XX Congreso Internacional de Análisis Organizacional (XX CIAO)
"Fenómenos organizacionales emergentes en Latinoamérica frente a la crisis global: Homenaje a Guillermo Ramírez Martínez, 20 años realizando el CIAO"

Critical Organizational Studies from the View of Black Swan Related to Working Capital Management

Mesa Temática: Estudios críticos de la administración y formas de organización en economías alternativas

Modalidad de la ponencia: Investigación Concluida

Miguel Hernandes Júnior

Murilo Alves Santos

Edson Alves Ferreira

Arthur Antonio Silva Rosa

Kárem Cristina de Sousa Ribeiro[1]

https://orcid.org/

0000-0003-2535-0421

Brasileira

kribeiro@ufu.br

Universidade Federal de Uberlândia

Avenida João Naves de Ávila, 2121

Uberlândia – MG CEP: 38408-100

Cartagena de Indias, Bolívar, Colombia, del 3 al 7 de octubre de 2022

[1] Autor responsable de la comunicación

Critical Organizational Studies from the View of Black Swan Related to Working Capital Management

Abstract

The aim of this study was to understand the impact of working capital management in important regions of Brazil, specifically in companies located in the mesoregion of Triângulo Mineiro e Alto Paranaíba (TMAP) and their areas of influence, in order to achieve positive and survival during the economic crisis triggered by COVID19 ensuring organizational economic sustainability. International studies have shown that by optimizing working capital management, organizations are able to finance themselves and achieve superior performance in other economic crises. The sample consisted of 882 non-financial companies from B3, the method used was panel data regression with fixed effects. The results showed that organizations belonging to the TMAP and its coverage area, in order to survive the economic crisis caused by COVID-19 (Black *Swan)* and generate positive performances, need to reduce the payment term to their suppliers.

Keywords: Organizational Structure ; working capital; economic crisis; Covid-19 .

Critical Organizational Studies from the View of Black Swan Related to Working Capital Management

Introduction

The pandemic caused by the SARS-COV-2 virus, popularly known as Coronavirus, triggered the biggest global health crisis ever experienced by humanity in the last hundred years, with the victimization of thousands of lives. In addition to the biological threat, the pandemic engendered an unprecedented economic crisis that spread across the world, generating unimaginable consequences in terms of economic and social plans (Melo & Cabral, 2020) .

Estimates of the world economy show a shrinkage of around -3.5% of world GDP in 2020. The United States will show a retraction of -3.4%; the Euro zone by -7.2% and in Brazil the reduction reached -4.5%. However, these numbers are preliminary, as it is already known that the projections of economic impacts based on the history of the last crises and pandemics faced by humanity have already proved to be inefficient, as a comparison parameter, with the current scenario (International Monetary Fund [IMF], 2020).

Due to the inexistence of a medicine or vaccine with proven scientific efficiency, the solution found by governments around the world (considered responsible according to rules suggested by the World Health Organization - WHO), was the decree of rigid forties with restrictions on the movement of people and the closing of non-essential businesses, in order to avoid agglomerations and new infections by COVID-19 (Sjödin, Wilder-Smith, Osman, Farooq & Rocklöv, 2020) .

The disastrous impacts of this pandemic and its countermeasures (such as quarantines) reflected directly on the world economy, which had unprecedented impacts on various economic and social sectors. We highlight the area of employability, responsible for the supply of jobs, which reached both developed and developing countries. Countries like the United States of America (USA), for example, which in 2019 had one of the lowest unemployment rates in their history with a percentage of 3.7%, reached the end of 2020 with 8.1%. In Brazil, the situation is even more serious, as the country already had a high unemployment rate in 2019 (11.9%) and reached 13.2% in 2020, not counting the population that lives in informality (International Monetary Fund [IMF], 2020) .

Crisis periods such as the one we are experiencing, due to the Coronavirus pandemic (Kuckertz et al., 2020; Nicola et al., 2020) , as well as the attack on the World Trade Center's twin towers in 2001 (Nafday, 2009) are examples of events with major impacts on society, but unlikely to occur. They are so implausible that regressions, correlations, standard deviations and so little expert opinions suggested event events of this magnitude. These events are metaphorically termed as Black Swan.

Financial crises, regardless of origin, directly affect the availability and costs of financing for companies (financial constraint). However, in developing countries like Brazil, where the financial system is still precarious, this effect becomes even more severe (Naeem & Li, 2019).

In an attempt to avoid a social crisis, mass business failures and unimaginable job losses on a global scale, governments across the planet have developed quick actions to help both the population and business organizations. Many governments responded with fiscal measures that mitigated the losses of income that had occurred, the incentive not to lay

off workers, expansion of social assistance, the guarantee of credits and the injection of capital in order for companies to obtain greater liquidity and be able to survive this unprecedented crisis (International Monetary Fund [IMF], 2020) .

In Brazil, the federal government, despite the suggestions made by both the IMF and the World Bank to make fiscal austerity more flexible, and implement policies of agility in combating the consequences of the economic crisis, adopted a posture characterized by following the recommendations, however, devoid of the rigor that the moment entailed. It established measures such as the three crucial points of: i) guaranteeing the solvency of companies (mainly working capital); ii) guarantee the maintenance of employability and salaries in order to safeguard the economy and iii) assistance to the most vulnerable of the population. However, it proved to be too late, with timid measures, carried out by the dropper, inefficient and without any articulation between them (Mattei, 2020) .

In addition, given the great uncertainty of the future economic scenario, associated with the lack of security and prospects of business sustainability, the possibility of increasing companies' indebtedness has become a high-risk measure. Added to these aspects are the rigorous assessments carried out by credit institutions, which make the conditions necessary for acquiring financing difficult, unfeasible and unattractive (Nogueira, Silva & Carvalho, 2020).

When carrying out analyzes in Brazil in a regionalized way, focusing on the state of Minas Gerais, it is possible to verify a great aggravating factor in situations of economic crises. According to Fernandes e Oliveira (2010) , the state has greater sensitivity and financial restrictions in these periods, with GDP tending to retract more than other Brazilian states. Even having mesoregions that stand out on the national scene, such as Triângulo Mineiro

and Alto Paranaíba, characterized by its industrial production, which in terms of Gross Additional Value (GVA) is higher than that verified in the state and in Brazil (Oliveira, Ribeiro & Martins , 2020) .

In this context of economic and social uncertainties, marked by difficulties in accessing credit, in addition to delayed and disjointed actions by the federal government, companies need alternative forms of financing in order to keep their businesses sustainable. One of the ways already identified in the literature that helps managers to face moments of economic crisis and increase their financial performance refers to the optimization of the management of working capital of companies (Enqvist, Graham & Nikkinen, 2014; Hernandes Júnior, Pereira, Penedo & Forti, 2020) .

In the most recent study published, Hernandes Júnior et al. (2020) showed that the flexibility of credit to customers and increase in inventories in order to avoid shortages of goods, constituted as vitally important measures for companies to maintain sales and increase their positive performances during the 2015-2015 economic crisis. 2016

Thus, considering the entire crisis scenario metaphorically called Black Swan exposed, the great capacity of companies in the Triângulo Mineiro and Alto Paranaíba to generate wealth combined with the peculiar characteristic of suffering greater financial restrictions in crisis situations and capital management as a strategy to generate greater performance in times of crisis, the question is:

What is the impact of working capital management on the survival of companies in Black Swan-type crises in the Triângulo Mineiro and Alto Paranaíba?

Given the above problem, the general objective that guided this research was to understand the impact of working capital management on companies in the mesoregion of Triângulo Mineiro e Alto Paranaíba (TMAP) and their areas of influence in order to achieve positive performances and survival during the economic crisis triggered by COVID19.

In order to reach the established general objective, this research had the following specific objectives: i) Identify the impact of working capital management with performance in TMAP companies; ii) Compare the findings of companies with those of other countries; iii) Check whether working capital management changes in times without the crisis.

This research is important, firstly, by its theoretical contribution, insofar as it is willing to fill the gap in the theories that discuss the management of working capital in TMAP companies and their area of influence during the most severe economic crisis and unforeseen (Black Swan).

In addition, by looking for alternative ways of financing companies and better performance, it is inferred that they will have reduced their losses due to the characteristic of the state of Minas Gerais to deepen in economic crises and in this way they will preserve their earnings and their staff. as well as your income at this difficult and complicated time for the world.

Theoretical Reference

Mesoregion of Triângulo Mineiro and Alto Paranaíba

Triângulo Mineiro and Alto Paranaíba represent for Minas Gerais about 15% of the state's GDP generation, being only behind the Metropolitan Region of Belo Horizonte, initially production was based simply on agriculture and livestock but over the last few years the manufacturing industry developed strongly, changing the dynamics of the region's economy positively and being a reference for the state of Minas, for the Southeast and for the country (Oliveira et al., 2020) .

Its centralized and strategic location between the main productive centers in the country led to the implementation of the main wholesalers Guimarães (2010) , in addition to the creation of the Manaus free zone warehouse in Uberlândia, which assured companies and industries located around the city, a competitive advantage in the acquisition and replacement of goods and stocks (Malaquias & Malaquias, 2014) .

Due to its privileged position, the mesoregion of the Triângulo Mineiro and Alto Paranaíba stands out as one of the main regions in the production of the sugar-energy sector and as a preferred area for new investments, in addition to standing out in the cultivation and processing of grains (soybean, corn) and sugarcane. -sugar production and beef farming (Santos, 2017) .

Black Swan Economic Crisis

Expert projections carried out in October 2019 for world GDP growth pointed to around 3.4% for the year 2020, even with the trade war between the US and China that had its

tension increased in 2019. For Brazil, the growth projections pointed to a 2% increase in GDP, which would represent a resumption of growth after the most serious crisis that the country has gone through in its history in 2015 and 2016 (International Monetary Fund [IMF], 2019) .

However, what experts did not expect and did not foresee was the outbreak caused by the COVID-19 pandemic, which had its initial epicenter in the city of Wuhan in China in late 2019 and spread to the rest of the world. In addition to the disease, the pandemic brought economic consequences that also spread to all countries and had a direct impact on production, exports, inflation and GDP (Ruiz Estrada, 2020) .

Once the crisis resulting from the pandemic is installed, new projections of the world economy show that the economies, instead of the growth indicated in 2019 to 2020, will have historic drops, nothing seen since the great depression of 1930. Forecasts point to an economic retraction of about -5 .2% of the world economy. Brazil, in turn, is forecast to fall by around -8%. However, these numbers are treated as estimates, as it has already been found that analyzes and projections of this crisis based on histories of previous crises and pandemics proved to be completely incorrect and outdated (Deloitte, 2020).

The economic and social crisis that COVID-19 has spread around the world has been given the metaphorical name of Black Swan. Due to its unpredictability and the great magnitude of the economic and social disasters that the COVID-19 pandemic caused and that still reflects in the world, engendering necessary radical changes both political and economic (Nicola et al., 2020).

This crisis, which has caused the collapse of the health system in several countries and overburdened many others around the world, on the one hand, has the only way to reduce infection rates, the outbreaks of rigid quarantines and social distance, with scientifically proven effectiveness. On the other hand, they end up breaking production chains and economic activities. The COVID-19 pandemic has expanded globally with great rapidity and its countermeasures instantly affect the economy (Kuckertz et al., 2020).

Working Capital and Performance in Organizations

Despite the theoretical advances related to long-term financial decisions in the company, in his seminal study of 1973, Smith already indicated the lower production of research focused on short-term or working capital decisions. This finding was verified with the high number of bankruptcies at the time, which could be attributed to the inability to properly manage current assets and liabilities in organizations (Smith, 1973).

Working capital is understood as the process of controlling and planning resources that are invested in current assets (inventories, accounts receivable and cash and cash equivalents) (Braga, 1991). There are three main sources available to the company to finance current assets. The first one comes from the suppliers and stems, to a large extent, from the purchases and negotiation methods themselves. In second place are the short-term financial lines – loans and financing – and; the third option consists of long-term financial lines and the company's equity (Vieira, 2008).

Working capital management contributes to the success of an organization (Barbosa, et al., 2019) and can be defined as a means of achieving its financial balance. Through its indicators, it is possible to assess the performance of companies in the short term (Costa

et al., 2013, Gitman, Johnson & Flaherty, 1980). In addition, it consists of the continuous process of decisions about the preservation of the company's liquidity and, consequently, its profitability (Sousa, Luporini & Souza, 1996).

National articles Batista, Penha, Santiago and Sales (2019) and Zeidan and Shapir (2017) and international Deloof (2003); Lazaridis and Tryfonidis (2006); López, Pazos and Ares (2020); Michel, Lahiani, Aytac and Hoang (2020) and Sensini and Vazquez (2021) demonstrated how the financial performance of organizations can be directly affected by working capital management.

The most used proxy to represent working capital in these studies was the cash conversion cycle (CCC) (Aytac et al., 2020; Deloof, 2003; Lazaridis & Tryfonidis, 2006) , in their findings the authors identified that a reduction in working capital in this case in the CCC, it would increase the financial performance and consequently the profitability of the organizations.

As well as the cash conversion cycle, the components of working capital also received attention and were analyzed for improvement in the performance of organizations. The CCC is formed by the sum of days in accounts receivable (DSO) with days in stock (DIO) subtracting from days of accounts payable (DPO); In order to maintain the highest performance, managers can obtain greater profitability by correctly managing the cash conversion cycle and keeping each component of working capital at its optimal level (Lazaridis & Tryfonidis, 2006).

In the analyzed and highlighted literature, a negative and positive relationship with the performance of organizations was found in the days in accounts receivable (DSO); the

negative shows that the less profitable companies end up offering greater credit to their customers and consumers in order to leverage their sales, in this way a reduction in the period granted to customers to a reasonable level would improve the financial situation of the companies since the value of resources in box would increase (Batista et al., 2019; Deloof, 2003; Lazaridis & Tryfonidis, 2006). The positive relationship with performance, on the other hand, denotes that greater credit made available to customers can be the motivator for purchasing this brand over another brand (Aytac et al., 2020).

Regarding the days of inventory (DIO) the relationship found is negative with the performance in organizations, this result demonstrates that when maintaining high inventories, they incur high maintenance costs that end up outweighing the potential benefits of avoiding possible interruptions in the production process. or loss of sales due to lack of goods. This inverted relationship can also be caused by falling sales and organizations with too much inventory levels (Deloof, 2003; Lazaridis & Tryfonidis, 2006; López et al., 2020).

The days of accounts payable (DPO) according to the literature the relationship with performance can be positive or negative. Positive due to a longer payment term in which the company uses supplier credit as a form of financing, in addition to being able to take advantage of possible discounts for early payments (Aytac et al., 2020). The negative relationship with performance is verified, because suppliers can increase the prices of raw materials as a result of a longer payment term, in this way the costs and advantages of paying later become non-existent, which leads to negotiations with shorter terms and better prices, which can also be interpreted that less profitable organizations, because

they have no choice, end up increasing the payment term in order to take advantage of the credit provided by suppliers (Lazaridis & Tryfonidis, 2006; López et al., 2020).

Working Capital in Economic Crises

An environment of uncertainty due to economic crises, may affect the cash flows projected to enter the companies due to possible delays and uncertainties regarding the receipt of accounts receivable. In addition, due to the scarcity of resources and financing, economic crises have a direct impact on the investment capacity and on the way organizations finance themselves, which changes and impacts the way organizations manage working capital (Enqvist et al., 2014).

The authors Enqvist et al. (2014) and Gonçalves, Gaio and Robles (2018) demonstrate in their studies how organizations can, through the management of working capital (CCC) and its components (DSO, DPO and DIO) be able to finance themselves in order to obtain resources and positive financial performance even in times of financial crisis. The authors' study Enqvist et al. (2014) was carried out with a sample of 1,136 Finnish companies in the period from 1990 to 2008, whereas the study by the authors Gonçalves et al. (2018) was carried out on 400 companies not listed on the UK stock exchange in the period 2006 to 2014.

The working capital proxy, the CCC, in the analyzed studies, obtained a negative relationship with the performance of organizations in economic crisis cycles, which demonstrates that financial managers, in order to obtain greater returns and performances, need in economic crises to optimize working capital by through its reduction to an optimal level (Enqvist et al., 2014; Gonçalves et al., 2018).

The days in accounts receivable (DSO) had a negative relationship with the performance of organizations in financial crises, which demonstrates that managers, in order to have more cash resources and better performance to face financial crises, need to reduce terms and credits. to its customers (Enqvist et al., 2014; Gonçalves et al., 2018).

Accounts Payable Days (DPO) had a negative and positive relationship with the performance of organizations in economic crises; the negative shows that financial managers, in order to achieve better performance in organizations in times of financial crisis, anticipate payments to suppliers in search of greater discounts and consequent savings of resources through advance payments (Enqvist et al., 2014) . The positive relationship according to Gonçalves et al. (2018) is verified, because managers need to use commercial credit (suppliers payment period) as a form of financing in times of financial crisis, in this way organizations extend the payment period to obtain benefits from commercial credit.

Inventory days (DIO) had a negative relationship with the performance of organizations in economic crises, which demonstrates that managers need to reduce inventories in order to achieve higher performances, in order to reduce expenses and costs with maintaining high inventories, in addition to the cost of losses, obsolescence and even theft (Enqvist et al., 2014; Gonçalves et al., 2018).

Study Hypotheses

In this way, in view of the COVID-19 pandemic that caused and still causes economic and social disasters of magnitudes and consequences not previously foreseen, which altered both political and economic dynamics Nicola et al. (2020) and the possibility of

working capital management as positive in generating performance for organizations even in times of financial crisis Enqvist et al. (2014) and Gonçalves et al. (2018) .

It is suggested that companies located in the mesoregion of Triângulo Mineiro and Alto Paranaíba with their areas of influence, adopt working capital policies that are beneficial and positive for the organization's performance, in this way it is suggested that in order to obtain better results during the economic crisis caused by the coronavirus, organizations reduce the cash conversion cycle in order to have greater resources to face the economic and financial uncertainties of this period; there is the first hypothesis of the study (H1).

H1: The cash conversion cycle (CCC) of companies located in the Triângulo Mineiro and Alto Paranaíba with their areas of influence has a negative relationship with performance.

As well as the CCC, the components of working capital are also vitally important to increase the performance of organizations. Regarding the days of accounts receivable (DSO), it is suggested that, as seen in the literature, the existing relationship is negative, showing that in order to have better performance, organizations reduce the deadlines of their customers in order to obtain greater resources in cash and survive during financial crises (Enqvist et al., 2014; Gonçalves et al., 2018).

H2: The days of accounts receivable (DSO) of companies located in the mesoregion of Triângulo Mineiro and Alto Paranaíba with their areas of influence, have a negative relationship with performance.

Organizations in the search for greater performance can also opt for the optimization of inventories, by reducing them to a minimum level of safety, cutting maintenance costs and expenses with losses, in this way it is suggested that the days of inventory (DIO)

have a negative relationship with performance Enqvist et al. (2014) and Gonçalves et al. (2018) of organizations located in the Triângulo Mineiro and Alto Paranaíba with their areas of influence.

H3: Inventory days (DIO) of companies located in the Triângulo Mineiro and Alto Paranaíba with their areas of influence have a negative relationship with performance.

Regarding paydays (DPO) two situations can be implemented in organizations to increase performance in economic crises, the first is verified through the reduction of paydays to suppliers in the search for advance discounts, which shows a relationship negative paydays to performance Enqvist et al. (2014). The second suggests using the period provided by suppliers as a form of investment for organizations in times of crisis, thus suggesting a positive relationship between paydays and performance in times of crisis (Gonçalves et al., 2018).

H4: Paydays (DPO) of companies located in the Triângulo Mineiro and Alto Paranaíba with their areas of influence have a negative relationship with performance.

H5: Paydays (DPO) of companies located in the Triângulo Mineiro and Alto Paranaíba with their areas of influence have a positive relationship with performance.

Methodology

To answer the above research problem, which refers to understanding the management of working capital in TMAP companies in order to achieve positive performances and survival during the economic crisis triggered by COVID19, the study has a sample of 882 non-financial companies that are active and canceled on B3, thus characterizing an

unbalanced panel. Data collection was performed using the economática software, which has the financial and accounting information of the companies registered on the B3 (BM&FBOVESPA + CETIP).

The period of analysis that guided this article was from 2010 to 2020, as in this clipping the differences between the management of working capital in the 2015-2016 crisis and in the 2020 crisis caused by COVID -19 and comparing with normal years. There are 66 cities originally belonging to the TMAP (listed in Table 1 below) however there are only 5 companies registered with B3 in the mesoregion (Algar Telecom and Concession de Rodovias Minas Gerais Goiás in Uberlândia; Cia Mineira de Açúcar e Álcool and Valefert in the city de Uberaba; Eletrosom in Monte Carmelo), in this way, to increase the study sample, we added the area of influence of the mesoregion with a radius of 350 km from the city of Uberlândia, thus obtaining a sample with 23 TMAP companies and their area of influence (Table 2).

Table 1
List of TMAP Cities

TMAP cities			
Dourados Abbey	Conceição das Alagoas	Ituiutaba	pilgrimage
long water	Conquest	Iturama	sacrament
araguari	coromandel	Lagoa Formosa	Santa Juliana
Arapora	fortress cruise	west lime tree	Santa Rosa da Serra
arapua	Delta	morning	Santa Vitória
araxá	goldenquara	mount	San Francisco de Sales
golden waterfall	south star	mount	Saint Gotthard
green field	Border	New Bridge	Serra do Salitre
Flower field	fruity	Mine Ducks	tapira
Campos Altos	Grupiara	Sponsorship	shots
canapolis	guimarania	Pedrinopolis	tupaciguara
capinopolis	gurinhatã	partridges	uberaba
Carmo do Paranaíba	ibiá	Pirajuba	uberlândia

TMAP cities			
Lamb	Indianapolis	flatness	Mines Union
Rich Gravel	ipiaçu	Silver	very true
ECU	Iraí de Minas	little silver	
Commander Gomes	Itapagipe	Paranaíba River	

Note . Produced by the Authors

Table 2
List of Companies by City

Companies	Cities
Lg Informática S/A	Aparecida de Goiania - GO
Minerva	Barretos - SP
olma	Drinking fountain - SP
Ourofino S/A	Cravinhos - SP
Magazine Luiza	France - SP
BR Home	Goiânia - GO
Celg Distribuição S/A	Goiânia - GO
Celgpar	Goiânia - GO
Concebra Concebra Das Rod Centrais do Brasil S/A	Goiânia - GO
Sanitation of Goias S/A	Goiânia - GO
Eletrosom S/A	Mount Carmel - MG
Sao Martinho	Pradópolis - SP
Autovias SA	Ribeirão Preto - SP
Cm Hospitalar S/A	Ribeirão Preto - SP
Viapaulista S/A	Ribeirão Preto - SP
Rni	Sao Jose do Rio Preto - SP
Rodobens S/A	Sao Jose do Rio Preto - SP
Deliveries Concessionária de Rodov S/A	Sertãozinho - SP
Vianorte SA	Sertãozinho - SP
Cia Mineira de Acucar e Alcool	Uberaba - MG
valefert	Uberaba - MG
Algar Telecom S/A	Uberlândia - MG
Concession of Highways Minas Gerais Goias S/A	Uberlândia - MG

Note. Produced by the Authors

Next, the variables used in the study that can influence the performance of organizations will be presented, the ways of calculating to obtain these variables are shown in Table 3.

Performance as a dependent variable is represented by the return on assets (ROA) proxy, calculated by operating income divided by total assets following the authors (Enqvist et al., 2014; Gonçalves et al., 2018).

Regarding the independent variables, the CCC (cash conversion cycle) and its components DPO (payment days), DIO (inventory days) and DSO (accounts receivable days) were used (Enqvist et al., 2014).

The control variables used in the study were, TAM (size) calculated by the logarithm of sales, IL (liquidity index) calculated by dividing current assets by current liabilities, and END (indebtedness) calculated by the sum of short-term debts with long-term debt divided by total assets.

The expected relationship in the control variables is negative for END and TAM and a positive relationship with the IL variable, with respect to the END variable this relationship is verified because more indebted organizations have lower performances and the TAM as calculated by the logarithm of sales, it is suggested that organizations with lower performances try to make their lines of credit to customers more flexible in an attempt to increase sales. The expected positive relationship with the IL variable, on the other hand, refers to the need for organizations in order to achieve better performances, need to improve their liquidity margins (Enqvist et al., 2014).

For the economic crisis proxy, the crisis dummy variable (DC) was created, in which the value 1 will identify the year that had an economic crisis and 0 for years of economic normality. To determine the years that Brazil had an economic crisis, the GDP result of

each year reported by the National Treasury was used as a premise, thus economic crisis were in the years 2015 - 2016 and 2020 in which the GDP result was negative.

Table 3
Study Variables

Variables	Description	Expression	Expected Ratio	authors
ROA	Return on asset	Operating Profit / Total Assets		(Enqvist et al., 2014; Gonçalves et al., 2018)
CCC	Cash Conversion Cycle	Number of days in accounts receivable + number of days in inventory - number of days in accounts payable	Negative	(The)
DSO	Number of Days of Accounts Receivable	(Accounts Receivable X 360) / Sales	Negative	(Enqvist et al., 2014; Gonçalves et al., 2018)
DPO	Number of Days of Accounts Payable	(Accounts Payable X 360) / COGS	Positive or Negative	(Enqvist et al., 2014; Gonçalves et al., 2018)
IPR	Number of Days Inventory	(Stocks X 360) / COGS	Negative	(Enqvist et al., 2014; Gonçalves et al., 2018)
IL	Liquidity Ratio	Current Assets / Current Liabilities	Positive	(Enqvist et al., 2014)
SIZE	Size	Logarithmic of Sales	Negative	(Enqvist et al., 2014)
END	indebtedness	Short-Term Debts + Long-Term Debts / Total Assets	Negative	(Enqvist et al., 2014)
A.D	Economic Crisis Dummy	1 for years with economic crisis and 0 for no economic crisis		

Note. Produced by the Authors: (a) Hypothesis 1 of the study

Econometric Models

The econometric models used in this study were based on the authors Enqvist et al. (2014) , to verify the effect of working capital on TMAP companies and their area of influence in order to achieve positive performance and survival during the economic crisis triggered by COVID19.

As in the base article, the study analyzed the working capital variable (CCC) and its components (DSO, DPI and DPO) separately. In this way, the first model tested working capital through the CCC proxy as an independent variable, the second model tested the numbers of accounts receivable days by adding the DSO variable to the model, the third model in turn tested the number of days of inventory (DPI) and the fourth model analyzed the number of days of accounts payable (DPO).

To jointly analyze the effect of working capital and crisis on TMAP companies and their area of influence, the interaction of variables, working capital and crisis was included in the models.

$$ROA_{it} = \beta_0 + \beta_1 CCC_{it} + \beta_2 IL_{it} + \beta_3 TAM_{it} + \beta_4 END_{it} + \beta_5 DC_{it} + \beta_6 (DC_{it} * CCC_{it}) + \mu_{it} \quad (1)$$

$$ROA_{it} = \beta_0 + \beta_1 DSO_{it} + \beta_2 IL_{it} + \beta_3 TAM_{it} + \beta_4 END_{it} + \beta_5 DC_{it} + \beta_6 (DC_{it} * DSO_{it}) + \mu_{it} \quad (2)$$

$$ROA_{it} = \beta_0 + \beta_1 DPI_{it} + \beta_2 IL_{it} + \beta_3 TAM_{it} + \beta_4 END_{it} + \beta_5 DC_{it} + \beta_6 (DC_{it} * DPI_{it}) + \mu_{it} \quad (3)$$

$$ROA_{it} = \beta_0 + \beta_1 DPO_{it} + \beta_2 IL_{it} + \beta_3 TAM_{it} + \beta_4 END_{it} + \beta_5 DC_{it} + \beta_6 (DC_{it} * DPO_{it}) + \mu_{it} \quad (4)$$

Results Analysis

The treatment of outliers was performed by winsorizing the variables by 2%, which allowed for variability in 98% of the variables. Table 4 below shows the descriptive

statistics, with the number of observations for each variable, mean, standard deviation, minimum and maximum, before and after the treatment of outliers.

Table 4
Descriptive Statistics Variables

Variables	Note	Average	Standard deviation	min.	Max.	Winsor variables	Note	Average	Standard deviation	min.	Max.
ROA	5662	-0.41	16.30	-670.19	866.75	**ROA**	5662	-0.06	0.58	-3.50	0.36
CCC	4806	-259.42	81196.97	-5394093	1099609	**CCC**	4806	171.37	585.09	-895.71	3361.35
DSO	4933	1148.40	29111.92	-18982.22	1864039.00	**DSO**	4933	177.91	451.06	0.00	2858.51
DPO	4815	2020.96	90583.04	-49392.00	6181848.00	**DPO**	4815	114.95	284.44	0.27	1783.08
IPR	4815	615.27	18554.69	-43076.35	1143360.00	**IPR**	4815	88.91	188.18	0.00	1013.08
IL	5620	17.94	212.95	0.00	7766.70	**IL**	5620	3.22	8.05	0.01	50.50
END	5662	4.44	108.47	0.00	3995.60	**END**	5662	0.35	0.39	0.00	2.30
SIZE	4922	13.60	2.41	-1.81	19.98	**SIZE**	4922	13.62	2.26	6.94	17.78
A.D	9691			0	1						

Note. Produced by the Authors - Winsorized variables at 2% except DC (Crisis Dummy): ROA – Return on Assets; CCC – Cash Conversion Cycle; DSO – Number of Days Accounts Receivable; DPO – Number of days Accounts Payable; DPI – Number of Days in Stock; IL – Liquidity Index; END – Indebtedness; DC – Crisis Dummy.

Then, the correlation matrix of the variables was generated, in order to verify that there were no correlation problems between them that could disrupt the econometric model and bias the sample and the results.

Table 5
Variable Correlation Matrix

Variables	ROA	CCC	DSO	DPO	IPR	IL	END	SIZE
ROA	1							
CCC	-0.0809*	1						
DSO	-0.1020*	0.7438*	1					
DPO	-0.1456*	-0.0191	0.4184*	1				
IPR	-0.0975*	0.5576*	0.2688*	0.0980*	1			
IL	-0.2108*	0.1081*	0.0191	-0.0834*	0.1296*	1		
END	0.0746*	-0.0051	0.0611*	0.1670*	-0.0572*	-0.1836*	1	
SIZE	0.2272*	-0.2059*	-0.3294*	-0.3635*	-0.1640*	-0.1581*	-0.1466*	1

Note. Produced by the Authors - Winsorized variables at 2% except DC (Crisis Dummy): ROA – Return on Assets; CCC – Cash Conversion Cycle; DSO – Number of Days Accounts Receivable; DPO – Number of days Accounts Payable; DPI – Number of Days in Stock; IL – Liquidity Index; END – Indebtedness; DC – Crisis Dummy. The asterisks *, **, *** represent statistical significance at the 10%, 5% and 1% levels respectively.

According to the results presented in Table 4 of correlation, a great correlation was found between the variables DSO and CCC with a significance of 10%, however as they will be tested in different regressions the results will not be affected by the high correlation of these variables.

Table 6
Result Regressions Total Sample

	Model 1	Model 2	Model 3	Model 4
CCC	0.0000154			
IL	**0.00266****	**0.00311*****	**0.00283****	**0.00269****
END	**-0.212*****	**-0.206*****	**-0.217*****	**-0.213*****
SIZE	**0.0411*****	**0.0553*****	**0.0430*****	**0.0399*****
DC=1	**-0.0193****	**-0.0314*****	**-0.0276*****	**-0.0173***
DC=1 # CCC	-0.0000141			
DSO		**0.0000692***		
DC=1 # DSO		-0.0000087		
DPO			0.0000137	
DC=1 # DPO			0.0000479	
IPR				0.0000118
DC=1 # DPI				**-0.0000432****
Constant	-0.433***	-0.635***	-0.456***	-0.414***
VIF	1.04	1.08	1.10	1.04
Wald test	0.7998	0.8524	0.8029	0.7918
Woodridge test	0.00	0.00	0.00	0.00
Breusch - Pagan Test	0.00	0.00	0.00	0.00
Chow test	0.00	0.00	0.00	0.00
Hausman test	0.00	0.00	0.00	0.00
Chosen Model	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect
Comments	4799	4921	4799	4799
Adjusted R ²	0.09	0.087	0.091	0.089

Note. Produced by the Authors - Winsorized variables at 2% except DC (Crisis Dummy): ROA – Return on Assets; CCC – Cash Conversion Cycle; DSO – Number of Days Accounts Receivable; DPO – Number of days Accounts Payable; DPI – Number of Days in Stock; IL – Liquidity Index; END – Indebtedness; DC – Crisis Dummy. The asterisks *, **, *** represent statistical significance at the 10%, 5% and 1% levels respectively.

Due to the results of the Wald and Woodrigde tests in which the presence of autocorrelation and absence of heteroscedasticity were detected, the regressions were run using robust standard errors.

With a positive and significant behavior, the DSO variable denotes that, in order to achieve greater performance, organizations need to encourage sales through larger and flexible credit policies that increase consumption; this result of accounts receivable was contrary to that found in developed countries by the authors Enqvist et al. (2014) and Gonçalves et al. (2018) in which they detected a negative relationship with the performance of Finland and the United Kingdom respectively.

The dummy variable of economic crisis brought a negative relationship with the performance of organizations, which demonstrates that times of economic crisis and financial constraints affected the gains of organizations. In the interactions between the crisis and working capital, it has been shown that organizations, in order to obtain better performances in times of crisis, need to reduce the volume of inventories in order to avoid unnecessary expenses with maintenance, losses and misplacement in stock in order to obtain better results. , these results corroborate previous studies (Enqvist et al., 2014; Gonçalves et al., 2018) .

Regarding the control variables, a positive and significant behavior of the IL and TAM variables was found, which shows that companies with better liquidity indices and higher sales are linked to better performances. The END variable, in turn, had a negative and significant relationship with performance, which demonstrates that more indebted organizations tend to have worse results and, consequently, lower performances. The findings in the END and IL variables corroborate previous studies carried out in developed

countries, however the TAM variable measured by the sales log was contrary to previous findings, demonstrating that in the economies of developing countries such as Brazil, the extension of credit and deadlines for customer payments.

Table 7
Result Regressions of TMAP Companies and Area of Influence

	Model 1	Model 2	Model 3	Model 4
CCC	0.0000315			
IL	0.00505	0.0052	0.00621	0.00597
END	-0.123	-0.122	-0.127	-0.127
SIZE	**0.0403*** **	**0.0384*** **	**0.0394*** **	**0.0387*** **
DC=1	0.0553	**0.0561***	**0.0768****	0.0276
DC=1 # CCC	**-0.0000388****			
DSO		0.0000225		
DC=1 # DSO		-0.0000554		
DPO			-0.00000656	
DC=1 # DPO			**-0.000554*** **	
IPR				0.0000365
DC=1 # DPI				**-0.000106***
Constant	**-0.481****	**-0.455*** **	**-0.466*** **	**-0.459*** **
VIF	1.07	1.12	1.11	1.02
Wald test	0.0000	0.0000	0.0000	0.0000
Woodridge test	0.0012	0.0016	0.0007	0.0101
Breusch - Pagan Test	0.0000	0.0000	0.0000	0.0000
Chow test	0.0000	0.0000	0.0000	0.0000
Hausman test	0.0000	0.0000	0.0000	0.0000
Chosen Model	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect
Comments	149	149	149	149
Adjusted R^2	0.251	0.248	0.265	0.255

Note. Produced by the Authors - Winsorized variables at 2% except DC (Crisis Dummy): ROA – Return on Assets; CCC – Cash Conversion Cycle; DSO – Number of Days Accounts Receivable; DPO – Number of days Accounts Payable; DPI – Number of Days in Stock; IL – Liquidity Index; END – Indebtedness; DC – Crisis Dummy. The asterisks *, **, *** represent statistical significance at the 10%, 5% and 1% levels respectively.

As the autocorrelation and heteroscedasticity tests were positive, the regressions were estimated by robust standard errors. When analyzing only the companies belonging to the mesoregion and its area of influence, there is a complete change in the results. In table 6, none of the working capital variables alone obtained statistical significance (CCC,

DSO, DPO and DPI), however, when interacting with the crisis, it showed that companies in the mesoregion and its area of influence to generate positive results, reduced the cash conversion cycle in order to save resources and preserve cash to better weather the financial crisis.

This reduction in CCC is achieved by reducing the number of days for payment and the number of days of inventory, which results in these companies, in order to obtain greater gains in the crisis, make payments to their suppliers in advance. the search for discounts and reduce their expenses with maintenance and control of smaller inventories; these results of the interactions of the economic crisis with the CCC and the DPI corroborate previous studies (Enqvist et al., 2014; Gonçalves et al., 2018).

The financial crisis dummy variable in this sample of companies also showed a different behavior, as it brings a positive relationship between the crisis variable and the performance of companies. Which demonstrates that these organizations obtained better results during the economic crisis, this result was contrary to that found in previous studies and in the total sample of this study.

Regarding the control variables, the only one that obtained significance was the TAM variable, which demonstrates that to achieve greater performances, greater sales and customer incentives for consumption are necessary, this result, as in the total sample of the study, was contrary to the previous studies from developed countries.

Robustness Test

To test the robustness of the results, specifically those demonstrated by the economic crisis variable and its interactions, the years 2015 and 2016 were removed as an economic crisis and only the year 2020 was left as the economic crisis caused by COVID-19. This test aims to elucidate and demonstrate that the results acquired are solely the effect of the pandemic, which will avoid possible influence on the results.

In this way, tables 7 and 8 demonstrate models 1, 2, 3 and 4 with the crisis dummy considered only for the year 2020, an exclusive effect on the cash conversion cycle and its components due to the COVID-19 crisis.

Table 8
Result Regressions Total Sample

	Model 1	Model 2	Model 3	Model 4
CCC	0.00000983			
IL	**0.00270****	**0.00313*****	**0.00288****	**0.00269****
END	**-0.213*****	**-0.208*****	**-0.216*****	**-0.213*****
SIZE	**0.0416*****	**0.0553*****	**0.0433*****	**0.0401*****
DC=1	**-0.0238****	**-0.0352*****	**-0.0238****	**-0.0211****
DC=1 # CCC	0.0000124			
DSO		**0.0000650***		
DC=1 # DSO		0.0000141		
DPO			0.0000257	
DC=1 # DPO			0.000012	
IPR				-0.00000166
DC=1 # DPI				0.00000000538
Constant	**-0.438*****	**-0.634*****	**-0.461*****	**-0.415*****
VIF	1.04	1.08	1.10	1.04
Wald test	0.7998	0.8524	0.8029	0.7918
Woodridge test	0.00	0.00	0.00	0.00
Breusch - Pagan Test	0.00	0.00	0.00	0.00
Chow Test	0.00	0.00	0.00	0.00
Hausman test	0.00	0.00	0.00	0.00
Chosen Model	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect

Comments	4799	4921	4799	4799
Adjusted R2	0.089	0.087	0.090	0.089

Note. Produced by the Authors - Winsorized variables at 2% except DC (Crisis Dummy): ROA – Return on Assets; CCC – Cash Conversion Cycle; DSO – Number of Days Accounts Receivable; DPO – Number of days Accounts Payable; DPI – Number of Days in Stock; IL – Liquidity Index; END – Indebtedness; DC – Crisis Dummy. The asterisks *, **, *** represent statistical significance at the 10%, 5% and 1% levels respectively.

The DSO variable, as in table 5, showed a positive and significant behavior, which confirms that, in general, companies need to encourage an increase in sales through the flexibilization of credit to consumers in order to achieve better results. However, the crisis dummy variable interacted with the stock did not bring static significance as demonstrated in the previous results, which denotes that the previously elucidated statistical significance refers to the economic crisis during the period from 2015 to 2016. The rest of the variables do not showed changes in terms of significance.

Table 9
Result Regressions of TMAP Companies and Area of Influence

	Model 1	**Model 2**	**Model 3**	**Model 4**
CCC	0.0000146			
IL	0.00545	0.00581	0.00591	0.0057
END	-0.124	-0.122	-0.134	-0.126
SIZE	**0.0406*** **	**0.0395*** **	**0.0391*** **	**0.0392*** **
DC=0	0	0	0	0
DC=1	0.0484	0.045	**0.106*** **	0.0568
DC=1 # CCC	0.00000506			
DSO		-0.00000932		
DC=1 # DSO		0.0000491		
DPO			0.0000125	
DC=1 # DPO			**-0.00117*** **	
IPR				0.0000242
DC=0 # DPI				0
DC=1 # DPI				-0.0000531
Constant	**-0.484****	**-0.469*** **	**-0.461*** **	**-0.465*** **
VIF	1.07	1.12	1.10	1.02
Wald test	0.00000	0.00000	0.00000	0.00000
Woodridge test	0.0012	0.0016	0.0007	0.0101
Breusch - Pagan Test	0.00000	0.00000	0.00000	0.00000

Chow Test	0.00000	0.00000	0.00000	0.00000
Hausman test	0.00000	0.00000	0.00000	0.00000
Chosen Model	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect
Comments	149	149	149	149
Adjusted R2	0.244	0.245	0.277	0.245

Note. Produced by the Authors - Winsorized variables at 2% except DC (Crisis Dummy): ROA – Return on Assets; CCC – Cash Conversion Cycle; DSO – Number of Days Accounts Receivable; DPO – Number of days Accounts Payable; DPI – Number of Days in Stock; IL – Liquidity Index; END – Indebtedness; DC – Crisis Dummy. The asterisks *, **, *** represent statistical significance at the 10%, 5% and 1% levels respectively.

When comparing the results obtained in tables 6 and 8, it appears that when modifying the crisis dummy variable, the interactions DC=1 # CCC and DC=1 # DPI lost statistical significance with performance. The interaction between the COVID-19 crisis and the paydays component (DPO) remained negative and significant, which demonstrates that, in order to obtain better performances during the financial crisis triggered by COVID-19, the managers of companies located in the mesoregion of the Triângulo Mineiro and Alto Paranaíba (TMAP) and its areas of influence need to advance their payments to suppliers in order to obtain discounts with the negotiation.

This result confirms hypothesis H4 regarding the negative relationship of the DPO variable with the performance of organizations in situations of extreme economic stress (COVID-19 pandemic), which corroborates the findings of the authors (Enqvist et al., 2014) . In addition, with the confirmation of hypothesis H4, it is possible to refute hypothesis H5, which refers to the positive relationship of the DPO variable with crisis performance.

Regarding the other hypotheses (H1, H2 and H3), the results achieved by the robustness test cannot confirm or refute the inferences and suggestions of behaviors with the performance of the other variables that make up the working capital and the cash conversion cycle itself .

Conclusions

This study aimed to understand the impact of working capital management on companies in the mesoregion of Triângulo Mineiro and Alto Paranaíba (TMAP) and their areas of influence in order to achieve positive performance and survival during the economic crisis triggered by COVID19.

For this, the study sample had 882 active and canceled companies that were or are registered in B3 through the Economática database, the method used for data analysis was panel data regressions by fixed effects.

Data analysis was perfomed in two stages. In the first stage, regressions were performed with all the companies in the sample, then to be able to separate the specific effects of the variables in the organizations of the mesoregion and its area of influence, regressions were generated only for this group companies. After these preliminary tests, a robustness test was performed considering the economic crisis variable as only the COVID-19 pandemic.

The results showed that organizations in the mesoregion and its areas of influence performed better both in the period of the 2015-2016 crisis and in the economic crisis caused by COVID-19 in 2020 when compared with other organizations. This fact was evidenced by the result of the crisis dummy variable having a positive and significant relationship with performance, both in the preliminary results and in the robustness test.

The number of payment days was what played a fundamental role in the performance in the economic crises of companies in the mesoregion and its areas of influence, as it was shown that in order to achieve better results, the management of these companies

needed to reduce the payment period to suppliers in order to get discounts and thus increase earnings.

This research, as well as previous studies by the authors Enqvist et al. (2014) and Gonçalves et al. (2018) , demonstrated that working capital management performed correctly can provide a positive impact on performance for organizations in times of economic crisis, especially in the COVID-19 crisis.

It is suggested for future studies that these regional differences in working capital management be addressed, explored and deepened in order to increase the possibilities of management strategies for companies located in different regions of the country.

References

Barbosa, J. P. G., Arantes, P. P. M., Sousa, V. H. T. F. de., Carvalho, L. F., & Ribeiro, K. C. de S. (2019). O Reflexo da Crise Política e Econômica Brasileira na Gestão do Capital de Giro das Empresas Listadas no IBOVESPA entre 2014 a 2016. Revista Mineira de Contabilidade, 20(1), 50-62.

Aytac, B., Hoang, T. H. Van, Lahiani, A., & Michel, L. (2020). Working capital management and profitability of wine firms in France: an empirical analysis. International Journal of Entrepreneurship and Small Business, 41(3), 368. https://doi.org/10.1504/ijesb.2020.10032621

Batista, A. T. N., Penha, R. S. da, Santiago, W. D. P., & Sales, H. L. (2019). Impacto da Gestão do Capital de Giro na Rentabilidade das Empresas do Setor de Construção

Civil. Revista de Administração IMED, 9(1), 114. https://doi.org/10.18256/2237-7956.2019.v9i1.2993

Deloitte. (2020). Covid-19 e os impactos nos setores econômicos: Um olhar atento às projeções. Retrieved from https://www2.deloitte.com/content/dam/Deloitte/br/Documents/about-deloitte/Deloitte-Covid-Impacto-Setores-junho.pdf

Deloof, M. (2003). Does working capital management affect profitability of Belgian firms? Journal of Business Finance and Accounting, 30(3–4), 573–587. https://doi.org/10.1111/1468-5957.00008

Enqvist, J., Graham, M., & Nikkinen, J. (2014). The impact of working capital management on firm profitability in different business cycles: Evidence from Finland. Research in International Business and Finance, 32, 36–49. https://doi.org/10.1016/j.ribaf.2014.03.005

Fernandes, C. L. de L., & Oliveira, F. A. de. (2010). Características e Evolução Recente da Economia em Minas Gerais. In F. A. de Oliveira & W. B. Siqueira (Eds.), As Muitas Minas: Ensaios Sobre a Economia Mineira (pp. 3–32). Belo Horizonte: CORECON-MG.

FMI. (2019). World Economic Forum. World Economic Outlook - Global Manufacturing Downturn, Rising Trade Barriers. Retrieved from https://www.imf.org/en/Publications/WEO/Issues/2019/10/01/world-economic-outlook-october-2019

FMI. (2020). World Economic Outlook A Long and Difficult Ascent. Retrieved from https://www.imf.org/en/Publications/WEO

Gonçalves, T. C., Gaio, C., & Robles, F. (2018). The impact of Working Capital Management on firm profitability in different economic cycles : Evidence from the United Kingdom. Economics and Business Letters, 7(2), 70–75.

Guimarães, E. N. (2010). Formação e desenvolvimento econômico do Triângulo Mineiro: integração nacional e consolidação regional. Uberlândia: EDUFU. https://doi.org/10.1192/bjp.112.483.211-a

Hernandes Júnior, M., Pereira, V. S., Penedo, A. S. T., & Forti, C. A. B. (2020). Capital de Giro e Internacionalização no Lucro das Organizações Brasileiras em épocas de crise. Revista de Negócios, 25(1), 68–90. https://doi.org/10.7867/1980-4431.2020v25n1p68-90

Kuckertz, A., Brändle, L., Gaudig, A., Hinderer, S., Reyes, C. A. M., Prochotta, A., … Berger, E. S. C. (2020). Startups in times of crisis – A rapid response to the COVID-19 pandemic. Journal of Business Venturing Insights, 13(April), 1–13. https://doi.org/10.1016/j.jbvi.2020.e00169

Lazaridis, I., & Tryfonidis, D. (2006). “ The relationship between working capital management and profitability of listed companies in the Athens Stock Exchange .” Journal of Financial Management and Analysis, 30(76), 1–12.

López, S. F., Pazos, D. R., & Ares, L. R. (2020). Effects of working capital management on firms ’ profitability : evidence from cheese - producing companies. Agribusiness, 36(4), 770–791. https://doi.org/10.1002/agr.21666

Malaquias, R. F., & Malaquias, F. F. de O. (2014). GESTÃO DE CUSTOS E GESTÃO LOGÍSTICA: O PAPEL DOS SISTEMAS DE INFORMAÇÃO. Revista de Gestão, Finanças e Contabilidade, 4(2), 93–111.

Mattei, L. (2020). Impactos da crise da Covid-19 no mercado de trabalho brasileiro. Revista de Economia Política, 40(4), 647–668. https://doi.org/10.1590/0101-31572020-3200

Melo, C., & Cabral, S. (2020). A Grande Crise e as Crises Brasileiras : O Efeito Catalisador da COVID-19. Revista Eletrônica Gestão & Soc Iedade, 14(39), 3681–3688. https://doi.org/10.21171/ges.v14i39.3259

Naeem, K., & Li, M. C. (2019). Corporate Investment Efficiency: The Role of Financial Development in Firms with Financing Constraints and Agency Issues in OECD Non- Financial Firms. International Review of Financial Analysis, 62, 53–68. https://doi.org/10.1016/j.irfa.2019.01.003

Nafday, A. M. (2009). Strategies for Managing the Consequences of Black Swan Events. Leadership and Management in Engineering, 9(4), 191–197. https://doi.org/10.1061/(ASCE)LM.1943-5630.0000036

Nicola, M., Alsafi, Z., Sohrabi, C., Kerwan, A., Al-jabir, A., Iosifidis, C., … Agha, R. (2020). The socio-economic implications of the coronavirus pandemic (COVID-19): A review. International Journal of Surgery, 78(January), 185–193.

Nogueira, M. O., Silva, S. P., & Carvalho, S. S. De. (2020). Da virose biológica à virose econômica : uma vacina para microempresas no Brasil. Revista de Administração Pública, 54(4), 1010–1021. https://doi.org/10.1590/0034-761220200312

Oliveira, A. S., Ribeiro, C. G., & Martins, H. (2020). A Evolução Recente da Indústria de Transformação no Triângulo Mineiro e Alto Paranaíba. Economia Ensaios, 35(1).

Ruiz Estrada, M. A. (2020). Economic Waves: The Effect of the Wuhan COVID-19 On the World Economy (2019-2020). Available at SSRN 3545758, 1–6.

Santos, H. F. D. (2017). Competitividade regional do setor sucroenergético na mesorregião Triângulo Mineiro/Alto Paranaíba: Agricultura científica globalizada e implicações socioambientais no município de Uberaba-MG.

Sensini, L., & Vazquez, M. (2021). Effects of Working Capital Management on SME Profitability: Evidence from an Emerging Economy. International Journal of Business and Management, 16(4), 85. https://doi.org/10.5539/ijbm.v16n4p85

Sjödin, H., Wilder-Smith, A., Osman, S., Farooq, Z., & Rocklöv, J. (2020). Only strict quarantine measures can curb the coronavirus disease (COVID-19) outbreak in Italy, 2020. Eurosurveillance, 25(13), 1–6. https://doi.org/10.2807/1560-7917.ES.2020.25.13.2000280

Zeidan, R., & Shapir, O. M. (2017). Cash conversion cycle and value-enhancing operations: Theory and evidence for a free lunch. Journal of Corporate Finance, 45(2016), 203–219. https://doi.org/10.1016/j.jcorpfin.2017.04.014

Smith, K. V. (1973). State of the art of working capital management. Financial management, 50-55.

Sousa, A. F., Luporini, C. E. M., & Souza, M. S. (1996). Gestão do capital de giro. Caderno de Pesquisas em Administração, São Paulo, 1(3).

Stone, B. K. & Wood, R. A. (1977). Daily Cash Forecasting: A Simple Method for Implementing the Distribution Approach. Financial Management, 6(3), 40-50.

Vieira, M. V. (2008). Administração Estratégica do Capital de Giro. 2 ed. São Paulo: Atlas.