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Exploring Risk Perception and Degree of Internationalization of Brazilian Small-and-Medium Enterprises

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Abstract

This research investigates managerial risk perception regarding internationalization of small and medium-sized enterprises in the Brazilian context. We examine how managers' perception of risk influences firms' degrees of internationalization. Likewise, we assessed how risk perception is influenced by managers' cognitive traits, such as tolerance for ambiguity and cognitive style. We provided empirical evidence for the relationships we proposed through a partial least squares structural equation model with data gathered from a survey of 149 SMEs from the State of Paraná, Brazil. Our results suggest that managers' tolerance for ambiguity is only significant for explaining risk perception for the managers with a preference for a deliberative style. Still, the research suggests that the Brazilian SMEs in our sample presented a higher degree of internationalization even when their managers perceived higher levels of risk.

Key words: risk perception; degree of internationalization; cognitive style; tolerance for ambiguity; SMEs.

Introduction

Global economic integration expanded market boundaries. Firms worldwide exploited such expansion, looking for higher growth rates, sales, and revenue from sources beyond traditional domestic markets (Prasad, 1999). In this context, small and medium-sized firms (SMEs) suddenly had a vast territory at their disposal to explore and escape from the competition against larger incumbent firms within their domestic markets (Etemad, 2004). However, it is noteworthy that competing in the international market is not effortless. SMEs do not possess the same bargaining power and resource availability as large multinational corporations (MNCs) or larger first-movers in international markets that are already established in their home markets (Schweizer, 2015).

In other words, despite internationalization being considered a form of risk diversification for late-movers in international markets (Carneiro & Brenes, 2014), SMEs that decide to engage in internationalization must be aware of the additional risks inherent in new, uncertain, and distinct markets, that are different from their usual domestic competition (Sapienza, Autio, George, & Zahra, 2006; Zahra, Korri, & Yu, 2005). Thus, the managerial perception, propensity, or aversion to risk is a relevant matter of interest to international business and international entrepreneurship scholars (Acedo & Florin, 2006; Claver, Rienda, & Quer, 2008; Figueira-de-Lemos, Johanson, & Vahlne, 2011).

Risk perception, a multifaceted endogenous and cognitive managerial feature (Brustbauer & Peters, 2013; Hagigi & Sivakumar, 2009) regarded as "the subjective judgement that SME decision-makers make about the characteristics and severity of a risk associated with an internationalisation activity" (Game & Apfelthaler, 2016, p. 227) has been shown to account for changes in the extent of firm commitment to international markets as compared to domestic operations. This is called the degree of internationalization (Acedo & Florin, 2006; Ietto-Gillies, 1998). However, there is still the need for further investigation not only about the influence managers' risk perception has on the degree of SME internationalization but also for comprehending what lies behind managerial risk perception (Brustbauer & Peters, 2013).

Furthermore, we assert that some managers' cognitive traits are relevant for understanding their perception of risk towards internationalizing. As suggested by previous literature (Acedo & Florin, 2006; Halikias & Panayotopoulou, 2003), tolerance for ambiguity, that is the extent to which managers are able to deal with ambiguous and uncertain situations, may predict managers' behavior regarding the perception of risk (Ghosh & Ray, 1997). However, their preference for a deliberative or intuitive cognitive style is also a factor that deserves to be further explored in the relationship between risk perception and SME internationalization (Barbosa, Gerhardt, & Kickul, 2007).

In order to empirically investigate these relationships, we apply a partial least squares structural equation modeling approach (PLS-SEM) on a sample of 149 Brazilian SMEs. Our interest in the internationalization of Brazilian SMEs relies on the factor that despite presenting a low level of internationalization of the economy (in terms the ratio of exports to GDP) and a large and attractive domestic market, Brazilian firms have been continuously increasing their share of international markets (Carneiro & Brenes, 2014; Dib, Rezende, & Figueiredo, 2016). Such idiosyncrasy is an opportunity for understanding risk perception and its antecedents and consequences regarding internationalization of SMEs, given that market dynamics found in Brazil are not comparable to those of developed countries traditionally investigated in international business studies (Seifert, Child, & Rodrigues, 2012).

Thus, for addressing the gaps in the extant literature, this article intends to verify the influence of cognitive antecedents in terms of managers' tolerance for ambiguity and cognitive style preference on their risk perception regarding international operations and its effect on the degree of internationalization of SMEs. Overall, the article is structured as follows. First, we review the internationalization literature and IB for deriving the hypothesis of the study. In the third section, we outline the research design and method we performed in this research. In the fourth section, we present the results of the measurement, structural and control models through PLS. Finally, we discuss our findings and address possibilities for future studies.

Theoretical Background and Hypothesis Statement

Research on international business and international markets dates back to the 1960s' and has been traditionally rooted in theories such as market imperfection, international product life cycle, stage theory, and eclectic theory (Game & Apfelthaler, 2016). As described by Andersson (2004), the first efforts to comprehend the nature of firm internationalization were based on economic and rationalistic motivations, which were consolidated by the growth of the eclectic paradigm in the 1990s'. Such rationale is evident in Dunning's (1979) seminal work on the eclectic paradigm. The author claims that firm internationalization (through foreign direct investments, FDI) would be motivated by the pursuit of three specific advantages: ownership, internalization, and location (OLI) specific advantages.

On the other hand, Northern European scholars were developing a theory based on behavioral sciences for explaining MNC internationalization from the early stages, not just focusing on FDI as their eclectic counterparts did (Andersson, 2004). This stream of research, later known as the Uppsala Model, or stage theory, noticed that firms were more likely to internationalize in locations with close geographic and psychic distance, starting gradually from less risky and less investment demanding efforts (such as exportation), to more advanced modes of internationalization, such as networks, joint-ventures, or FDIs, after the learning process occurred on each stage of internationalization (Vahlne & Johanson, 2013).

Further research also focused on understanding not only the behavior of the internationalizing firm but also what lies behind the decision-making process regarding internationalization. Based on the Upper Echelon Theory (Hambrick & Mason, 1984), international business scholars, especially those aligned with the Uppsala model, started to be concerned with the cognitive and experiential background of the board (top management team, TMT) of firms deciding to internationalize (Nielsen, 2010). Regarding experiential background, for instance, Rivas (2012) showed that managers' diversity in terms of age, tenure, and functional background were significantly related to large US and European firms' internationalization.

The IB field's evolution and gradual shift in focus from the external environment to the firm level, and then to team and individual level, brought to the surface claims that the internationalization process of established MNCs may not be the same as for new ventures, leading to the intersection of IB with entrepreneurship studies (McDougall & Oviatt, 2000). However, this new stream, international entrepreneurship (IE) was criticized for the lack of conceptual and theoretical foundations, as well as for neglecting the internationalization of other firms that are not new ventures (small and young firms), such as older SMEs (Keupp & Gassmann, 2009).

However, the contributions of this field of research have been paramount for understanding the cognitive traits of managers and entrepreneurs when deciding to internationalize, as well as the myriad of risks that are involved in this kind of international venture (Acedo & Jones, 2007; Oviatt, Shrader, & McDougall, 2004). Furthermore, IE lately ended up incorporating studies concerning SMEs and family firms as well (Acedo & Florin, 2006; Zahra *et al.*, 2005).

In this article, we adopt the assumptions of Uppsala model of internationalization when considering that firms are more likely to internationalize gradually, the Upper Echelon perspective by assuming that the decision to internationalize usually relies on the personal profile of TMT and we utilize the IE contributions to IB regarding the role of the entrepreneurial nature and manager-centered decision-making process concerning SME internationalization. Still, we assume that either the motivations or the risks perceived by these managers are not the same as for the boards of established MNCs (Game & Apfelthaler, 2016; Kiss, Williams, & Houghton, 2013). Furthermore, the next section is dedicated to addressing what lies behind manager risk perception (Brustbauer & Peters, 2013) concerning internationalization decisions.

Ambiguity, uncertainty, and risk perception effects on SME internationalization

The internationalization process itself is highly ambiguous and uncertain (Figueira-de-Lemos *et al.*, 2011; Maitland & Sammartino, 2015). Firms may need to abdicate their focus on keeping their current position in the domestic market to pursuit a novel position in unexplored territory, a situation that is uncomfortable even for individuals managing large and established firms (Doz, 2016). For SMEs, the internationalization process is more than just uncomfortable, since the amount of already scarce resources invested in the international operation may put the firm's possible growth and survival at stake if the attempt is unsuccessful (Sapienza *et al.*, 2006).

Thus, the extent to which managers are able to deal with ambiguous and uncertain situations has been closely linked to their abilities to perceive and assume risks during decision-making processes (Ghosh & Ray, 1997). Psychological theory has been addressing this relationship for quite some time under the name of tolerance for ambiguity, or ambiguity tolerance (Furnham & Marks, 2013). For instance, Lauriola, Levin, and Hart (2007) found that individuals that scored higher on the tolerance for ambiguity test were more prone to make risky decisions, whereas individuals with an ambiguity-avoiding profile perceived those decisions as risky options and avoided them.

Regarding the tolerance for ambiguities' influence on the perception of risk in internationalization, the extent to which an individual feels threatened by ambiguity and uncertainty when making decisions under unknown environmental characteristics of international operations is a matter of concern (Acedo & Florin, 2006; Eduardsen & Marinova, 2016; Halikias & Panayotopoulou, 2003). Based on these arguments, we state that managers with higher levels of tolerance for ambiguity are more likely to perceive lower levels of risk when deciding whether to internationalize or not (Acedo & Florin, 2006; Acedo & Jones, 2007), leading to the enunciation of the following hypothesis.

> **H1:** Tolerance for ambiguity has a negative effect on managers' levels of risk perception regarding internationalization.

The mediating role of managers' cognitive style

Considering that the perception of risk is inherent to the firm manager, the individual cognitive profile is said to influence perceived risks regarding internationalization (Maitland & Sammartino, 2015). This claim fits SME reality, where the decision to internationalize usually relies upon a single manager or owner (Acar, 2016; Eduardsen & Marinova, 2016). However, we argue that the perception of risk in internationalization is not a product of managers' tolerance for ambiguity alone. With this rationale, we claim that the managers' cognitive style may mediate the relationship between their tolerance for ambiguity and their risk perception.

Cognitive styles differentiate managers across a continuum according to their preference for a given rational mode of decision-making, whether it relies mainly upon deliberation or intuition (Betsch & Kunz, 2008; Jones & Casulli, 2014). Managers with an intuitive cognitive style are prone to decide on internationalization with an open-minded decision-making, taking into account past experiences, prototypes and examples, and mental representations. Managers with a deliberative cognitive style make decisions based on a structured mindset, with rational and extensive reasoning, and with systematic methodologies (González-Loureiro & Vlačić, 2016).

Usually, SMEs are in a position where risk perception and decision-making regarding internationalization are limited by managers' bounded rationality (Figueira-de-Lemos *et al.*, 2011; Grandinetti & Mason, 2012) and by the costly access to information and resources (Child & Hsieh, 2014). Furthermore, we argue that individual tolerance for ambiguity may foster a decision-maker's rationality and cognitive style (Blume & Covin, 2011; Schweizer, 2015). In this sense, we propose that managers with higher levels of tolerance for ambiguity tend to be more comfortable with uncertain situations. Thus, they are more likely to prefer the adoption of an intuitive cognitive style, more prone

to be faster decision-makers and to perceive lower levels of risk in international operations (Barbosa *et al.*, 2007; Blume & Covin, 2011).

On the other hand, we contend that managers with lower levels of tolerance for ambiguity are more likely to feel the need for rationalization and analytical thinking before making decisions (Child & Hsieh, 2014), preferring a deliberative cognitive style regarding decision-making related to internationalization and, as a result, perceiving higher levels of risk in international operations. This rationale leads to the following hypotheses.

> **H2a:** The influence of managers' tolerance for ambiguity on their levels of risk perception regarding internationalization is negatively mediated by their preference for deliberative cognitive styles.
>
> **H2b:** The influence of managers' tolerance for ambiguity on their levels of risk perception regarding internationalization is positively mediated by their preference for intuitive cognitive styles.

Managers' risk perception and SME internationalization

In this article, we have been claiming that internationalizing is not a risk-free effort since firms have to cope with several exogenous factors, such as cultural distance, institutional complexity, different stages of market development, and economic and currency instabilities (Dib *et al.*, 2016; Eduardsen & Marinova, 2016). Figueira-de-Lemos, Johanson, and Vahlne (2011) asserted that internationalization risk is composed of the product function between uncertainty and commitment to the new market ($R_i = C_i \times U_i$). Thus, higher levels of commitment and higher levels of environmental uncertainties will reduce the likelihood of SME internationalization.

Relying on the upper echelon perspective and for the development of the Uppsala mode of internationalization, scholars focused on the micro-level process of how top team management (TMT) perceived risks and uncertainties concerning firms' international operations (Acar, 2016; Figueira-de-Lemos *et al.*, 2011). In the case of SMEs, single managers and owners are usually responsible for internationalization decisions (Acar, 2016; Schweizer, 2015). Thus, how these managers perceive risks affects the decision to internationalize (Acedo & Florin, 2006; Eduardsen & Marinova, 2016). For instance, Eduardsen and Marinova (2016) found that SME managers consider the extent of risk perception when deciding to internationalize. Therefore, higher levels of risk perceptions may "hinder or inhibit firm internationalization or even cause the firm to de-internationalize" (Eduardsen & Marinova, 2016, p. 17).

Once the decision to internationalize has been explained in the light of risk perception, there is still the need to understand the influence this perception of risk has on the extent of resource commitment and market effort managers put on international operations. This construct was introduced in IB literature as the degree of internationalization, being conceptually divided into two streams: the foreign-home dichotomy, and the speediness of firms' operation among different countries (Ietto-Gillies, 1998; Sullivan, 1994).

In this article we adopt the first perspective, understanding the degree of internationalization as the firms' degree of commitment to international operations in comparison with their total activities (Ietto-Gillies, 1998), especially concerning production and revenue. Previous theory and empirical results on SMEs have shown that managerial perception of risk towards international operations affects firms' likelihood of increasing their commitment to international operations to the detriment of domestic markets (Acedo & Florin, 2006; Claver *et al.*, 2008).

Thus, we argue that the higher the level of risk perception by SMEs managers, the less likely the firm will be to engage in higher levels of internationalization, resulting in the following hypothesis.

H3: Managers' levels of risk perception have a negative effect on SMEs' degrees of internationalization.

The moderating role of entry mode decisions

Finally, we assert that the effect of managers' risk perceptions on firms' degrees of internationalization may be potentialized, and thus, moderated by different entry modes. There are several forms of entry into international markets with different extents of complexity, control and commitment of the internationalizing firm, with exportation the entry mode presenting the least control over the operations abroad (Cavusgil, Knight, & Riesenberger, 2012; Johanson & Vahlne, 1977). However, this also requires limited resource commitment, allows for maximum flexibility in operations, and involves lower risks. Such commitments, risks, and demands become higher in advanced entry modes, such as global sourcing, licensing and franchising, alliances, joint ventures, and finally, the most complex form, foreign direct investments (FDI).

Thus, firms engaged in more advanced modes of internationalization have access to more information, knowledge, and market acknowledgment than firms that enter international markets only through exportation, increasing the likelihood of increased levels of sales and revenue in international markets (Grandinetti & Mason, 2012). On the other hand, exportation is the most likely form of internationalization for SMEs, since they usually have limited resources, information, and capabilities (Cavusgil *et al.*, 2012; Knight & Liesch, 2016; Malhotra, Agarwal, & Ulgado, 2003; Morgan, 1999), and tend to engage in exportation activities more reactively than proactively (Child & Hsieh, 2014; Morgan, 1999; Musso & Francioni, 2014).

Following the rationale of the Uppsala model of internationalization (Figueira-de-Lemos *et al.*, 2011; Johanson & Vahlne, 1977), we contend that SME managers that perceive higher levels of risk are more likely to commit lower levels of resources, for a gradual internationalization, engaging in less-advanced stages of internationalization such as exportation, instead of more complex stages like FDI and joint-ventures (Figueira-de-Lemos *et al.*, 2011; Laufs & Schwens, 2014; Malhotra *et al.*, 2003). Consequently their firms present lower degrees of internationalization. Thus, we formulate the following hypothesis regarding risk perception and entry mode into international markets.

H4: The relationship between managers' risk perception and SMEs' degree of internationalization is moderated by the entry mode decision.

Given the hypotheses statement, we present the research model and the proposed relationships between this investigation's variables in Figure 1.

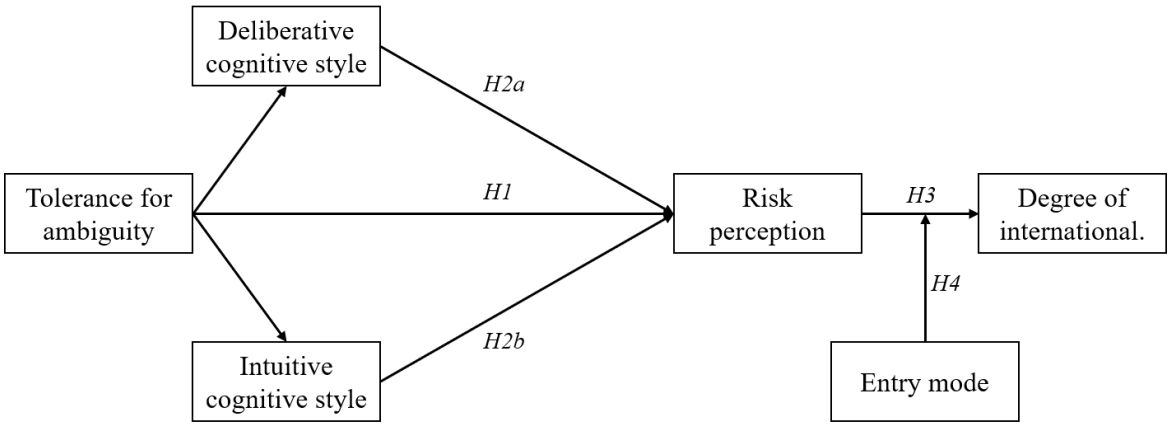

Figure 1. Research Model

Research Methods

Sample and data collection

The research setting is based on micro, small and medium-sized firms with international operations from the State of Paraná, Brazil. The population of firms with international activities in the State at the time of data collection was 1,428 small and medium-sized firms. Their information was collected from the Brazilian Ministry of Industry, Foreign Trade, and Services (Ministério da Indústria, Comércio Exterior e Serviços [MDIC], 2015) database. Paraná is the fifth-ranked Brazilian state in terms of international trade when considering only SMEs. For instance, according to the report of the Brazilian Micro and Small Business Support Service (Serviço Brasileiro de Apoio às Micro e Pequenas Empresas [SEBRAE]), the State of Paraná alone represented 7.5% (73.3 million dollars) of the total value of exportation (976.9 million dollars) from Brazilian SMEs in 2016, and 10.1% (832) of the total number (8,240) of Brazilian exporting SMEs (Fonseca, 2017).

We conducted a survey with self-administered standardized questionnaires adopting both the Qualtrics online survey platform and direct personal contacts with SME managers, controlling the quality and duplication of data through geographical location (latitude and longitude) and IP address (Schoenherr, Ellram, & Tate, 2015). We had a 17.23% response rate, with 246 answered questionnaires. Of the responses we received, 97 were not included in the research due to issues such as missing values or inadequate answer patterns, resulting in a final sample of 149 valid responses, representing a net response rate of 10.43%, which is adequate and comparable to similar studies in international business (Game & Apfelthaler, 2016; Pinho & Prange, 2016).

Regarding data collection, as we could not find a validated questionnaire adequate for our proposed study, we combined different instruments for gathering data from our sample. In accordance with the approach established by Acedo and his colleagues (Acedo & Florin, 2006; Acedo & Jones, 2007), we considered firm-level characteristics constructs as formative and cognitive individual characteristics construct as reflective. By nature, the complexity regarding firm characteristics and the degree of internationalization as latent constructs suggested that creating indices rather than scales would be more adequate, demanding formative rather than reflective constructs (Acedo & Florin, 2006; Diamantopoulos & Siguaw, 2006; Hair, Hult, Ringle, & Sarstedt, 2014). For individual cognitive characteristics, as they ended up representing personal traits of SME managers, we adopted a scale with reflective constructs (Diamantopoulos & Siguaw, 2006; Hair *et al.*, 2014).

Measures

For measuring risk perception (RiskPercep), we adopted Acedo and Florin's (2006) 4-item scale with a five-point Likert scale ranging from **strongly disagree** to **strongly agree** Regarding tolerance for ambiguity (TolAmb), we measured it on a five-point Likert scale composed of 6 items originally developed by Costa (2011), ranging from **strongly disagree** to **strongly agree**. For measuring cognitive styles, deliberative (DelibCS) and intuitive (IntuitCS), we adopted Betsch and Kunz' (2008) Preference for Intuition and Deliberation Scale (PID), consisting of 18 items, 9 for each cognitive style, with a five-point Likert scale ranging from **strongly disagree** to **strongly agree**.

Due to criticism of unidimensional measures for such construct (Sommer, 2009), we measured the degree of internationalization (DOI) as a combination of (a) the proportion of a firm's production/services destined to international markets, and (b) the proportion of a firm's total income originating from international trade. For measuring a firm's commitment to international operations, we measured entry mode (EntryMode) with a single-item construct based on the three categories of the entry mode classification: exporting, collaboration and investment (Jones & Young, 2009). The measure had 5 points where the managers should assign if their firm: (1) exported but do not export anymore; (2) export sporadically; (3) export regularly; (4) have distribution contracts overseas; and (5) have direct investments in foreign markets.

For control purposes, we measured firm characteristics (FirmCharac) by (a) the age of the firm in years and (b) size of the firm according to the logarithm of the gross operating income (GOI) in (R$) Brazilian reais (Acedo & Florin, 2006; Grandinetti & Mason, 2012). The original data for firm size was collected in the form of categorical-ordinal variable, which the values assigned were 1 for micro-sized firms (GOI<R$2.4 million), 2 for small-sized firms (GOI>R$2.4 million<R$16 million), 3 for medium-sized firms (GOI>R$16 million<R$90 million), 4 for medium-to-large-sized firms (GOI>R$ 90 million<R$300 million), and for controlling inadequate respondents, we also included a fifth category, 5 for large-sized firms (GOI>R$300 million). We collected data on firm size through categorical variables because usually, managers do not feel comfortable declaring their firms' incomes. For calculating the GOI in terms of gross values, we re-coded the variable on a new continuous variable by assigning the mean value of the categorical class in which they declared to be on for each case, and we performed a logarithm data transformation ($\log_{10}$).

For guaranteeing the content validity of scale-items, we followed the recommendations of Malhotra and Birks (2007). We translated and reverse-translated the questionnaires from English to the Portuguese language (except for the tolerance for ambiguity scale, which was already in Portuguese) and from Portuguese to English for validation purposes. After the translation process, we assessed the content validity by sending the composite questionnaire to three referees that are PhDs in Business Management and are specialists in International Business research. After their revision, suggestions and final approval, we pretested the instrument with three SME managers of firms with international business at the time. They did not experience any difficulty in answering the questionnaire, which showed that the instrument was ready to be applied to the whole sample.

We adopted partial least squares structural equation modeling (PLS-SEM) as an analytic technique with the support of SmartPLS 3 software (Ringle, Wende, & Becker, 2015), but we also performed preliminary analysis on the Statistical Package for Social Sciences (IBM SPSS version 23) software. The PLS was adequate to our model because it fits complex research with small-sized samples, making no underlying assumptions regarding data distribution. Otherwise, unlike covariance-based modeling, it works with formative, reflective and single-item constructs (Hair *et al.*, 2014; Peng & Lai, 2012; Richter, Sinkovics, Ringle, & Schlägel, 2016). The sample size required for performing PLS-SEM must follow the 10-times rule, that is, 10 times the largest number of structural paths directed to a latent variable in the structural model (Evermann & Tate, 2016; Hair *et al.*, 2014; Richter *et al.*, 2016). Given such criteria, the minimum sample required for our model would be 70 valid responses, which was surpassed by our data collection (n=149).

As described by Pinho and Prange (2016), the operationalization of PLS path modeling has two stages: the first for the assessment of the reliability and validity called measurement model, and the second, for assessing the structural model itself through a bootstrapping procedure. Following Streukens and Leroi-Werelds (2016) recommendations, we adopted 10,000 bootstrap samples (J=10,000) with bias-corrected and accelerated (BCa) confidence intervals. We also assessed the predictive relevance of the model though a blindfolding procedure, adopting an omission distance of seven (D=7), in accordance with previously recommended parameters (Chin, 2010; Evermann & Tate, 2016).

Finally, we controlled for firm characteristics in terms of size and age through PLS multi-group analysis (PLS-MGA). This procedure is adequate for exploring the possible differences in heterogeneous data, that is, for comparing parameters between two or more groups (Hair *et al.*, 2014). Concerning the parameters of MGA estimation, we follow the recommendations of Sarstedt, Henseler, and Ringle (2011) for adopting nonparametric tests for analyzing more than two groups, since it is more conservative and less prone to type-II errors. Thus, we relied on the PLS-MGA estimates, being the difference between two groups significant at 95% of confidence if p<0.05 or if p>0.95 (Hair *et al.*, 2014).

In the following section, we present the results of the PLS modeling, considering that we followed strict recommendations in order to guarantee the rigor and the richness of the description of data analysis (Chin, 2010; Peng & Lai, 2012; Richter *et al.*, 2016; Streukens & Leroi-Werelds, 2016).

Results

Measurement model

The first step of the path modeling PLS-SEM analysis was the assessment of individual item reliability, construct reliability and discriminant validity of the measurement model, which is equivalent to performing a confirmatory factor analysis (Acedo & Florin, 2006; Richter *et al.*, 2016). For evaluating reflective constructs, we assessed composite reliability (C.R.) and Cronbach's alpha to verify internal consistency reliability, and average variance explained (AVE) for evaluating convergent validity (Hair *et al.*, 2014). We followed Richter and colleagues' (2016) guidelines for establishing the threshold for acceptable values of composite reliability ($\rho_C \geq 0.70$) and convergent validity ($AVE \geq 0.50$), as well as a conservative position when verifying the Cronbach's alpha ($\alpha \geq 0.70$) as complementary for C.R. evaluation (Hair *et al.*, 2014). Concerning indicator reliability for reflective constructs, we assessed the outer loadings of each indicator. The value expected for indicator's outer loading is higher than 0.708, with the removal of the indicator with lower values indicated if such procedure increases C.R. and AVE above the recommended threshold values (Hair *et al.*, 2014; Richter *et al.*, 2016).

As they are considered multidimensional, non-convergent measures reflecting a given construct (Chin, 2010), the formative constructs composite reliability and average variance explained are not adequate for evaluation (Hair *et al.*, 2014). Thus, this kind of construct is reliable when their outer weights are significant ($p<0.05$) and not lower than 0.10 (Peng & Lai, 2012). Another point that needs to be addressed is collinearity, since formative constructs might get destabilized by the multicollinearity between their indicators, affecting content validity (Petter, Straub, & Rai, 2007). Hence, meeting recent recommendations (Hair *et al.*, 2014; Richter *et al.*, 2016), we assessed the collinearity of the formative constructs through the variance inflation factor ($VIF \leq 5.0$) of each indicator.

Table 1

Measurement Model

Latent Construct	VIF	Weight	Initial loading	Final loading	C.R.	AVE	Cronbach alpha
Internationalization degree					n/a	n/a	n/a
Q9	3.68	0.73					
Q10	3.68	0.31					
Entry mode					n/a	n/a	n/a
Q8	1.00	1.00					
Risk perception					0.87	0.69	0.78
Q12_2	1.87		0.87	0.86			
Q12_3	1.46		0.86	0.83			
Q12_4	1.70		0.80	0.81			

Continues

Table 1 (continued)

Latent Construct	VIF	Weight	Initial loading	Final loading	C.R.	AVE	Cronbach alpha
Tolerance for ambiguity					0.85	0.66	0.76
Q17_1	1.37		0.80	0.86			
Q17_2	1.66		0.65	0.75			
Q17_3	1.78		0.73	0.82			
Deliberative cognitive style					0.85	0.59	0.76
Q15_1	1.80		0.72	0.80			
Q15_3	1.70		0.68	0.76			
Q15_11	1.47		0.72	0.77			
Q15_13	1.40		0.76	0.73			
Intuitive cognitive style					0.84	0.57	0.76
Q15_2	1.63		0.64	0.72			
Q15_4	1.68		0.64	0.74			
Q15_8	1.28		0.64	0.71			
Q15_9	1.53		0.76	0.85			

Note. The sign n/a indicates that construct reliability and convergent validity are not applicable to formative constructs.

The results of the measurement model assessment are summarized in Table 1. Regarding reflective constructs, we observed the outer loadings of the indicators. As Acedo and Florin (2006) proceeded, we eliminated some items measuring latent constructs for risk perception (1 indicator), tolerance for ambiguity (3 indicators) and cognitive and intuitive cognitive style (5 indicators each) due to low and non-significant values of outer loadings. We report the initial loadings and final loadings of the indicators presented in the measurement model, although the depuration process was done step-by-step until we could reach the predetermined values for composite reliability and average variance explained of the latent constructs (Hair *et al.*, 2014). We present descriptive statistics regarding the final variables included in the model in Table 2.

Regarding formative constructs, the criterion was the analysis of outer weights. We had two formative constructs in our model, one of them being a single-item measure. The degree of internationalization was composed by the proportion of firms' production/services destined for international trade (Q9, $\omega=0.31$, $t=1.29$, $p>0.10$) and the proportion of firms' total income originating from international trade (Q10, $\omega=0.73$, $t=3.32$, $p<0.01$). Concerning Q9, we could not reach the established threshold regarding significance, but the magnitude of the outer weights was higher than recommended by Peng and Lai (2012), $\omega>0.10$. Considering the limitation of single-item measurements of the degree of internationalization (Sommer, 2009; Sullivan, 1994), we decided to proceed with analysis with this item in the model.

Table 2

Descriptive Statistics

Descript.	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Q9	11.79	13.33	-																		
Q10	11.53	10.69	0.85*	-																	
Q3	21.16	16.92	0.51*	0.47*	-																
Q4_log	6.97	0.69	0.36*	0.34*	0.60*	-															
Q8	2.68	0.79	0.54*	0.60*	0.47*	0.43*	-														
Q12_2	4.33	0.99	0.29*	0.29*	0.24*	0.20†	0.17†	-													
Q12_3	4.40	0.85	0.31*	0.28*	0.29*	0.23*	0.21*	0.53*	-												
Q12_4	4.09	0.95	0.22*	0.19†	0.15	0.17†	0.15	0.62*	0.46*	-											
Q17_1	4.11	0.97	0.18†	0.22*	0.06	0.18†	0.04	0.13	0.27*	0.12	-										
Q17_2	3.34	1.15	0.18†	0.20†	0.15	0.21*	0.10	0.21†	0.07	0.19†	0.43*	-									
Q17_3	3.54	1.16	0.13	0.18†	0.21*	0.16	0.04	0.11	0.15	0.03	0.49*	0.61*	-								
Q15_1	4.61	0.70	-0.03	-0.01	0.11	0.21*	0.10	0.34*	0.36*	0.35*	0.30*	0.10	0.11	-							
Q15_3	4.42	0.86	0.03	0.07	0.10	0.11	0.15	0.23*	0.35*	0.28*	0.29*	0.06	0.23*	0.62*	-						
Q15_11	4.13	0.92	0.10	0.19†	0.12	0.23*	0.18†	0.32*	0.42*	0.31*	0.31*	0.12	0.15	0.44*	0.39*	-					
Q15_13	4.40	0.81	0.09	0.12	0.20†	0.27*	0.11	0.26*	0.32*	0.25*	0.38*	0.10	0.26*	0.39*	0.35*	0.49*	-				
Q15_2	3.23	1.19	-0.04	0.01	-0.05	0.01	-0.06	-0.03	0.11	0.09	0.16	0.05	0.08	0.15	0.25*	0.16	0.12	-			
Q15_4	2.67	1.20	-0.07	-0.05	-0.01	0.02	-0.03	-0.10	0.09	0.08	0.14	0.09	0.14	0.06	0.15	0.15	0.01	0.58*	-		
Q15_8	2.68	1.26	0.11	0.13	0.21†	0.06	0.15	-0.07	0.16	-0.04	0.18†	0.13	0.23*	0.09	-0.02	0.20†	0.07	0.39*	0.33*	-	
Q15_9	2.94	1.25	0.02	0.06	0.18†	0.15	0.10	0.05	0.21*	0.11	0.21†	0.16†	0.21*	0.11	0.19†	0.32*	0.10	0.46*	0.49*	0.44*	-

Note. †if correlation is significant at the 0.05 level (2-tailed), *if correlation is significant at the 0.01 level (2-tailed).

The measurement of entry mode moderator variable was by means of a single-item measure (EntryMode), and by definition, single-items are assigned an outer weight of 1.00. We controlled for firms' characteristics by measuring the age of the firm in years (Q3, ω=0.76, t=7.16, p<0.001) and by the size of the firm according to logarithm of the gross operating income (GOI) in (R$) Brazilian reais (Q4_log, ω=0.34, t=2.54, p<0.01). The analysis of collinearity of the formative constructs resulted in the values expected since the VIF of the indicators of all formative constructs were lower than the established threshold (VIF≤5.0).

Another step of measurement model evaluation was discriminant validity. Considering that the classic Fornell-Larcker test is not accurate enough, often presenting problems for detecting discriminant validity issues, Richter, Sinkovics, Ringle, and Schlägel (2016) advised adoption of a heterotrait-monotrait (HTMT) ratio of correlation (Henseler, Ringle, & Sarstedt, 2015). As we show in Table 3, our model satisfied the HTMT discriminant validity criteria, since all correlations are under the previously established threshold (HTMT≤0.85) (Henseler *et al.*, 2015; Richter *et al.*, 2016).

Table 3

Heterotrait-monotrait Method Discriminant Validity

Discriminant validity (HTMT)	1	2	3	4
Risk perception	-			
Tolerance for ambiguity	0.27	-		
Deliberative cognitive style	0.65	0.42	-	
Intuitive cognitive style	0.19	0.32	0.30	-

Note. + Threshold of HTMT≤0.85.

After specifying and evaluating the measurement model, the following stage of PLS modeling was the specification of the structural model, which is the predictor of the relationships for hypotheses testing.

Structural model

Since PLS is a non-parametric inferential framework, the structural model parameters are estimated by bootstrapping. This estimation is gathered through a resampling procedure that assesses the variability within sample data (Peng & Lai, 2012; Streukens & Leroi-Werelds, 2016). For our model, we adopted a consistent number of bootstrap samples (J=10,000) for improving the level of accuracy of the estimations (Streukens & Leroi-Werelds, 2016). We assessed the explained variance (R^2) and Stone-Geisser test ($Q^2>0$) through blindfolding procedure (omission distance $D=7$) for evaluating the predictive power of the structural model (Figure 2), as well as path coefficient (β), effect size (f^2), confidence intervals, *t*-value and *p*-value of each path (Table 4) in order to support or refute our hypotheses and assess their explanatory power (Chin, 2010; Evermann & Tate, 2016; Peng & Lai, 2012; Richter *et al.*, 2016).

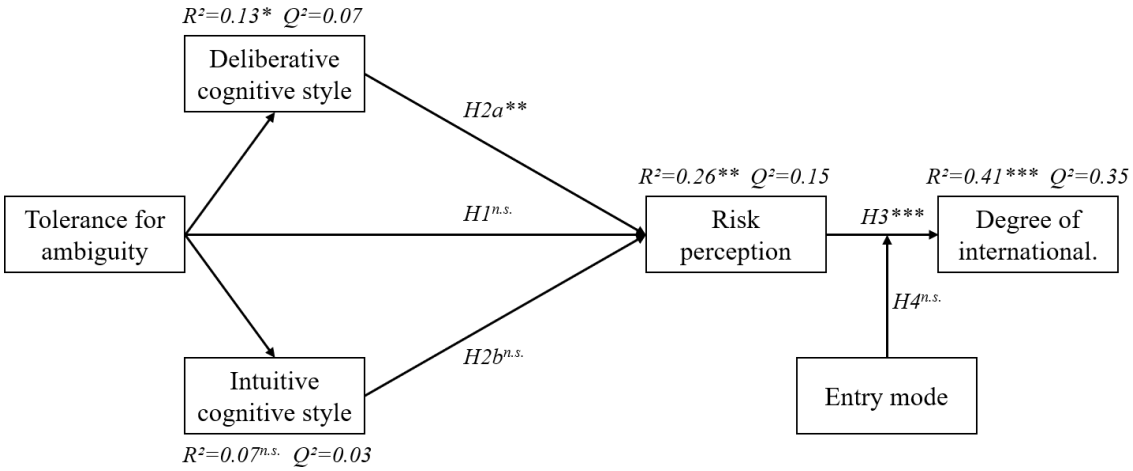

Figure 2. Research Model Explanation and Predictive Relevance
For β, if *p<0.05; if ** p<0.01; if *** p<0.001, if n.s not significant.

Regarding variance explained (R^2) we adopted the cut-off value of 0.10, with values between 0.19 and 0.33 considered weak explanation, values between 0.33 and 0.67 considered moderate explanation, and values higher than 0.67 considered strong explanation (Peng & Lai, 2012; Streukens & Leroi-Werelds, 2016). The model presented significant explanation and predictive power for the degree of internationalization (R^2=0.41; p<0.001 and Q^2=0.35) and risk perception (R^2=0.26; p<0.01 and Q^2=0.15). For deliberative cognitive style, despite being significant (R^2=0.13; p<0.05 and Q^2=0.07), the explanatory power of the variance is slightly above the cut-off value. Regarding the intuitive cognitive style, its variance explanation and predictive power were not significant (R^2=0.07; p=0.14 and Q^2=0.03).

We present the results of our path model analysis in Table 4. We started our model predicting that managers' tolerance for ambiguity would affect their perception of risk regarding internationalization. Thus, we hypothesized that managers with higher levels of tolerance for ambiguity and uncertain situations would be more likely to perceive lower levels of risk related to international operations. However, our Hypothesis 1 was not supported (β=0.04; t=0.57; p=0.57). Hence, tolerance for ambiguity by itself is not a predictor of managerial perception of risk when firms decide to internationalize.

Table 4

Structural Model

Predicted path	Hypoth	β	Conf. Int.		f^2	t Stat.	p-value	Outcome
TolAmb → RiskPercep	H1(-)	0.04	[-0.11,	0.18]	0.00	0.57	0.57	Refuted
TolAmb → DelbCS → RiskPercep	H2a(-)	0.18	[0.07,	0.33]	0.28	2.59	0.01**	Refuted
TolAmb → IntuitCS → RiskPercep	H2b(+)	0.00	[-0.07,	0.04]	0.00	0.19	0.85	Refuted
RiskPercep → DOI	H3(-)	0.21	[0.13,	0.33]	0.07	4.04	0.00***	Refuted
RiskPercep*EntryMode → DOI	H4(-)	0.10	[0.02,	0.30]	0.02	1.47	0.14	Refuted

Note. If *p<0.05, if ** p<0.01, if *** p<0.001; confidence interval for α=0.025; for f^2, 0.02 weak effects, 0.15 moderate effects, 0.35 strong effects.

Additionally, we also predicted that the relationship between managers' tolerance for ambiguity and risk perception would be mediated by the managers' preference for a given cognitive style. In this sense, managers with lower levels of tolerance for ambiguity possessing a deliberative cognitive style would likely perceive higher levels of risk regarding internationalization. Analysis of the specific indirect effects indicates strong refutation for this claim (β=0.18; t=2.59; p<0.01), not confirming our Hypothesis 2a that predicted this mediation in the opposite direction. However, it is noteworthy that the direct effect that was not manifested in isolation (TolAmb → RiskPercep) was significant in the presence

of the mediating variable (DelibCS), indicating a complete mediation of deliberative cognitive style in the relationship between tolerance for ambiguity and risk perception.

On the other hand, we also predicted that managers with a higher tolerance for ambiguity would perceive lower levels of risk concerning internationalization if they were more prone to adopt an intuitive cognitive style. The results of the mediation analysis could not find a significant specific indirect effect of intuitive cognitive style in the relationship between tolerance for ambiguity and risk perception, leading to the refutation of our Hypothesis 2b (β=0.00; t=0.18; p=0.85). In this regard, our findings suggest that tolerance for ambiguity is only a relevant cognitive trace for managers that prefer deliberation to intuition when deciding to internationalize. Thus, intuitive managers, tolerant of ambiguity or not, would not be likely to perceive the inherent risks in the internationalization processes.

In the following findings, we explore the influence of managers' risk perception on firms' degrees of internationalization. We predicted that firms with managers with higher levels of risk perception would present lower degrees of internationalization. However, despite being significant (β=0.21; t=4.04; p<0.001), the effect was in the opposite direction of that predicted, leading to refutation of Hypothesis 3. The findings in our sample suggest that managers with higher levels of risk perception came from firms with higher degrees of internationalization.

Likewise, we also predicted that the entry mode decision would moderate the relationship between managers' risk perceptions and firms' degrees of internationalization. In this regard, firms with managers presenting higher levels of risk perception would more likely be engaged in entry modes with less international commitment, and, as a consequence, present lower degrees of internationalization. Indeed, the results could not confirm Hypothesis 4 (β=0.10; t=1.47; p=0.14). Although not significant at a 95% confidence level, our findings suggest that the moderating effect could not be disregarded, since it was marginally below acceptable levels of significance with less-strict confidence intervals. Furthermore, the direct effect of entry mode on degree of internationalization also presents strong significance (β=0.56; t=8.91; p<0.001).

Control model

The last stage of our research was to control for the effects of firms' size and age on the baseline structural model through a PLS multi-group analysis (PLS-MGA). In this sense, we are looking for significant differences in the path coefficients between groups. For controlling firm size, we generated data groups of micro (*n*=48), small (*n*=44) and medium-sized firms (*n*=57). For controlling firm age, we also generated three groups, containing young firms (*n*=39; age < 10 years), established firms (*n*=54; 11 years > age < 20 years), and mature firms (*n*=56; age > 21 years).

Regarding our first hypothesis (H1), we found that firms' size and age had similar behavior in the three groups of age and size concerning the effects of tolerance for ambiguity on risk perception concerning internationalization. It is noteworthy that the procedure does not permit control for differences between specific indirect effects, that is, the mediations predicted in H2a and H2b.

In what refers to the effects of managers' risk perception on firms' degrees of internationalization (H3), we found significant differences in the results of young firms compared to established ones (p>0.98), and significant differences if compared to mature firms as well (p>0.95). In this regard, for young firms, managers' risk perception is not significantly affecting firms' degrees of internationalization, despite signaling a predicted negative effect (β=-0.08; t=0.45; p=0.65).

On the other hand, we found that the larger the firm size, the stronger the influence of managers' risk perception on the degrees of internationalization. The difference between firm size effect on the results found in the baseline structural model is marginally significant when comparing effects of risk perception on internationalization in micro and medium-sized firms (p=0.92). This finding denotes that the risk perception by managers from micro-sized firms does not significantly affect their degree of internationalization (β=0.06; t=0.31; p=0.76), while in medium-sized firms the risk perception is a strong indicator of the extent to which a firm is likely to internationalize (β=0.38; t=3.69; p<0.001). It

is relevant to note that in small-sized firms, the effect of risk perception was also not significant (β=0.18; t=1.03; p=0.30), but the difference compared to the other two groups is not statistically significant (vs. micro-sized, p=0.72; vs. medium-sized, p=0.86). It is also noteworthy that in this subsample, the direction of the path is also positive, contradicting the negative effect we originally predicted.

Finally, we also verified if there could be significant differences in our results regarding the moderation between risk perception and entry mode on the degree of internationalization (H4) when controlling for firm age and size. Our findings suggest the results presented in our baseline structural model are not affected by differences between younger and older firms, nor between smaller and larger firms.

Discussion and Concluding Remarks

The aim of our research was to verify the influence of cognitive antecedents in terms of managers' tolerance for ambiguity and cognitive style preference on their risk perception regarding international operations and its effect on the degree of internationalization of SMEs. Our findings suggest that tolerance for ambiguity alone may not be a significant antecedent of managers' risk perception when internationalizing, contradicting previous findings on both emerging (Acar, 2016) and developed markets (Acedo & Jones, 2007).

However, the findings concerning the mediation analysis show that tolerance for ambiguity only has a significant effect on risk perception when considering the deliberative cognitive style of the decision. The opposite is true for intuitive managers, where the effect of tolerance for ambiguity was still not significant. In this regard, our findings suggest that managers with higher levels of tolerance for ambiguity adopting a deliberative cognitive style are more likely to perceive higher levels of risk in international operations. By coping with resource scarcity and high levels of uncertainty, whether tolerant for ambiguity or not, Brazilian SME managers tend to be engaged more in deliberate and planned internationalization (Krakauer & Almeida, 2016), given that their motives for internationalizing may be more tied to necessity than to opportunity, contradicting recent trends to bring intuition back into internationalization discussion (Jones & Casulli, 2014).

Thus, such counterintuitive findings may suggest that tolerance for ambiguity as a managerial psychological trait may be context and cultural dependent (Kreiser, Marino, Dickson, & Weaver, 2010). Another possible explanation may reside in managers' cognitive changes during internationalization processes, given that managers may rely on both cognitive styles when internationalizing, with some experiencing cognitive changes towards a more intuitive stance, and others towards a more deliberative style (Apfelthaler, Shane, & Hruby, 2011).

We also found in this study that the relationship between risk perception and degree of internationalization that was established in the extant literature could not be replicated in the analysis of managers from Brazilian SMEs. For instance, even with their managers perceiving higher levels of risk, Brazilian SMEs still presented higher degrees of internationalization.

One may argue that before taking these results for granted as Brazilian SME reality, halo effects should be taken into consideration in forms of uncontrolled variables or effects (Rosenzweig, 2007). We recognize this limitation, especially considering that Brazilian firms are culturally attached to the domestic market, still being in the process of catching up to a global mindset (Carneiro & Brenes, 2014; Dib *et al.*, 2016), and that the recent decline of the internal economy may be forcing SMEs to assume higher levels of risk and to invest in international market operations.

Furthermore, our findings may spark a call for the discussion on internationalization driven by opportunity versus internationalization driven by necessity on IB research (Fuentelsaz, González, Maícas, & Montero, 2015). It is widely known that emerging market entrepreneurs are more likely to be driven by necessity than by opportunity (Sautet, 2013). Since in this research we focused only on risk

perception, we argue that the trade-off between risk and opportunity perception, aligned with the necessity to engage in international trade, deserves to be explored in further research, extending already existing efforts regarding the investigation of proactive versus reactive internationalization (Kiss *et al.*, 2013).

Regarding the moderation predicted between SMEs' risk perception, commitment to internationalization, and degree of internationalization, we found that entry mode does not affect managers' risk perception and degrees of internationalization. One may argue that the lack of effect is due to entry mode effects on the relationship between risk perception and degree of internationalization, and research should take into account other factors, such as commitment, risk, and control (Figueira-de-Lemos *et al.*, 2011; Jones & Young, 2009; Laufs & Schwens, 2014). Still, factors such as previous market knowledge, network partnership availability, foreign investments and equity shares, reactive behavior, and host market incentives and favorable conditions (Kiss *et al.*, 2013; Laufs & Schwens, 2014; Musso & Francioni, 2014) could also affect this relationship.

Our study presented managerial and theoretical contributions and implications. Theoretically, our findings suggest that established relationships in IB studies, such as risk perception and degree of internationalization, could be context dependent. In this sense, we recommend future studies include environmental variables in models, especially regarding domestic market drivers (positive or negative) for internationalization (Francioni, Pagano, & Castellani, 2016; Morgan, 1999) and opportunity versus necessity motivations. We extended the IB knowledge by demonstrating that tolerance for ambiguity, when combined with the deliberative preference of decision-making style, may increase the risk perceived by managers when engaging in international operations.

Still, our findings suggest that the extent to which managers perceive risks in international operations may not always be negatively associated with firms' degrees of internationalization. Thus, comparing the managers' perception of domestic market risks with the risks perceived in international markets may foster fruitful discussion in this regard. We also recommend that future research consider managers' risk perceptions in regards to their stance on risk-taking in order to internationalize to gain in international markets or to avoid losses in the domestic one (Lauriola, Levin, & Hart, 2007).

Concerning managerial implications, we suggest that the awareness of the cognitive process affecting their decision-making regarding internationalization by managers from Brazilian SMEs could point the direction towards the kind of cognitive style they should adopt in order to increase their likelihood of risk perception in international operations, avoiding decisions based solely on intuition. Thus, after analytical reasoning and deliberation, even if perceiving more risks, SMEs may be more comfortable in assuming risks, enhancing their degree of internationalization, and as a consequence, their access to new markets and revenue.

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