Factors influencing Brazilian sugar and ethanol refineries' failure

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Factors influencing Brazilian sugar and ethanol refineries' failure

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Abstract

Purpose – This study aims to examine the dimensions of organisational failure in the Brazilian sugarcane and ethanol refineries, as reported in judicial recovery plans.

Design/methodology/approach – This paper follows a qualitative, inductive approach that uses content analysis to examine the details of recovery plans. Besides, a cause-and-effect relationship diagram is proposed, making it possible to identify the interconnections between the identified variables.

Findings – There is evidence that organisational failures are not a linear outcome. Organisational failures are complex and occur because of several factors, often interdependent and operating at different levels.

Research limitations/implications – Organisational failures basically have three interrelated levels: the macro-level (external environment), the meso-level (organisational environment) and the micro-level (associated with the decision-maker). The relationship between these levels is not trivial and involves coordinated research efforts.

Practical implications – Organisations must consider all types of failure levels when developing business reorganisation plans. Reorganisation plans are more than a formal document to achieve judicial recovery, as they should incorporate strategic factors.

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Social implications – Organisational failures are regularity in organisations' day-to-day. Understanding failure's sources is vital to design firms' strategies and public policies.

Originality/value – The study of organisational failure involves the analysis of complex and multidimensional phenomena. Judicial recovery plans are the means for companies to get a second chance. To that end, this paper addresses the sources of organisational failures through the lens of judicial plans.

Keywords Failure factors, Judicial recovery, Organisational failure

Paper type Research paper

1. Introduction

Agribusiness in Brazil is known for its competitiveness and efficiency and for being of fundamental importance for the country's export income. In addition, agribusiness plays a prominent role in reducing inflation and generating employment in Brazil (CNA, 2017). Being the third largest global food exporter makes the country a relevant international player among other agricultural power nations (Bacchi, 2019). Specifically, Brazil has comparative advantages in producing sugarcane due to its geographic position and territorial extension. Microclimate diversity within the country makes it possible to produce sugarcane in different regions and seasons (Conab, 2017). Furthermore, sugarcane is a renewable source, a C4 plant capable of capturing carbon dioxide (CO_2) from the atmosphere during the crop cycle, which is around 78 months in Brazil (UNICA, 2013). The sector is recognised for the flexibility of sugarcane processing in the sugar mills. The mills can switch the production into many types of sugar and anhydrous ethanol (added to fuel) or hydrated ethanol (fuel). Because of this advantage, the sector should be able to adapt as necessary to national and international politics and dynamics (Castillo, 2015).

However, despite the competitiveness of sugar and alcohol production in Brazil, sugar and ethanol mills are not immune from organisational failure. Although the 2008 international financial crisis hardly affected the sector, in the same period, the Brazilian Government began controlling the fuel price as a political strategy to limit gas station prices. Moreover, the sector then faced three consecutive years of terrible climate conditions generating a decrease in crop production (Chaddad, 2016; Nogueira & Capaz, 2013; Wubeen, 2009). More recently, there has been an observed increase of 2.8% in sugarcane production costs in the 2018/2019 harvest season (NovaCana, 2019).

If these economic issues were not enough, the sector has also undergone several institutional changes. As a result of these external pressures, many Brazilian sugar and ethanol mills opted to be part of the judicial recovery processes to prevent bankruptcy and insolvency (Monteiro, Caleman, & Pongeluppe, 2020). This leads to our research question:

RQ1. In what way, and to what extent, do judicial recovery processes allow the understanding of the organisational failure dimensions of the sugar and alcohol production sector in Brazil?

The answer to this question is relevant as it allows us to deepen the understanding of organisational failure dimensions in complex agri-business sectors. In the face of the uncertainties raised by pandemics, climate change and political turbulences, the issue of organisational failure and its causes, as well as the role of regulatory support in business recovery processes, is highly relevant.

This paper aims to examine the reported dimensions of organisational failure in judicial recovery plans by Brazilian sugar and ethanol mills to determine the direct and indirect factors of influence. The research followed a qualitative, inductive approach by using content analysis to examine the details contained in recovery plans produced in 2019. By doing so, it is possible to investigate all reported factors involved in the companies' failures as well as their interconnections.

More importantly, by analysing the recovery plans, it is possible to frame the reported reasons that allow understanding the multidimensionality of organisational failures, i.e. extending the analysis beyond purely economic factors (Higashi, Morales de Queiroz Caleman, Kluwe de Aguiar, & Manning, 2020).

This research makes three significant contributions to the literature. First, to provide evidence that organisational failure is not a linear outcome. Organisational failures are complex and occur because of several factors, often interdependent and operating at different levels. Thus, it is possible to analyse failures from a macro, meso and micro analytical perspective. The macro-level is related to the companies' external environment, over which they have no control. The meso analytical level is related to the organisational environment, over which companies have control, for instance, their internal resources and customers' and suppliers' relationship. Finally, the micro analytical level focuses on studying the decision-maker (Guerras-Martín, Madhok, & Montoro-Sánchez, 2014; Mellahi & Wilkinson, 2004). These three levels are considered within this research.

As a second contribution, we find evidence that managers neglect the micro-analytical dimension in recovery plans as a determining cause of failure – that is, managers neglect their own role in the failure of the organisation they lead. External failure factors identified as being beyond the control of managers are mentioned more frequently and cited as the leading causes of organisational failures. Finally, from a broader understanding of organisational failure and the factors involved, it is possible to design better, more agile public policies because uncertainty is the new business context under which companies are currently managed, especially with COVID-19 and its implications.

The remainder of this article is organised as follows. Section 2 briefly discusses the received knowledge on organisational failure. Section 3 describes the methodological approach, and Section 4 presents the results. In Section 5, the main findings, limitations and implications of this study are discussed. Finally, Section 6 presents the conclusion.

2. Organisational failure

There is no clear understanding or consensus of what organisational failures are. Some several definitions and terms have been used to address the issue: "organisational mortality", "organisational death", "organisational exit", "bankruptcy", "decline", "retraction" and "downsizing" (Mellahi & Wilkinson, 2004). Failures are usually associated with unforeseen events in a firm's performance, health and legitimacy. They may be associated with falling sales, prolonged strikes, natural disasters or ethical violations (Wiesenfeld, Wurthmann, & Hambrick, 2008). Failure can also be related to the lack of cooperation between partner companies (Wegner & Padula, 2012) or even the lack of financial resources (Laitinen & Lukason, 2014). In addition, failures can relate to how companies perceive and adapt to institutions (Amankwah-Amoah & Debrah, 2010). If firms do not adapt to local institutions, they will hardly be among the market leaders and can fail to survive in the long run (Peng, 2014). Therefore, organisational failures are complex and occur because of several factors, often interdependent and operating at different levels. Perhaps more importantly, because organisational failures are complex and interconnected (McGovern, 2007), their origin cannot be traced to just one or two sources (Stanger, 2010).

2.1 Integrative approaches

Amankwah-Amoah (2016) and Mellahi and Wilkinson (2004) proposed integrative models that helped to elucidate the general understanding of failures. Based on these integrative models, Caleman and Zylbersztajn (2013) defined six dimensions to study the phenomenon (structural, cognitive, behavioural, informative, institutional and politics). However, the

authors did not explore the institutional and individual cognitive dimensions in depth. Considering this limitation, Higashi et al. (2020) proposed a broader perspective.

Following Higashi et al. (2020), it is possible to analyse failure from a macro, meso and micro perspective. The macro-level relates to the companies' external environment, over which they have no control. The meso-analytical level relates to the organisational environment, which companies can control, for instance, their internal resources and customers and suppliers' relationships. Finally, the micro-analytical level focuses on studying the decision-maker (Mellahi & Wilkinson, 2004; Guerras-Martín et al., 2014).

At the macro-level, "institutions" is one dimension which can be understood as formal or informal (North, 1991). A change in the institutional environment will impact a company, and when managers' attempt to adapt to the changing environment is weak, it could also affect organisational continuity (Amankwah-Amoah & Debrah, 2010). Thus, when managers fail to understand the external environment framed by national or local institutions, this consequently affects the organisations' success and can lead to failure (Peng, 2014). Furthermore, formal institutions could be considered through the legal framework governing companies' bankruptcies and their judicial recovery. As this framework varies from country to country, it can be more or less "business friendly" towards those organisations going through bankruptcy or judicial recovery (Peng, Yamakawa, & Lee, 2010). Because of this, investors must take into account not only the company's corporate governance but also the legal particularities that govern judicial recovery and bankruptcy in each country (Kim, 2018; Peng et al., 2010).

Failures can also be studied from the meso-level (internal) perspective. The unavailability of resources, the lack of concrete objectives and the absence of adequate strategies can lead to the inadequate functioning of organisations, which in turn, can cause organisational failure over time (McMillan & Overall, 2017). As for meso-factors influencing organisation failure, the literature has identified company age and size; location; associated organisational network; diversity in the composition of the board; hierarchy structure, the nature of the relationship with clients, suppliers and shareholders; resources (financial, physical and human); and organisational succession processes (Higashi et al., 2020). Monteiro et al. (2020) emphasise the importance of an articulated examination of meso-level characteristics in evaluating organisational failures.

Individuals have also been deemed another important failure dimension. When making decisions, managers can incorporate their cognitive biases in their analysis. The cognitive dimension is important because researchers have confirmed the presence of heuristics in individuals' decision-making. Many executives make their decisions influenced by affective heuristics; in other words, their decision has little logic, being influenced mainly by feelings of sympathy or antipathy, of liking or disliking (Kahneman, 2012). This cognitive dimension is related to the limited way in which some individuals perceive the world because their decisions are based on the sensed proximity of a given event (Simon, 1979; Williamson, 1985, 2000).

Consequently, the managers' experiences, skills and expertise are essential for the firm's strategic direction and quality of decision-making, helping the firm to respond to organisational failure's signs (Amankwah-Amoah & Debrah, 2010). Moreover, this micro-level influence is mediated by the degree of adoption within an organisation of information processing techniques that may overcome the impact of personal framings of a given issue (Hino, Aoki, & Hidetaka, 2013).

Seeking long-term survival, companies need to adapt to changes at the macro-analytical level by using meso-level or internal organisational aspects and resources (Amankwah-Amoah, 2016). In the case of the Brazilian sugarcane sector, this can be observed when organisations face changing climate challenges, changes in environmental and labour legislation, increased harvest mechanisation, genetically modified seed use or investment in R&D to find new plant varieties (Neves & Conejero, 2007).

3. Method

This study followed a qualitative, inductive approach that used content analysis to examine the details of the recovery plans prepared by sugar and ethanol refineries. To operationalise this study, we followed Daily, (1994), who stated that organisational failures occur when a company go through a difficult period and, under the protection of the law, it carries on working. In Brazil, this process is governed by the Judicial Recovery Law No. 11.101/05, which allows an organisation to either recover or go into liquidation during the period in question. Brazilian law establishes that the recovery plan must be presented within 60 days after the court decision to grant a judicial reorganisation. The plan should cover:

- recovery strategies;
- evidence of company's economic viability during the recovery period; and
- a valuation report on company's assets.

The plan is usually prepared by the recovering company's managers and must be approved by creditors before it can be considered viable by the Bankruptcy Court.

We applied an inductive research method to identify the failure factors in the recovery plans and the potential inter-relationships between the associated factors in each failure dimension. This research was undertaken following a systematic review of literature on factors influencing organisational failure (Higashi et al., 2020) and the development of a conceptual model which frames the work described in this paper.

The initial data sample was composed of 30 judicial recovery plans that were sourced from the sugar and ethanol companies' websites. However, during stage one of content analysis, five plans did not discriminate well enough the factors deemed important in the process of business failure. Consequently, the inductive research was carried out with 25 sugar and ethanol refineries' recovery plans that contained sufficient detail to be analysed.

Content analysis was used as it is an inductive method that enables the researcher to identify specific content and generate codes related to this content, allowing the development and iteration of the code during the research (Bengtsson, 2016). Content coding is proposed as a reliable qualitative methodology (Weber, 1990) and is based on word frequency or "word occurrence" in the sample text. Krippendorf, (1980) identifies six questions that need to be addressed in a content analysis approach, all of which have been considered in this work (see Table 1).

As the text analysed was in Portuguese, a second Portuguese speaker undertook a secondary assessment of the process via a sampling approach to confirm the suitability of coding and the assigning of variables. The factors contained in judicial recovery plans were iteratively categorised according to failure dimension, problem scope and problem nature. The failure dimensions were determined using the House of Cards Model (Higashi et al., 2020) as a typology. Firstly, factors were allocated into three socio-technical dimensions (micro, meso, macro) in terms of the organisational system (Coding Level 1). Secondly, meso and macro levels were further differentiated to focus on influence or failure dimensions (Coding Level 2). The NVivo software was used to analyse recovery plans.

4. Results

4.1 Content analysis

The main factors described in sugar and alcohol refineries' recovery plans as factors influencing organisational failure are identified and collated according to thematic, factor coding, frequency of reporting and meso or macro level failure dimensions.

Concerning the problem scope, the variables were divided in: universal variable: factors applied to all companies located in any part of the world; Brazil's specific variables: factors

Question	Answer
1) Which data are analysed?	The content of judicial recovery plans initiated in Brazil in line with legislative requirements
2) How are they defined?	The judicial recovery plans arise from company reporting of organisational failure
3) What is the population from which they are drawn?	Businesses that have developed judicial recovery plans in the sugar and ethanol sector
4) What is the context relative to which the data are analysed?	The factors that influence organisational failure
5) What are the boundaries of the analysis?	The boundary relates to sugar and ethanol mill's recovery plans
6) What is the target of the inferences?	The target is to identify the factors reported in recovery plans that have influenced organisational failure

Table 1.
Content analysis approach

Source: The authors, based on Krippendorf (1980)

that affect specifically companies located in Brazil; variable specific to a Brazilian region: factors that affect specifically some Brazilian region; variable specific to sugarcane and ethanol industry: factors that affect only the sugarcane and ethanol industry; and variable specific to the company: factors that affect the mill exclusively.

Regarding the nature of the problem reported in the reorganisation plan, the variables were divided into *initial* and *final* categories. The *initial* category was composed of the first variables founded in recovery plans, whereas the final category was made up by grouping the initial categories. The final categories were economic problems, government policies, climatic problems, financial crises, credit availability, legislative change, competition, financial problems, organisational operational issues, investments, problems related to the final price and relational problems. Table 2 presents the initial and final categories.

These results create a thematic typology and provide little information on how the variables were reported concurrently or in a cluster of factors by a given organisation. Therefore, the findings were triangulated using qualitative data from the judicial recovery plans and secondary data to articulate meaning in the factors reported by the organisations concerned.

4.2 Triangulation of factors identified in research with secondary data

The economic problems most cited in the judicial recovery plans are related both to the drop in sugar prices and the oversupply of sugar and ethanol. Although the sugar price was at its peak in 2001 [attracting US$46.31 per 50 kg bag (CEPEA, 2021)], after that the price fluctuated but has never returned to that same value. As for the recovery plans, eighteen out of the 25 ones studied confirmed that the drop in sugar prices was an important variable contributing to organisational failure. Examples of responses include:

> Thus, the sugar and ethanol sector was hit by the lack of working capital, and it was still forced to lower sugar and alcohol prices to compete in the new economic scenario (C11) [1].

> [. . .] the sugar price compromises the entire sector, which have been affected by the many historical interventions so far [. . .] (C25).

Besides the sugar price volatility, the ethanol (anhydrous and hydrated) price experienced strong fluctuation. As Neves & Conejero, (2007) mentioned, the sugarcane agro-industrial

Final category	Initial category
Economic problems	Sugar and ethanol price, oversupply, demand shrinkage, sugar export drop, sector's profitability decline, ethanol export drop
Government policies	High interest rate, government decisions about ethanol and gasoline price, lack of government incentives, IAA dissolution
Climatic problems	Excess rainfall, drought, frost
Financial crises	2008 crisis, World crises
Credit availability	Lack of credit
Legislative change	Change in environmental legislation
Competition	High competition
Financial problems	Revenue decrease, indebtedness increase, lack of working capital, difficulty in credit line renewal, availability of credit through the pledge/pawn of products, short-term debt payment
Organisational operational issues	Sugarcane milling decline, operational costs increase, low productivity, delay to start the mill's activity, high costs to maintain rural properties, high sugar logistical costs, high production cost, labour cost increase
Investments	Investments in expansion, investment decrease, investment for expansion
Problems related to the final price	Cost of production higher than the sale value, early products sale
Relational problems	Conflicts and uncertainty towards the stakeholders

Source: Elaborated by authors

Table 2.
Factor coding

system presents ethanol price fluctuation as a weakness. According to CEPEA (2019b), the ethanol (anhydrous and hydrated) price peaked in 2011, when the hydrated ethanol was sold at US$0.98 and the anhydrous ethanol at US$1.72 per litre. After that period, the prices varied between US$0.40 and US$0.70. No less than 16 refineries reported ethanol price falling as an important variable to explain organisational failure.

> From 2007 onwards, the sugar and alcohol prices fell, both in Brazil and in the international market – agricultural commodity. The refinery detected this unexpected change from the previous year, which led to a decrease in the revenue for the 2007/2008 crop at around twenty percent, which in total finances volume – revenue – means a considerable value. Then the market was again surprised by prices being flat, opposite to what is expected during the usual off-season period (December to March), which further damaged the entire sugar and alcohol sector (C14).

Despite these economic pressures, Brazilian sugar production has seen an exponential increase in area, leading to an *oversupply of sugar* in the market. Therefore, the *oversupply of sugar* was mentioned by eight refineries in the sample analysed:

> [. . .] resulted in a strong growth in the supply of sugar and alcohol products, occasioned by the installation of numerous new units across the country, with the massive participation of government and international financing, which contributed to an even greater depression in the prices of products in the economic segment, causing difficulties for almost all companies in the sector (C15).

Ethanol production also faced the same oversupply problems both at national and international markets. Six refineries mentioned *the oversupply of ethanol*:

> The sugar and ethanol sector in the country, as the main producer of sugar and ethanol commodities, has suffered many crises in recent years which in short could be identified, at first, as the problems of oversupply of products that consequently reduced the process of these commodities on the domestic and foreign market. (C7).

The government policy-related factor most frequently cited by the refineries ($n = 10$) was the *high interest rate*. The interest rate in Brazil was around 14% per year between 2015 and 2016 (IPEA, 2021). Government decisions regarding interest rates impact the cost of raising funds used to finance agriculture. Thus, the higher the interest rate, the lower the incentives for farmers to take credit (Souza Filho, Buainain, & Paulillo, 2021). C24 stated "It is important to note that Brazil has a high interest rate, which increases the financial cost for refineries".

The climatic problem most mentioned by the refineries was the *excess rainfall*. This problem was a factor affecting the location of refineries in the country. This impacts production efficiency as described by the following refinery:

> This climatic factor affects the sugar and ethanol production in two aspects. First, due to the difficulty of sugarcane harvesting, i.e., the cutting, loading, and transportation of the raw material is harmed, and second, in the raw material transformation into products, corresponding to the production of Total Recovered Sugar per ton of processed cane (ATR), whose concentration decreases with the excess of water over the sugarcane, meaning less sugar and alcohol per ton of ground cane. (C18).

As explained by thirteen refineries, the 2008 financial crisis and the associated financial ripples through world markets also directly affected the sugarcane sector. The 2008 crisis occurred at a time of high investment encouraged by the rise in the international ethanol market. This generated excess capacity, which led to deactivated plants, some in judicial recovery and many with high indebtedness (Moraes & Bacchi, 2014).

One example of responses that pondered on this reality elicits the impact of this macro-level factor:

> In 2008, especially the credit market was drastically affected by the global financial crisis and that was felt not only in Brazil but worldwide. It was when companies in the sector had difficulties obtaining financing at reasonable terms and costs compatible with their production cycles and margins. (C21).

Refineries have also reported difficulty in accessing credit in the market (the *credit crisis)*:

> [. . .] the global financial crisis drastically impacted the credit market, making it difficult for companies in the sector to obtain financing at reasonable terms and costs compatible with their production cycle and margins. (C19)

Regarding organisational operational issues, the most cited factors were sugarcane milling declining whilst operational costs increased. Some inputs increased in price, such as potassium chloride, which went from US$400 to US$1,200 per ton; urea from US$350 to US $900; and triple superphosphate from US$450 to US$800 per ton (Queiroz, 2022).

The *decline of sugarcane milling* was a problem reported by seven refineries. It was partly driven by a lack of working capital (C14) and the changing weather. C21 explained:

> Also, during the harvests of 2011, 2012, 2013, and 2014, the Southern-Central region (which includes the state of Mato Grosso do Sul and São Paulo), was devastated by prolonged droughts, which reduced the milling and consequently the revenue, as well as affected the future sugarcane production cycle.

The *increase in operational costs* was described by six refineries and summed up by C13: "In a second moment, operating costs increased significantly, especially during the off-season [. . .]" and C14: "This increase in industrial and personnel expenses led to an increase in mill operating costs, as well as a substantial increase in agricultural inputs, widely reported by the specialized media".

As revenue decreased (n = 8), indebtedness increased (n = 6), and so did difficulty in credit agreement renewal (n = 6). These were essential contributors to organisational failure, leading to some refineries being "forced to sell their stocks below production cost for most of the harvest, which caused many refineries to have a negative operating result" (C1). Debt servicing was a key issue, as C12 states: "Debt servicing has risen sharply and reached extremely high levels, eroding in recent years approximately one-third of the Group's revenues [. . .]". C24 proposes that there was a "Devaluation of the Real, which occurred in recent months, which substantially affected the indebtedness", and another mill explains the collective problem associated with trying to roll credit over:

> [. . .] with the outbreak of the crisis, the financial agents refused to roll over the debt as they usually did. This made it impossible to lengthen debts, disrupting the production chain, preventing the Group from honouring, as usual, its commitments to banks, labour compensation and suppliers in general. (C15)

The factor *Investments in expansion* was linked to organisational failure (n = 7), including the need to change practices to reduce straw burning (Paraiso & Gouveia, 2015; Cardoso et al., 2018):

> In recent years, to comply with the environmental legislation for the elimination of sugarcane straw burning, it has been necessary to rely more heavily upon machines and vehicles to promote the mechanised harvesting (C21).

The price paid for the product was a vital factor in generating revenue for companies, but refineries (n = 6) faced severe problems because *production costs were higher than the sale value*.

4.3 Cause-and-effect relationship map

Based on the analysis of the judicial recovery plans, a cause-and-effect relationship map of the variables that influenced organisational failure and their interconnection was developed (Figure 1). For better visualisation of the map, the variables were divided into two colours: blue and green. The green colour represents the macro-analytical variables, and the blue colour is the meso-analytical variables. Micro-level variables were not presented in the judicial recovery plans; therefore, they are not included in the figure. The arrows' thickness demonstrates the reporting frequency of the causal relation in the judicial recovery plans. Each refinery is identified by a label (letter "C" + a number, similar to the treatment given to qualitative data above). The dotted lines connecting the variables show how they link up.

The analysis shows the relevant factors for organisational failure as described by the refineries. Organisations referred to macro-level variables more often (n = 147) than meso-level variables (n = 110). Indeed, most of the factors described are outside the refineries' direct control, such as the sugar (72%) and ethanol (64%) price fall, the credit crisis (56%), the 2008 crisis (52%) and high interest rates (40%). Weather problems and lack of investment were mentioned less frequently. Eighty percent of refineries described some type of economic problem, the impact of government policies and operational issues.

The map indicates that organisational failure is a complex issue due to the multiple sources of interaction and because organisations have no consensus on the variables that generate failure. It is worth noting that the factors that influence failure have both direct and indirect effects as well as singular or cumulative effects. Therefore, one variable can trigger other variables to cause organisational failure, i.e. the variables do not operate in isolation, as Higashi et al. (2020) proposed. The ethanol prices' fall was one example of this complexity because at the same time as the price falls, which directly influenced failures, the falling

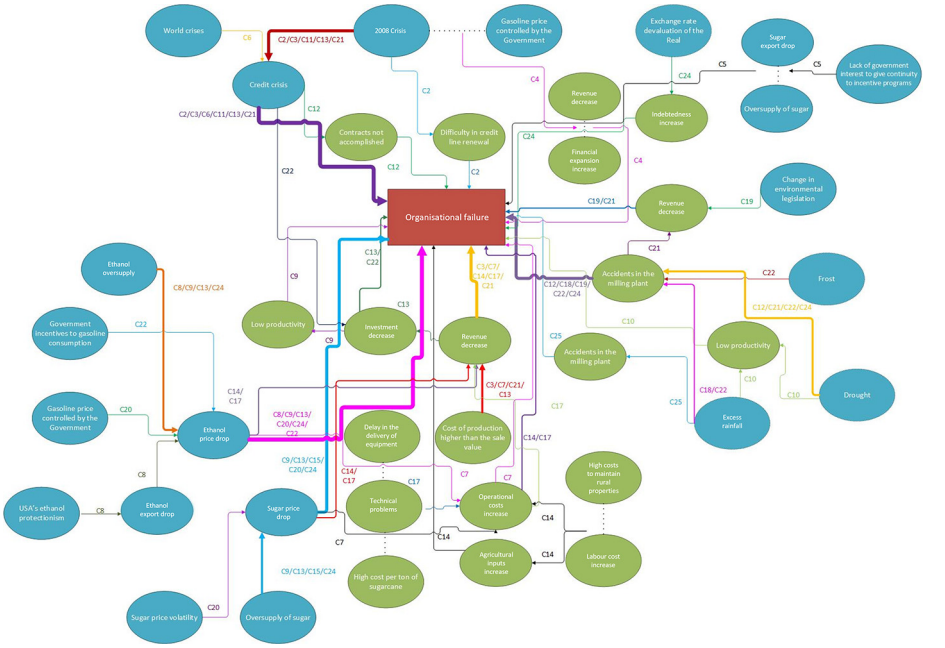

Figure 1.
Cause-and-effect relationship map

prices triggered revenue reduction and operational cost increase, also leading to failure. In addition, there can be singular or multiple climatic problems (excess rainfall, drought, frost), and therefore, a decline in production caused by climatic conditions could be, in fact, attributed to several different variables.

The macro and meso failure dimensions' levels are interrelated, so it could be asserted that the macro and meso failure dimensions are, in fact, dependent. That means that the shocks that occurred at the macro-level directly influenced how a refinery would organise its resources (economic, human, physical etc.) at the meso-level, which in turn influenced the organisational failure risk. Therefore, both levels must be studied together to understand better the factors that lead to organisational failure.

5. Discussion

The Brazilian sugar and ethanol sector has a raw material flexibility advantage compared to other agribusiness sectors, i.e. it can produce various final products from the same raw material. However, this industry framing in the policy context explored here means that this advantage does not reflect a competitive edge for those refineries. The Brazilian sugar and ethanol sector was affected by a diversity of economic shocks within their own sector and outside, i.e. at government, national and global levels. The interaction of these factors influenced the organisations' ability to be resilient and agile at the individual business and sector levels. That was further compounded by the financial uncertainty that exists from harvest to harvest. Specific organisational factors are important, but this study has introduced the concept of failure dimensions where there is interconnectedness and thus influence within a socio-technical dimension and between them. Thus, from the theoretical point of view, the paper advances current knowledge because it demonstrates, for the context studied, the interaction between the

macro and meso-analytical levels that influence organisational failure. From the empirical perspective, the analysis of the recovery plans of sugar and ethanol refineries supports the claim that organisational failure is a result of interconnected variables from different levels (Higashi et al., 2020). Therefore, to understand organisational failure, it is necessary to examine both the macro and meso failure dimensions and the failure dimensions within those levels.

The absence of the micro-level factors in the recovery plans is a challenge, but there may be a lack of willingness to report them on the judicial plans. This finding reinforces the need at the policy level to give judicial recovery plans a more strategic and less operational character if they are to drive more effective company recovery processes (Monteiro et al., 2020). When a refinery engages in a judicial recovery plan, its primary concern is identifying the macro-variables that can explain the failure. Such an approach often leads firms not to consider the recovery plan as a strategic tool or to drive internal improvements. Conversely, using the recovery plan as a tool to drive best practices would allow new solutions to emerge that reduce the company's debt, improve product sales and drive cost reduction (Monteiro et al., 2020). In any case, the absence of a micro-level dimension is a limitation of this study. A possible solution would be to incorporate interviews with managers, which is a suggestion for future research. Furthermore, a complementary methodological approach could be considered in future investigations, e.g. meta-analyses and multi-case studies.

Another limitation is that our study only considers sugar and ethanol refineries, so the findings may have limited applicability in other value-added commodity and agribusiness production chains. Therefore, such an analysis with other products may help to identify different variables to explain the advent of organisational failure. Thus, the suggestion is that future empirical studies work with larger samples and also investigate other production chains to draw out more evidence from a content analysis that can extend the applicability of this work.

6. Conclusion

This paper aimed to examine the reported dimensions of organisational failure in judicial recovery plans by Brazilian sugar and ethanol refineries to determine the direct and indirect factors of influence. This research makes significant contributions to the literature. First and most importantly, it provides evidence that organisational failure is complex and not a linear outcome. The research has also identified the external and internal factors that contribute to organisational failure and highlighted the role of managers in the process. External failure factors, identified as being beyond the control of managers, tend to be mentioned more frequently and are also cited as the leading cause of organisational failures. Understanding the factors of influence broadens the understanding of organisational failure as a whole.

The theme explored in this study has implications not only for firm strategy, but also for public policies. This study contributes to management practices by identifying the factors that directly and indirectly influence organisational failures. Direct factors are easier to identify because the company can recognise them more readily. However, because of the complex and nuanced inter-relationship between direct and indirect factors, many companies fail to know the real reasons that lead to organisational failure in a given context. This complex inter-relationship also has policy implications in terms of the tools governments use to seek to stabilise food supply chains in the event of a shock on an international, national or regional scale. This was evident during the COVID-19 pandemic. Some fiscal policy options may prove to be too blunt a tool to have a strong impact at the organisational level. This is particularly interesting as we seek to develop post-COVID policy mechanisms to restore food supply chains and prevent organisational failure.

Note

1. All mills' reports are translations of parts of the judicial recovery plans.

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