

Knowledge generation and market orientation during global crises in B2B supply chains

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KNOWLEDGE GENERATION AND MARKET ORIENTATION DURING GLOBAL CRISES IN B2B SUPPLY CHAINS

Introduction

Supply chain (SC) firms depend on coordination and information flows throughout the chain to assess their fit with and within their environments (Kanda and Deshmukh, 2008; Zimmermann et al., 2019). However, the efficiency of this system depends on the quality of the inter-organizational relationships (IOR) within the SC (Cheng, 2011; Neutzling, 2018). Whereas in normal situations the information flow and knowledge generation ranges from suboptimal to optimal (Fang et al., 2013; Bhosale, 2018; Singh and Stout, 2018; Nazam et al., 2020), during crises, disruptions in these processes may lessen the ability SC firms have to communicate and survive (Vargo and Seville, 2011). During crises, organizations become rigid - i.e., their reactions to threats are impaired (Staw et al. 1981; Nelson, 2011). This may lead both the SC as a whole as well as individual firms to enter an organizational decline phase (Swanson et al., 2017a; Swanson et al., 2017b) and eventually go bankrupt.

While the extant literature defines what kind of reactions will happen in a given organization facing a threat, it is not so clear about what happens to an SC in the same circumstances (Ponis and Ntalla, 2016). The supply chain management literature is divided in two main axes - first, to treat the whole SC as one in terms of coordination (Zhou, 2017; Hugos, 2018); and second, to treat each link in the chain as a single factor (Prajogo and Olhager, 2012; Prajogo et al. 2017). These two standpoints affect how knowledge management and information flows will be handled. If, during crises, SC firms act as one, the existing literature posits that there will be an intense inwards search for solutions (Marchi et al. 2016); otherwise, if they behave as a collection of independent units, crisis perception will be mitigated by the quality in the knowledge generation and sharing (Chen et al. 2015). Thus, it is unclear whether relationships in a SC during crises will affect knowledge generation, dissemination and reaction by strengthening or diminishing the crisis perception of SC links.

To address this issue, we gathered data from 279 B2B service companies in Brazil, actively engaged in their SCs. Brazil has been facing a severe financial crisis that throws most markets off balance, leading to disruptions in the knowledge generation flows in SCs, which has worsened beyond the financial aspects due the current Covid-19 pandemic. We have employed partial-least square structural equation modelling (PLS-SEM) to understand these interactions. This paper contributes to the literature by discussing relationships, knowledge generation and management as well as market orientation in critical times for supply chains.

The results obtained show that even during a crisis, there is constant flow of information and knowledge generation and dissemination from the SC towards the individual organization in the SC. It is also evident that the past relationships between links in the SC reinforce this flow. On the other hand, we expected that the increased flow of information would mitigate the crisis perception in the SC, but this hypothesis was rejected. This points to rigidity being concentrated more at an individual level with crisis still affecting firms' market orientation. Such results offer a counterpoint to studies such as Jüttner and Maklan (2011) and complement studies such as Jüttner et al. (2002) and Blome and Schoenherr (2011).

Literature review and hypotheses development

Interorganizational relationships are desired for their theoretical benefits, but in practical terms, they are difficult to implement. Even when they are implemented, the results may fall short of the desired goal (Fang et al., 2013). According to the literature, gaps exist primarily in the factors

that may intervene in the creation of knowledge and its dissemination in IORs (Agostini and Nosella, 2017), that may cause such inefficiencies. Various factors can be considered as impediments to full efficiency in knowledge creation, sharing and management in IORs such as ambiguity and tacitness (Simonin, 2004; Luo et al. 2017).

Knowledge is a powerful tool for organizational performance and survival (Cegarra-Navarro et al. 2015). From a resource-based view standpoint, knowledge generation and management are paramount for organizations to maintain a good fit with and within their environments (Li and Wu, 2014; Bach et al. 2016) and mitigate negative aspects such as ambiguity and tacitness. That is even more important in the context of supply chains (SCs), where coordination between entities in the SC exhibit a large advantage - i.e., gathering, processing, disseminating information and coordinating responses (Stadtler, 2015; Eltantawy, 2015). However, its increasing complexities may make this process of knowledge generation and management more difficult to attain (Blome et al. 2014).

Organizations consistently struggle to define their strategic problem formulation (SPF) (Baer et al. 2013), but this may be mitigated by a larger influx of information (Jagoda et al. 2016). As such, the more data and knowledge generated in a SC, the more reliable decisions will be made for each and every link in the SC. Internally, each SC link must do its own interpretation about the incremental or radical changes in the environment (Gligor et al. 2015). More importantly, they have to define and deploy mechanisms for internal dissemination of the new-found knowledge, what the reactions will be, and how it will be coordinated inside.

These internal aspects are concentrated on their market orientation, the ability an organization exhibits of generating and disseminating information internally, determine the appropriate response action and necessary internal coordination mechanisms (MacCarthy, 2016). For that, we have two main sides of a balance - on one hand the generation of knowledge from the SC partners and their interpretation of environmental changes; on the other the internal appraisal of this knowledge and reaction. Thus, it is posited that (H1) **knowledge from the supply chain positively affects market orientation.**

However, this influence may be understood as raw and shallow – since SC links have to intrinsically operate at least in some level of coordination, there will be knowledge transfer no matter what. On the other hand, better building relationships can foster not only integration as first intended but take integration to another level. This link, especially when third parties are brought to mediate such relationships, indirectly increase resilience and knowledge transfer both from a contractual standpoint but also because the increased effort in coordinating forces SC members to share information and integrate mutually created knowledge in their processes and culture (Scholten & Schilder, 2015), especially when past knowledge, tacit knowledge and their knowledge channels are well managed.

Thus, collaborations within the SC also lead to technical, technological and knowledge spillovers that reinforces relationship among the parties and also lead to reciprocal dependence (Isaksson et al., 2016). In addition, open boundaries within the SC is also believed to improve innovation as well as ambidexterity – which is even more necessary in critical contexts (Ardito et al., 2018). All these arguments lead to increased efficiency, coordinated action and financial performance for the whole SC (Gu et al., 2017). However, the most important aspect of this collaboration efforts is the agility in reacting to major problems (Kim & Chai, 2017), which, in turn, mitigates SC vulnerability (Kurniawan et al., 2017). As such, it is plausible to believe (H2) **knowledge from the supply chain positively affects the relationship with suppliers.**

Market orientation (MO) is basically the joining of information generation, dissemination, internal coordination and consequent response action in organizations (Arora et al., 2016). Thus, it directly depends on the knowledge generation – both from within as well as from the supply chain (Grigoriou and Rothaermel, 2017). Crisis theories propose that during crises, organizations have a tendency to look inwards in search of underlying reasons for poor performance (Staw et al., 1981) and leave external sensemaking to a severely diminished role (Martins et al., 2020). It is also posited that business relationships enhance innovation, commercialization capabilities and overall SC performance (Lim et al., 2017). While this is already likely to happen because of the coordination efforts in a SC, when there is a closer relationship between the links in a SC, especially in coordinating their MO effort, this results in higher financial returns (Gligor et al., 2019).

The more efforts in place towards relational aspects such as governance, information sharing and product/service co-development, the more likely trust in the overall SC and performance (Mirkovski et al., 2016; Kim and Chai, 2017; Pradabwong et al., 2017; Al-Henzab et al., 2018). Thus, (H3) **closer relationship with the supply chain positively affects market orientation.**

SC contract-enforced collaborations account for the most of knowledge flows within a SC. However, going beyond the mere contractual aspects improve overall SC knowledge management. This is especially clear in the enhanced visibility, velocity and flexibility in SCs (Scholten and Schilder, 2015), which may be crucial in mitigating inwards crisis perception (Kurniawan et al., 2017).

If, during crises, SC firms act as one, the existing literature posits that there will be an intense inwards search for solutions (Marchi et al. 2016); otherwise, if they behave as a collection of independent units, crisis perception will be mitigated by the quality in the knowledge generation and sharing (Chen et al. 2015). Thus, it is unclear if the relationships in a SC during crises will or will not affect knowledge generation, dissemination and reaction by strengthening or diminishing the crisis perception of SC links. Knowledge generated mutually and continuously may balance low levels of collaboration during crises (Scholten and Schilder, 2015) and be a key function in diminishing uncertainty and risk in SCs (Cantor et al., 2014). Thus, knowledge sharing – especially during crises – enhance readiness and foster responses for the whole SC (Chowdhury et al., 2016). As such, we propose that (H4) **knowledge from the supply chain negatively affects crisis perception.**

Dealing with increasingly complex problems, threats and especially crises may throw organizations off balance (Ackermans and Van Wassenhove, 2017; Bode and Macdonald, 2017). Managing conflicts is not always a straightforward task and positive outcomes are not always consistent, if can ever be predicted (Tjosvold et al. 2014). In the case of incrementally emerging problems, decision-making is affected but it is not disrupted (Snyder and Diesing, 2015), yet when crises are in play it becomes much more difficult to deal. This is due to the properties of a crisis - it is a novel situation, mainly unstructured, atypical (or even abnormal) and that requires untried (non-programmed) decision strategies (Reilly, 1993).

Other features of crises directly affect how an organization will gather information, coordinate and react, such as the high level of ambiguity, low probability and unexpectedness of its happening, and very limited time for decision-makers to respond (Brockner & James, 2008). In larger SCs, other features such as publicness negative-outcome probability will affect decision, since they may upset the whole SC reliability towards the market (James et al., 2011). The overall consequences of Threat Rigidity - overload in communication channels, restraining and reduction

in the information generation, increased centralization and formalization of authority directly impact an organization's MOR abilities. Thus, we posit that (H5) **crisis perception negatively affects market orientation**.

Method

In order to test the hypothesized concepts, we have chosen partial-least squares structural equation modelling (PLS-SEM). PLS-SEM is particularly used to explore and test conceptual as well as theoretical models, in special when multiple factors happen simultaneously (Gefen et al., 2000; Hair et al., 2016). PLS-SEM methods has been successfully used for its prediction making, along with testing and building theory and has found ample use in management and operational research (Sosik et al., 2012). For data collection, we gathered data from foreign B2B companies in Brazil. Brazil is still dependent on the export of commodities, which makes local economy more prone to suffer from its volatility in the international markets (Cavalcanti et al., 2015; Martins et al., 2019a). This, in turn, makes market fluctuations and crises an important topic and driver for strategic changes. The institutional environment for subsidiary receiving is more developed around the Sao Paulo metropolitan area (Falaster et al., 2018), where we focused on our data collection phase of the study.

To test the posited effects and to assess these concepts on real-world situations, a few scales were selected. First, we have chosen the Threat Rigidity scale (Daly et al., 2011; Martins et al., 2020), which measures how an organization becomes rigid and has impaired responses following a crisis (CRS), to estimate the crisis perception and impact in the subsidiaries. We have also a dimension of Rosenzweig and Roth's scale (2007) to gauge business knowledge channels (KNC), Kotabe et al.'s (2003) Buyer's Knowledge of Supplier's Past Performance (PKN) dimension from their vertical partnerships scale and Liu et al. (2008) for their tacit knowledge dimension (TKN). Relationships between the B2B companies and their suppliers was measured from the long-time relationship dimension in Chen and Paulraj's supply chain scale (2004). For Market Orientation, we employed the Foreign Business Market Orientation scale (MOR) since its specialized nature accommodates the intricacies of global SC needs (Vasconcellos et al., 2019).

All of these are operationalized as 5-point Likert scales. Thus, the proposed model is as follows (see Figure 1):

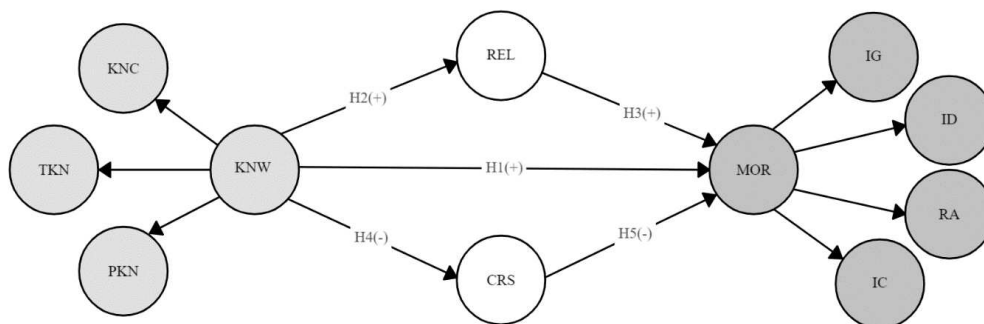


Figure 1 - Original model and hypotheses

Survey administration

Our sample set was taken organizations part of global B2B supply chains located in the Sao Paulo area (Brazil), from a database of approximately 410 companies. Special attention was paid to ensure internal variation in the sample, in terms of size and sectors. Our data collection

focused on these firms' foreign trade specialists, whose knowledge about their sector, changes and relationships was paramount to gather meaningful data.

The first draft of the survey questionnaire was applied to a few specialist scholars and professionals, and a refined version was also tested before finally submitting to the respondents. All the respondents were sent an email, assuring them of the confidentiality in the questionnaire collecting and data handling, offering them the possibility of skipping confidential information in the company description part of the questionnaire. The potential respondents were first contacted by phone or personally and later an email was sent inviting them formally to participate in the study. Follow-up emails were sent after one and two weeks to remind respondents to fill the questionnaires.

Results

We have divided the results in two main parts - first, a description of the sample and, second, the data about the model. Initially, a survey was developed, and tested by a small group of academics and practitioners. A refined version was pre-tested and after approval, the questionnaire was sent to 410 companies part of global B2B supply chains. The response rate was of 68.1% (279 fully answered questionnaires). As for the respondents, their average age is 35.5 years old (s.d. = 7.2) and the sample was evenly split according to genders (49.0% males). Their exports also varied in proportion, with an average of 43.5% of all produce (s.d.= 24.2%). Most of the sample comprised multinational companies, with approximately 42.1 from European origin and 35.4% from North American origin.

Their activities also ranged in form, with 140 of them focusing on manufacturing and 61 in trade (both wholesale and retail). The other sectors (service mainly) account for the remainder of the companies. This is coherent with the role Sao Paulo plays in the Brazilian SC centrality, with local companies focusing on providing services to most of the country. After collecting data and analyzing, the following steps are presented – sampling characteristics, measurement model results, validity checks, robustness tests and hypotheses results.

Minimum sample size was calculated in the software G*Power (effect size $f^2 = 0.15$; α error probability = 0.05; $1-\beta$ error probability = 0.95; number of predictors (arrows) = 3). For a statistical power of 95% (effect), minimum sample size was defined as 65 responses. A less conservative calculation was obtained according to Cohen (1992), Ringle, Silva and Bido (2014) and Hair et al. (2016) for a PLS model with the same parameters (arrows = 3; significance level 5%; minimum $R^2 = 0.25$) and estimated in 59 responses. Comparatively, CB-SEM ratio of 5 to each parameter (Tanaka, 1987; Westland, 2010) is also met – 40 parameters in the final model (see figure 2) times 5 equals 200. A total of 210 respondents provided full, usable responses (approximately 46.7%), and, thus, the sample is deemed adequate for subsequent analyses.

To address any distortions issues in the sample (since self-reported data was employed along with only one collection source for this study) there are potential effects from common method bias (Podsakoff et al., 2012). To mitigate any issues, Harman's single factor test was employed, to which the sample is adequate (36.07% of variance) (Podsakoff et al., 2003). In regards to plausible nonresponse bias two different steps were employed. First, there was no significant differences ($p < 0.05$) between the early respondent group (1 week, 64%) and late respondent group (2 and 3 weeks, 36%), which is the most common method employed to address this kind of issue in survey data (Radhakrishna & Doamekpor, 2008; Dubey & Gunasekaran, 2015; Gorane & Kant, 2017). Second, we also tested for significant differences ($p < 0.05$) between a

group of 15 nonresponding companies on number of employees, years in operation and percentage of exports, but no significant results emerged.

Endogeneity may arise when testing causal explanations through statistical mechanisms (Shmueli, 2010). This issue is not usually associated with SEM methods (which commonly test hypotheses grounded in the literature) (Hult et al., 2018). Whereas endogeneity is commonly linked to lack of control or confounding variables, PLS-SEM has no standardized mechanism to test it, yet multigroup analysis (run in pairs) is commonly used to ensure no groups or variables distort the hypotheses (Martins et al., 2020). To perform multigroup analyses, data was gathered on SIC codes (and grouped by manufacturing, trade and service), number of employees and percentage of exports. In none of the analysis the p-values were in insignificant, and no meaningful effect on these was found. Finally, we have also chosen some instrumental variables (IVs) to test endogeneity – years in operation (AGE), yearly net sales billed (NSB) and number of subsidiaries abroad (SUB). The p-values obtained were 0.55 for AGE, 0.62 for NSB and 0.49 for SUB, which reflects that these are not endogenous with the dependent market orientation (Wooldridge, 2015).

Structural equation model

The PLS-SEM approach is commonly divided in two main steps - first, defining an *outer* model (constructs and their measurements) and, then, an *inner* model (relationships between constructs, i.e., the hypotheses). The first step aims at verifying the reliability of the measurement items as well as convergence of these items in each construct, building, then a level of construct reliability.

As for the inner model, the data obtained yields significant information about the reliability of the constructs as well as the convergence of items to each construct (see Table 1). The reliability is verified by the Composite Reliability (CR) as well as the Average Variance Extracted (AVE). These indicators provide good measurement of the reliability as well as stability of the model, and that the constructs are self-contained.

	CR	AVE
CRS	0.601	0.522
KNW	0.814	0.507
MOR	0.839	0.552
REL	0.815	0.597

Table 1 - Assessment of the measurement model (indicators CR and AVE)

Further, we have assessed that the items converge correctly to their own constructs. To do thus, we have used the Fornell-Larcker criterion. This indicator provides discriminant validity for each construct (see Table 2).

	CRS	KNW	MOR	REL
CRS	0.722			
KNW	0.177	0.554		
MOR	-0.185	0.297	0.502	
REL	-0.117	0.223	0.391	0.772

Table 2 - Construct correlations with the square root of AVE along the diagonals

We have also used the comparison between item loadings and in cross loadings to test for discriminant validity. Each item scores higher in its own construct than others, which is a sign of

reliability of the relationship between items and constructs in which they are comprised (see Table 3).

	CRS	KNL	MOR	REL		CRS	KNL	MOR	REL
CRS01	0.794	0.127	-0.144	-0.097	ID01	0.134	0.259	0.424	0.106
CRS02	0.681	-0.099	0.138	0.042	ID02	0.159	0.245	0.406	0.097
CRS03	0.723	-0.046	0.228	0.199	ID03	0.018	0.190	0.372	0.098
CRS04	0.763	0.192	-0.109	0.000	ID04	0.020	0.184	0.370	0.112
CRS05	0.778	0.174	-0.089	-0.047	ID05	-0.131	0.109	0.538	0.152
CRS06	0.665	0.146	-0.118	-0.115	IC01	-0.135	0.098	0.540	0.161
CRS07	0.638	0.100	-0.105	-0.095	IC02	-0.190	0.054	0.583	0.309
KNC01	0.065	0.482	0.251	0.147	IC03	-0.120	0.049	0.588	0.304
KNC02	0.065	0.583	0.223	0.134	IC04	0.046	0.239	0.490	0.185
KNC03	0.245	0.404	0.162	0.053	IC05	-0.168	0.082	0.590	0.237
KNC04	0.223	0.423	0.179	0.120	IC06	-0.114	0.090	0.579	0.256
PKN01	-0.063	0.599	0.250	0.226	IG01	-0.074	0.091	0.422	0.073
PKN02	-0.058	0.595	0.235	0.232	IG02	-0.215	0.198	0.547	0.192
PKN03	-0.060	0.578	0.250	0.248	IG03	-0.120	0.090	0.507	0.202
PKN04	-0.059	0.589	0.245	0.260	IG04	-0.209	0.212	0.596	0.330
PKN05	-0.130	0.563	0.270	0.174	RA01	-0.135	0.172	0.591	0.191
PKN06	-0.028	0.578	0.172	0.122	RA02	-0.034	0.161	0.477	0.204
TKN1	0.210	0.562	0.110	0.141	RA03	-0.208	0.118	0.506	0.232
TKN2	0.203	0.558	0.095	0.126	RA04	-0.045	0.168	0.428	0.181
TKN3	0.238	0.613	0.068	0.032	REL01	-0.113	0.112	0.226	0.678
TKN4	0.254	0.627	0.071	0.030	REL02	-0.098	0.217	0.259	0.798
TKN5	0.175	0.626	0.023	0.057	REL03	-0.074	0.178	0.389	0.833

Table 3 - Item loadings and cross loadings

After the constructs are verified and considered reliable, the measurement model is assessed as adequate for the consecutive analyses. In sequence, the inner model is tested - i.e., the hypothesized relationships between constructs. This inner model contains the hypotheses, which, in PLS-SEM are tested through a series of T-tests using bootstrapped standard errors, i.e., verifying whether the hypotheses are > 1.96 (see figure 2). All hypotheses are accepted except for H5 (KNW \rightarrow CRS).

Cohen's Indicator (f^2) which evaluates the weight of each construct in the model (i.e., how useful it is to explain the model) was also ascertained and the obtained levels are adequate (KNW=0.43; REL=0.25; CRS=0.14; MOR=0.27), although CRS level is only low to medium. Other results also suggest a good fit in the model, such as the standardized root means square residual (>0.10) and standardized root means square theta (0.118) as well as normed fit index (0.762) (Henseler et al., 2014).

As for the mediation of REL in the relationship between KNW and MOR, it was tested through the Variance Accounted For test (VAF) (Hair et al., 2016) and it is considered as a full mediation type of interaction since VAF > 0.80 . Finally, per the results obtained, the only hypothesis rejected was H5 and, as such, the following figure represents the final, adjusted model (Figure 2).

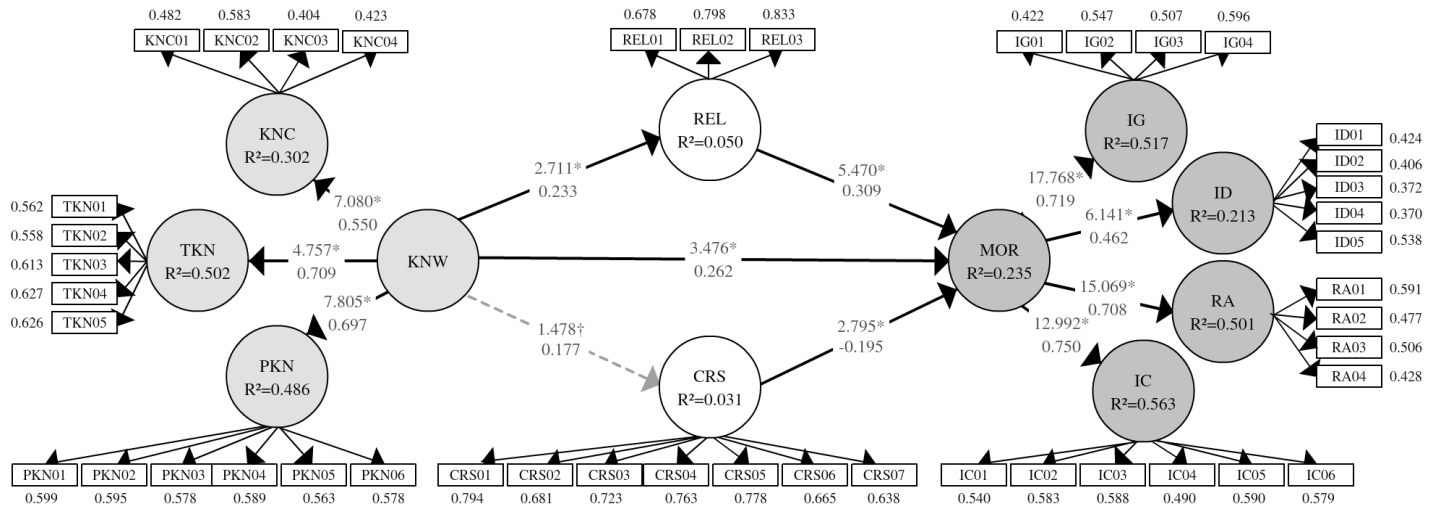


Figure 2 - Final model (dotted grey line † - indicates rejected hypothesis; *significant at 0.05).

Discussion

Knowledge generation and management in Supply Chains are complex matters, because of the coordination that must be present for them to emerge (Gligor, 2014). Generally speaking, knowledge management in SCs derive its strength from the knowledge channels existing in the SC (Schoenherr et al. 2014), the tacit knowledge shared by the individual firms in the SC (Williams, 2014) as well as the common past knowledge shared by them (Büyüközkan and Göçer, 2018). Our tests show the high significance of these three aspects towards a good measure of knowledge in SCs. The main aspect we aimed at answering is whether SC knowledge management would positively influence individual firms market orientation. This hypothesis is significant, and its effects are medium-to-high. Thus, the moving of knowledge from the lower level (SC) to the lower level (individual firms) happens, despite the ongoing crisis in the environment. Thus, the mediating effects are of the utmost importance, since these are also happening at the same time as the hypothesized effect of KPW in MOR.

The first mediation we tested was the role of relationships in the SC. IOR is paramount to good performance in the transformation and moving of knowledge from the SC inwards the individual firms (Cheng, 2011; Neutzling, 2018). Even in situations of an ongoing crisis, the relationships remain in action. The relationship is particularly high in terms of significance and on how it affects the MOR of individual firms.

However, the main finding is the role of crisis. The extant literature points to the relational arrangement in SCs as a potential mitigator to crises, since through it individual firms in SCs have access to much more information and pre-processed knowledge (Grant, 2016). As a property, the SC should have provided means for individual firms to understand better the environmental changes and, as such, diminish their crisis perception. This hypothesis was rejected. In this sense our results go against extant literature. While not its primary objective, it may be inferred from Jüttner and Maklan 2011 that coordination mitigates risk perceptions and boosts SC resilience. Our results show otherwise, at least that during times of heightened crises, coordination does not mitigate negative perceptions and diminishes organizations' abilities to bounce back.

Whereas in this study we did not intend to understand the rejected hypothesis, we may propose an alternative explanation to why this happens, that may be confirmed in further studies. First, SCs are in the middle of two main concepts - a single firm dominating a whole SC and the

isolated individual firm. As such, it benefits from information and knowledge generation from the SC, while maintaining their own separated status quo. The coordination that exists in non-critical times benefits each firm in the SC but does not oblige them to coordinate further than what is pre-arranged.

When crises emerge, they maintain their relationships, but look inwards to assess strategic problem formulation (SPF) and find solutions. This is consistent with both Threat Rigidity (Staw et al., 1981) and SPF (Baer et al. 2013). These dictate that organizations in crises cut or diminish information-processing ties with the environment (but not relationships) and that they struggle with ambiguity in defining the strategic problem. Finally, crisis perception negatively affects market orientation of the individual firms, which is consistent with crisis management theories (Hale et al. 2005; Painter and Martins, 2017) and threat rigidity (Staw et al., 1981).

The idea of crises leading to constriction in the decision-making processes comes from TR thesis (Staw et al., 1981). In the same sense Blome and Schoenherr (2011) and Moktadir et al. (2018) demonstrate that risk management may become constricted, especially concurrently in a crisis - and not when daily wicked problems arise. Our results also exhibit different results regarding the dichotomy between manufacturing and other services – whereas Blome and Schoenherr found interesting disparities in information gathering and reaction, our results point to no difference in these groups. This may be due to the fact that Blome and Schoenherr only analyzed 8 cases and our sample is larger or also because they analyzed a financial-led only crisis when in our case the pandemic had greater effects beyond the financial aspects – which may also foster opportunism in multi-tier SCs, accounting for the different results (Vieira, 2020).

A different explanation is also that knowledge does not necessarily mitigate crisis perception because links in SCs may be in different countries, in different stages of the pandemic (which entails different responses and local restrictions) – which, at least in terms of agricultural or food SCs has had an important impact (Gray, 2020). Thus, when the negative effects start to be subdued in parts of a SC, it may still take its toll in other parts, taxing the whole SC. This is linked to Jüttner et al (2002) risk classification of SCs as internal, external and network-related – however there are no propositions or hypothesis as to what is supposed to happen when two or all of these happen at the same time. While it is not our goal to simulate such conditions, our results may be a basis for future studies.

This study contributes to the development of theory on SCs by discussing the role of crises on mediating knowledge creation and management and strategic decision-making. The data obtained demonstrate that whenever facing crises, the mechanism in place in SCs are not enough to mitigate crisis perception, but counterbalance its negative effects on market orientation. In addition, long-term relationships enhance market orientation adding to the positive side of this balance.

Conclusions and future studies

Whereas knowledge management in SCs is an already established theme in the extant literature, there is still space for research on the role of crises on SC strategic management. While “crisis management” is also a repeatedly theme in research, rigidity following crises merits deeper understanding – as reactions to crises (crises, rigidity, reaction) are handled as a black box or, at least, as a very sensitive topic in SCs (Burnard & Bhamra, 2011; Fawcett et al., 2012). Many gaps in current SC reaction to crisis papers are dependent on a keener look on how crises shape organizations’ knowledge management mechanisms (Saebi et al., 2017; Linnenluecke, 2017).

SC knowledge management, thus, is a deliberate effort to collaborate, against opportunistic human nature (Abubakar et al., 2019; Gast et al., 2019). Crises, on the other hand, shift values and expectations which makes collaborating more difficult or playing solo more attractive (Ritala et al., 2018; Durst and Ziba, 2019). As such, organizations in SCs need to understand that it is natural to look inwards (as the data in this study suggests) and leave external sensemaking and collaboration aside. This step is necessary if SCs are to implement mechanisms to avoid this natural yet dangerous behavior and keep the ball rolling in critical times.

The data also points to a grey area between deterministic and normative, traditional SC management and subtler behavioral SC management – at least this inward-looking during crises match extant behavioral operations theory. Further studies may delve deeper in the behavioral side of the equation, especially in the post-Covid-19 resilience scenario.

Limitations and managerial implications

This study has a few limitations that should be considered, especially in future replications and development of theories. Whereas we have endeavored to collect data that fits the literature gap intended, the Covid-19 pandemic has taken its toll every research project in course and ours could not be any different. Our sampling was reduced because many organizations understandably could not devote time in allocating time and employees to answer surveys. As such, data should be taken with a grain of salt since all common problems with survey participation may become more present – such as survey fatigue (Nguyen, 2017) and lack of attention (Alvarez et al., 2019).

As for the data collection, respondents were massively located in Brazil. The current Covid-19 crisis has only worsened the ongoing financial crises that Brazil was already in. Researchers may take notice that while the definition of crisis was met (an event that is significant, public, needs immediate response and there are not known practices to adequately solve the issue) (James et al., 2011), this is a heightened crisis, on a level that is different if compared to other contexts such as Europe and the United States. On the other hand, no model is complete – and several other constructs already studied may be linked to constructs in this study – for instance, entrepreneurial orientation also counterbalances crisis perception and crisis induce organizations to look for solutions in product development (Martins et al., 2019b).

Practitioners should observe that not all SCs and/or organizations will display the same behavior as the data suggests. Extant literature abounds in that post-crisis SCs learn from the crises and put in place mechanisms to cope with crisis perception and reaction. Managers should revisit internal practices and set in motion mechanisms to continue opening collaborations among SC links during crises.

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