrastructure, which would already be deficient without this reinforcement and thus contributing to its deterioration.

Proposition 10: The "unfair complexity" trait consists of having too many rules, inefficient rules, and rule uncertainty, all of which hinder SCM practices;

Proposition 11: "Unfair complexity" reinforces the cultural aspects of "flexible adventure" (individualism, immediacy, and indiscipline), amplifying obstacles to SCM practices;

Proposition 12: "Unfair complexity" contributes to the deterioration and overuse of transport infrastructure, amplifying barriers to SCM practices.

The last set of peculiar aspects of infrastructure in Brazil refers to the scarcity of qualified professionals to work in SCM and point to nonspecific training, low technical quality, and inexperience as possible causes, as previously pointed out by Freitas et al. (2019). The main cause identified for the shortage of qualified professionals to work in SCM in Brazil is the low technical quality in its education. The lack of knowledge of concepts, models, and techniques seems to be an important barrier to SCM. This trait characterized as "shortage of professionals" still feeds a last reinforcement mechanism, strengthening cultural aspects of individualism and immediacy.

Proposition 13: Shortage of professionals is a barrier to SCM practices;

Proposition 14: Shortage of professionals reinforces the cultural aspects of individualism and immediacy, amplifying obstacles to SCM practices.

5 Conclusion

5.1 Study's contributions

This study shows that peculiar aspects of Brazilian culture and logistics infrastructure can act as significant barriers in the implementation of supply chain

management. Taking Brazil as an example, this study indicates that these aspects show complex barriers to integration initiatives between companies, which helps justify the country's difficulty in inserting its companies into global supply chains. The study offers a model that organizes on the one hand three cultural dimensions—bureaucratic formalization, unproductive *jeitinho*, and flexible adventure, and on the other three infrastructural dimensions—transport-limiting infrastructure, unjust complexity, and shortage of professionals that refine previous mappings of SCM barriers (Leuschner et al., 2013). Next it presents propositions that expose the reinforcement mechanisms that cause the culture to feed an inadequate infrastructure and vice-versa, justifying why SCM initiatives in Brazil do not advance in line with the proposed theory in the last 30 years (Mentzer et al., 2001; Frohlich & Westbrook, 2001).

On the one hand, undiscipline and the unproductive *jeitinho* reinforce the culture of bureaucracy, the focus on the short term, and the consequent imprisonment in an infrastructure that never modernizes and continues being excessively dependent on road as it best suits short-term decisions (Figueiredo et al., 2003). On the other hand, transport infrastructure, the perception of unjust regulatory complexity and the lack of professional qualification reinforce the flexible adventure and immediate thinking. These reinforcement mechanisms conflict with the definition of SCM from its origin, but even more acutely, when the definition is updated to reflect the dynamism of global supply chains that advance in a non-linear manner, in successive adaptive cycles, as proposed by Wieland (2021). Effective network integration and collaboration is critical to participating in global supply chains. Barriers in the sphere of a country such as those identified in the case of Brazil can relegate companies to the periphery of the global supply chains, or as Wieland's analogy states, "leave them out of the dance".

The exception in the map designed in this study is the *mitigating mechanism* identified where the positive dimension of the flexible adventure as characterized by the traces of impetus and adaptation helps managers and companies that need to advance in a context of precarized infrastructure and excessive regulatory and legal complexity. This mitigating mechanism offers two important inputs for SCM managers. The first is the opportunity to explore positive aspects of local culture when implementing new management practices (Erthal et al., 2021). Other mitigating mechanisms not identified in this study may reinforce the advancement of SCM even under non-favorable macro conditions. The second is to devise counter-mechanisms capable of breaking the vicious cycle. The organizational culture adaptation planning (Tanure & Duarte, 2005) can counter elements of the national culture (Chu, 2020), reducing the resistance to implementing SCM while mitigating the reinforcement mechanisms between culture and infrastructure.

This study advances in the discussion of the barriers to SCM for specific contexts by exposing reinforcement mechanisms between culture and infrastructure while mutually reinforcing themselves. In line with previous alerts made by Fawcett et al. (2008, 2015), deficient infrastructure is a key barrier to unlocking SCM implementations. But to this must be added the cultural context, which is in line with Freitas et al. (2019) as it also creates barriers. The proposals in this study also serve as a warning to other countries that identify themselves with the cultural and infrastructural aspects reported in this study and probably face similar challenges in adopting SCM. To unlock reinforcement mechanisms, countries exposed to the problem must think of programs that act simultaneously in both dimensions in order to ensure progress toward collaboration and favor participation in global supply chains.

5.2 Study's limitations

It is not possible to have the ambition of being complete, accurate, and profound when dealing with the culture and infrastructure in Brazil at the same time and its impacts on supply chain management. Thus, this is the first and largest limitation of this study and there is no way to ensure that all relevant literature has been covered, nor that the analyses have been comprehensive enough to point out all possible propositions. Nor can it be denied that some of the proposals presented here, especially those related to infrastructure in Brazil, have already been listed and that academics and executives in the area of corporate logistics have already been aware of, limiting the merit of their enunciation in this work to the fact that they receive new meanings and impacts in the context of supply chain integration and not just as operational challenges in themselves.

The propositions formulated, although significant and substantiated, were not prioritized according to their importance or relevance to the supply chain integration, and therefore it is not possible to prioritize the actions to be taken. Having said that, the simple identification of barriers is not enough to overcome them, which can be considered a limitation of this study. It should also be pointed out that despite the effort to follow the method of content analysis with exemption, possible interpretation bias related to preconceived concepts should not be disregarded, which together with a lack of language training, may have resulted in the inadequate choice of words by researchers.

Despite the limitations discussed here, it is believed that this work brings relevant considerations to the evolution of SCM in Brazil, contributing to a better understanding of the existing cultural barriers to adopting its practices in the country, deepening the knowledge available.

5.3 Recommendations for future studies

This work should be seen as a new step in preparing an SCM theory that considers the cultural and infrastructural characteristics of Brazil, enabling a full appropriation of its benefits by companies and the country. However, there is still much to be studied for developing management artifacts that allow the effective development and application of collaborative practices between companies in the Brazilian context.

The natural continuation of this study seems to be preparing an objective questionnaire that can be applied in stratified samples of SCM professionals in order to validate or reject the propositions formulated here from statistical analyses, allowing extrapolation or not of the findings in this work to different industries, companies of distinct sizes and varied supply chain segments. A larger-scale study would make it possible to control the effects of the industry's maturity, for example.

It also seems necessary to carry out in-depth case studies with companies of different sizes, industries, and segments along the chain in order to observe the difficulties reported here in everyday situations so as to broaden the understanding of the peculiarities identified, their impacts and mechanisms of functioning, thus allowing to specify and deepen the results of this work.

Also in continuation to this study, a quantitative research would be very welcome that would make it possible to prioritize the SCM barriers in Brazil pointed out in this study. Ideally, this hierarchy should be conducted in such a way that an individualized

diagnostic model could be reached, considering a set of predominant cultural and infrastructural characteristics in a given company or chain.

Another desired development for this work, after the proper deepening of the diagnosis carried out here, would be identifying and/or building mechanisms that would enable the barriers to the integration of supply chains in Brazil to be overcome and with this finally allow the insertion of the companies installed here in the global supply chains.

Finally, it is considered important to deepen the knowledge about the peculiarities of each region and their possible impacts on the integrated management of the supply chain since regionalism emerged in the discourse several interviewees as an element of fundamental importance for SCM in Brazil. There appears to be a great cultural diversity and also of resources that would require a deep knowledge of these peculiarities.

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Supplementary Material

Supplementary material accompanies this paper.

Appendix/Apêndice 1. Referências bibliográficas utilizadas na construção das Figuras 1 e 2 e do Quadro 2.

Appendix/Apêndice 2. Verbalizações por classe.

Appendix/Apêndice 3. Construção das relações de co-ocorrência.

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