

## RESILIÊNCIA DAS CADEIAS DE SUPRIMENTOS BRASILEIRA COM OS IMPACTOS DA COVID-19

M. V. D. DE ASSUNÇÃO<sup>1</sup>, M. MEDEIROS<sup>2</sup>, L. N. R. MOREIRA<sup>3</sup>, I. V. L. PAIVA<sup>4</sup>, D. C. A. DE S. PAES<sup>5</sup>

Instituto Federal de Educação, Ciência e Tecnologia do Rio Grande do Norte

ORCID ID: <http://orcid.org/0000-0002-3384-1899><sup>1</sup>

[marcus.assuncao@ifrn.edu.br](mailto:marcus.assuncao@ifrn.edu.br)<sup>1</sup>

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### RESUMO

Desafios sem precedentes foram impostos aos mercados globais para minimizar as perdas nas cadeias de suprimentos curtas e longas. O objetivo deste artigo é identificar os impactos criados pela pandemia da Covid-19 nas cadeias de suprimentos curtas e longas no Brasil. Os dados utilizados para a análise foram consultados nos sites de órgãos e agências de supervisão no país e no exterior. Adotando uma abordagem qualitativa, a consulta à literatura sobre cadeias de suprimentos curtas e longas foi determinante para compreender os impactos da pandemia nessas cadeias no Brasil, bem como a resiliência adotada no decorrer do surto do novo

coronavírus. Este estudo examina a resiliência das cadeias de suprimentos brasileiras ao apontar os impactos sobre elas durante a pandemia de Covid-19 e as alternativas para continuar operando. Também foi constatado que a resiliência da cadeia de suprimentos curta desempenha um papel fundamental no suprimento de alimentos brasileiro. O estudo restringe-se ao contexto do Brasil e suas particularidades. Além disso, são necessários mais estudos para explorar os impactos econômicos e operacionais em diferentes setores da economia no período pós-pandemia.

**PALAVRAS-CHAVE:** Cadeias de Suprimentos, Cadeias Longas, Cadeias Curtas, COVID-19, Resiliência.

## RESILIENCE OF THE BRAZILIAN SUPPLY CHAINS DUE TO THE IMPACTS OF COVID-19

### ABSTRACT

Unprecedented challenges have been imposed on global markets to minimise losses in the short and long supply chains. The purpose of this paper is to identify the impacts created by the Covid-19 pandemic on the short and long supply chains in Brazil. This paper analyses the short and long supply chains in Brazil, whose overriding data were consulted on the websites of supervisory bodies and agencies at home and abroad. Adopting a qualitative approach, the consultation of literature about short and long supply chains was to determine the impacts of the pandemic on them in Brazil, as well as the

resilience adopted by many in the course of the outbreak of the new coronavirus. This study examines the resilience of the Brazilian supply chains when pointing out the impacts on them during the Covid-19 pandemic and the alternatives to continue operating. It was also found that short supply chain resilience plays a key role in the Brazilian food supply. The study is restricted to the context of Brazil and its particularities. Also, further studies are required to explore the economic and operating impacts on different sectors of the economy in the post-pandemic period.

**KEYWORDS:** Supply Chain, Long Chain, Short Chain, Covid-19, Resilience.



## 1 INTRODUCTION

On 30<sup>th</sup> January 2020 the World Health Organisation (WHO) declared a Public Health Emergency of International Concern (PHEIC) as a result of the Covid-19 outbreak. This epidemic was concentrated in China, being officially registered in December 2019, the consequences on human health not yet being fully understood (WHO, 2020a). The virus resulted in major economic interruption as a result of the quarantines, travel restrictions, plant closure and a sharp drop in many service sector activities (Boone, 2020), which caused severe breakdowns globally, making room for the resilience of short and long chains in Brazil in the face of the resulting economic crisis.

These chains were interrupted by the current crisis, which has caused side effects at different levels of supplier networks (Fernandes, 2020). Also according to the author, world trade in 2020 will decline everywhere in the planet and affect all sectors of the economy.

The crisis caused by Covid-19 comes after a year of a slowdown of the world trade in goods caused by trade disputes and tensions between China and the USA. Although with as yet unconfirmed data, the World Trade Organisation (WTO) estimates a 13%-32% drop in world trade for 2020, overtaking the 2008-2009 economic crisis (WTO, 2020). The reduction in trade takes into account both the economic slowdown and the interruption of production chains caused by social isolation measures or labour restrictions as mitigating measures, something that in the first months of the year was concentrated on China and is now spreading globally (WTO, 2020a).

In Europe, countries such as Belgium, France, Germany, Italy, Portugal, Spain, Switzerland, Turkey and others, – have closed their borders, which caused a break in the long supply chains and made room for the arrival of short chains, included in the local economic contexts (Cappelli & Cini, 2020).

Following the standard adopted in other countries, the Brazilian government's response to the pandemic was focused on introducing restrictive measures to guarantee social distancing, which caused immediate impact on different short and long chains affecting businesses in many different segments of the economy.

With the rise in numbers of the dead and infected, the country attempted to redesign its supply chains in order to attend its 210 million inhabitants and also create strategies to subsidise the anticipation of a possible collapse in its National Health Service (Sistema Único de Saúde-SUS), by looking to foreign companies that could provide the inputs for tackling the Covid-19. Many businesses had to be resilient in order to survive amidst the economic crisis caused by the pandemic.

The aim of this study is to identify the impacts created by the Covid-19 pandemic on the short and long supply chains in Brazil. The study will involve analysing the dynamics of those chains (short and long) from the view of primary activities of logistics as well as considering the presence of resilience as a differential within the pandemic. The originality and relevance of this paper can be ratified due to the pioneering nature in the discussion of the consequences of the disease on the Brazilian supply chains, acting as a parameter for a comparative analysis with other countries. The discussion contributes to literature with regard to the logistics and resilience in the supply



chain when pointing to the impacts on them in the Covid-19 pandemic and alternatives to remain in operation.

This article is divided into four sections, with the first describing the background of the problem. Section 2.1 addresses on the development of the pandemic in Brazil, while section 2.2 talks about the repercussions of the pandemic on the supply chains. Section 2.3 discusses the pandemic's impacts on the management of inventories, procurement, transport and order processing. Section 2.4 considers a link between government actions to contain the Covid-19 and its developments in the short and long supply chains. Section 3 analyses the resilient actions of the supply chains to continue operating during the crisis. Section 4 provides the final comments explaining the implications of management for the post-pandemic supply chains.

## 2 DEVELOPMENTS OF THE COVID-19 PANDEMIC IN THE SUPPLY CHAINS

The links in the supply chain, consisting of different levels of relationship between suppliers and clients, seek collaborative partnerships in order to continue being competitive considering the operating and financial objectives aspired by their members. These partnerships, in turn, create a conglomerate of cooperative relations, the information of which is paramount for the success of such joint actions (Cooper, Lambert & Pugh, 1997; Christopher & Peck, 2004; Lambert & Cooper, 2000). The idea behind Supply Chain Management (SCM) is that the companies do not compete with each other, but with their supply chains (Christopher & Peck, 2004).

The integration of SCM members, with a view to a more systemic and strategic operation, promotes cost cutting and a better customer service, resulting in greater efficiency and competitive edge, for each company individually and for the chain as a whole (Cooper & Ellram, 1993; Cooper et al., 1997; Mentzer et al., 2001). This integration is only possible by cooperative relationships and sharing information about the logistics activities performed by its members, forming an interdependent network between the member companies of the supply chain (Seuring & Müller, 2008; Christopher, 2000).

The Covid-19 pandemic has also brought with it consequences for global supply chains. The first victims were the transport and hospitality industries (IATA, 2020). Today companies in a wide variety of segments are hard hit with lost revenue, reduced demand, broken supply chains, harm to entire chains, as in the case of local and global tourism; increasing risk aversion in financial markets, which is now causing a drop in the level of corporate and consumer confidence (Açikgoz & Gunay, 2020; OECD, 2020; Ivanov, 2020) and one of the main trading upsets in recent decades (Araz et al., 2020).

Amidst the slowdown of the Chinese economy with disruptions in production, the operation of global supply chains was affected, a result of their key role as producers of intermediary goods, particularly computer hardware, electronic, pharmaceutical drugs, transport equipment and as a main source of demand for many commodities (OECD, 2020). Companies worldwide, depending on Chinese inputs, now began to shrink production. Also, the limited transport, and even restricted between countries, slowed down even further the global economic activities (McKibbin & Fernando, 2020, Di Mario, 2020).



Ports and terminals are, at the same time, facing a plummeting drop in revenue; higher stockyard costs due to the accumulation of empty containers; and client request for waiving storage fees. In the aviation sector the scenario is also one of pessimism. The International Air Transport Association (IATA) predicts that the aviation sector may well face a loss of USD 29 billion in passenger revenue, if the Covid-19's impact pattern extrapolates into flights, and that flight cancellations reach the 4.5 million mark and lost revenue by the end of June 2020 may arrive at USD 314 billion.

If under normal conditions coordination of the supply chain and integration of logistics are complicated, in pandemic situations this scenario is then challenging. The Covid-19 impacts on the supply chains are not fully calculated. Losses from disruptions could reach USD 100 million a day (Rice & Caniato, 2003). Rajesh (2018) demonstrates that in a more current scenario, based on a Chinese case, the disruption in chains may cost billions and would take months to recover.

### 3 THE COVID-19 PANDEMIC AND ITS EFFECTS ON BRAZILIAN SUPPLY CHAINS

The first official case of Covid-19 recorded in Brazil was confirmed on 26th February, in the city of São Paulo (Saúde, 2020c). On 11th March, while the World Health Organisation was officially announcing the pandemic status, the number of suspect cases in Brazil began to indicate community transmission (Saúde, 2020a).

In order to mitigate the spread of the disease and ensure that the infection did not exceed the overload capacity of the health systems, guidelines were issued on preventive strategies and pharmacological interventions (INF), recommended by WHO, and reported in a number of studies on this topic (Nicola et al., 2020; Cowling et al., 2020; Leung, Wu, Liu, & Leung, 2020). These measures included border control; closing environments that involved crowding, such as schools and public meetings; quarantine and isolation of the suspected and infected, respectively; taking disinfection sanitary measures of public places; individual sanitisation measures and respiratory protection; and mandatory or voluntary social distancing.

In this context, the Brazilian government took actions to tackle this pandemic state, ranging from structuring the health systems, keeping the basic supply requirements for the population, and reducing side effects on the economy. In turn, the Brazilian Supreme Court (STF) prioritised rulings on Covid-19 cases. By 6th June 2020, 2,890 cases had been registered in the Court relating to the disease were registered and 2,743 decisions made on the subject (STF, 2020). Figure 1 illustrates the spread of the disease in Brazil in line with the main government measures.



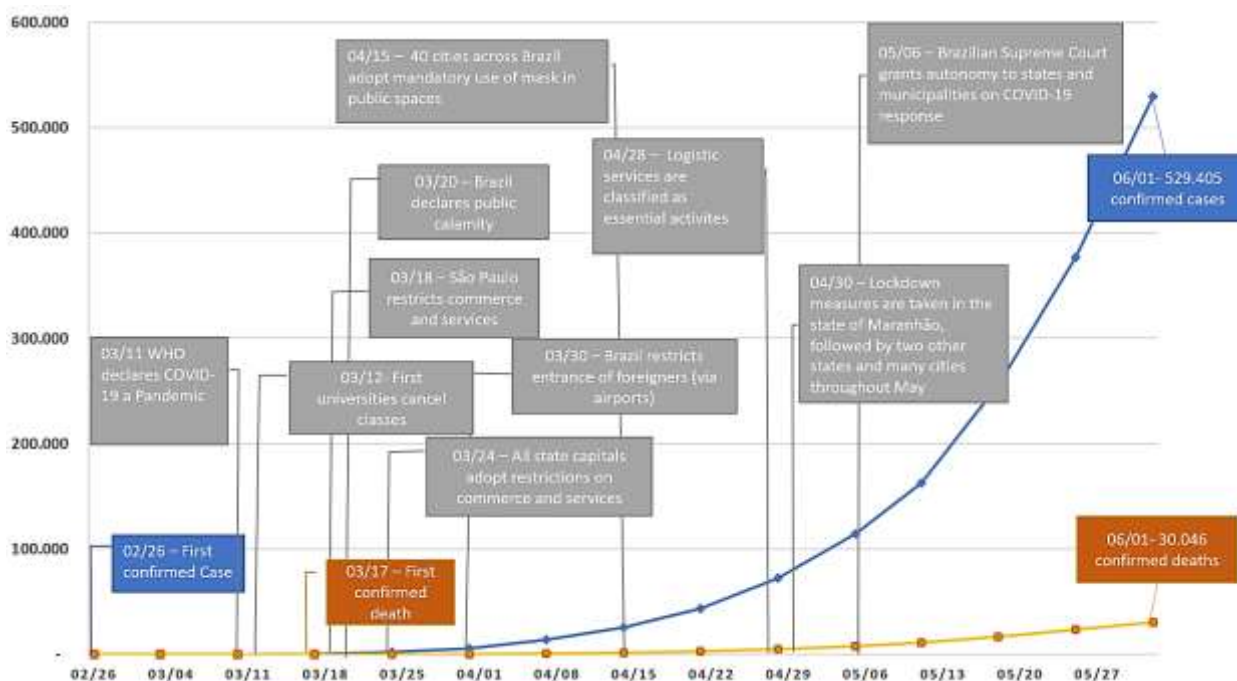


Figure 1: Spread of COVID-19 in Brazil

Source: Adapted from Saúde (2020a; 2020b; 2020c), Planalto [Presidential Palace] (2020).

By the 1st June 2020, more than 6.36 million infected patients had been confirmed worldwide and more than 377,000 deaths (WHO, 2020). In Brazil, on that same date, the Health Ministry (2020) informed the existence of almost 530,000 confirmed cases and around 30,000 deaths as a result of the disease. In early June, several cities and states were still unsure of the rate of the spread of the disease and as a result of the rising number of infections and deaths, many municipalities were forced to take stricter isolation measures or lockdown.

It should be stressed that taking restrictive measures, essential for reducing the epidemic curve and restructuring the health system, directly affects the logistics and global supply chains, resulting in adverse economic implications, such as slowdown and even standstill of some sectors of the economy.

### 3.1 Impacts of the pandemic on Brazilian key logistics activities

The Brazilian supply chain has been hard hit by the impacts of the Covid-19. The need for broader communication channels, implementation and or improvement of e-commerce channels, need for a more responsive attitude, readjustment of production and distribution have been a challenge for Brazilian businesses and especially the small and medium-size, which needed to suddenly adapt to carry on working. The necessary changes reflect on further investments in technology, productivity and finding local suppliers.

Brazilian businesses were widely impacted as a result of the social distancing decrees that caused a retraction in consumption. The chains of essential items, such as pharmaceutical products

and food, as well as supermarkets, had a steadier production and delivery flow, with no major disruption.

Figure 2 shows the main impacts of Covid-19 on the Brazilian supply chains with regard to the essential logistics activities.

| Key logistics activities | Logistics impacts on supply chains   |
|--------------------------|--|
| Inventories              | <ul style="list-style-type: none"> <li>● Increasing losses due to obsolescence, damage or beyond expiry date;</li> <li>● Interruption of items most in demand (medication, hygiene and cleaning products, masks, fitness equipment, tools);</li> <li>● Increase in stocks of “less essential” items during this period (decoration, footwear, furniture, home appliances);</li> <li>● Drop in predictability of supplies, due to unknown demands in a period strictly seasonal and without comparative effects in Brazil;</li> <li>● Increase in stocks in the chain channels, especially upstream.</li> <li>● Unpredictable demand for the next few periods.</li> </ul>   |
| Transport                | <ul style="list-style-type: none"> <li>● Increase in freight costs, caused by the traffic jam in the transport sector as a result of the especially high freight demand fractions;</li> <li>● Reinforcing alternative transport equipment (motorbikes, bikes, drones), especially for door-to-door, intra and inter-neighbourhood deliveries;</li> <li>● Longer delivery dates;</li> <li>● Drop of more than 93% in the Brazilian domestic airline network (ANAC, 2020), which as a result causes demand to move from air to road travel;</li> <li>● Total drop in the volume of road freight of 39.69% (Decope, 2020) in relation to the average move before the preventive measures against Covid-19;</li> <li>● A 14.9 growth in coastal transport in the first three months of the year, with 62.9 million tons shipped and unloaded in Brazilian port facilities (ANTAQ, 2020);</li> <li>● Fewer passengers led airlines to prioritise freight transport, adapting passenger planes to freight, with temporary authorisation from ANAC while confronting the pandemic (ANAC, 2020b).</li> </ul> |
| Procurement              | <ul style="list-style-type: none"> <li>● Looking for alternative suppliers to meet the demand for more popular items;</li> <li>● Increase in sales in local small shops, preventing the visit to large retail stores;</li> <li>● Substantial rise in the price of hospital inputs, caused by interruption in the supply of these items on a global scale;</li> <li>● The lack of essential supplies, especially clinical and hygiene items for the Covid-19 treatment made price the secondary decision in the procurement process, due to the imbalance between supply and demand;</li> <li>● Payment of fines for failing to comply with contractual clauses between suppliers and companies.</li> </ul>   |
| Order processing         | <ul style="list-style-type: none"> <li>● Increasing use apps (e.g. WhatsApp), as an alternative to the online sales information systems. Development such as: high consumer processing and response lead-time, sales loss due to delay in service, absence of efficient communication and increase in returns;</li> <li>● Drop in number of orders in the long chains and secondary products;</li> <li>● Increase in demand for e-commerce and m-commerce systems;</li> <li>● Instability in demand.</li> </ul>  |

**Figure 2: Covid-19 impacts on supply chains in Brazil with regard to key logistics activities**

Source: Authors, 2020.

According to the latest study published by the Operational Costs Department of NTC&Logística (Decope, 2020), for the period 18-31 May, the Brazilian freight road transport sector recorded a 39.69% overall decline in demand in relation to the levels prior to the coronavirus

pandemic, as a result of restrictions adopted in several Brazilian states, namely closing down non-essential services. The pharmaceutical sector that has been showing less downturns since the start of the pandemic, has shown no drop in demand in this latest publication (Decope, 2020).

The changes the pandemic made in logistics activities, especially in the primary, have unleashed sudden alterations in the procurement processes. The good relationship of buyers with suppliers are no longer efficient for successful negotiation, since uncertainty in delivery deadlines, prices and even in the production capacity of the required suppliers.

With regard to the inventories, the chains that once operated with inventories – such as the hospital material and drugs chain -, are now working with Just-in-time because of the huge demand produced by the pandemic for hospital and safety equipment. Many of those plants are unable to increase their supply due to the number of employees that have been laid off with Covid-19 and other ailments. On the other hand, the companies that held inventories faced problems with regard to the validity date of their products, obsolescence and damage. Many of them have already migrated to m-commerce or e-commerce in order to cut their losses.

The logistics activity that most impacted the Brazilian supply chains was transport. Brazil's multimodal matrix depends on the production sector to shift freight around the country and also export worldwide. With the fall in imports and exports since the start of the pandemic, there has been a drop in waterway and air transport, the latter with a reduction of more than 90% of its activities. Road freight transport – the most popular modality in Brazil, corresponding to 62% of the multimodal matrix – had declined more than 39% in volume and quantity of freight.

The Covid-19 pandemic imposes logistical barriers hampering imports, exports and the transport of inputs and products, forcing manufacturers and distributors to find innovative solutions, requiring a greater degree of flexibility in readapting the processes and further synergy between their members, especially in the procurement macro-processes, inventory administration and distribution, as recommended by Swafford, Ghosh and Murthy (2006). Corroborating with the classic logistics literature (Bowersox, Carter & Monczka, 1985; Bowersox, Closs & Helferich, 1996; Lambert & Stock, 1993), challenging Covid-19 has communicated to the organisations the importance of logistic activities, such as strategic tools with a competitive edge of organisations.

### 3.2 Impacts of the pandemic on short and long chains

The pandemic of the new coronavirus has modified consumer behaviour, triggering a process of deeper change in the short and long supply chains, since they need to become more resilient, adaptable and in line with the immediate needs imposed by the contingency.

In Brazil government actions were seen to be closing borders to decrees implementing social distancing measures, such as isolation and quarantine, or even in some regions of the country, lockdown, referring to the strictest state of social distancing with total suspension of non-essential activities. These measures brought immediate impacts for the country's economy, especially for the long supply chains, or as Baldwin and Tomiura (2020) suggest, internationalised chains.

The long chains are characterised by the complexity of their operations, with many physical, information and financial flows to ensure that the goods and or services are delivered in the right quantities and places (Christopher & Peck, 2004, Jain, Benyoucef & Bennett, 2008). According to Jain, Benyoucef and Bennett (2008), the emerging models of long supply chains, unlike short supply chains, bring new challenges for the companies involved in especially electronic business, as follows: the need for infrastructure among companies, possibility of cultural management incompatibilities between partner enterprises, high costs and complex implementation of an integrated supply chain model, and so on. In the Covid-19 pandemic, one of the most striking examples addresses the chain of medico-hospital products that broke down at the start of March 2020, since its largest world producer was China that was also undergoing the effects of the pandemic.

With the international trade compromised by the restrictions imposed by the pandemic, goods and services produced by short chains, soon emerged on the Brazilian scene. Baldwin and Tomiura (2020) said that short chains (regional) would be expected to survive a pandemic period.

According to Raftowicz, Kalisiak-Mędelaska and Struś (2020), the development of these regional chains are becoming extremely important, not only because of the sector's care with sustainable development, but principally to maintain the local production capacity, ensuring a transparent top quality food production process with a known source of origin. With the pandemic, these short chains of local producers and customers, have contributed to maintaining food supply in Brazil during the Covid-19 pandemic.

Government decrees have limited multimodal transport operations, especially international, bringing to the fore benefits for local and regional supply chains and the vulnerability of long chain operations. Figure 3 presents the negative (-) and positive (+) impacts of the pandemic of the new coronavirus in the short and long chains in terms of the measures adopted by Brazilian government agencies.

| Government actions and measures | Regulatory Instrument   | Short Chains | Long Chains | Comments   |
|---------------------------------|---|--------------|-------------|--|
| Import restriction              | Not applicable  | (+)          | (-)         | The restriction is due to the downturn in industrial activity worldwide, especially in China, USA and the European Union.  |
| Closing land borders            | Admin. Rule no. 125 dated 19/03; Updated by decree no.204 dated 29/04             | (+)          | (+)         | Entry of foreigners of any nationality is restricted, but free road freight traffic is guaranteed to prevent shortages in the country. This measure has no negative impacts on the development of short and long supply chains, considering the guarantee of haulage traffic via Brazilian borders.                                    |
| Closing air borders             | Admin. Rule no. 133, dated 23/03/20; updated by Admin Rule no. 152 dated 27/03/20 | (+)          | (-)         | The measure is restricted to the entry of foreigners into Brazil, but freight into the country depends heavily on the cargo compartment, with few freight operations, causing a drop in their operating capacity. Brazilian flight paths were reduced by 91% (ANAC, 2020), which caused even heavier losses to long chains and somehow |



|  |   |     |     |   |
|--|---|-----|-----|---|
|  |   |     |     | attracted competitiveness to the short chains that normally are regionalised and use road transport.  |
| Logistics activities as an essential service | Decree no. 10,282, dated 20/03 (with later amendments)  | (+) | (+) | Logistics activities were considered essential under Brazilian decrees, which minimised damage to the short and long chains.  |
| Store closures                               | Law no. 13,979 dated 6/02.<br>Applied by state and municipal decrees, e.g.: Decree no. 64,881 dated 22/03 (São Paulo).  | (-) | (-) | The law in question, adopted by several Brazilian municipalities and states in specific decrees, clarifies quarantine as a measure of social distancing that restricts opening stores to services listed as essential. Shop closures raise uncertainties regarding demand for goods that are not basic, standstill on stores' inventories and, consequently, a sudden drop in demand farther up the chain, causing more stocks at all points in the chain and quick search for information and communication technologies (ICTs) that can transform these physical sales units into virtual e-commerce stores. This measure also had a direct impact on the chains downstream, causing a considerable cut in general demand for road haulage. |
| Vehicle rotation in some Brazilian cities    | Municipal decree no. 59,403 dated 07/05 (City of São Paulo/SP)  | (-) | (-) | Vehicle rotation was used in the city of São Paulo and limited logistics activity of short and long chains, especially in detriment to retail and wholesale food distribution, as well as the spread of a new global habit: e-commerce.   |
| Lockdown                                     | State decree no. 33,574 dated 05/05 (applied in Fortaleza/Ceará);<br>State decree no. 729 dated 05/05 (applied in 17 cities in Pará state);<br>State decree no. 35784 dated 03/05 (applied in 4 cities in Maranhão state) | (-) | (-) | The lockdown was decreed in some cities/micro-regions in Brazil with losses for all supply chains, given the total/partial blockage of these places, with permission only to circulate consumer goods of basic necessity.   |
| e-commerce activities are essential          | Decree no. 10,282 (with later amendments)   | (+) | (+) | The essential nature of e-commerce gave impetus to some sectors of the industry for remote outflow of their products.   |
| Hospitality lockdown                         | Decree no. 10,282 (with later amendments)<br>Municipal decree no. 7710/2020 (São Sebastião City Hall/SP), among others.   | (-) | (-) | The hospitality industry has not been listed in federal decrees as an essential service, and was suspended in specific decrees in some places, but the sector's drop in demand attributed to measures such as restrictions on entry of foreigner visitors and interstate and inter-municipal travel, have caused many hotels to temporarily close. The closure of the hotel   |



|   |   |     |     |  |
|---|---|-----|-----|--|
|   |   |     |     | network has had a local and regional impact on hotels and services for tourism and, consequently, on large national and global tourism chains.   |
| Hospital and health care materials and services   | Decree no. 10,282 (with later amendments);<br>Decrees no. 10,285 and 10,302           | (+) | (+) | Health care chains (in Brazilian decrees retained as essential services), have generally gained during the pandemic. Even with a collapse without supplies for the home market and depending on foreign trade to meet internal demand, the short and long chains of health care have been working to maximum capacity since March 2020. Contributing to the sector, some products essential for the supply to the health systems were temporarily exempted from excise tax (IPI).  |
| Food and beverage production chains are essential | Decree nº 10.282 (with later amendments);<br>Admin. rule no. 116, dated 26 March 2020 | (+) | (+) | Services, activities and goods necessary for the full functioning of food and beverage production chains were considered essential by Brazilian decrees to ensure food security and supply to the Brazilian population. So MAPA published a series of recommendations for the harvest of farm produce, which strictly satisfy the minimum safety guidelines provided by the Health Ministry (MAPA, 2020); and effectively maintain the inspection and surveillance activities; health certification (for exports); and analysis of import licence applications, for maintaining the public supply of animal products for human consumption and animal feed, for public safety. These measures have benefitted national long supply chains, considering their expertise in food security and have made the short chains more competitive. |

**Figure 3: Impacts of government measures on tackling the Covid-19 in Brazilian short and long chains**  
Source: Authors (2020)

Short supply chains have benefitted from this pandemic process by having closer proximity to regional suppliers, depending mostly on road transport, which were not affected as much by restrictions from the imposed scenario, and therefore not requiring sophisticated multimodal logistics. Another advantage of these regional supply chains lies in the practice of low inventory volume of finished goods and work in progress, and also having buyers with a close relationship with their suppliers, giving them security and quality in procurement farther up the chain.

Concerning long supply chains, the logistic impacts most affecting them are caused by restrictions on transport modes, since they form the link between the Brazilian market and their business partners. The restriction was the result of the decline in global industrial activity, especially in China, USA and the European Union. The strongest impact occurred with the sharp

fall in global air traffic, which caused disruptions in multiple global chains and almost all sectors of the economy.

#### 4 RESILIENCE OF BRAZILIAN SHORT SUPPLY CHAINS IN LIGHT OF THE COVID-19 PANDEMIC

The global economy is facing challenges in the supply chain amid the coronavirus outbreak. The virus has crossed borders to impact countries' economies, supply chains, manufacturing sector and stock market. Staff shortages are inevitable due to lockdowns and limitations nationwide with regard to labour, forcing companies in the main sectors to cut back on their operations, which has seriously affected the global supply chains (Majid, 2020). This uncertain scenario, such as pandemics, has a direct influence on supply chains and logistic operations of their members. In this context, resilience and management agility are special abilities of the organisations (Sharifi & Zhang, 1999).

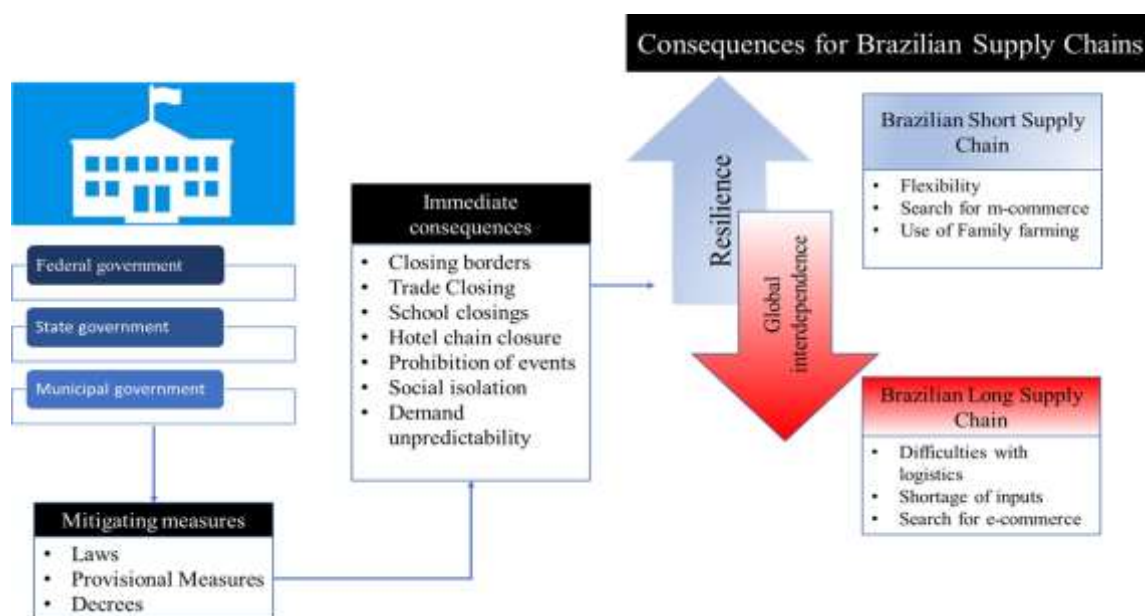
Concerning the supply chain's resilience, it can be understood to be its ability to recover from the disruption event by responding efficiently (Ponomarov & Holcomb, 2009), while agility can be understood as its members' ability to adopt more flexible internal logistics in reacting and readjusting to uncertainty. This internal ability reflects the speed of the supply chains when they move to synchronise more rapidly the effects of uncertainty on supply and demand (Christopher & Peck, 2004; Swafford et al., 2006).

Jutnner and Maklan (2011) state that resilience not only helps mitigate the uncertainties resulting from the inclusive risk management processes, but also seeks the organisations' recovery by taking alternative actions. To be able to survive, many businesses have reinvented themselves and sought resilience as a form of survival, as already seen in the studies by Rice and Caniato (2003) and Jutnner and Maklan (2011).

It is worth considering that, when the matter is how to combat the Covid-19, the first measures to be taken come from the government, and so Domingues, Cardoso and Magalhães (2020) stress that the federal, municipal and state spheres should channel resources into increasing the capacity of intensive care, widening the supply of health-care services while, at the same time, guaranteeing restrictive measures to further the slowdown of infection to minimise demand for the services.

However, the economy and production sector are impacted by the social distancing measures, especially concerning trade closing, since this is the most powerful point in the supply chains by being close to consumers. The impacts of these mitigating measures of the three federative bodies are illustrated in Figure 4 below.





**Figure 4: Consequences for Brazilian long and short supply chains after government measures against the Covid-19 pandemic**  
Source: Authors, 2020.

In view of the worsening crisis and public unrest, it is important to ensure the input and distribution of the resources required to prevent shortages, and therefore the Brazilian federal government injected USD 200 billion into the economy (Economia, 2020). These incentives have helped the chains to maintain the supply throughout the country, and among other utilities, in order to help the Brazilian informal workforce; the socially vulnerable; employees of private companies that have paralysed activities; or even those whose sales have fallen; a cut in import duties, and aid to states and municipalities with their public servant payrolls. These incentives have allowed the chains to continue the nationwide supply, assuring especially those involved in family farming production and agribusiness.

Characteristics of resilience and agility are noticeable in the organisation of short social chains, which have been mobilised to help people in risk groups (pregnant women, the elderly, the disabled or people with comorbidities) or in social vulnerability. They are permanent or temporary short chains as a result of the Covid-19 pandemic from federal educational institutions, non-government community organisations or those related to food chains developed by family-based farming.

In the scenario of border closures and reinforcement of short chains, the supply chains are showing endogenous movement. As stated by Domingues, Cardoso and Magalhães (2020), a productive reconversion is happening, planned and encouraged, or even at the initiative of the internal sectors of companies. This reconversion is guided by economic and social demands, redirecting the content of businesses to confront Covid-19. Some examples worth mentioning are textile mills that now produce facemasks on a large scale, and companies in the beverage sector and cosmetic plants now making 70% alcohol gel.

Also in the context of production reconversion, since tourism was not included as an essential activity, hotel chains throughout the country now accommodate the elderly with services

adapted to social distancing, as well as agreeing with municipal and state governments to accommodate health professionals who have contracted the virus.

The search for resilience during the Covid-19 pandemic can also be pinpointed in the migratory movement of services from once being physically offered and now being traded through e-commerce and m-commerce, having even further boosted delivery services throughout Brazil, raising logistics to a first-ranking essential service level. Moreover, when migrating to online services, businesses are able to cut their costs and take breath to continue operating in the market.

While some sectors, as in the case of the food sector, have embraced m-commerce as a priority and now handle inter-neighbourhood logistics, the major department store chains in Brazil have consolidated e-commerce, transforming their physical stores into fast take-away points, with the advantage of eliminating freight from the product's final value, in addition to providing their online platforms for small businesses and self-employed salespersons to be able to advertise and sell their goods.

It's worth mentioning that m-commerce has become an easy-to-access and necessary tool both for the entrepreneur and consumer. This facility offers the high potential mobility and convenience to supply, demand and payment security. In m-commerce, entrepreneurs can easily offer and provide their own product, and in many cases without needing to develop their own app, they can register in already existing apps. The consumer, on the other hand, has the convenience of staying at home and searching for the product in platforms combining different suppliers, ensuring the experience of comparing prices, quality and distance, essential for complete satisfaction. This new virtual market, absorbed by local chains, has also reinforced alternative transport equipment (motorbikes, bicycles, drones) for door-to-door deliveries within and between neighbourhoods.

Some Brazilian characteristics confirm the need for resilient supply chains in order to ensure the supply within the pandemic context. According to data presented by Cavalcante and Campolina (2020), Brazil has 3.5 million very small and small enterprises that make up 98% of all establishments in the country and includes 40% of the monthly total wages bill in the private sector (around USD 6.5 billion), therefore, becoming key employment units in the country's daily life.

Furthermore, a large number of Brazilians rely on grassroots economics, a term referring to a set of economic practices adopted by workers from their workforce and own production means, in order to meet local demands, very often built on solidarity. Now with social distancing measures, grassroots activities are compromised. As Cavalcante and Campolina (2020) point out, this economy can be identified in the work of street vendors, recyclable waste collectors, artisans, folk artists, urban farmers, artisan food producers, among other many heterogeneous activities.

In this scenario it is worth mentioning actions taken over the last few decades regarding modernisation and upgrade of family-based farming in Brazil. To attend the markets and individual customers, family farmers are organised in cooperative groups, associations and other setups, as well as relying on different government funding, providing them with better conditions to reach specific market niches, which have high demands regarding quality of the agri-food products (Bruno, 2016), allowing the creation of new market opportunities and with varying attributes.



Many different projects based on short food supply chains have been strengthened, such as direct sales from farms, farm markets, online shopping carts, and producer-consumer partnerships. Short supply chains are, therefore, desirable and, not just because of cost reduction, their significance goes much deeper. In this period of growing market uncertainty, they are one of the alternative solutions for rational business operations (Raftowicz, Kalisiak-Medelska & Strus, 2020).

Therefore, in order to survive, many Brazilian supply chains have adapted to the restrictions imposed by the need for social distancing, readjusting their portfolios of goods and services and marketing them, using information tools as a means to interact with their customers and reinforce the collaboration between chain members to deliver a win-win policy amidst the pandemic.

## 5 FINAL CONSIDERATIONS

The general aim of this paper was to identify the impacts created by the Covid-19 pandemic on the short and long supply chains in Brazil. From the pandemic-imposed effects, among them the need for social distancing as the best way to combat the disease, several contingency measures were also required by the federal, municipal and state governments to tackle head-on the Brazilian and especially the long supply chains.

The negative impacts of the pandemic were greater for the global and long supply chains, considering their need for permanent international collaboration with other countries' modes of transport and production chains with limited capacities due to the pandemic. On the other hand, short supply chains were affected less negatively and were compensated by not being disrupted by such measures as border closures and import restrictions. Moreover, short supply chains were found to have greater willingness and capacity for resilience given the operating restrictions imposed by government authorities and aspects from the sanitary stipulations because of the new coronavirus pandemic.

Although the impacts of the Covid-19 on the supply chains are not yet fully measurable, since the pandemic curve is still rising in some countries, for example, in Brazil, some management implications for them are identifiable, resulting from lessons learned during the crisis, which should continue in the post-pandemic period, namely: (i) reorganisation of the chains in an attempt to form more collaborative and lasting networks; (ii) implementation of algorithms that help identify capacity restraints of first, second and third tier suppliers; (iii) the selection of suppliers will not only be backed by quality, cost and lead-time, but factors such as the suppliers' responsive capacity, knowledge of their supply chain (2nd and 3rd tier suppliers), will also be decisive selection criteria; (iv) partnerships with short supply chains in order to identify more rapidly the evidence of disruptions in supply and facilitate joint work to operate in this setting; (v) trading activities should plan alternative sales and delivery options, not just depending on the physical point of sale; (vi) provide main partners (suppliers and distributors) with transparent data about volumes in stock and productive capacity in the new scenario, in order to anticipate their material shortages, and (vii) have more frequent scenario analyses in order to understand the operating and financial implications in their business.



The challenges of the Brazilian supply chains after the pandemic will be marked by their abilities to build resilient strategic plans, the key characteristic of which lies in the organisational and technological flexibility of their operations. These strategies need to be in line with society's change in attitude and also with the natural evolution of tools that support the development of the logistics activities.

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#### SOBRE OS AUTORES

##### M. V. D. DE ASSUNÇÃO

Graduado em Engenharia de Produção, Mestre em Administração e Doutor em Ciência e Engenharia de Petróleo. É professor do IFRN Campus São Gonçalo do Amarante. E-mail: [marcus.assuncao@ifrn.edu.br](mailto:marcus.assuncao@ifrn.edu.br)  
ORCID ID: <http://orcid.org/0000-0002-3384-1899>

##### M. MEDEIROS

Graduada, mestre e doutora em Administração. É professora de Logística do IFRN Campus Natal Zona Norte. E-mail: [marlene.medeiros@ifrn.edu.br](mailto:marlene.medeiros@ifrn.edu.br)  
ORCID ID: <http://orcid.org/0000-0003-4742-6087>

##### L. N. R. MOREIRA

Graduada e Mestre em Engenharia de Produção. É professora de Gestão e Negócios do IFRN Campus Mossoró. E-mail: [lycia.moreira@ifrn.edu.br](mailto:lycia.moreira@ifrn.edu.br)  
ORCID ID: <http://orcid.org/0000-0002-4280-642X>

##### I. V. L. PAIVA

Graduada e Mestre em Engenharia de Produção. É professora de Gestão e Negócios do IFRN Campus Parelhas. E-mail: [izabelle.paiva@ifrn.edu.br](mailto:izabelle.paiva@ifrn.edu.br)  
ORCID ID: <http://orcid.org/0000-0002-7439-6939>

##### D. C. A. DE S. PAES

Graduado em Relações Internacionais, Mestre e Doutor em Administração. É professor do IFRN Campus São Gonçalo do Amarante. E-mail: [diegopaes@msn.com](mailto:diegopaes@msn.com)  
ORCID ID: <http://orcid.org/0000-0001-8828-7234>

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