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BUSINESS INTELLIGENCE AND COMPETITIVENESS: THE MEDIATING ROLE OF ENTREPRENEURIAL ORIENTATION

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1. INTRODUCTION

In a strongly competitive, dynamic and volatile environment, firms must make the efforts to gather information needed to improve their decisions. This can be a challenge for every business but a more marked one to startups trying to get in a market (Foster, Smith, Ariyachandra, & Frolick, 2015).

Business Intelligence (BI) has attracted attention because we have an increase of information available through electronic means of acquisition, processing and communication that can be used as a basis for intelligence practices. Other motive is due to the context of great worldwide political and social change, increased global competition from new or more aggressive competition, and rapid technological changes (Nasri, 2012) that requires improved information use. An increase in uncertainty leads to increasing information processing activities within firms (Dishman & Calof, 2008). If not, the survival of firms may be at risk (Shollo, 2010)

As a special kind of enterprise, startups work to conquer their space in the market and grow, and, at the same time, develop competitive advantages to survive. We must note that a small firm is not a scaled-down version of larger firms. There are differences in terms of their structures, resources available, management practices, environmental response and the way they compete in the market (Man, Lau, & Chan, 2002).

The resource-based view (RBV) asserts that, to develop and maintain competitive advantages companies must use their physical assets, human assets, and organizational assets which are largely intangible. (Lonial & Carter, 2015; Molina, Del Pino, & Rodriguez, 2004). An important notion of this theory is that firms controlling valuable and rare resources have the capacity to build a competitive advantage, moreover, if this resources are difficult to imitate or substitute. (Wiklund & Shepherd, 2011)

BI can be seen as one of these assets that must be developed and used as a tool that can help and have great value for the gathering, analysis and dissemination of information to support better decisions.

In this study we approach BI by its characteristics seen as a multidimensional construct that evaluates several aspects: Intraindustry comprehensiveness, Interindustry analysis, BI formality and Perceived usefulness. The first to are concerned with external aspects of intelligence and the other two with internal structure and use of information. This combination can give us an understanding of the intelligence efforts to support decision.

In the entrepreneurship and strategy literature, Entrepreneurial Orientation (EO) is commonly pointed as having a positive effect on performance. Although, according with Wiklund and Shepherd (2011:929) “the majority of research on the topic implicitly assumes that EO somehow provides an advantage to firm”. Several studies suggest a relation between Entrepreneurial orientation and performance or competitiveness aspects, but according to Wang (2008) simply examining the direct EO- performance relationship provides an incomplete picture.

The need to control for internal and external factors that can influence this relationship is pointed as an important research path and different studies try to explore different factors (Gunawan, Jacob, & Duysters, 2016; Real, Roldán, & Leal, 2014; Shirokova, Bogatyreva, Beliaeva, & Puffer, 2016; Wang, 2008; Wiklund & Shepherd, 2003).

The traditional dimensions of EO: innovativeness, risk taking, and pro-activeness (Covin & Lumpkin, 2011; Covin & Miller, 2014; Lumpkin & Dess, 1996; Miller, 2011) appear to be more consistent with the domain of experimentation and new product markets, an usual posture of startups, than with the refinement of existing routines and product markets, more consistent with established firms (Wiklund & Shepherd, 2011).

As being competitive can be viewed as the ability of a good performance, or the generation and maintenance of competitive advantages (Guzmán, Gutiérrez, Cortes, & Ramírez, 2012), we use this concept, because it conveys the performance aspects and the capacity to compete, required to the startup survival.

This study aims to make two main contributions to literature. Since a lack of research regarding Business Intelligence studies and small firms (where startups are included) is reported (Hoppe, 2015), we try advance theory by exploring some aspects of Business Intelligence in startups.

As referred above, there is a need for research that explores the influence of internal or external factors on the EO-performance relationship but there is no evidence of research regarding business intelligence as a factor

that can impact either entrepreneurial orientation or startup competitiveness in the extant literature. Therefore, this study attempts to explore the relationships between these constructs, either by the direct influence of BI on startup competitiveness and by the mediating effect of EO on that relation.

To achieve our objectives, the article is structured as follows. Section 2 reviews prior research on Business Intelligence, Entrepreneurial Orientation and Startup competitiveness as the basis for proposing a series of hypotheses on the BI influence on competitiveness and the mediating effect of EO.

Section 3 presents the data and method used to analyze empirically the hypotheses developed in Section 2 in a sample of European startups. Section 4 presents the results obtained. Finally, Section 5 discusses the results, presents some limitations of this study and points some future research directions.

2. THEORETICAL BACKGROUND AND HYPOTHESES

2.1. BUSINESS INTELLIGENCE

Although recent technological developments have trended Business Intelligence research the concept is not new (Shollo, 2010). Some authors point to a long history of more than 2,000 years (Dishman & Calof, 2008; Tej Adidam, Banerjee, & Shukla, 2012). It borrows elements and processes from the military, government administration, business administration, marketing, economics, and to some extent intelligence-driven cultures (Maune, 2014).

Business Intelligence is an umbrella term, covering different activities, processes and technologies for gathering, storing and analyzing information to improve decision making (Wanda & Stian, 2015). It is a broad and complex initiative which has been defined and discussed differently by several authors and thus does not have a unanimous definition (Lukman, Hackney, Popovič, Jaklič, & Irani, 2011).

In the field of management, the concept has been studied under different titles (Tej Adidam et al., 2012). Some authors use the term BI to convey the concept of “environmental scanning”, which is focused on how managers “scan” their organizations’ environment; others refer to competitive intelligence or analysis (Berndtsson, Gudfinnsson, & Strand, 2015; Dishman & Calof, 2008; Shollo, 2010; Wright & Calof, 2006) more focused on the competitors, their strengths and weakness and behavior; while others research mention technological intelligence oriented towards technological dynamics (Hannula & Pirttimäki, 2003; Pellissier & Nenzhelele, 2013; Tej Adidam et al., 2012).

Other labels used at various times to describe more or less the same concept include market (or marketing) intelligence, customer intelligence, product intelligence and environmental intelligence (Hannula & Pirttimäki, 2003; Venter & Tustin, 2012) or capturing other, more specific, intelligence (Hoppe, Hamrefors, & Soilen, 2009; Shollo, 2010).

The practice allows firms to convert data into useful intelligence and knowledge (Hoppe et al., 2009), and then make better and faster decisions (Y.-W. Chang, Hsu, & Wu, 2014; Hannula & Pirttimäki, 2003) to enhance business performance and support decision-making at all organizational levels, i.e., strategic, tactical and operational levels (Berndtsson et al., 2015). It has a permanent nature and allows the discovery of problems and general awareness about the state of activities (Shollo & Galliers, 2015).

It’s important to note that BI has impact not only in decision making process but also in the practices of organizational actors – how they make sense of, create and share knowledge (Shollo & Galliers, 2015).

In a review by Wanda & Satian (2015) they present that the main perceived benefits from BI are: better decisions, improvements in business processes and support for the accomplishment of strategic business objectives among others.

2.2. BI AND COMPETITIVENESS

Competitiveness means the abilities of individual firms (or whole sectors, regions and even countries) to assert themselves successfully in the domestic and global market. Competitiveness is not only a result of entrepreneurial activity of individual firms, but also a result of an appropriate structural policy, functioning competitive policy and adequate infrastructure. In capitalist system businesses survive and thrive through successful competition (Maune, 2014).

The concept of competitiveness can be seen in different perspectives. Some define competitiveness as a condition, focusing on what factors lead to being competitive; whereas others define it as an attitude, alluding on how it can be achieved (Man et al., 2002; Maune, 2014) or also, the successful outcome and long-term performance of the subject related to its competitors, which is the result of being competitive (Man et al., 2002). It can be viewed as the ability of a good performance, or the generation and maintenance of competitive advantages, a process of benchmarking, the trade performance and trade terms, labor costs, and also as factor productivity growth (Guzmán et al., 2012)

Competitiveness assumes a matching between the firm's strategy and his internal competencies with external opportunities and the acceptance and adjustment of the strategy by the environment in which the firm competes. This provides a sustainable competitive advantage towards the competitors, securing and growing market share and generating profits. (Maune, 2014)

Firm competitiveness relates to continuous presence in the markets, profit-making, and the ability to adapt production to demand (Díaz-Chao, Sainz-González, & Torrent-Sellens, 2015) and to the changes in the environment. This requires some degree of mastery about the industry, superior cost management, and follow-up of the political-economic environment around it, implying a need for both external and internal considerations (Man et al., 2002).

Given the challenges competitiveness present to businesses in general, and startups in particular, the concept of intelligence as a process has long been proposed as an effort to increase a firm's competitiveness, becoming more vital to firm survival in today's dynamic markets through improved effectiveness and efficiency (Maune, 2014).

To our knowledge there are no studies exploring the effects of BI in competitiveness in the context of startups, so we propose the following research hypothesis:

H1: A direct positive relation exists between business intelligence characteristics and startup competitiveness.

2.3. THE MEDIATING ROLE OF ENTREPRENEURIAL ORIENTATION

Entrepreneurial orientation refers to the processes, practices and decision-making activities that lead to a new entry into the market (Covin & Miller, 2014; Lumpkin & Dess, 1996). Entrepreneurial orientation is an effective means for coping with competitive threats and avoiding competitive pressures, being imperative in a firm's entrepreneurial process, namely in opportunity recognition, innovation practices and opportunity exploitation (Chen, Li, & Evans, 2012).

Literature conceptualizes entrepreneurial orientation as a composite construct consisting of three dimensions: proactiveness, innovativeness and risk taking (Covin & Miller, 2014; Herath & Mahmood, 2014; Wiklund & Shepherd, 2003).

Proactiveness refers to the degree to which a firm acts in anticipation of future market needs and changes (Covin & Miller, 2014; Hughes & Morgan, 2007; Lumpkin & Dess, 1996) by looking at situations in which new goods, services, raw materials, and organizing processes can be introduced and sold at greater value than their cost of production or the discovery of new means-ends relationships (Davidsson, 2015; Shane & Venkataraman, 2000). Proactive firms try to be pioneers, capitalizing on emerging opportunities (Wiklund & Shepherd, 2003).

Proactiveness has an opportunity-seeking, forward-looking perspective that involves introduction of new products or services ahead of the competition and acting in anticipation of future demand to create change and shape the environment). This gives a firm the ability to anticipate change or needs in the marketplace and be among the first to act on them (first-mover advantage) (Dhliwayo, 2014).

Innovativeness refers to the degree to which a firm engages in and embraces new ideas, novelty, experimentation and creativity that may lead to new products, services or processes (Lumpkin & Dess, 1996; Wang, 2008).

It can be viewed as an aspect of a firm's culture: the openness to new ideas; that can help a firm to survive in a volatile environment (Calantone, Cavusgil, & Zhao, 2002). Innovation is seen as an activity that is within

the control of a firm which management can control or manipulate (Prajogo, 2015), engaging in experimentation and creative processes that may result in new products, services or technological processes (Dhliwayo, 2014).

Firm's actions including their innovative activities are contingent, and sometimes driven, by external factors including customer (market) demand, competitors' actions, or even government's legislation (Prajogo, 2015). This aspects should be known and incorporated in decision making but that aren't always available or complete.

The above activities cannot be implemented without a third dimension: risk taking. Risk taking refers to the degree to which managers are willing to make large and risky resource commitments—i.e., those which have a reasonable chance for a costly failure (Covin & Miller, 2014; De Clercq, Dimov, & Thongpapanl, 2013; Fern, Cardinal, & O'Neill, 2012).

We must note that risk acceptance is dominant in academic literature about entrepreneurship (Morrison, 2006). As some authors point, entrepreneurs see opportunities in situations in which other people tend to see risks. For this they must be willing to take risks of being wrong about the opportunity and put some effort, time and money forward before a return exists and the opportunity is validated (Shane & Venkataraman, 2000).

Risk-taking differs from proactiveness because it reflects the willingness to use new approaches, venturing into the unknown without knowing the probability of success. Firms that are willing to take risks are also more prone to focus attention and effort toward the pursuit of new opportunities (Clausen & Korneliusen, 2012). Hence, risk-taking is often positively associated with proactiveness (Wiklund & Shepherd, 2003).

Moreover, small businesses and startups are smaller economic units (employees, assets and resources and scale) compared with larger corporations, facing diversified and complicated risks in their activities (Zha & Chen, 2009).

From the literature we can anticipate a relation between BI and EO. Since BI is concerned with information use for better decisions, it can have influence in the entrepreneurial orientation of the firm. If we note the dimensions that are usually considered in the literature regarding entrepreneurial orientation - Proactiveness, innovativeness and risk taking, we can postulate that better use of information can influence these dimensions positively.

H2: There is a positive relation between business intelligence characteristics and entrepreneurial orientation in startups.

Previous studies already explored the relationship between EO and firm performance (Herath & Mahmood, 2014; Koryak et al., 2015; Wiklund & Shepherd, 2003). There some other studies that approach firm competitiveness from the owners or business dimensions (Chen et al., 2012; Fern et al., 2012; Madhok & Marques, 2014; Wright, Bisson, & Duffy, 2012). Given the importance of entrepreneurial orientation as theoretical framework, we propose the following research hypothesis:

H3: A positive relationship exists between entrepreneurial orientation and startup competitiveness.

A structural equation model is adopted for analyzing the conceptual model and the research hypotheses proposed for this study as shown in figure 1.

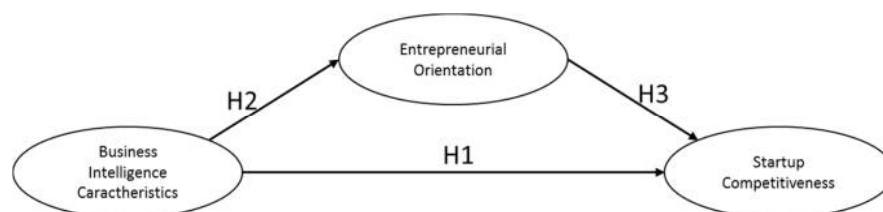


Figure 1- Conceptual framework

3. RESEARCH METHODS

3.1. SAMPLE

Given the nature of startup firms, there is no up-to-date published list of nascent firms that can be used as a sample basis. Every day new startups are created and not always readily visible.

To overcome this problem, we contacted several business incubators to try to obtain a list of their supported firms or ask them to disseminate the enquiry. The incubators were selected based on references in specialized publications mentioning their successful work with this type of firms and were located in different European countries. The choice for using incubators as a proxy to startups is due to the fact that these organizations work directly with the population we want to address.

Several incubators replied, declining collaboration with this research. They justified their position arguing that they receive a high number of requests to participate in similar academic studies and is not feasible to satisfy all the requests. To overcome this situation, we obtained the contacts of the supported startups, that were listed in the incubators websites and contacted them directly, asking for their participation in this research. We recognize this as convenience sample but attending the nature of the population, we think that is a suitable approach.

A database with a total of 3.100 emails was constructed with a list of startups that are being supported by the incubators services or have already graduated but are being followed. An individual email was sent, inviting to participate and answer the questions in an online survey. The questionnaire was created and managed using the open-source software *Limesurvey*.

Two follow-up reminders were sent at the third and sixth week, after the initial invitation email. A total of 664 responses were obtained. From these, 228 were used because of completion issues. The reply rate was of near 7%, deemed acceptable to an online survey. Although our response rate may appear low, it is offset in part by the fact that most of the reviewed papers use samples of similar size or lower.

A higher number of answers were obtained from Portuguese startups (n=143/63%), and the remaining cases were divided between different European countries (n=85/37%). In Table 1 we show more information about the demographics of the sample.

Number of employees	N
10 or less	182
]10, 50]	41
More than 50	5
Years of activity	
Less that 2	41
3	54
4	70
5	14
More that 5	49
TOTAL	228

Table 1- Sample characteristics

One limitation of the followed sampling approach results from the activity area of the startups. One of the survey questions asked for this information and the analysis of the results show that the startups in the sample operate mostly in services, consulting or software development (web and apps), as expected, since this is the typical business profile we find in incubators.

3.2. VARIABLES AND MEASURES

The measures used in this study were all based on those used in previous studies on similar topics in order to ensure their content validity.

The measures of Business Intelligence characteristics were derived from the study by Zahra et al. (2002). It consisted on 16 measurement items grouped in four dimensions: Intraindustry comprehensiveness, interindustry analysis, formality and perceived usefulness. The items for the scale are shown in Table 2.

Respondents were asked to provide their perceived rating for the stated items, based on their startup experience and Business Intelligence practices, in a Likert-type scale of five items, ranging from strongly disagree (1) to strongly agree (5).

The scale was evaluated for internal consistency using the Cronbach alpha with a value of 0.887.

Item	Dimension
Cover small and large competitors.	Intraindustry comprehensiveness
Cover competitors' major resources and capabilities.	
Cover competitors' strengths and weaknesses.	
Cover competitors' strategy.	
Cover competitors' operations.	
Cover domestic and foreign competitors.	Interindustry analysis
Cover competitors in other industries.	
Examine competitive trends in other industries.	
Are usually limited to the company's primary operations	BI formality
Are conducted informally	
Are performed continuously.	
Are supported by our company's senior executives (or owners).	
Are well-supported financially by the company's senior executives.	Perceived usefulness
Generate reports and analyses that match executives' information needs.	
Are evaluated frequently to ensure they match informational needs of managers.	
Produce reports that are understandable and relatively easy to use.	
Are user-unfriendly.	

Table 2- Business Intelligence characteristics scale items

The scale for measuring entrepreneurial orientation comprises nine items grouped in the three cited dimensions: proactiveness, innovativeness and risk taking. (Clausen & Korneliusson, 2012; Covin & Miller, 2014; Smart & Conant, 1998). This scale also uses a five point Likert-type scale of agreement as the previous one. The value of the Cronbach alpha for this construct is 0,74.

"Our startup has..."	Dimension
A cultural emphasis on innovation and R&D	Innovativeness
A high rate of product introduction	
A bold and innovative product development effort	
An initiative, pro-active posture	Proactiveness
A tendency to be the first to introduce new technologies and products	
A competitive posture towards competitors	Risk taking
A strong proclivity for high risk, high return projects	
An environment that requires boldness from the firm to archive its objectives	
When faced with risk, the firm adopts an aggressive, bold posture	

Table 3- Entrepreneurial orientation scale items

Last, competitiveness was measured using the scale developed by Wu et al (2008). As the authors argue most studies on measuring firm competitiveness adopted financial indicators, which have limited applicability to the startup reality. If we take into consideration the nascent life cycle of these firms, financial figures do not necessarily reflect sustained improvements in their competitive performance and also they are hard to obtain and difficult to interpret in the context of new ventures (Stam & Elfring, 2008). This scale is of multidimensional nature and seems interesting for young firms because to survive and prosper, it is imperative that they present something new to market; are capable of respond to market demands; have the internal ability to control their productive processes and also, they keep looking for new developments. They must conquer a customer base using an interesting competitive offer, to survive in the short term and develop future profitability (Hughes & Morgan, 2007).

In this study, competitiveness describes the achievements of firms compared to their competitors. Other studies are in line with the approach of comparison the firms position with their competitors (Wiklund & Shepherd, 2003, 2011).

The authors replaced financial measurements with six measurements that are deemed more suitable to evaluate startup firms competitiveness, as follows: innovation speed; speed of response to the market; production efficiency; product quality; production flexibility; and R&D capability (Wu, Wang, Chen, & Pan, 2008). The firms were asked to evaluate their performance related to the six above mentioned items, in a 5 point Likert scale, ranging from (1) "Much worse than competitors" to (5) "Much better than competitors". The value of the Cronbach alpha for the scale is 0,67.

The presented variables were tested for normality. Literature presents different reference values that kurtosis (ku) and skewness (sk) measures must respect to assess for normality. We use the conditions that $|ku| < 2$ and $|sk| < 7$. None of the variables violate these limits.

Also, the tests for variance inflation factor (VIF) were calculated. The results show values for $VIF < 5$ with their tolerance values higher than .2, so we can conclude that there are no collinearity problems.

3.3. COMMON METHOD BIAS

When self-report questionnaires are used to collect data at the same time from the same participants, a common method variance (CMV) can be a problem. This concern is strongest when both the dependent and independent variables are perceptual measures derived from the same respondent, the same scale type is used along the questionnaire or different constructs are measured at the same time by the same questionnaire. Self-report data can create false correlations if the respondents have a propensity to provide consistent answers to survey questions that are otherwise not related (S.-J. Chang, Van Witteloostuijn, Eden, & Eden, 2010; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

Since, some of the procedures used in this study can promote the emergence of CMV, we performed a Harman's single factor test and a common latent factor (CLF) analysis (Podsakoff et al., 2003; Podsakoff, MacKenzie, & Podsakoff, 2011).

Following the Harman's test, a single factor can't explain more than 24% of the variance and there were 4 factors with eigenvalues greater than 1, explaining 65% of the total variance.

The CLF method requires that that all item of the model be restricted to load on a common single factor (Podsakoff et al., 2011) and examines the significance of theoretical constructs with or without the common factor method.

The results from these tests suggest that common method variance is not present and do not hinder the results.

4. RESULTS

A previous note regarding the results and the measurement of firm competitiveness. From the six indicators retrieved from the literature, we eliminated "R&D capability" from the model given the low load in the construct "startup competitiveness", meaning a weak explanatory effect. This can be due to the nature of the firms sampled, since startups have a lack of R&D capability or view this as a big firm's feature.

The path analysis is employed to test the causal relationship between the research constructs (Chi-square value was 51,76, $DF=49$ and a p-value of 0,367). The results revealed that the overall disposition of the model-fit indexes are excellent. The results for the common indexes were: $GFI = .964$, $AGFI = .943$, $RMSEA = .016$, $NFI = .900$ $TLI = .992$, and $CFI = .994$.

The analytical results support two of the three hypotheses. The supported hypotheses include:

- H2 - Business intelligence characteristics positively influences Entrepreneurial orientation
- H3 - Entrepreneurial orientation has a positive influence on startup competitiveness

However, hypothesis 1 (Direct positive relation exists between Business Intelligence characteristics and startup competitiveness) was not supported (see Table 4).

Path	Hypotheses	Standardized Estimate	p-value
BI characteristics → competitiveness	H1	0,12	.223
BI characteristics → Entrepreneurial orientation	H2	0,40	<.001
EO → Startup competitiveness	H3	0,37	.007

Table 4- SEM path results

Despite the literature suggests a positive relationship between BI and competitiveness (Maune, 2014) this was not confirmed in the present study. A justification to these findings can be associated to the fact that the Business Intelligence that a firm conduct must be subject to some internal transformation and used in some way to influence the firm competitiveness, and so no direct influence was uncovered.

The positive and significant relation between BI characteristics and entrepreneurial orientation found can be justified because the use of information in result of Business Intelligence can improve the support to proactiveness and innovativeness aspects and, at the same time, reduce the risk that entrepreneurs assume. The information use can provide support to those organizational dimensions.

As expect from the literature, and in line with previous studies, a positive and significant relation was found between EO and startup competitiveness. This means that the efforts made in terms of entrepreneurial orientations dimensions have impact on competitive results.

Given the nature of the sample used, with a more Portuguese firms (as mentioned on section 2.1) a Chi Square test was used to verify for differences between the full model as presented above, and a model constrained by group (Portuguese and Other EU countries of origin).

The results of Chi-Square difference between models is 16,271 (Df=12). Since the critical Chi-square value for a 95% confidence interval is 21,02, we can assume that both models have no significant differences.

5. FINAL CONSIDERATIONS, LIMITATIONS AND FUTURE DIRECTIONS

The primary contribution of this article is that Entrepreneurial Orientation moderates the relationship between Business Intelligence and startup competitiveness.

This is important because BI is normally a resource that firms develop and explore that can influence the information available. It can be considered an internal organizational variable and as stated in previous literature, these can influence entrepreneurial orientation (Lumpkin & Dess, 1996). BI can enhance the dimensions of entrepreneurial orientation and help startups to be more innovative, proactive, and risk takers. From this, a positive impact results in better competitive behaviors. The mediating effect is supported by the results.

Although EO has received attention from the research community both empirically and conceptually, the studies tend to focus on the relation with performance. This study makes a contribution to explore the relation with firm competitiveness, using a scale adjusted to startups.

Despite the literature suggesting a positive relationship between BI and competitiveness (Maune, 2014), the results show no significant relation. This can be due to the nature of the sample. Usually Business Intelligence studies tend to focus on established companies. As far as we know there are no studies focusing on startups to compare the results.

Finally, another contribution results from the analysis of Business Intelligence in startups. Addressing this group of firms, the present study also fulfills a gap in literature regarding the lack of research about business intelligence focused on small businesses and startups (Hoppe, 2015).

As practical implications we wish to highlight the importance that BI characteristics can have in improving the competitiveness of the firm. Business Intelligence tend to focus mostly in technical aspects but is important to note the positive impact in organizational aspects.

We think that, from the findings, practitioners must raise awareness to the impact Business Intelligence practices and characteristics can have. This topic may be addresses in training and information sessions directed to startups, namely by incubators.

A few remarks can be made regarding the limitations of this study. One is the sample characteristics namely the representativeness of the different countries of origin of the startups. To try to overcome this limitation, we used only two groups: Portuguese and Other European startups. Also, differences among sub-groups on the sample were not taken in to account.

We must acknowledge that there can be differences in the interpretation of the questions and items used in the survey. Although items used were already tested and present in the literature, different language level of respondents and their level of understanding can rise some concerns. This situation can be surpassed with future studies with similar samples.

Another possible limitation is tied to the fact that we considered the constructs: Business Intelligence, Entrepreneurial Orientation and Competitiveness as latent variables measured by the mentioned literature factors. For instance, the EO construct was measure by innovativeness, risk taking and proactiveness. An improvement in the study can be made if we explore the same model but use a multidimensional construct approach instead. This can help understand which factors have impact in the relationships under analysis.

Future research questions not addressed in this paper can include the study of differences among groups of startups (e.g. by country, sector, previous experience or years of existence). Also, to verify the influence of factors external factors such as environmental turbulence or other important concepts in entrepreneurship literature, such as dynamic capabilities or absorptive capacity.

REFERENCES

- Berndtsson, M. M., Gudfinnsson, K. K., & Strand, M. M. (2015). Analyzing business intelligence maturity. *Journal of Decision Systems*, 24(1), 37–54. <http://doi.org/10.1080/12460125.2015.994287>
- Calantone, R. J., Cavusgil, S. T., & Zhao, Y. (2002). Learning orientation, firm innovation capability, and firm performance. *Industrial Marketing Management*, 31(6), 515–524. [http://doi.org/10.1016/S0019-8501\(01\)00203-6](http://doi.org/10.1016/S0019-8501(01)00203-6)
- Chang, S.-J., Van Witteloostuijn, A., Eden, L., & Eden, L. (2010). From the Editors: Common method variance in international business research. *Journal of International Business Studies*, 41(2), 178–184. <http://doi.org/10.1057/jibs.2009.88>
- Chang, Y.-W., Hsu, P.-Y., & Wu, Z.-Y. (2014). Exploring managers' intention to use business intelligence: the role of motivations. *Behaviour & Information Technology*, 34(3), 273–285. <http://doi.org/10.1080/0144929X.2014.968208>
- Chen, Y.-C., Li, P.-C., & Evans, K. R. (2012). Effects of interaction and entrepreneurial orientation on organizational performance: Insights into market driven and market driving. *Industrial Marketing Management*, 41(6), 1019–1034. <http://doi.org/10.1016/j.indmarman.2012.01.017>
- Clausen, T., & Korneliussen, T. (2012). The relationship between entrepreneurial orientation and speed to the market: The case of incubator firms in Norway. *Technovation*, 32(9–10), 560–567. <http://doi.org/10.1016/j.technovation.2012.05.004>
- Covin, J. G., & Lumpkin, G. T. (2011). Entrepreneurial orientation theory and research: Reflections on a needed construct. *Entrepreneurship: Theory and Practice*, 35(5), 855–872. <http://doi.org/10.1111/j.1540-6520.2011.00482.x>
- Covin, J. G., & Miller, D. (2014). International Entrepreneurial Orientation: Conceptual Considerations, Research Themes, Measurement Issues, and Future Research Directions. *Entrepreneurship Theory and Practice*, 38(1), 11–44. <http://doi.org/10.1111/etap.12027>
- Davidsson, P. (2015). Entrepreneurial opportunities and the entrepreneurship nexus: A re-conceptualization. *Journal of Business Venturing*, 30(5), 674–695. <http://doi.org/10.1016/j.jbusvent.2015.01.002>
- De Clercq, D., Dimov, D., & Thongpapanl, N. T. (2013). Organizational Social Capital, Formalization, and Internal Knowledge Sharing in Entrepreneurial Orientation Formation. *Entrepreneurship Theory and Practice*, 37(3), 505–537. <http://doi.org/10.1111/etap.12021>
- Dhliwayo, S. (2014). Entrepreneurship and Competitive Strategy: An Integrative Approach. *Journal of Entrepreneurship*, 23(1), 115–135. <http://doi.org/10.1177/0971355713513356>
- Díaz-Chao, Á., Sainz-González, J., & Torrent-Sellens, J. (2015). The competitiveness of small network-firm: A practical tool. *Journal of Business Research*. <http://doi.org/10.1016/j.jbusres.2015.10.053>
- Dishman, P. L., & Calof, J. L. (2008). Competitive intelligence: a multiphase precedent to marketing strategy. *European Journal of Marketing*, 42(7/8), 766–785.

<http://doi.org/10.1108/03090560810877141>

- Fern, M. J., Cardinal, L. B., & O'Neill, H. M. (2012). The genesis of strategy in new ventures: escaping the constraints of founder and team knowledge. *Strategic Management Journal*, 33(4), 427–447. <http://doi.org/10.1002/smj.1944>
- Foster, K., Smith, G., Ariyachandra, T., & Frolick, M. N. (2015). Business Intelligence Competency Center: Improving Data and Decisions. *Information Systems Management*, 32(3), 229–233. <http://doi.org/10.1080/10580530.2015.1044343>
- Gunawan, T., Jacob, J., & Duysters, G. (2016). Network ties and entrepreneurial orientation: Innovative performance of SMEs in a developing country. *International Entrepreneurship and Management Journal*, 12(2), 575–599. <http://doi.org/10.1007/s11365-014-0355-y>
- Guzmán, G. M., Gutiérrez, J. S., Cortes, J. G., & Ramírez, R. G. (2012). Measuring the competitiveness level in furniture SMEs of Spain. *International Journal of Economics and Management Sciences*, 1(11), 9–19.
- Hannula, M., & Pirttimäki, V. (2003). Business intelligence empirical study on the top 50 Finnish companies. *Journal of American Academy of Business*, 2, 593–599.
- Herath, H. M. A., & Mahmood, R. (2014). Strategic Orientations and SME Performance: Moderating Effect of Absorptive Capacity of the Firm. *Asian Social Science*, 10(13), 95–107. <http://doi.org/10.5539/ass.v10n13p95>
- Hoppe, M. (2015). Intelligence as a discipline, not just a practise. *Journal of Intelligence Studies in Business*, 5(3), 47–56.
- Hoppe, M., Hamrefors, S., & Soilen, K. S. (2009). Competitive Intelligence: Competing, Consuming and Collaborating in a Flat World Proceedings of the Third European Competitive Intelligence Symposium.
- Hughes, M., & Morgan, R. E. (2007). Deconstructing the relationship between entrepreneurial orientation and business performance at the embryonic stage of firm growth. *Industrial Marketing Management*, 36(5), 651–661. <http://doi.org/10.1016/j.indmarman.2006.04.003>
- Koryak, O., Mole, K. F., Lockett, A., Hayton, J. C., Ucbasaran, D., & Hodgkinson, G. P. (2015). Entrepreneurial leadership, capabilities and firm growth. *International Small Business Journal*, 33(1, SI), 89–105. <http://doi.org/10.1177/0266242614558315>
- Lonial, S. C., & Carter, R. E. (2015). The Impact of Organizational Orientations on Medium and Small Firm Performance: A Resource-Based Perspective. *Journal of Small Business Management*, 53(1), 94–113. <http://doi.org/10.1111/jsbm.12054>
- Lukman, T., Hackney, R., Popovič, A., Jaklič, J., & Irani, Z. (2011). Business Intelligence Maturity: The Economic Transitional Context Within Slovenia. *Information Systems Management*, 28(3), 211–222. <http://doi.org/10.1080/10580530.2011.585583>
- Lumpkin, G. T., & Dess, G. G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Review*, 21(1), 135–172. <http://doi.org/10.5465/AMR.1996.9602161568>
- Madhok, A., & Marques, R. (2014). Towards an action-based perspective on firm competitiveness. *BRQ Business Research Quarterly*, 17(2), 77–81. <http://doi.org/10.1016/j.brq.2014.03.002>
- Man, T. W. ., Lau, T., & Chan, K. . (2002). The competitiveness of small and medium enterprises. *Journal of Business Venturing*, 17(2), 123–142. [http://doi.org/10.1016/S0883-9026\(00\)00058-6](http://doi.org/10.1016/S0883-9026(00)00058-6)
- Maune, A. (2014). Competitive Intelligence and Firm Competitiveness: an Overview. *Corporate Ownership & Control*, 11(1), 533–542.
- Miller, D. (2011). Miller (1983) Revisited: A Reflection on EO Research and Some Suggestions for the Future. *Entrepreneurship Theory and Practice*, 35(5), 873–894. <http://doi.org/10.1111/j.1540-6520.2011.00457.x>
- Molina, M. A., Del Pino, I. B., & Rodriguez, A. C. (2004). Industry, management capabilities and firms' competitiveness: An empirical contribution. *Managerial and Decision Economics*, 25(June), 265–281.

<http://doi.org/10.1002/mde.1148>

- Morrison, A. (2006). A contextualisation of entrepreneurship. *International Journal of Entrepreneurial Behaviour & Research*, 12(4), 192–209. <http://doi.org/10.1108/13552550610679159>
- Nasri, W. (2012). Conceptual model of strategic benefits of competitive intelligence process. *International Journal of Business and Commerce*, 1(6), 25–35.
- Pellissier, R., & Nenzhelele, T. E. (2013). Towards a universal definition of competitive intelligence. *SA Journal of Information Management*, 15(2), 1–7. <http://doi.org/10.4102/sajim.v15i2.559>
- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *The Journal of Applied Psychology*, 88(5), 879–903. <http://doi.org/10.1037/0021-9010.88.5.879>
- Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2011). Sources of Method Bias in Social Science Research and Recommendations on How to Control It. *Annual Review of Psychology*, 63(1), 539–569. <http://doi.org/10.1146/annurev-psych-120710-100452>
- Prajogo, D. I. (2015). The strategic fit between innovation strategies and business environment in delivering business performance. *International Journal of Production Economics*. <http://doi.org/10.1016/j.ijpe.2015.07.037>
- Real, J. C., Roldán, J. L., & Leal, A. (2014). From Entrepreneurial Orientation and Learning Orientation to Business Performance: Analysing the Mediating Role of Organizational Learning and the Moderating Effects of Organizational Size. *British Journal of Management*, 25(2), 186–208. <http://doi.org/10.1111/j.1467-8551.2012.00848.x>
- Shane, S., & Venkataraman, S. (2000). The Promise of Entrepreneurship as a Field of Research. *The Academy of Management Review*, 25(4), 217–226.
- Shirokova, G., Bogatyreva, K., Beliaeva, T., & Puffer, S. (2016). Entrepreneurial orientation and firm performance in different environmental settings. *Journal of Small Business and Enterprise Development*, 23(3), 703–727. <http://doi.org/10.1108/JSBED-09-2015-0132>
- Shollo, A. (2010). Towards an Understanding of Business Intelligence. *21st Australasian Conference on Information Systems*, 1–11.
- Shollo, A., & Galliers, R. D. (2015). Towards an understanding of the role of business intelligence systems in organisational knowing. *Information Systems Journal*, n/a-n/a. <http://doi.org/10.1111/isj.12071>
- Smart, D., & Conant, J. (1998). Entrepreneurial orientation, distinctive marketing and competencies and organizational performance. *Journal of Applied Business Research*.
- Stam, W., & Elfring, T. (2008). Entrepreneurial orientation and new venture performance: the moderating role of intra- and extraindustry social capital. *Academy of Management Journal*, 51(1), 97–111.
- Tej Adidam, P., Banerjee, M., & Shukla, P. (2012). Competitive intelligence and firm's performance in emerging markets: an exploratory study in India. *Journal of Business & Industrial Marketing*, 27(3), 242–254. <http://doi.org/10.1108/08858621211207252>
- Venter, P., & Tustin, D. (2012). The availability and use of competitive and business intelligence in South African business organisations. *Southern African Business Review*, 13(2), 88–117. Retrieved from <http://www.ajol.info/index.php/sabr/article/view/76337/66795>
- Wanda, P., & Stian, S. (2015). The Secret of my Success: An exploratory study of Business Intelligence management in the Norwegian Industry. *Procedia Computer Science*, 64(1877), 240–247. <http://doi.org/10.1016/j.procs.2015.08.486>
- Wang, C. L. (2008). Entrepreneurial orientation, learning orientation, and firm performance. *Entrepreneurship Theory and Practice*, 32(4), 635–656. <http://doi.org/10.1111/j.1540-6520.2008.00246.x>
- Wiklund, J., & Shepherd, D. (2003). Knowledge-based resources, entrepreneurial orientation, and the performance of small and medium-sized businesses. *Strategic Management Journal*, 24(13), 1307–1314. <http://doi.org/10.1002/smj.360>

- Wiklund, J., & Shepherd, D. A. (2011). Where to from here? EO-as-experimentation, failure, and distribution of outcomes. *Entrepreneurship: Theory and Practice*, 35(5), 925–946. <http://doi.org/10.1111/j.1540-6520.2011.00454.x>
- Wright, S., Bisson, C., & Duffy, A. P. (2012). Applying a behavioural and operational diagnostic typology of competitive intelligence practice: empirical evidence from the SME sector in Turkey. *Journal of Strategic Marketing*, 20(1), 19–33. <http://doi.org/10.1080/0965254X.2011.628450>
- Wright, S., & Calof, J. L. (2006). The quest for competitive, business and marketing intelligence. *European Journal of Marketing*, 40(5/6), 453–465. <http://doi.org/10.1108/03090560610657787>
- Wu, L.-Y., Wang, C.-J., Chen, C.-P., & Pan, L.-Y. (2008). Internal Resources, External Network, and Competitiveness during the Growth Stage: A Study of Taiwanese High-Tech Ventures. *Entrepreneurship Theory and Practice*, 32(3), 529–549. <http://doi.org/10.1111/j.1540-6520.2008.00239.x>
- Zahra, S. A., Neubaum, D. O. D. O., & El-Hagrassey, G. M. G. M. (2002). Competitive Analysis and New Venture Performance: Understanding the Impact of Strategic Uncertainty and Venture Origin. *Entrepreneurship Theory and Practice*, 27(1), 1–28. <http://doi.org/10.1111/1540-8520.t01-2-00001>
- Zha, X., & Chen, M. (2009). Competitive Intelligence Monitoring in the Risk Prevention of SMEs. *Journal of Service Science and Management*, 2(3), 230–235. <http://doi.org/10.4236/jssm.2009.23028>