

# How does a region react to different types of shocks? The case of a Brazilian T&C industrial region

Reactions to  
different types  
of shocks

103

Newton da Silva Miranda Junior

*Department of Administration, University of Brasília, Brasília, Brazil*

Valmir Emil Hoffmann

*Department of Accounting, Federal University of Santa Catarina,  
Florianópolis, Brazil, and*

Renan Costa Filgueiras

*Department of Software Engineering, University of Brasília, Brasília, Brazil*

Received 19 November 2021

Revised 2 June 2022

26 July 2022

25 September 2022

Accepted 29 November 2022

## Abstract

**Purpose** – This study aims to empirically investigate how an industrial region has reacted to different shocks – competitive, market and environmental – through its economic subsystems – its firms, workers and institutions – in a longitudinal perspective for the period 1985–2021.

**Design/methodology/approach** – The authors used a mixed-method approach applied to a case study of the Brazilian T&C industrial region. The authors used two data sources and two stages for data collection. The first stage involved documentary research and the second in-depth interviews. The analysis of qualitative data took place in two stages. In the first, the authors applied content analysis, and in the second stage, the authors used the exploratory statistical technique of simple correspondence analysis and the categorical data.

**Findings** – The results provide evidence that different types of shock provoke different reactions. However, the shock–reaction relationship is invariable over time. The authors observed proportionality in the size of the shock and the regional actors involved in the regional response – firms, workers and institutions.

**Originality/value** – The authors went a step further, presenting empirical research on the shock–reaction relationship using the “type of shock” as a variable. This paper provides a holistic understanding of the factors behind regional resilience through insights into the role that resources, structures, institutions and actors play in the regional response to distinct types of shocks, reaching four main conclusions.

**Keywords** Regional resilience, Regional economic subsystem, Shocks, Reactions

**Paper type** Research paper

## Introduction

Resilience has multiple definitions from different disciplines. Historically, it has been applied to ecological systems, materials, individuals, communities, geographic areas, along with others. Generally, these definitions can be summarized in two main perspectives: equilibrium-oriented perspective and evolution-oriented perspective (Pendall, Foster, & Cowell, 2010). The first refers to a system's ability to return to its unique static equilibrium point, which is the pre-shock state (Christopherson, Michie, & Tyler, 2010). In the second perspective, resilience is the dynamic ability of a system to anticipate, prepare and react to changes (Martin, 2012).

© Newton da Silva Miranda Junior, Valmir Emil Hoffmann and Renan Costa Filgueiras. Published in *Innovation & Management Review*. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at <http://creativecommons.org/licenses/by/4.0/legalcode>



Researchers have focused their attention on studying the determinants of regional resilience to economic crisis (Giannakis & Bruggeman, 2017) and how regions react to recession (Martin, 2012). It is known that regional economic resilience depends on the interaction between various economic subsystems, such as (1) industrial and business structure, (2) labor market conditions, (3) governmental and financial arrangements (Martin & Sunley, 2015), and (4) territorial elements (Miranda Júnior & Hoffmann, 2021). Although a shock event is an assumption in the field of resilience research, little is known about the influence of shock attributes on regions' reactions to their adverse economic effects.

The researcher tends to investigate resilience after a specific economic shock (Diodato & Weterings, 2015). Despite this, it is known that other types of shocks cause economic impacts in regions (Martin & Sunley, 2015), such as catastrophic weather events, urban disasters, technological changes, a rise of competitors and plant closures (Fröhlich & Hassink, 2018). It remains to be analyzed how these distinct types of shocks are related to the varied regional reactions to their adverse effects.

Based on the above, the main research question is: How does a region react to different types of shocks? This study aims to empirically investigate how an industrial region has reacted to different shocks – competitive, market and environmental – through its economic subsystems – its firms, workers and institutions – in a longitudinal perspective for the period 1985–2021.

This paper extends the literature on resilience by

- (1) empirically articulating the regional shock–reaction relationship and
- (2) exploring the shock typology and the determinants of the structure of regional economic resilience as presented by Martin and Sunley (2015).

At the managerial level, it contributes to the public policy agenda aimed at regional economic recovery after crises, based on the evidence found on how regional economic subsystems are configured to respond to shocks.

We organized the paper as follows. First, we present our theoretical framework and describe the methods and practical steps for collecting and analyzing the data. Then, we present the results, discussion, and, finally, the conclusions.

## Theoretical framework

### *Regional resilience, shocks and regional economic subsystems: a brief introduction*

One can understand resilience in the regional economic field as “the capacity of a regional or local economy to withstand or recover from the market, competitive and environmental shocks that have occurred or are likely to occur in its developmental growth path” (Martin & Sunley, 2015, p. 15). Such a recovery can occur through the “changing ability of a regional economy – its firms, workers, and institutions – to adapt, over time, to what pervades that economy with the needed resilience to minimize its vulnerability and ability to recover successfully from shocks” (Martin, 2018, p. 844). The concept of regional economic resilience can take on two primary meanings. The first is when there is (1) maintenance or restoration of the region's previous developmental path, and the second is when there is (2) a change to a new sustainable regional path (Evenhuis, 2017).

In the first case, the preservation or restoration of the previous path of regional economic development emphasizes the resilience approach known as the equilibrium-centered view (Gunderson & Holling, 2002) based on deterministic and linear assumptions (Folke, 2006). Within the equilibrium-centered view, there is also an alternative approach to the idea of singular equilibrium (Folke, 2006) derived from studies on socio-ecological systems (Holling, 1973). This approach is known as ecological resilience and emphasizes multiple equilibrium

points (Pendall *et al.*, 2010). Thus, regional resilience is seen as a cycle of an adaptive renewal, and critical events are opportunities for innovation and development (Folke, 2006).

One of the main points of the field of study on regional resilience is to identify which elements determine its resilience (Martin & Sunley, 2015). In general, these studies adopt the premise that there are transversal predictive variables of regional resilience. On the one hand, some researchers argue that a region's resilience is a function of its specific resources. Therefore, their studies shed light on the goal of "knowing how" such resources lead regions to resilience (e.g. Clark *et al.*, 2010). This current study generally focuses on the in-depth research of regions (e.g. Hervas-Oliver *et al.*, 2011). On the other hand, some researchers seek to "know which" the determinants that lead regions to resilience are. This line of studies generally suggests macroeconomic variables (Evenhuis, 2017) as predictors of regional resilience (e.g. Crescenzi *et al.*, 2016). Some examples of these variables are local culture (Huggins & Thompson, 2015), innovative capacity (Clark *et al.*, 2010), economic specialization (Lagravinese, 2015), local entrepreneurial capacity (Spigel & Vinodrai, 2020) and local knowledge networks (Crespo, Suire, & Vicente, 2016).

The framework proposed by Martin and Sunley (2015) suggests that regional resilience is determined by the dynamics of four main economic, interactive and non-exclusive subsystems: (1) structural and business subsystem, (2) labor market subsystem, (3) financial subsystem and (4) governance subsystem. There are two considerations related to the model, according to Martin and Sunley (2015): (1) a single economic subsystem does not entirely determine the economic responses and (2) the subsystems interact with agency and decision-making. In addition to the framework outlined by Martin and Sunley (2015) and Miranda Júnior and Hoffmann (2021) suggest the so-called economic subsystem of "Territorial elements."

Regarding shocks, the regional economic resilience literature has used financial shocks as a basis for empirical research, especially the 2008–2009 global financial crisis (Gong, Hassink, Tan, & Huang, 2020). However, non-financial shocks also have the potential to cause economic losses (Martin & Sunley, 2015), such as natural disasters (Boschma, 2015), technological disruptions (Østergaard & Park, 2013), and, more recently, the COVID-19 pandemic (Sutton & Arku, 2022).

Through empirical evidence from Billington, Karlsen, Mathisen, and Pettersen (2017), we know that firms use regional resources to deal with shocks. The resilience resulting from this firm–region interaction is built by contributing to the region's economic and social systems and vice versa (Billington *et al.*, 2017). From the above, we extract the general proposition of this study, which complements the two considerations by Martin and Sunley (2015) about their theoretical model: the responses coming from the economic resilience subsystems are related to the types of shocks faced by regional actors (such as firms, institutions, community). Based on this, we derive three specific propositions:

- Proposition 1.* Competitive shocks, taken as part of the macroenvironment, are related to the responses given by subsystems related to systemic actors.
- Proposition 2.* Environmental shocks, taken as part of both the macroenvironment and the microenvironment, are related to the responses given by subsystems related to the local community.
- Proposition 3.* Market shocks, taken as part of the microenvironment, are related to the responses given by subsystems related to firms.

## Method

### *A brief history of the origin of the T&C Brusque region*

This research deals with the textile and clothing (T&C) sector in a Brazilian industrial cluster in the Brusque region, located in Santa Catarina, south of Brazil. The city has a

territorial extension of 283.4 km<sup>2</sup>, an estimated population of around 132,000 individuals, and a Human Development Index (HDI) of 0.80. The emergence of T&C industrial activities in the region dates back to the arrival of Polish and German immigrants to Brusque at the end of the 19th century. These immigrants (Glatz, 2018; Seyferth, 1974) influenced the opening of the region's three large anchor textile factories – Renaux, Buettner and Schlösser – at the end of the 19th century. Historically, the region of Brusque is known as the “cradle of spinning” because the first spinning factory's emergence in the state of Santa Catarina took place there in 1908. From the 1930s to the 1970s, the textile cluster increased in the number of new firms, especially spin-offs from the pioneers. During this period, the pioneers founded several support institutions. The centennial existence and economic representativeness of the Brusque region in the state of Santa Catarina justify its choice for the establishment of the T&C sector. According to Yin's typology (2018), it is a representative or typical case.

### *Research design*

We used a mixed-method approach applied to Brusque's empirical case study of the Brazilian T&C industrial region to answer our research questions about how regions respond to different shocks. The case study is appropriate for the theory-building purpose (Eisenhardt & Graebner, 2007) on the phenomenon of interest that cannot be studied outside its natural setting (Yin, 2018). The case study method is also recommended in regional resilience literature. According to Martin and Sunley (2015, p. 22):

Ultimately, determining the extent and nature of regional economic adaptation in response to shocks requires an in-depth study of individual industries, firms, and workers, — only case study analysis, whether regional or local, can reveal such an extent and nature.

### *Data collection and sample*

We used two data sources and two stages for data collection.

The first stage involved documentary research and the second in-depth interviews. This variety of sources allowed data triangulation, a reliability factor in qualitative research (Jick, 1979). We carried out documentary research at the municipal museum “Casa de Brusque” where there are historical books on the region's T&C industrial origins, dating from the late 19th century, and the collection of the regional newspaper “O Município,” founded in the 1950s and still in circulation today. Through exploratory reading, we selected 882 newspaper reports dating from the 1980s to 2021. After the circular process of data interpretation (Denzin & Lincoln, 2005), we selected 670 newspaper reports as sampling material using as selection criteria those that addressed simultaneously (1) shocks faced by the Brusque T&C industrial region and (2) its responses to these shocks.

The second stage of data collection was to conduct in-depth interviews with 20 regional actors (e.g. companies, local supporting institutions, government agencies, labor unions, universities and others), considering the level of new insights expected for this research (Glaser & Strauss, 1967). Thirteen regional actors were identified by reading the sampling newspaper reports, and the other seven used the snowball technique. Table 1 provides an overview of the actors interviewed and their roles in the Brusque T&C industrial region.

We developed a semi-structured interview guide with the same questions used previously in a document collection: (1) What were the shocks faced by the Brusque T&C industrial region? and (2) What were the region's responses to these shocks? Each interview lasted about one hour, and all were tape-recorded and transcribed in full.

Code	Actors and their roles in Brusque's T&C industrial region	Years in the region	Identified through Documentary research	Snowball technique
I1	Society	T&C Labor Union Leader	26	X
I2	Industry	T&C Entrepreneur and former Production Manager of a century-old T&C company	32	X
I3	Industry	R&D Manager at a sizeable T&C company	12	X
I4	Industry	T&C Entrepreneur and Coordinator of the T&C Business Association	18	X
I5	Industry	Marketing Manager of a century-old T&C company	21	X
I6	University	Professor of Textile Engineering and Academic Researcher	25	X
I7	University	Fashion Business Professor and Academic Researcher	22	X
I8	Industry	T&C entrepreneur and Trade Association Leader	26	X
I9	Government	T&C Business Analyst working at a local Support Institution	12	X
I10	Industry	T&C Entrepreneur and Coordinator of the T&C Business Association	30	X
I11	Industry	T&C Entrepreneur and former leader of the T&C Business Association	50	X
I12	Industry	T&C Entrepreneur and former Production Manager of a century-old T&C company	12	X
I13	Government	T&C Entrepreneur and Political Manager of the city's economy	40	X
I14	Industry	T&C Entrepreneur	22	X
I15	Industry	Marketing Manager at a sizeable T&C company	11	X
I16	Government	Former City Mayor	56	X
I17	University	Professor of Business Administration and Academic Researcher	20	X
I18	Industry	Fashion Design Consultant for small T&C businesses in the region	10	X
I19	Government	Leader of Local Support Institution	12	X
I20	University	Professor of Business Administration and Dean of the Local University	30	X

Source(s): Elaborated by the authors

Table 1.  
Interviewees' profile

### Analysis techniques

*Qualitative data analysis.* The analysis of qualitative data took place in two stages. In the first, we applied content analysis, and in the second stage, we used the exploratory statistical technique of simple correspondence analysis and the categorical data.

*Content analysis.* First, we studied the history of the Brusque T&C industrial region based on local historiographical books on the subject, such as Seyferth (1974), Renaux (2010), Betta (2016), and Glatz (2018). The newspaper "O Município" also published editions with reports on the history of T&C economic activity in Brusque. We aimed to understand how the T&C

industrial region emerged in Brusque and how it has developed over time through the data analysis process based on the narrative strategy (Langley, 1999).

We adopted descriptive content analysis (Neuendorf, 2002) under the criterion of quantification of raw qualitative data collected from newspaper reports and interviews. Our objective was to identify and quantify the frequency of shocks experienced by the Brusque T&C industrial region and how this industrial region coped with these shocks. Through a double-blind analysis by the researchers, we developed codebooks (Tables 2 and 3) applying a theory-driven approach according to the framework adaptation of Martin and Sunley (2015) proposed by Miranda Júnior and Hoffmann (2021).

According to Martin and Sunley (2015), we coded the shocks identified in the raw data into three variables (1) competitive, (2) market and (3) environmental shocks. The definitions adopted in this study for the shock categories are in the codebook in Table 2.

We sliced the raw data into text units, which should simultaneously mention a shock and the respective reaction of the T&C industrial region to deal with it, according to the variables of the regional resilience economic subsystems. The 149 text units we identified were organized in a spreadsheet and coded by the two researchers in double-blind analysis, both in a type of shock and a type of subsystem.

As a validity criterion (Neuendorf, 2002), we applied Cohen’s kappa coefficient to compare the researchers’ coding using the Recal3 tool (Freelon, 2010). The first coding cycle randomly selected fifty text units, and Cohen’s kappa coefficient was insufficient. After a new alignment

Economic subsystem	Description
Industrial and Business Structure	It refers to the industrial economic configuration (diversified or specialized) that leads to the region’s market orientation. It also refers to endogenous attributes of the business, entrepreneurial and relational structure of the supply chain, and firms’ facts (size, debt structure, financial strength)
Governance Arrangements	It refers to economic policies, strategies and support measures at the systemic level – formulated by the national government or arising from international regulatory arrangements and developed by the local government at the sectoral level. It also refers to non-state entities and local supporting institutions
Labor Market Conditions	It refers to systemic elements, such as inter-regional labor mobility, the connection to the labor market, and the workforce’s specific attributes and adaptability, from the perspective of the firm and workers, to deal with the effects of shocks
Financial Arrangements	It refers to national or local credit market conditions, such as loans and financing, and attitudes of financial institutions. It also refers to stock market conditions
Territorial Elements	It refers to material and immaterial elements related to expressions of human values that shape formal and informal institutions in the region

**Source(s):** Elaborated by the authors

**Table 2.**  
Codebook for regional economic resilience subsystems

Shock types	Description
Competitive	It refers to systemic economic, socio-cultural, political-legal and demographic issues extrinsic to Brusque’s T&C industrial relations
Market	It refers to the sectoral shock related to local industrial relations between firms, suppliers, customers, distributors and the local workforce in the Brusque T&C region
Environmental	It refers to natural disasters of external or internal origin in the region of Brusque

**Source(s):** Elaborated by the authors

**Table 3.**  
Codebook for shock types

between researchers and adjustments to the codebooks, a new random sample of fifty text units was analyzed in the Recal3 tool. In this second coding cycle, Cohen’s kappa coefficient was 0.81, suggesting that the agreement was almost perfect (Landis & Koch, 1977).

*Correspondence analysis*

In the second stage, our objective was to verify whether the categorical variables “types of shocks” and “types of regional resilience economic subsystems” were statistically correlated. We applied the exploratory statistical technique of simple correspondence analysis using the symmetric normalization method. The assumptions for applying the simple correspondence analysis technique were satisfied, according to Doey and Kurta (2011). Through the R software, we adopted the criteria of two dimensions in solution and chi-square as a distance measure. According to Greenacre (2007), the application of the chi-square distance was justified because it satisfies many favorable properties of correspondence analysis, such as the principle of distributive equivalence.

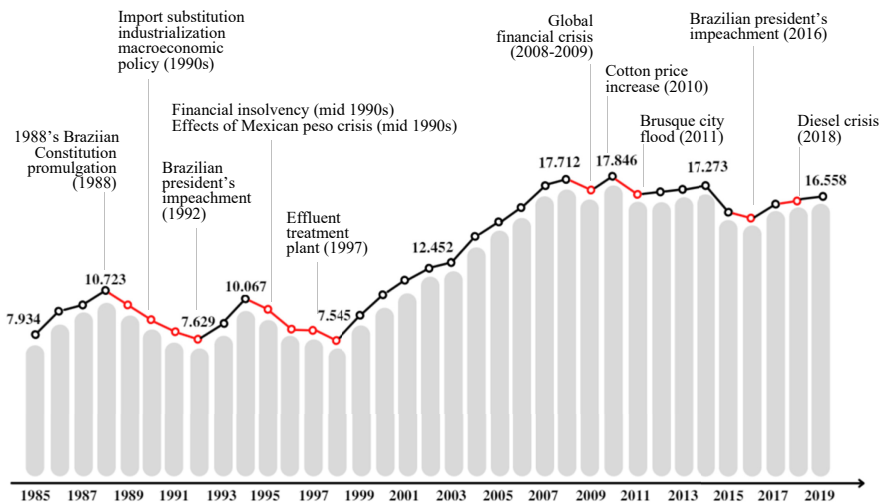
**Findings**

*Shocks and regional resilience economic subsystems*

We identified different shocks and reactions to them in our raw qualitative data. Based on Knaflic (2015), the narrative in Figure 1 summarizes the main ones. Like Martin and Sunley (2015) and Diodato and Weterings (2015), we considered recessions in the level of employment in the Brusque T&C industrial region (from 1985 to 2019) as events suggestive of shocks.

After categorizing the events according to our codebook, we tabulated the respective category frequencies. The balloon plot in Figure 2 shows the absolute frequencies observed between each pair composed by the cross-tabulation between the categories: “shocks” and “economic subsystems.” The tabulations in each cell do not necessarily correspond to the same shock–reaction pair; there is a combination of distinct pairs. The assumption adopted was that a maximum of 20% of the expected values were less than 5 (Greenacre, 2007).

As can be seen, reactions to shocks are concentrated in the category “competitive shock,” with economic shocks as a subcategory. We infer, therefore, that economic shocks are the

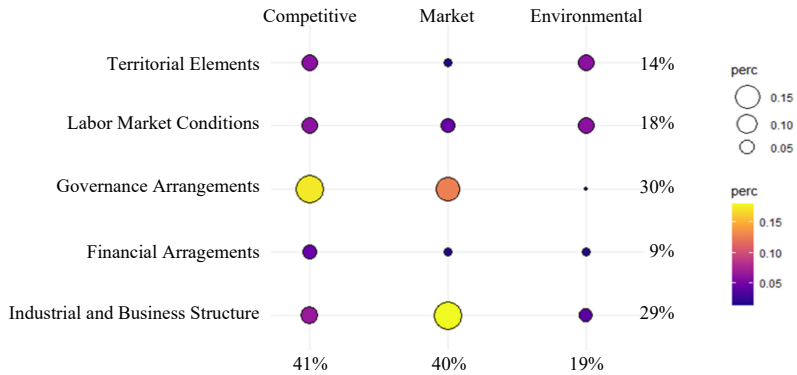


Source(s): Annual Social Information List (RAIS) data collection

**Figure 1.** Main events storytelling and employment in Brusque’s T&C industrial region (1985–2019)



**Figure 2.** Balloon plot of the crosstab between “types of shocks” and “economic subsystems”



**Source(s):** Elaborated by the authors

most mentioned in the regional resilience literature. However, they are not the only ones negatively impacting a region’s economy (Martin & Sunley, 2015). Based on this cross-tabulation, we applied the bivariate exploratory technique of simple correspondence analysis to investigate the association between the categories “shocks” and “economic subsystems” using the chi-square method (Table 4). This method determines whether the rows and columns are independent of each other or not.

The *p*-value of 0.000 ( $\chi^2$  29.637, d.f. 8) at a significance level of 5% tells us that there is a minimal probability that the frequencies observed in Table 4 can be reconciled with the assumption of homogeneity. It is possible to conclude that there is a statistically significant association between the shock and categorical variables of the economic subsystems.

Row		FA	GA	Column IBS	LMC	TE	Marginals
Competitive	Obs	7	26	10	9	9	52
	Exp	5.3	19.2	17.6	10.2	8.5	
	Column%	53.8%	55.3%	23.2%	36.0%	42.8%	
	Res	0.7	1.5	-1.8	-0.3	0.1	
	Std. Res	0.9	2.4	-2.7	-0.5	0.1	
Environmental	Obs	3	2	6	9	9	29
	Exp	2.5	9.1	8.3	4.8	4.0	
	Column%	23.1%	4.3%	14.0%	36.0%	42.9%	
	Res	0.2	-2.3	-0.8	1.8	2.4	
	Std. Res	<b>0.3</b>	-3.1	-1.0	2.2	2.9	
Market	Obs	3	19	27	7	3	59
	Exp	5.1	18.6	17.0	9.8	8.3	
	Column%	23.1%	40.4%	62.8%	28.0%	14.3%	
	Res	-0.9	0	2.4	-0.9	-1.8	
	Std. Res	-1.2	0.1	3.6	-1.2	-2.5	
Marginals		13	47	43	25	21	149

**Table 4.** Contingency table and procedure for the Chi-squared test

**Note(s):** Values in bold are those that exceed  $\pm 1.96$ . Obs = Observations, Exp = Expected, Res = Residuals, Std Res = Studentized residuals. FA = Financial Arrangements, GA = Governance Arrangements, IBS = Industrial and Business Structure, LMC = Labor Market Conditions, and TE = Territorial Elements

**Source(s):** Elaborated by the authors



Regarding the correspondence analysis, the total inertia was 20%, a percentage considered adequate for the simple correspondence analysis technique (Doey & Kurta, 2011). The eigenvalue values were 13.4% for dimension 1 (67.3% of inertia) and 6.5% for dimension 2 (32.7% of inertia). The perceptual map (Figure 3) illustrates these associations on a two-dimensional plane.

### Discussion

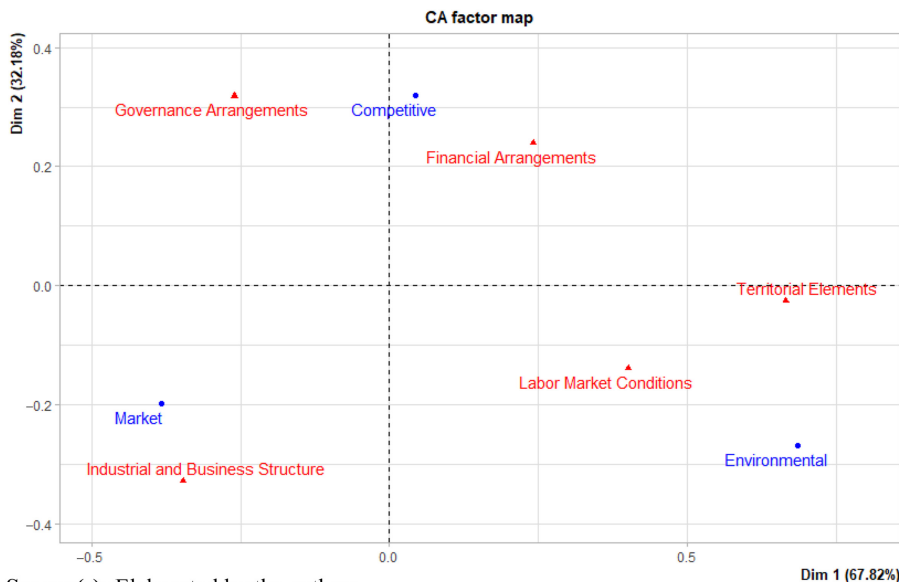
In this section, we discuss the most relevant shocks in terms of the narrative contextualization presented in Figure 1.

#### From 1988 to 1992

During the 1980s and mid-1990s, the national government implemented seven economic plans to curb domestic inflation. When these economic plans were implemented in 1986, the inflation rate was double digits. Among the measures taken by some of these plans was the taxation of products considered “inflation feeders,” such as clothing products, to discourage their domestic consumption. The consequence of this measure for the Brusque T&C industry was a decrease in revenue from clothing sales and an increase in inventories.

Brazilian parliamentarians promulgated, in 1988, the seventh Constitution of Brazil. As reported in 1990 and also mentioned in the interviews, the new labor rights guaranteed by the 1988’s Constitution increased labor-intensive industries’ production costs by 50%. As a result, textile firms in the Brusque region laid off many of their workers (see 1988–1992 period in Figure 1).

The Brusque T&C industrial region, previously characterized by medium and large-sized industries (Renaux, 2010), gradually became an industrial hub of micro, small and medium-sized enterprises (MSMEs). According to Glatz (2018), unemployment in the Brusque region and the expertise in T&C manufacturing activities influenced micro-entrepreneurship in the



Source(s): Elaborated by the authors

**Figure 3.**  
Perceptual map  
between the categories  
“shocks” and  
“subsystems” in a two-  
dimensional plane

clothing sector – mainly due to the low entry costs in this industry (circular looms instead of flat looms and knitwear production instead of plain fabrics). From [Eraydin \(2016\)](#) and [Glonti, Manvelidze, and Surmanidze \(2021\)](#), we know that small-size firms contribute to regional economic resilience mainly due to their adaptability and flexibility capabilities before the effects of external shocks.

While the pioneering textile industries dispersed throughout the region, the new clothing manufacturing MSMEs concentrated on the avenue called “Rua Azambuja.” Since Brusque founding, this avenue has been a mono-structure with an intense flow of tourists attracted by the church and the religious sanctuary. The clothing trade along Rua Azambuja Avenue contributed to the gradual economic reorientation of the Brusque region ([Betta, 2016](#)). The avenue has established itself as the largest open-air shopping center in southern Brazil ([Glatz, 2018](#)). However, the inadequate structure of Rua Azambuja motivated the migration of some MSMEs – and new entrants from other regions – to large shopping malls in Brusque downtown ([Betta, 2016](#)). It has gradually contributed to the shift of commerce to the city center ([Belli, Cassol, Alberton, & Marinho, 2013](#)).

The national economic policy based on opening the market to foreign trade in the early 1990s intensified new entrants and their low-cost T&C manufacturing in the national competitive market ([Meyer-Stamer, 1998](#)). As a reaction to this market shock, among other factors, clothing MSMEs founded a local industrial and traded association called AICA. Its member firms worked in collaborative networks dedicated to internationalizing their clothing trade to South American countries. According to [Witek-Hajduk \(2014\)](#) and [Diodato and Weterings \(2015\)](#), the export orientation implies less vulnerability to demand contractions, contributing to regional economic resilience.

Previously in the Brusque T&C region, the supply chain stages were concentrated in large vertical firms. To be more competitive, the T&C firms have specialized in specific stages. Moreover, the diversity of firms operating in the same activities and at all stages of the T&C industry has made the supply chain less vulnerable to interruptions ([Oxborrow & Brindley, 2012](#)). Finally, according to [Yu and Wang \(2016\)](#), political instability negatively influences regional economic resilience. In this regard, it is essential to mention the political instability in the national political sphere due to the Brazilian president’s impeachment in 1992.

#### *From 1994 to 1999*

Another recession in employment in the Brusque T&C industrial region happened from 1994 to 1999 (see [Figure 1](#)). During this period, the impacts of the 1994 Mexican peso crisis and the national governance economic deflation policies to maintain high domestic interest rates and overvaluation of the national currency stand out. Although this strategy controlled domestic inflation, on the other hand, the result was an increase in imported manufactured goods, increased competition and national deindustrialization ([Meyer-Stamer, 1998](#)).

Among Brusque’s local reactions, we highlight the foundation of the local technology center for clothing manufacturers, in 1994, as a strategy to improve the quality of clothing production and, thus, make the region more competitive compared to imported T&C clothing. Considering the contribution of public investment expenditures to regional resilience ([Psycharis, Panori, & Athanasopoulos, 2021](#)), among the financial arrangements category, we highlight the fiscal incentive policies of Brusque Municipality.

The employment recession in 1998 was related to the new wave of MSMEs bankrupting in Rua Azambuja due to financial insolvency caused by unsecured credit. According to a report, due to insufficient check funds, financial ruin reached a high percentage of sales in the clothing sector in 1997. On the macroeconomic sphere, domestic inflation returned to a single-digit level in 1995 due to the final national economic plan, “Plano Real.”

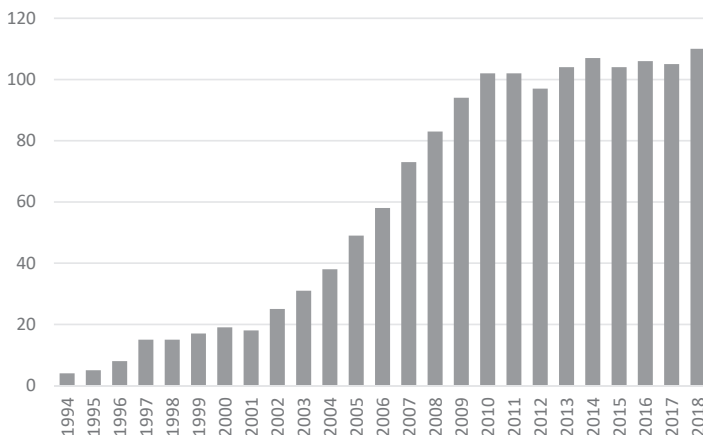
In addition, we highlight two other vital responses that the Brusque region gave to the recessive period of 1994–1999. First, the construction by the local government of an effluent treatment plant for the T&C industry in 1996 considerably influenced the migration of firms that operate in the clothing dyeing stage from other Brazilian industrial clusters to Brusque (Figure 4). Second, the creation of the trade fair to promote Brusque’s T&C manufacturers in 1997, called *Pronegócio*, in partnership with Sebrae, a non-state institute that supports institutions aimed at MSMEs.

*From 2008 to 2009*

According to some reports, the employment drop in Brusque in 2009 (see Figure 1) is related to the effects of the 2008–2009 global financial crisis. Although the impacts of this crisis on the Brazilian economy were less pronounced in the short term, in the long term, it caused instability in the political environment, risk aversion and a preference for liquidity in the economic environment (Domingues, Magalhães, Betarelli, Carvalho, & Santiago, 2015). In addition, according to interviewees, the drop in employment in Brusque in 2010 was related to deindustrialization associated with the decline of the large anchor textile firms Buettner, Schloesser and Renaux.

*From 2010 to present*

According to the interviewed entrepreneurs, the drop in employment in Brusque related to T&C firms in this period was mainly due to the reduction in sales caused by the increased competition related to new entrants installed in points of sale built along the access roads to the city of Brusque. It negatively influenced shopping tourism in the city center and, consequently, T&C sales. As a strategy for not depending on shopping tourism, firms in the region adhered to the private label business model in 2010. Contrary to the evidence of Pal, Torstensson, and Mattila (2014), retailers’ control over all aspects of T&C manufacturing led to several innovations by Brusque firms. Some examples of such innovations are the changes in the functional layout, quality control of clothing, compliance with labor laws, formalization of company registration with government agencies, the fight against slave labor and compliance with environmental protection laws.



Source(s): General Register of Employees and Unemployed (CAGED) data collection

Figure 4.  
Growth of textile  
dyeing firms in  
Brusque (1994–2018)

Other events related to this period that deserve mention are (1) the record increase in cotton prices due to lower domestic supply and low inventories in the international market and (2) one of the most significant floods in the history of the Brusque region. The economic consequences for the local T&C firms were both intra-organizational (destruction of machinery and inputs) and inter-organizational (supply chain disruption). T&C firms suspended their activities in the short term and anticipated their employees' vacations.

During the 2010s, there was a shortage of T&C labor force in the Brusque industrial region, mainly due to the domestic economic recession in 2014 and the consequent political instability arising from the impeachment of the Brazilian president in 2016. As an example of entrepreneurship in industrial and business structure in the region, medium-sized T&C firms, in partnership with local support institutions, mobilized resources to create production cells within the firms, inspired by Toyota, to overcome this market shock.

Another market shock related to suppliers was a national truck drivers' strike, called the Diesel crisis, in protest against the constant increase in fuel prices in 2018. The consequence for the Brusque T&C firms and other industrial sectors was the total suspension of T&C manufacturing activities. An immediate reaction of firms to this shock was the adoption of non-cotton inputs in their production.

Finally, although numerical data on employment in the Brusque T&C industrial region has yet to be available, we have collected qualitative data on the reaction of Brusque's T&C firms to the initial effects of the COVID-19 pandemic in the region. A study carried out in Chinese regions, [Gong et al. \(2020\)](#), show evidence that the institutional experience dealing with previous pandemic crises, government support and regional industrial structures can affect regional resilience. However, we found that T&C firms in Brusque used labor market conditions, such as holidays for all employees and flexibility in salaries and working hours, to react to the lockdown.

## Conclusions

In this study, we sought to investigate how a century-old Brazilian T&C industrial region responded to different types of shocks over almost 40 years (from 1985 to 2021). Recently, the relationship between regional resilience and the type of shocks has been highlighted ([Sutton & Arku, 2022](#)). We went a step further, presenting empirical research on the shock–reaction relationship using the “type of shock” as a variable. This paper provides a holistic understanding of the factors behind regional resilience through insights into the role that resources, structures, institutions and actors play in the regional response to distinct types of shocks, reaching four main conclusions.

First, shocks are reduced as an economical category in the literature on regional resilience, even if they are not economic. An example is the 2019 coronavirus pandemic ([Sutton & Arku, 2022](#)). In contrast, this research enriches our understanding of regional resilience by showing that regional reaction varies with the type of shock.

Second, our empirical evidence shows intangible territorial elements such as regional legacy, culture and expertise which can shape the local response to different kinds of shocks. These intangible elements were absent in the regional resilience subsystems proposed by [Martin and Sunley \(2015\)](#). So this is another contribution.

Third, our empirical evidence supports the evolutionary perspective of regional resilience, highlighting that companies, governments and institutional and even social structures are restructured during and aftershocks. A plausible explanation is that restoring the previous economic level does not interrupt the non-economic effects of a shock (whether economic or otherwise).

Fourth, there is proportionality between the response of an industrial region and the magnitude of the shock faced. Firms work together with supporting non-government

institutions and government agencies in cooperative actions to deal with the effects of systemic shocks, especially those at the macroeconomic level. On the other hand, shocks related to a region, such as natural disasters, are faced jointly by local firms and the local community.

The Brusque T&C region has reacted to competitive shocks through actions of economic subsystems related to financial and governance arrangements. To name a few of these actions, we highlight inter-organizational cooperation, support from local non-governmental institutions and tax incentives for business investment. Environmental shocks are related to labor market conditions and responses given by the regional community through territorial elements. Although the concept of resilience from disaster studies has been applied to regional economic development, the different research groups on regional resilience do not dialogue, conducting the phenomenon as a broad idea (Fröhlich & Hassink, 2018).

Our results align with other themes used to focus on the study of the resilience of geographic areas. An example is urban or community resilience (Norris, Stevens, Pfefferbaum, Wyche, & Pfefferbaum, 2008), based on the assumptions of geography and urbanism and focused on studying adverse effects caused by natural disasters.

### Implications

This paper contributes to the resilience literature of different dimensions of geographic areas by showing that non-economic shocks (usually not considered by the economic field) also cause adverse economic effects (not considered by the geography and urbanism field). Environmental shock is an example. We recommend that policymakers pay more attention to the types of shocks other than the economic ones, which can lead to overestimating some economic subsystems. Thus, regional public recovery policies (economic, environmental, social, institutional and others) should be designed considering regional impact, specificity and the duration of each shock.

### Limitations

The analysis focuses on a specific industrial region only. Empirically, cross-referencing and comparative analyses with other industrial regions or meta-analyses of the regional resilience literature can further clarify the results, eliminating geographic and industrial biases. In addition, we suggest robust statistical tests considering the three propositions formulated based on the empirical evidence of this study.

### References

- Belli, A. C. H., Cassol, A., Alberton, A., & Marinho, S. V. (2013). O Caso da Rua Azambuja: Ascensão e Queda. *Tecnologias de Administração e Contabilidade*, 3(2), 110–125.
- Betta, E. P. da S. (2016). A costura das décadas - conhecendo a história da moda pela voz singular dos teares. In *Notícias de Vicente Só - Brusque e Região*, (Ano XV, p. 144), Nova Letra.
- Billington, M. G., Karlsen, J., Mathisen, L., & Pettersen, I. B. (2017). Unfolding the relationship between resilient firms and the region. *European Planning Studies*, 25(3), 425–442. doi: [10.1080/09654313.2016.1276886](https://doi.org/10.1080/09654313.2016.1276886).
- Boschma, R. (2015). Towards an evolutionary perspective on regional resilience. *Regional Studies*, 49(5), 733–751. doi: [10.1080/00343404.2014.959481](https://doi.org/10.1080/00343404.2014.959481).
- Christopherson, S., Michie, J., & Tyler, P. (2010). Regional resilience: Theoretical and empirical perspectives. *Cambridge Journal of Regions, Economy and Society*, 3(1), 3–10. doi: [10.1093/cjres/rsq004](https://doi.org/10.1093/cjres/rsq004).

- Clark, J., Huang, H. I., & Walsh, J. P. (2010). A typology of 'innovation districts': What it means for regional resilience. *Cambridge Journal of Regions, Economy and Society*, 3(1), 121–137. doi: [10.1093/cjres/rsp034](https://doi.org/10.1093/cjres/rsp034).
- Crescenzi, R., Luca, D., & Milio, S. (2016). The geography of the economic crisis in Europe: National macroeconomic conditions, regional structural factors, and short-term economic performance. *Cambridge Journal of Regions, Economy and Society*, 9(1), 13–32. doi: [10.1093/cjres/rsv031](https://doi.org/10.1093/cjres/rsv031).
- Crespo, J., Suire, R., & Vicente, J. (2016). Network structural properties for cluster long-run dynamics: Evidence from collaborative R&D networks in the European mobile phone industry. *Industrial and Corporate Change*, 25(2), 261–282. doi: [10.1093/icc/dtv032](https://doi.org/10.1093/icc/dtv032).
- Denzin, N., & Lincoln, Y. (2005). The sage handbook of qualitative research. In *Qualitative Research in Organizations and Management: An International Journal* (3rd ed., Vol. 1 No. 1). SAGE Publications. doi: [10.1108/17465640610666642](https://doi.org/10.1108/17465640610666642).
- Diodato, D., & Weterings, A. B. R. (2015). The resilience of regional labour markets to economic shocks: Exploring the role of interactions among firms and workers. *Journal of Economic Geography*, 15(4), 723–742. doi: [10.1093/jeg/lbu030](https://doi.org/10.1093/jeg/lbu030).
- Doey, L., & Kurta, J. (2011). Correspondence analysis applied to psychological research. *Tutorials in Quantitative Methods for Psychology*, 7(1), 5–14. doi: [10.20982/tqmp.07.1.p005](https://doi.org/10.20982/tqmp.07.1.p005).
- Domingues, E. P., Magalhães, A. S., Betarelli, A. A., Carvalho, T. S., & Santiago, F. S. (2015). The world financial crisis in Brazil: Industry and regional economic impacts. *Journal of International Business and Economics*, 2(3), 57–94. doi: [10.15640/jibe.v2n3a4](https://doi.org/10.15640/jibe.v2n3a4).
- Eisenhardt, K., & Graebner, M. (2007). Theory building from cases: Opportunities and challenges. *Academy of Management Journal*, 50(1), 25–37. doi: [10.2307/20159839](https://doi.org/10.2307/20159839).
- Eraydin, A. (2016). Attributes and characteristics of regional resilience: Defining and measuring the resilience of Turkish regions. *Regional Studies*, 50(4), 600–614. doi: [10.1080/00343404.2015.1034672](https://doi.org/10.1080/00343404.2015.1034672).
- Evenhuis, E. (2017). New directions in researching regional economic resilience and adaptation. *Geography Compass*, 11(11), 1–15. doi: [10.1111/gec3.12333](https://doi.org/10.1111/gec3.12333).
- Folke, C. (2006). Resilience: The emergence of a perspective for social-ecological systems analyses. *Global Environmental Change*, 16(3), 253–267. doi: [10.1016/j.gloenvcha.2006.04.002](https://doi.org/10.1016/j.gloenvcha.2006.04.002).
- Freelon, D. G. (2010). ReCal : Intercoder reliability calculation as a web service. *International Journal of Internet Science*, 5(1), 20–33.
- Fröhlich, K., & Hassink, R. (2018). Regional resilience: A stretched concept? *European Planning Studies*, 4313(269), 1763–1778. doi: [10.1080/09654313.2018.1494137](https://doi.org/10.1080/09654313.2018.1494137).
- Giannakis, E., & Bruggeman, A. (2017). Determinants of regional resilience to economic crisis: A European perspective. *European Planning Studies*, 25(8), 1394–1415. doi: [10.1080/09654313.2017.1319464](https://doi.org/10.1080/09654313.2017.1319464).
- Glaser, B., & Strauss, A. (1967). *The discovery of grounded theory- strategies for qualitative research*. London: Aldine Transaction.
- Glatz, R. (2018). *Brusque – os 60 e o 160: Elementos de nossa história* (p. 280). Brusque (SC): Editora UNIFEBE.
- Glonti, V., Manvelidze, R., & Surmanidze, I. (2021). The contribution of SME to regional economic development: On the example of adjara autonomous republic. *European Journal of Sustainable Development*, 10(1), 513–526. doi: [10.14207/ejsd.2021.v10n1p513](https://doi.org/10.14207/ejsd.2021.v10n1p513).
- Gong, H., Hassink, R., Tan, J., & Huang, D. (2020). Regional resilience in times of a pandemic crisis: The case of COVID-19 in China. *Tijdschrift Voor Economische En Sociale Geografie*, 111(3), 497–512. doi: [10.1111/tesg.12447](https://doi.org/10.1111/tesg.12447).
- Greenacre, M. (2007). Correspondence analysis in practice. In *Correspondence Analysis in Practice* (3rd ed.), Taylor & Francis Group. doi: [10.1201/9781315369983](https://doi.org/10.1201/9781315369983).
- Gunderson, L. H., & Holling, C. S. (2002). Panarchy: Understanding transformations in human and natural systems. In Gunderson, L. H., Holling, C. S. (Eds.), *Ecological Economics*. Island Press. doi: [10.1016/j.ecolecon.2004.01.009](https://doi.org/10.1016/j.ecolecon.2004.01.009).

- Hervas-Oliver, J. L., Jackson, I., & Tomlinson, P. R. (2011). 'May the ovens never grow cold': Regional resilience and industrial policy in the North Staffordshire ceramics industrial district - with lessons from Sassoulo and Castellon. *Policy Studies*, 32(4), 377–395. doi: [10.1080/01442872.2011.571855](https://doi.org/10.1080/01442872.2011.571855).
- Holling, C. S. (1973). Resilience and ecological systems. *Annual Review of Ecology, Evolution, and Systematics*, 4, 1–23. doi: [10.1146/annurev.es.04.110173.000245](https://doi.org/10.1146/annurev.es.04.110173.000245).
- Huggins, R., & Thompson, P. (2015). Local entrepreneurial resilience and culture: The role of social values in fostering economic recovery. *Cambridge Journal of Regions, Economy and Society*, 8(2), 313–330. doi: [10.1093/cjres/rsu035](https://doi.org/10.1093/cjres/rsu035).
- Jick, T. D. (1979). Mixing qualitative and quantitative methods: Triangulation in action. *Administrative Science Quarterly*, 24(4), 602–611.
- Knaflitz, C. N. (2015). *Storytelling with data: A data visualization guide for business professionals* (1st ed.). New Jersey: Wiley.
- Lagravinese, R. (2015). Economic crisis and rising gaps North-South: Evidence from the Italian regions. *Cambridge Journal of Regions, Economy and Society*, 8(2), 331–342. doi: [10.1093/cjres/rsv006](https://doi.org/10.1093/cjres/rsv006).
- Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, 33(1), 159–174. doi: [10.2307/2529310](https://doi.org/10.2307/2529310).
- Langley, A. (1999). Strategies for theorizing from process data. *Academy of Management Review*, 24(4), 691–710. doi: [10.5465/AMR.1999.2553248](https://doi.org/10.5465/AMR.1999.2553248).
- Martin, R. (2012). Regional economic resilience, hysteresis and recessionary shocks. *Journal of Economic Geography*, 12(1), 1–32. doi: [10.1093/jeg/lbr019](https://doi.org/10.1093/jeg/lbr019).
- Martin, R. (2018). Shocking aspects of regional development: Towards an economic geography of resilience. In Clark, G., Gertler, M., Feldman, M. P., & Wójcik, D. (Eds.), *The New Oxford handbook of economic geography* (pp. 839–864). Oxford University Press.
- Martin, R., & Sunley, P. (2015). On the notion of regional economic resilience: Conceptualisation and explanation. *Journal of Economic Geography*, 15(1), 1–50. doi: [10.1093/jeg/lbu015](https://doi.org/10.1093/jeg/lbu015).
- Meyer-Stamer, J. (1998). Path dependence in regional development: Persistence and change in three industrial clusters in Santa Catarina. *World Development*, 26(8), 1495–1511. doi: [10.1016/S0305-750X\(98\)00072-2](https://doi.org/10.1016/S0305-750X(98)00072-2).
- Miranda Júnior, N. da S., & Hoffmann, V. E. (2021). Regional resilience: A bibliometric study from the web of science. *Gestão and Regionalidade*, 37(111), 23–41. doi: [10.13037/gr.vol37n111.6093](https://doi.org/10.13037/gr.vol37n111.6093).
- Neuendorf, K. A. (2002). *The content analysis guidebook* (1st ed.), SAGE Publications. Available from: [http://www.amazon.com/Content-Analysis-Guidebook-Kimberly-Neuendorf/dp/0761919783/ref=sr\\_1\\_1?s=books&ie=UTF8&qid=1395675490&sr=1-1&keywords=Content+analysis+guidebook+Neuendorf](http://www.amazon.com/Content-Analysis-Guidebook-Kimberly-Neuendorf/dp/0761919783/ref=sr_1_1?s=books&ie=UTF8&qid=1395675490&sr=1-1&keywords=Content+analysis+guidebook+Neuendorf)
- Norris, F. H., Stevens, S. P., Pfefferbaum, B., Wyche, K. F., & Pfefferbaum, R. L. (2008). Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. *American Journal of Community Psychology*, 41(1-2), 127–150. doi: [10.1007/s10464-007-9156-6](https://doi.org/10.1007/s10464-007-9156-6).
- Østergaard, C. R., & Park, E. K. (2013). Cluster decline and resilience - the case of the wireless communication cluster in North Jutland, Denmark. *SSRN Electronic Journal, Social Science*. doi: [10.2139/ssrn.2196445](https://doi.org/10.2139/ssrn.2196445).
- Oxborrow, L., & Brindley, C. (2012). Regional resilience in recessionary times: A case study of the East Midlands. *International Journal of Retail and Distribution Management*, 40(11), 882–899. doi: [10.1108/09590551211267629](https://doi.org/10.1108/09590551211267629).
- Pal, R., Torstensson, H., & Mattila, H. (2014). Antecedents of organizational resilience in economic crises - an empirical study of Swedish textile and clothing SMEs. *International Journal of Production Economics*, 147(Part B), 410–428. doi: [10.1016/j.ijpe.2013.02.031](https://doi.org/10.1016/j.ijpe.2013.02.031).
- Pendall, R., Foster, K. A., & Cowell, M. (2010). Resilience and regions: Building understanding of the metaphor. *Cambridge Journal of Regions, Economy and Society*, 3(1), 71–84. doi: [10.1093/cjres/rsp028](https://doi.org/10.1093/cjres/rsp028).



- Psycharis, Y., Panori, A., & Athanasopoulos, D. (2021). Public investment and regional resilience empirical evidence from the Greek regions. *Journal of Economics and Human Geography*, 1(1), 57–79. doi: [10.1111/tesg.12499](https://doi.org/10.1111/tesg.12499).
- Renaux, M.L. (2010). *Colonização e Indústria no Vale do Itajaí: o modelo catarinense de desenvolvimento* (2nd ed.). Blumenau: Editora da FURB.
- Seyferth, G. (1974). *A colonização alemã no Vale do Itajaí: um estudo de desenvolvimento econômico* (5). Porto Alegre: Editora Movimento.
- Spigel, B., & Vinodrai, T. (2020). Meeting its waterloo? Recycling in entrepreneurial ecosystems after firm anchor collapse. *Entrepreneurship and Regional Development*, 33(7), 1–22. doi: [10.1080/08985626.2020.1734262](https://doi.org/10.1080/08985626.2020.1734262).
- Sutton, J., & Arku, G. (2022). The importance of local characteristics: An examination of Canadian cities' resilience during the 2020 economic crisis. *Canadian Geographer*, 9, 1–16. doi: [10.1111/cag.12780](https://doi.org/10.1111/cag.12780).
- Witek-Hajduk, M. K. (2014). Internationalization strategies in response to the economic crisis: The example of Polish companies. In *8th international scientific conference business and management*, 469–477.
- Yin, R.K. (2018). *Case study research and applications: Design and methods*. In *journal of hospitality and tourism research* (6th ed., Vol. 53 No. 5). SAGE Publications. doi: [10.1177/109634809702100108](https://doi.org/10.1177/109634809702100108).
- Yu, J., & Wang, C. (2016). Political risk and economic development: A case study of China. *Economic Research*, 26(2), 35–50. doi: [10.1080/1331677X.2013.11517605](https://doi.org/10.1080/1331677X.2013.11517605).

**Corresponding author**

Newton da Silva Miranda Junior can be contacted at: [newtondasmjr@gmail.com](mailto:newtondasmjr@gmail.com)