



The effects of the COVID-19 pandemic on startups: Putting causation, effectuation, and crucible strategies into practice

Os efeitos da pandemia de COVID-19 em startups: Colocando as estratégias de causation, effectuation e crucible em prática

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Abstract

Purpose: Companies around the world have been challenged by the unprecedented crisis caused by the COVID-19 pandemic. Although several studies have been conducted to understand how companies are surviving these challenges, little attention has been paid to survival strategies among startups. This research intends to address this gap by exploring how startups have put into practice causation, effectuation and/or crucible strategies in attempting to secure the survival of their businesses.

Design/methodology/approach: Applying an inductive approach, this research uses descriptive and comparative 3 case studies from three Brazilian startups. **Findings:** The main findings reveal that: (i) the startups have been able to create positive effects from the COVID-19 pandemic after adopting different sets of causation, effectuation and crucible strategies; (ii) the emergence of the *Reborn Epidemic Company* concept has developed since startups started generating revenue following changes implemented due to the effects of the pandemic; (iii) crucible strategies have been successfully implemented by startup 2 in redesigning the business entirely and reorienting its product towards a completely new market niche. **Originality:** The findings corroborate the emergent Low-Touch Economy paradigm. Theoretical and practical contributions are addressed, as well as suggestions for future research.

Keywords: Startup; COVID-19; causation and effectuation strategies; reborn epidemic company; crucible strategy; low-touch economy; digitalization.

Resumo

Objetivo: Empresas em todo o mundo foram desafiadas pela crise sem precedentes causada pela pandemia da COVID-19. Embora vários estudos tenham sido realizados para entender como as empresas estão sobrevivendo a esses desafios, pouca atenção tem sido dada às estratégias de sobrevivência entre as startups. Esta pesquisa pretende preencher essa lacuna, explorando como as startups colocaram em prática estratégias de causation, effectuation e/ou crucible na tentativa de garantir a sobrevivência de seus negócios. **Design/metodologia/abordagem:** Aplicando uma abordagem indutiva, esta pesquisa usa estudos descritivos e comparativos de 3 casos de três startups brasileiras. **Resultados:** Os principais descobertas revelam que: (i) as startups foram capazes de criar efeitos positivos a partir da pandemia de COVID-19 após adotarem diferentes conjuntos de estratégias de causation, effectuation e crucible; (ii) o surgimento do conceito *Reborn Epidemic Company* foi desenvolvido uma vez que as startups começaram a gerar receita após as mudanças implementadas

devido aos efeitos da pandemia; (iii) estratégias crucible foram implementadas com sucesso pela startup 2 ao redesenhar totalmente o negócio e reorientar seu produto para um nicho de mercado completamente novo. **Originalidade:** Os achados corroboram o paradigma emergente da Economia de Baixo Contato. Contribuições teóricas e práticas são abordadas, bem como sugestões para pesquisas futuras.

Palavras-chave: Startups; COVID-19; estratégias de causation e effectuation; reborn epidemic company; estratégia crucible; economia de baixo contato; digitalização.

1. Introdução

The COVID-19 pandemic is currently a global concern in numerous nations due to its widespread effects, both known and unknown (Wenham et al., 2020). Governments and companies are struggling with the economic crisis that has followed the health crisis, and several studies are being conducted to support and better identify successful public policies (Baker et al., 2020; Bozorgmehr et al., 2020), as well as to guide businesses through these difficult times (Syriopoulos, 2020).

The economic effect of COVID-19 on businesses such as restaurants, hotels, service providers, stores, etc., was felt immediately, due to the social distancing and lockdown measures implemented across the world (Gössling et al., 2020). These measures are due to the transmission of coronavirus through droplets or aerosols, leading to community spread of the virus (Asadi et al., 2020). Subsequently, traditional businesses based on business to customer (B2C) social interactions and/or business to business (B2B) transactions were immediately affected by lockdowns (Fernandes, 2020; Hartmann & Lussier, 2020). Moreover, companies from various other industries also suffered impacts on their supply chains, due to the destabilization of demand during this period (Jabbour et al., 2020). Business owners attempted to implement palliative solutions to ensure their survival, such as delivering orders, introducing protective measures, and even reinventing their business model as a whole by migrating to e-commerce, digital platforms and social media, i.e., through digitalization (Beliaeva et al., 2019).

The effects of COVID-19 on economies have given birth to the 'Low-Touch Economy', which is characterized by restrictions on social interactions, behavioral changes, higher levels of health security and adaptations in several industries (De Ridder & De Mey, 2020; Jesus et al., 2020). The new paradigm of the Low-Touch Economy requires equally new strategies for business survival (Bucaciuc et al., 2020), or radical business model innovations oriented towards features of the Low-Touch Economy (Baghiu, 2020).

Although the most drastic measures implemented have tended to be related to traditional businesses based on trading and providing services directly to customers (Donthu & Gustafsson, 2020), little attention has been paid to high-tech businesses, such as startups (Verma & Gustafsson, 2020). Davidsson and Gordon (2016) emphasize the importance of further studies to analyze how small samples of startups respond to crises in specific locations or sectors. Holland and Shepherd (2013) highlight the need for more research exploring the persistence of entrepreneurs in making strategic decisions for emerging businesses in adverse situations. Additionally, empirical studies looking at possible entrepreneurial opportunities in international contexts have also been recommended by Alvarez and Barney (2014). Therefore, the importance of this study is justified when analyzing how high-tech business managed during the COVID-19 pandemic, since their business models were already 'Low-Touch Economy' even before the pandemic, assuming greater adaptability in crises as the COVID-19 pandemic.

This research intends to address these gaps in the literature by shedding some light and identifying the impact of the COVID-19 pandemic on startups' strategies in the Brazilian context of these intertwined health, political and economic crises. The data was collected during the months in which Brazil became the second largest epicenter of the pandemic globally, behind only the USA (April to August 2020), with the country later reaching 500,000 deaths by June 2021 (BBC, 2021). Moreover, the Brazilian context was chosen due to the fact that emerging economies face greater risks associated with health, economic and social crises when compared with established economies (Arellano et al., 2020).

Beyond struggling with the immediate effect of the pandemic, businesses owners and managers have been faced with various medium/long-term effects on their companies. The pandemic has forced them to react strategically, to adapt or to choose among planned strategies to survive. As a theoretical approach to the analysis of the cases in this study, the causation (planned strategies) and effectuation (emergent strategies) theories were selected (Sarasvathy, 2001).

Additionally, we have considered a new strategic approach, which we have termed 'crucible strategy'. We consider 'crucible strategies' to be those strategies developed when business owners/managers are forced to deal with risky and hazardous situations and contexts which they have never

faced before, faster than they would be in normal conditions. In these difficult contexts, decisions must be taken even more rapidly by business managers aiming to ensure their companies' survival.

The establishment of crucible strategies is based on previous experiences that have shaped business managers' skills in strategic planning, despite their bounded rationality (Ferasso & Bergamaschi, 2020). Each manager's experience is produced through a lifetime of trial-and-error situations, which allow for profound self-reflection on what failed and what succeeded, improving the manager's competencies (Bennis & Thomas, 2002). In unpredictable circumstances, a company's survival can depend on quickly conceived strategies which must be implemented rapidly by business managers, in which context their competencies became critical.

Crucible strategies go beyond the normal process of causation and effectuation strategies, since standard processes may not respond to the company's urgent needs in difficult and hazardous situations, where the company requires quick action to avoid bankruptcy. In this situation, a crucible strategy can contribute to the business' survival and, therefore, to the business manager being more prepared to deal with tough situations in future.

This research aims to address the identified research gaps by exploring how startups have been affected by the COVID-19 pandemic and how they are putting causation, effectuation and/or crucible strategies into practice in attempting to ensure business survival. Accordingly, we were guided by the following research questions:

- (RQ1) *To what extent has the COVID-19 pandemic threatened startups' survival?*
- (RQ2) *What strategies are being selected in attempting to ensure startups' survival?*
- (RQ3) *How are startups' managers putting their chosen strategies into practice, and at what speed?*

This study provides contributions for academia and business managers as follows. We explore the effects of the COVID-19 pandemic on startups in the context of the most critical stage of the pandemic's effects on Brazil. This specific period was chosen for data collection in order to understand how companies were dealing with this unprecedented crisis and in a country that was facing its worst pandemic scenario. We identify *what* strategies are being put into practice as well as *how* startups' managers are dealing with the current precarious business context. We also identify how startup managers put causation and effectuation strategies into practice. Finally, we identify the emergence of the 'crucible strategy' in the studied cases.

Our research paper is structured as follows. Section 2 presents a contextual background on the COVID-19 pandemic and its effects, as well as discussing the causation and effectuation strategies, and proposing the fundamentals of the crucible strategy. In Section 3, we describe the research design adopted in this research. Section 4 presents the cases studied and empirical findings. The paper ends with a discussion as well as concluding remarks and references.

2. Literature review

2.1. The COVID-19 pandemic and its crisis effects

Since the confirmation of Coronavirus Disease 2019 (COVID-19) as a pandemic in March 2020 by the World Health Organization (WHO), several social distancing measures have become widely accepted as recommendations for disease prevention (WHO, 2020). Different countries have adopted different preventative measures; however, the rapid advance of the disease has depleted medical resources, overburdened health systems, and led to thousands of lives being lost (Cohen et al., 2020).

In addition to the health crisis, the global economy has also suffered severe consequences. Distancing measures have prevented companies from running their businesses as usual in many countries, decreasing economic activity, and resulting in an unprecedented global crisis (Baker et al., 2020). The Global Economic Perspectives pointed to a 3.5% contraction of the global economy in 2020 (Global Economic Prospects, 2021) and the International Monetary Fund suggests a slow recovery, especially in emerging economies (WIMF, 2020).

This slowdown in economic activity has reduced companies' revenues, leading decision-makers to adapt their activities, cut investment and reduce expenses. Many workers have moved into remote working, although teleworking/working from home is generally more common among higher skilled workers and is not applicable in many sectors (Bartik et al., 2020). In many cases, layoffs were inevitable, which has raised unemployment rates to historic levels around the world (Coibion et al., 2020).

Supply chains have also suffered from deficiencies in product delivery due to travel restrictions and border closures (Hartmann & Lussier, 2020; Jabbour et al., 2020). Service-oriented industries such as tourism, aviation, sports, entertainment, retail, hotels, restaurants, and local services (hairdressing, dentistry, restaurants, etc.) have been the worst affected, and have

consequently been the industries in which the number of unemployed has most increased (Fernandes, 2020). Emerging economies also face the limitation of limited fiscal space, allowing for little public support for the citizens most affected by the pandemic (Arellano et al., 2020). Considering these factors, competent leaders in the areas of health, business and government are needed, combined with stimuli for entrepreneurship, to seek effective strategies to overcome the crisis (Nicola et al., 2020).

2.2 Effects of the pandemic on companies' survival strategies

In an attempt to adapt to the context of the pandemic, companies have sought new strategies. Abubakar (2020) indicates the need to re-evaluate productive capacities, technology, and customer feedback to drive strategies in turbulent moments. Focusing specifically on small businesses, such as startups, systematic strategies to reduce the impacts of the pandemic have so far been little explored and implemented (Fabeil et al., 2020).

In this sense, due to the constraints of distancing, digital solutions and strategies have become a priority (Beaunoyer et al., 2020). Digital transformation enables the redesign of traditional business models and the introduction of new technologies (Beliaeva et al., 2019; Fitriasari, 2020), and the COVID-19 pandemic has imposed and accelerated this process of technological use in the adaptation of business models (Guitton, 2020). Despite the vast range of strategies available in the Business Management domain, in this study we analyze a few specific strategies that may be considered by startups in critical moments, such as this current pandemic, as presented in the following sections.

2.3 Causation and effectuation strategies

Sarasvathy (2001) argues that companies guide their strategies in two different ways for decision-making purposes: causation and effectuation. Causation refers to a specified effect that is taken for granted as a requirement; in this approach the focus is on decision-making among various options in order to select a strategy that will produce the desired effect. In this case, the decision-maker deals with predictive strategies. On the other hand, effectuation refers to the process whereby a set of means is taken as the foundation, with the focus being on selecting among the possible effects that can be created with that set of means; that is, the rationale of the effectuation strategy is in exercising control over what can be done with the available resources to meet a new demand (Sarasvathy, 2001).

Sarasvathy (2001) suggests that the causation process supports the concept that companies should analyze their internal and external environment in order to create a strategic plan, which is later implemented and controlled. However, the effectuation process occurs when strategies emerge without a clear intention (Mintzberg, 1991). In short, causation is related to planned strategies and effectuation to emergent strategies (Gabrielsson & Gabrielsson, 2013).

2.4 Crucible strategy

By the term 'crucible', we refer to strategies that are created by business owners or managers when faced with risky or hazardous situations that require significant speed in the formulation and implementation of strategies. The term crucible comes from the field of Chemistry, where it refers to a ceramic container used in laboratory activities for melting chemical compounds at high temperatures (Weber et al., 1957). In choosing this term, we considered the pressure and temperature that the crucible is subjected to, and how it resists them, since companies in such situations face uncommon pressures, which they also need to resist and deal with.

These strategies are those related to business survival; they are formulated to address urgent environmental threats and are largely based on business managers' previous working experience, shaped by the trial-and-error situations they have encountered during their careers (Bennis & Thomas, 2002). Thus, crucible strategies are considered only when causation and effectuation strategies would not give the required results, in which situation crucible strategies are rapidly formulated and adopted by company managers/owners.

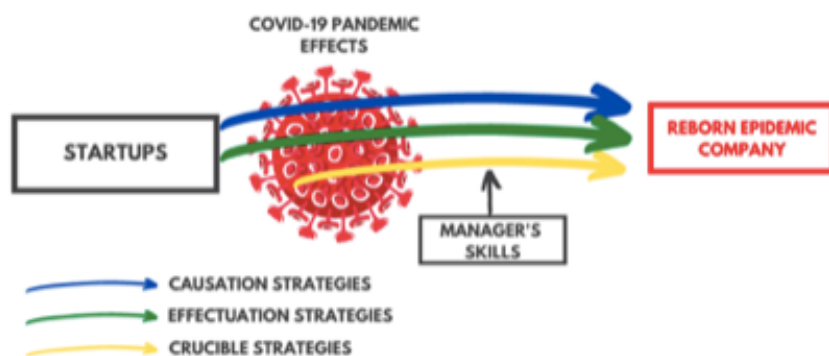
In the leadership field of study, a leader deals with tough decisions which need to be taken and can undergo self-improvement based on the analysis of failures and lessons learned from what succeeded (Bennis & Thomas, 2002). In alignment with these precepts, when a business manager faces unpredictable situations that can be considered a threat to the business' survival, the business manager must create a strategy at speed in order to save the business. Creating and implementing crucible strategies depends on the business manager's previous experiences, due to the need to decide quickly. In the context of the COVID-19 pandemic, business managers have been challenged to rethink part or all their business strategy in trying to ensure survival. The pandemic has had the direct effect of a decrease in sales and, consequently, decreased revenues, threatening business survival. Thus,

business managers have been forced to adopt crucible strategies in order to deal with such risky and hazardous contexts.

Crucible strategies may also take the form of strategies that the business manager finds unfavorable or would not normally choose but is forced into by the emergent threat. Thus, crucible strategies are not characterized as a set of pre-defined strategies (causation), nor emergent strategies (effectuation), but as strategies that business managers are forced to use in challenging scenarios or under extreme necessity or imminent threat to the survival of their business.

Considering the literature presented above, the research framework is now presented in Figure 1.

Figure 1 – Research framework



Source: the authors.

As observed, startups are struggling with the effects of the COVID-19 pandemic, and causation and effectuation strategies can help with businesses survival. Moreover, the pandemic has specifically stimulated the emergence of new crucible strategies, which are largely based on managers' specific skills and experiences. These three strategies may be used to achieve the emergent concept of the *Reborn Epidemic Company*.

3. Research methodologies

This inductive research was developed based on empirical evidence (Sainsbury, 1991), and can be characterized as a multiple descriptive comparative case study (Collis & Hussey, 2005; Yin, 2014), conducted using a qualitative approach (Yin, 2014) with both primary and secondary sources. The unit of analysis selected is startup companies, along with their environment/context in the COVID-19 pandemic. The multiple comparative case studies methodology has been chosen for two reasons. First, it contributes to our understanding of phenomena of interest, i.e., Low Touch Economy on strategies on high-tech startups. Second, the multiple comparative case studies are a suitable research method to analyze the causation, effectuation, and crucible strategies. Finally, the crucible strategy on Low Touch Economy lacks established theoretical models.

The literature review was conducted targeting the two widely known strategies (causation and effectuation) and main references in the field were revisited. For the term 'crucible', scientific databases (like Science Direct, Scopus, and Web of Science) were consulted (as well as Google Scholar) in order to identify the previous use of this concept, and no research was found. The concept was triangulated to the Business Strategy field of study from Chemistry and also Leadership (Bennis & Thomas, 2002). Therefore, this section resulted in a completely new concept in the strategy field of study.

The sampling procedure adopted in this research was the snowball (Parker, Scott & Geddes, 2019), due to its recommendation for recruiting research participants when dealing with hard-to-reach individuals. Specifically, the first CEO was appointed by one Full professor and the first CEO recommended the next one. The snowball sampling allowed the research team to collect data in a faster way and allow the cross-cases comparisons in a simultaneous way.

Regarding qualitative data (primary sources), we conducted semi-structured interviews with three CEOs (as described in Table 1), and the interviews were complemented with data from secondary sources such as Deloitte, *Órbi Conecta* and reports from the Dom Cabral Foundation. We targeted CEOs because they tend to have critical information about the companies they manage, and because strategies tend to be developed by such strategic staff members (Usunier, Easterby-Smith &

Thorpe, 1993). Regarding the quantitative data used (secondary sources), we retrieved information from startups' internet webpages, social networking profiles (Facebook, Instagram, YouTube, and LinkedIn), entrepreneurship incentive program websites and promotional materials made available by the startups, such as folders and reports.

Table 1 – Interviewee characteristics

Company	Industry	Foundation year	Interviewee's role	Interview duration
Pilot case	Digitalization	2018	Head Sales	17:00
Startup 1	Stock Control	2018	Founder and CEO (S1)	85:13
Startup 2	Education	2018	Founder and CEO (S2)	48:39
Startup 3	Education	2013	Head Sales (S3)	28:35

Source: the authors.

The pilot case study was conducted in order to identify how the COVID-19 pandemic was affecting startups in the Brazilian context, and to adjust the interview guiding questions appropriately. This case was excluded from the subsequent analyses.

Following social distancing guidelines, we adopted the precepts of cyber research (Weible & Wallace, 1998), specifically through use of the Google Meet platform. The interviews were conducted in August 2020 by the second and third authors and were recorded and subsequently transcribed.

The data was analyzed by following the thematic content technique (Joffe & Yardley, 2004), which was applied to both the primary and secondary data analyses (Ravitch & Carl, 2016). After careful analysis of the cases' datasets, we selected representative excerpts for detailed analysis (Evrard et al., 1997). The selection of key findings allowed for cross-case comparisons (Usunier et al., 1993), with these excerpts characterized according to the strategies used and their features, as retrieved from the literature. These original excerpts were categorized accordingly, for examination through an interpretive analysis approach (Dobson, 2001).

We followed the validity and reliability considerations set out by Drucker et al. (2002). The collection and analysis stages were supervised by the first author in order to guarantee their validity (Yin, 2014), while external validity checking was carried out by the fourth author. The authors declare their ethical commitment to impartiality vis-à-vis the research outcomes (Miles et al., 2014).

4. Presentation of cases and empirical findings

4.1 The Brazilian startup ecosystem

The startup sector generated US \$ 2.8 trillion globally in 2019, representing 10% growth over the previous year, according to the Global Startup Ecosystem Report (Startup Genome, 2019). Specifically, in Brazil, the startup market showed exponential growth of more than 200% between 2015 and 2019, increasing from 4,000 to more than 12,000 startups, along with the foundation of the Brazilian Startup Association (ABStartups).

According to StartupBase (2020), the largest database on the Brazilian startup ecosystem, the country currently has more than 13,200 startups, which are located mainly in the Southern and Southeastern regions. These startups are operating in a variety of industries, including education, finance, internet, health, well-being, and agribusiness. In addition, 47.9% of such companies are working in the B2B model, and the main business models used are Software as a Service (SaaS) (41.15%), Marketplace (19.42%) and e-Commerce (7.23%). Therefore, the Brazilian ecosystem is a relevant empirical research field for investigating the impacts caused by the COVID-19 pandemic on Brazilian startups, especially during its spread through Brazilian territory.

4.2 Case study company profiles

4.2.1 Startup 1: stock control

Startup 1 offers digital solutions for filing electronic tax documents, simplifying business management for Small and Medium-sized Enterprises (SMEs). This company operates across four areas of business management: inventory control, corporate accountability, construction monitoring and product pricing. The interviewee from this startup is one of its founders and has taken part in the formulation of the company's planning, control, and commercial activities.

This is a young company, founded in 2019, which began its operation by constructing platforms, developing prototypes, conducting research, and consolidating its target audience. In early 2020, Startup 1 had no revenue. With the spread of the pandemic within Brazil by March 2020 and the beginning of social distancing and lockdown, this startup needed to adapt in order to survive. The development of its construction monitoring platform was interrupted because of the pandemic due to requiring on-site observation of activities, such as interpersonal interactions, which were avoided under social distancing rules. The corporate accountability platform was also interrupted due to requiring employees to travel for business, a practice which is also now avoided. The pricing platform has also been discontinued due to strategic decisions considering the present context.

Despite the interruption of these activities, this company's inventory management platform became its main product in the pandemic period. The company launched this platform as a smartphone application, with a starter version available free of charge and the option of a paid full version via monthly fees. The interviewee reported that these services were launched during the pandemic, and he noticed positive sales growth due to the pandemic.

4.2.2 Startup 2: EdTech

Startup 2 is an EdTech company dedicated to children's education, which provides educational materials for coding experiments, games, and robots. This company trades content and educational robotics kits for teachers and schools through both franchising and direct sales. The educational content is developed using a programming platform which is compatible with the Internet of the Things (IoT) technology, toy parts, interconnections with other market platforms, connections to sensors and additional modules, providing multiple options for use. The interviewee from this company is one of the founding partners and develops the educational materials and the company's programming tools.

This company was founded in 2017 when its founders participated in the creation of a "maker environment" in a children's school, helping to train teachers to work with technologies, programming, and robotics by stimulating creativity, innovation, critical thinking, problem-solving, communication and collaboration among their young students.

Since its foundation, this startup has regularly demonstrated positive revenues and worked with micro franchising of its solutions in elementary schools. The company has also participated in incubation and acceleration programmes and has participated in an international innovation ecosystem. With the arrival and spread of COVID-19 in Brazil, all educational institutions were closed, and this company had no active revenue by June 2020, forcing its CEO into the decision to migrate to another market area.

4.2.3 Startup 3: EdTech

Startup 3 is a company which is oriented towards the Brazilian private education market share. This company offers optimization and automation for student enrollment processes at elementary and high school levels, converting contacts into contracts. Startup 3 was founded in 2014, initially focusing on regulated degrees, such as undergraduate degrees and professional courses. Among its first main clients were representatives of private universities, such as the third and the nineteenth largest¹ Brazilian universities.

Analyzing the market and finding that non-regulated/short courses had an income equivalent to regulated courses (such as bachelor's degrees) in 2018, Startup 3 opted to migrate to this market of non-regulated short courses, such as courses in languages (English), communication skills and project management, among others. According to the interviewee from this company, revenue from non-regulated courses exceeded revenue from regulated courses in Brazil in 2019, the year in which Startup 3 acquired its first investment. Currently, non-regulated courses represent 90% of Startup 3's revenues.

Before the context of the COVID-19 pandemic, Startup 3 concentrated all its activities on face-to-face courses, for both non-regulated and regulated courses, which were highly affected by social distancing measures. However, this same obstacle led the company to anticipate such strategies and launch its distance learning platform.

4.3 Empirical findings and cross-case comparisons

The three selected cases were demonstrated to be rich sources of data and provided detailed information. These three startups provided various evidence about the three strategies analyzed in

¹ According to the *Ranking Universitário Folha* for the year 2019. Available at <https://ruf.folha.uol.com.br/2019/ranking-de-universidades/principal/>

this research (causation, effectuation, and crucible strategies). The following results were retrieved from this field research, and, in this section, we analyze the strategies implemented by these startups.

Startup 1 originally had four products in its portfolio, but due to the conditions of social distancing, the company strategically redesigned itself, since three of these products required the physical presence of consumers. Therefore, the focus of Startup 1 shifted to only its inventory control app since users can use this platform remotely.

This type of product repositioning is aligned with the causation strategy, since the interviewee's decision-making was based on analysis of the new conditions imposed by the environment, characterized by predictive strategizing (Sarasvathy, 2001). Gabrielsson and Gabrielsson (2013) argue that the causation strategy is a planned strategy and, as demonstrated in the decision made by Startup 1, their focus changed to a product that can be used remotely, based on the environmental circumstances. Therefore, the causation strategy is observed in organization's analysis of their internal and external environment to determine decision-making (Sarasvathy, 2001).

The causation strategy is also related to the continual search for partners which possess desirable resources that the company does not have (Prashantham et al., 2019). This is also evident with Startup 1, as a new partnership was established with a product advertising company during the pandemic in order to leverage sales of the inventory control app as well as brand awareness.

According to SEBRAE (2020), considering strategies undertaken by startups in managing the pandemic's effects, a focus on digital marketing and expansion of contacts – strategies adopted by Startup 1 – are measures that allow a greater number of potential customers to become aware of available solutions, in addition to increasing the startup's visibility.

Startup 1's interviewee pointed out that the context of the pandemic facilitated constant and rapid communication through digital channels with new partners. The remote method provided contacts with a wider range of customers which, with traditional face-to-face interactions, would be a more time-consuming task; however, as he emphasized: "[...] now it's easier, I click and open a communication channel, then it became easier" (S, 1).

On the other hand, in contrast to Startup 1's use of the causation strategy, the effectuation strategy was noted in Startup 3. The emerging strategies used by Startup 3 considered the extent of their control over what could be done with the available resources to meet new demand (Sarasvathy, 2001). Since schools and universities suspended their face-to-face activities, Startup 3 had to anticipate the planning and launching of a distance learning platform, since 100% of its sales previously came from face-to-face courses until remote learning became the only option allowed by public regulatory bodies. This finding aligns with the literature, with the anticipation and acceleration of projects and strategies considered to be measures commonly adopted by startups affected by the pandemic (Orbi & FDC, 2020).

According by Mintzberg (1991), the process of the effectuation strategy occurs without a clear intention, i.e., it is not a predictive strategy. Although Startup 3 already had the intention of developing an online platform in the short term, it was not expected to be implemented so soon because of the pandemic period. It was the effects of the pandemic that accelerated this process for Startup 3, and this can be characterized as an emerging strategy for such a company.

The Organization for Economic Co-operation and Development (OECD) reports that online resources have been supporting the continuity of education during the COVID-19 pandemic (OECD, 2020). In this context, Startup 3 implemented a distance education platform in order to fulfill this new market demand which, in turn, resulted in higher revenues than they earned in the pre-pandemic period. Startups that showed positive financial results during the pandemic represent only 12% of the total number of startups, as indicated in the Startup Genome Global Startup Ecosystem report (2020).

Prashantham et al. (2019) argue that partners constitute the main providers of resources in the effectuation strategy approach. This is evidenced by the Head of Sales of Startup 3, who stated that "[...] we are conducting many partnerships with large institutions and the result is very positive [...]".

In addition to the causation and effectuation strategies observed in these two startups, another interesting finding was identified. After Startup 3 launched its courses through a new online platform, the company witnessed positive results related to the revenue provided by first-time sales. Similarly, after the onset of the pandemic, Startup 1 started selling and trading in the international market, which had not been previously planned, and witnessed revenue growth as a result. Moreover, Startup 2 started operating in a completely new market niche during the pandemic period, and thus generated profits. From these indications, we considered these three startups as *Reborn Epidemic Companies*. Similarly to the concept of Reborn Global Companies, where the company has focused on international markets since its foundation (Knight & Cavusgil, 2005), a *Reborn Epidemic Company* is a company that presented its first revenues after the onset of the COVID-19 pandemic, a company that is

trading and profiting under hazardous and unprecedented restrictions never before faced by such organizations.

Another emerging finding from this field of research is the crucible strategy. This strategy was observed at Startup 2, as the Founder/CEO ran out of revenue in the first half of 2020 due to the pandemic and was forced to change his company's market niche to the agribusiness field. The company had planned to operate in the education industry, specifically providing services to elementary schools. Due to the lack of revenue and concerns about the business' survival in a risky situation, the Founder/CEO of Startup 2 was forced to rethink the whole business using new strategies, which characterizes his approach as a crucible strategy. In the Founder/CEO's own words:

"[...] we had to rethink everything we were going to do [...] As soon as the pandemic started, we had zero revenue, until June. So, in contact with consultants, we saw an opportunity in the agribusiness sector that was outside our radar, totally outside, taking education for agribusiness, into agribusiness [...] So, I moved to a new segment, needing to make adjustments to the characteristics of the business" (S, 2).

An important aspect of the crucible strategy is the manager's personal and professional experience concerning decision-making in hazardous situations. The CEO of Startup 2 reported being forced to take measures due to the atypical context:

"The pandemic is very similar to what I experienced in the 1980s, as a young preteen, we saw the Brazilian economy full of ups and downs. Then, as a manager, I also saw a lot of companies closing, in the crises of the 1990s. [...]"

In other sectors that I worked in, I noticed that I may not even face a real pandemic, but I dealt with pandemics every day in different proportions, I think the way I deal with this is what will change. If I don't see beyond the limits of my wall, which is the pandemic, then, there's no way. I need to look at and be aware of these perceptions. In this, I think it helps that I have worked in so many sectors, such as: automotive, clothing, education, and I've had other ventures. So, we always try to see a little more than what is the natural situation" (S, 2).

Startup 2's Founder/CEO has over 20 years of experience in business management, entrepreneurship and in the education field. These experiences contributed to more drastic decision-making, which enabled this company to enter an industry it had not initially planned to. This manager underlined the importance of resilience in the decision-maker and considers the pandemic scenario as an opportunity for something bigger. He also demonstrated a positive mindset and is not afraid of chaos, reinforcing that chaos is a necessary element of the exploitation of opportunities.

The manager's experience is a key element of decision-making in the crucible strategy, which was observed in the profile of Startup 2's Founder/CEO. This lengthy experience is not observed in the managers of Startups 1 and 3, which led them to adopt less aggressive strategies, such as the identified causation and effectuation strategies, when compared with Startup 2's crucible strategies. The Startup 1 interviewee had no professional experience prior to founding this company, while the Startup 3 interviewee had five years of experience in the consulting and information technology industries.

Another emerging finding from our field research relates to the digitalization process resulting from social distancing measures. The three startups analyzed were shown to have benefited from digitization. Startup 1 used digitalization to meet more partners, a process that previously required face-to-face meetings. Startup 2, by developing a digital platform, started to serve the distance learning education market. Startup 3, on the other hand, was able to attract customers from other regions and countries that it had not previously served, or even considered at its foundation.

Digitalization is an aspect observed in all of the analyzed startups and reflects the results of a survey carried out by the Inter-American Development Bank and the Organization of American States indicating that, during the pandemic, digitization in Latin America accelerated in three months at a pace which would normally take three years to advance (IDB & OAS, 2020).

The strategies adopted by the startups analyzed are summarized in Table 2. The advancement of digitalization is also highlighted in the Global Startup Ecosystem report (Genome, 2020), which states that, even though technology industries' revenue fell during the pandemic, the digital technology industry showed better results compared to other industries. The sectors of EdTech and IT startups (relevant to all startups in this manuscript) are among those that showed the highest liquidity in the first half of 2020, according to a survey by *Distrito Dataminer* (Distrito, 2020).

Table 2: Strategies adopted, outcomes and cross-case meta-inferences

Causes/pandemic effects	Strategies adopted	Results obtained	Cross-case meta-inferences
Constraints caused by limits on physical interactions between the company and customers.	Startup 1 strategically redesigned one of its four products to operate remotely (inventory control app).	Digitalization of one product (startup 1).	Startup 1 adopted three causation strategies by digitalizing one product, implementing digital marketing strategies and implementing digital communications. Startup 2 showed three crucible strategies by radically changing their market niche and abandoning the niche in which it developed its competencies, redesigning the whole business and repositioning an existing product. The crucible strategy was characterized in Startup 2 by the manager's skills , forged in previous hazardous circumstances. Startup 3 adopted two effectuation strategies by digitalizing internal processes, allowing the company to implement a distance learning platform; and by targeting a new and more profitable and wider market niche.
Competitors also migrated to cyberspace, intensifying concurrence.	Startup 1 partnered with an advertising company to leverage sales growth and brand awareness, resulting in the emergence and growth of profits .	Digital marketing strategies for reinforcing product/brand positioning (startup 1).	
Cessation of face-to-face communication with customers.	Startup 1 adopted digital communication via Information and Communication Technology (ICT) tools.	Digital communication expanded access to a wider range of customers and optimized the time used for interactions (startup 1).	
Customers in the education industry (relevant to Startups 2 and 3) were affected by social distancing measures and moved to virtual education.	Startup 2 was challenged by obtaining no revenue from its market niche. Startup 2 changed its market niche to a completely new industry (agribusiness) during the pandemic. Repositioning an existing product (BBC micro:bit hardware) to the new market niche. The CEO's mindset considered chaos as an opportunity. Startup 3 anticipated the implementation of distance learning platforms and started exploring another market niche in the same segment more intensively (education industry), based on the distance learning mode. Startup 3 accelerated internal changes to faster implement a distance learning platform with a strategic technical partnership. Startup 3 needed to adapt to the international market to receive international payments, a market not considered before the pandemic . Startup 3 partnered with bigger and more profitable customers at the national and international levels .	By rethinking the whole business , the CEO radically changed to a new market niche via exploitation (consultancy services), redesigning the whole company and product offering (startup 2). Aggressive strategies were adopted faster thanks to the manager's skills when dealing with previous hazardous circumstances (startup 2). Digitalization of internal processes to meet emergent market niche demands, resulting in substantially more profitable and bigger customers. Startup 3 expanded its market share by entering into new Brazilian regions and also into the international market , which had not previously been planned. This startup reached more customers by establishing strategic partnerships (startup 3).	Reborn Epidemic Companies: Startup 1 generated profits from its first-ever product commercialization during the pandemic period. Startup 3 started generating revenues by shifting to a more profitable market niche during the pandemic and by trading in the international market, which had not previously been planned, thanks to ICT tools. Startup 2 started generating revenue thanks to changing its market niche to a new industry. Thus, startup 2 could be considered a 'reborn epidemic company' with regard to exploring its new market niche during the pandemic.

Note: Colors came from the research framework (Figure 1). Terms colored in blue refer to causation strategies; those in yellow, to crucial strategies, and those in green, to effectuation strategies. Terms colored in red refer to features of Reborn Epidemic Companies.

Source: the authors.

The positive results presented by the three startups studied are also aligned with reports from *Órbi Conecta* and *Fundação Dom Cabral* on the pandemic's impact in Brazilian startups. As reported, 30.9% of the startups analyzed were proven to be positively affected by the pandemic's effects (Orbi & FDC, 2020). Our empirical findings show that, among the main positive impacts

reported by managers, changes in strategic priorities, the acquisition of new customers, changes made in terms of processes and products and increased revenues are major common points among the cases studied.

5. Discussion and conclusion

This research set out with the goal to explore how startups have been affected by the COVID-19 pandemic and how these startups are putting causation, effectuation and/or crucible strategies into practice, with the aim of business survival.

Our main findings reveal that the companies studied have been affected by the COVID-19 pandemic threatening their survival, and that these companies have used a set of strategies which favor several changes undertaken during the pandemic period, from adapting an existing product for remote use of Startup 1 as described by causation strategy (Sarasvathy, 2001) to a radical shift in market (Abubakar, 2020) niche of Startup 2 according to crucible strategy.

In short, Startup 1 implemented a set of three causation strategies, to which the decision-maker deals with predictive strategies (Sarasvathy, 2001) as digitalization of one product, digital marketing strategies and digital communication as suggests Beaunoyer et al. (2020). Whereas Startup 3 used two effectuation strategies, ie, emerged without a clear intention (Mintzberg, 1991) as new Brazilian regions and also into the international market by digitalization of internal processes. The Startup 2 demonstrated a completely new concept in the field of strategy was born like crucible strategies, the strategies adopted went to rethink the whole business changing its market niche to a completely new industry via exploitation and repositioning an existing product to the new market niche thanks to the manager's skills (Bennis & Thomas, 2002).

All the companies studied have ultimately positively benefited from the disturbances caused by the pandemic, by adopting causation, effectuation, and crucible strategies. These companies used digital solutions (Beaunoyer et al., 2020) and digital transformation processes (Fitriasari, 2020) in their business models in an attempt to survive.

An interesting finding that emerged from these empirical cases is the *Reborn Epidemic Company* concept, by which we identified that Startups 1 and 2 started generating revenue during the pandemic period and by implementing their causation and crucible strategies, respectively. Startup 3 also proved to be a *Reborn Epidemic Company* by starting its trading activities at the international level during the pandemic period (effectuation strategy), thanks to its radical market niche alteration and exploitation of ICT tools.

5.1 Contributions

This research provides several contributions to both scholars and practitioners. We have presented how the three startups studied put their strategies into practice with the aim of securing their businesses' survival, and we identified that the three types of strategies were implemented by each company at rapid speed.

Additionally, we have addressed how the startups studied are dealing with the effects of the COVID-19 pandemic on their businesses, and the different ways in which the companies studied are implementing different strategies to ensure the survival of their businesses.

Our research contributes to the emerging body of literature on the Low-Touch Economy by introducing novel findings on startups and the need for new types of strategies, in line with the recommendations of Bucaciuc et al. (2020), or the radical business model innovations of Baghiu (2020).

5.2 Implications for theory

We have empirically identified the concept and features of crucible strategies, which was noted in analyzing Startup 2, and identifying which specific actions were taken in relation to this new type of strategy. Then, beyond identifying the specific strategies used by the startups analyzed in relation to causation and effectuation strategies, previously identified by Sarasvathy (2001), we identified the emergence of a new strategy type: the crucible strategy.

This research paper provides novelty by defining the concept and features of the crucible strategy, as well as identifying how this type of strategy is implemented in a real company during the hazardous period of the COVID-19 pandemic in Brazil. We suggest future research on a longitudinal approach to identify if the decisions taken were successful or not in the long term.

5.3 Implications for practitioners

The companies studied revealed which specific strategies related to the causation, effectuation and crucible strategies are being used to overcome the effects of the COVID-19 pandemic, which proved to provide better results than if they had remained in the same industry or selling the same products.

We recommend to practitioners and business owners/managers to consider the three strategies studied (causation, effectuation, and crucible) when deciding how to strategically alter the businesses they manage, according to the results achieved by these three companies. This research adds value for practitioners when identifying how the startups studied herein strategically planned their survival under the unprecedented effects of the COVID-19 pandemic crisis.

Therefore, we recommend the following practical actions for managers and practitioners: (1) causation strategy: to adapt the existing products or processes to serve the same current market/target audience; (2) effectuation strategy: to establish strategic partnerships with other companies in order to expand the current scope, and (3) crucible strategy: to adapt existing products/processes or reformulate products/processes to serve a market/target audience totally different from the current one, implying a radical change in the market focus.

Regarding the limitations of this study, this research was carried out using three case studies which were compared to each other, and results may vary if other companies are analyzed. We recommend researchers to conduct future studies and compare their findings in order to reinforce the causation, effectuation and crucible strategies. We suggest that future researchers conduct studies in other industries and other contexts/countries, as well as other technological niches. We also recommend the development of a model/question guide that is validated by a panel of experts (Delphi method) and then validated with a significant sample of companies that survived the pandemic.

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