

The project management maturity effect in the relation between the sustainability level and organization performance

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Abstract

Companies are seeking sustainability as a value and it grows every day. In the context of secondary sector companies, the consequence of that is a need to evaluate how much the investment in sustainability brings a better financial performance. In addition, companies have also invested in projects, on the grounds that the need for innovation and new technologies. The objective of this study is to analyze the project management maturity effect in the relation between sustainability level and organization performance in 64 Brazilian companies of the secondary sector. To do so, a quantitative approach was adopted, through multivariate analysis of data using secondary databases. Our findings suggest that there is a relation between the sustainability level and project management maturity. However, it was not identified relation between the sustainability level and the organizational performance, among the companies composed by Corporate Sustainability Index (ISE) portfolio in 2016. Although there are no significant results in the tests, this study may also be considered essential for the literature and future studies.

Key-words: Sustainability; Sustainable Index; Profit; ISE; Project Management Maturity

1. Introduction

Companies have been searching for strategies that enhance their profits (Reckziegel, Silva & Contador, 2016). As an alternative to work it is based on the Triple Bottom Line (TBL) which adopts three main pillars known as social, environmental, and economical allowing companies to broaden their competitiveness (Sulistiarini, Suparman, Santoso & Tama, 2018). There are some ways to help companies in this direction, such as sustainable indexes.

It is possible to identify agencies that support and measure how sustainable companies are. Orsato, Garcia, Mendes-Da-Silva, Simonetti and Monzoni (2015) have presented a table with eight most important sustainability indexes. These indexes comprise companies from North America, Europe, Asia and Brazil. As a matter of limitation, it was considered only the Brazilian stock exchanges' index in this paper.

Thus, the ISE is a pioneering initiative in Latin America - Brazil, to promote comparative analysis between companies, as well supports the investor and stimulate corporate ethical responsibility. ISE Strategy Goals from 2016 to 2020 are related to increase the relevance of ISE to investors, strengthen the role of the ISE for a culture of sustainability in companies and to broaden ISE's recognition by society (ISE, 2018).

One of the most widely used organizational performance measures is sales history, through sales revenue. This measure of performance is known as a measure of organizational performance growth (Reckziegel *et al.*, 2016). In this article, this measure was used to analyze organizational performance, also because it is an easily accessible company information.

There are studies that demonstrate the relationship between sustainability and organizational performance, such as the study of Garcés-Ayerbe and Cañón-de-Francia (2017). However, some studies inquire this relationship (Cainelli, Mazzanti & Zoboli, 2013; Trumpp & Guenther, 2015). Thus, there are controversies related to the relationship between these constructs.

The objective of this study is to analyze the project management maturity effect in the relation between the sustainability level and organization performance. In addition, a secondary objective is to analyze the relation between the sustainability level and organizational

performance. To accomplish these objectives of this study, the quantitative approach was used with secondary databases.

This paper is organized as follows. Section 1 presents a brief introduction about the content. Section 2 describes the literature review and conceptual model development. Section 3 presents the method to achieve the results. Section 4 to 6 presents the results, discussion and conclusion. Section 7 shows the limitations and suggest future researches. Section 8 presents the conflict of interests.

2. Literature review, research model and hypotheses

This section presents a literature review of sustainability and indexes, project management maturity and organization performance.

2.1 Sustainability

In the TBL study, Elkington (1998) mentioned that sustainability metrics should be better defined and they cannot be considered separately. Since then, sustainability measurement has been expanded, besides to environmental, social and economic perspectives and it has reached other dimensions, such as business ethics, human rights, bribery, corruption and others.

Elkington (2006) noted that sustainability, besides influencing corporate governance, has also caused social pressure on business. Van Marrewijk (2003) noted in the Corporate Sustainability (CS) that there is sufficient interest in integrating social and societal aspects focusing on value creation, environmental management, environmental-friendly production systems, human capital management and so forth. Thus, transparency, stakeholder dialogue, and sustainability reporting are also related to Corporate Social Responsibility (CSR).

2.1.1 Sustainability Indexes

There are several indexes across the world that meet sustainability demands such as the Dow Jones Sustainability Index on the New York Stock Exchange (Dow Jones Sustainability Index, 2018). There are the FTSE4GOOD Global Index of the London Stock Exchange and the Socially Responsible Index (SRI) of Johannesburg. The fourth index created in the world was ISE from São Paulo Stock Exchange - BM&FBOVESPA (Cunha & Samanez, 2012).

According to the annual report of FGV (Fundação Getúlio Vargas) by Sustainability Center Study, the transparency, the dialogue with stakeholders and society, the continuous improvement of scope and process, and the financial, methodological and decision-making autonomy compose the ISE's fundamentals (ISE, 2018). ISE's portfolio with approximately 30 companies per year is composed of 200 most liquid shares in B3 and its amount is over one trillion brazilian reais per year.

2.2 Project Management Maturity

Companies seek to increase their maturity in project management to achieve excellence in projects. The concept of project management maturity of organizations stems back to the concept of process maturity (Cooke-Davies, 2002). Silveira, Sbragia and Kruglianskas (2013) define maturity as synonymous of perfection, something that is fully developed and has reached its highest level.

Project management maturity models are designed to provide the framework that an organization needs to purposefully and progressively develop its capabilities to deliver projects successfully (Pennypacker & Grant, 2003). Academics and professionals believe that the

maturity models can bring a better performance to the projects in the organizations (Carvalho, Patah & Bido, 2015; Görög, 2016; Kerzner, 2006).

Several project management maturity models have been developed and two models can be highlighted (Berssaneti & Carvalho, 2015): Organizational Project Management Maturity Model (OPM3) and Kerzner Project Management Maturity Model (PMMM). The OPM3 is considered such a three-dimensional maturity model, which adopts the ladder notion and documented standard knowledge areas to assess maturity level, while it is definitely a development-centered solution (Kerzner, 2001; PMI, 2008).

The basis for achieving excellence in project management can best be described as the maturity model PMMM, which is comprised of five levels, which represents a different degree of maturity in project management and can be used to assist corporations in performing strategic planning for project management and achieving maturity and excellence in a reasonable period (Kerzner, 2001). The PMMM's levels are: Level 1 (Common language), Level 2 (Common processes), Level 3 (Singular methodology), Level 4 (Benchmarking) and Level 5 (Continuous improvement) (Kerzner, 2001).

2.3 Organizational performance

The measurement of organizational performance can be fulfilled in different ways (Reckziegel *et al.*, 2016), and there are some studies such as Murphy, Trailer and Hill (1996) and Maltz, Shenhar and Reilly (2003) that shed a light in that question. A previous work named as 'Measuring Performance in Entrepreneurship Research' presented a two-phase examination of performance measurement in entrepreneurship research, and the latter titled as 'Beyond the Balanced Scorecard: Refining the Search for Organizational Success Measures' aimed to answer how to assess the organizational success of commercial firms.

Another source of information derived from a bibliometric study of growth measures has shown a percentage of 38% of sales revenue as one of the most used organizational performance (Reckziegel *et al.*, 2016). It is related to some data sample analysis in which refers to companies from the secondary sector that aim profit, being primarily industries and service companies. Building on the previous works it was adopted gross companies' sales revenue to substantiate the construct.

Hence, companies that are as part of the sustainability index indicate a degree of commitment in the capital market with social and environmental responsibility (Orsato *et al.*, 2015). Besides that, the sustainability can be a critical competitive factor, allowing through the assessment to conduct to competitive benchmarking, helping learn from the top-performing companies to improve your own performance and providing the information to work with strategies and drive the companies (Robecosam, 2018).

There are controversies related to the relationship between sustainability and organizational performance. The positive relation was described by Garcés-Ayerbe and Cañón-de-Francia (2017), however, some studies question this relationship (Cainelli *et al.*, 2013; Trumpp & Guenther, 2015). Thus, the hypothesis 1 (H1) was identified and described below:

- **H1. There is a relation between the sustainability level and the organization performance.**

In this research, the maturity model adopted was the PMMM model, because it is possible to select one of the levels to measure the maturity of the companies studied. The level selected to carry out our research is Level 2 (Common processes). According to Kerzner (2001), in this level, the organization recognizes that common processes need to be defined and developed such that successes on one project can be repeated on other projects. The

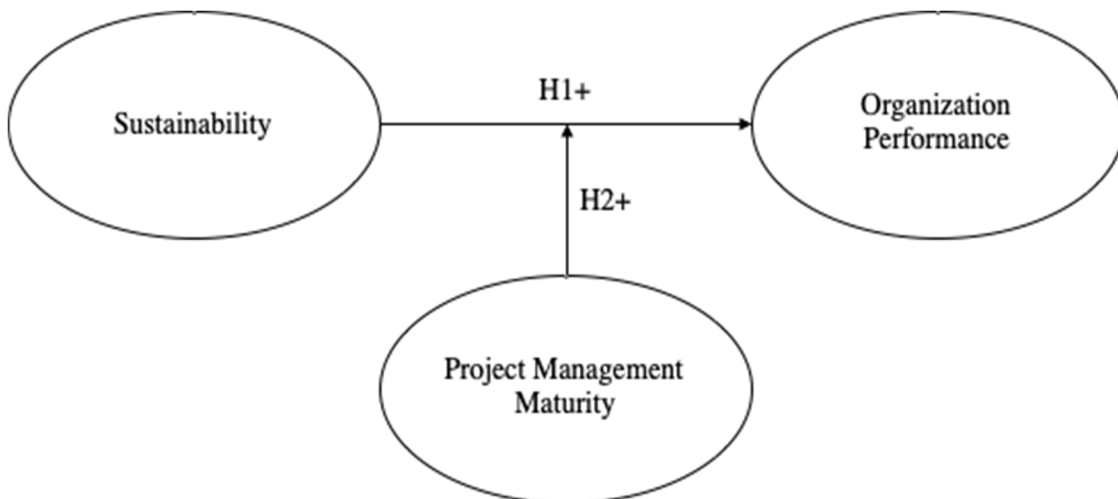
characteristics of this level are: recognition of benefits of project management; organizational support at all levels; recognition of need for processes and methodologies; recognition of the need for cost control; and development of a project management training curriculum (Kerzner, 2001).

The relationship between the concepts of sustainability and its effect in projects and project management, was mentioned by Silviu and Schipper (2015). However, despite of some aspects of sustainability are found in project management, Silviu and Schipper (2015) concluded that the integration of sustainability in projects and project management is not fully recognized yet. Thus, the hypothesis 2 (H2) was identified and described below:

- **H2. The project management maturity moderates positively the relation between the sustainability level and the organization performance.**

Finally, based on the constructs and the hypotheses the associated research model is shown in Figure 1.

Figure 1. Research Model



Note. Source. Authors (2018)

3. Method

This study aims to analyze the project management maturity effect in the relation between the sustainability level and organization performance. Apart from that, a quantitative approach and statistical analyses were used to test the hypotheses. The data and the research goal seek to assess the ties between sustainability level and organization performance. Data collection procedures and sample are described and detailed better as follow.

3.1 Data collection and sample

The data was collected from secondary sources. The financial sales and services results of the companies from ISE was extracted from each income statement available on the internet. It is vital to highlight that the revenues information is based on accounting data published and audited since the companies belong to the stock exchange. Due to that some procedures were adopted to select and delimit the sample.

First, ISE platform was screened to select only the companies that correspond to sustainability index. Then, a secondary database available in Alencar, Rodrigues, Pereira,

Sakalauskas, Menezes and Patah (2018) study was analyzed to identify those companies that was considered in the ISE platform. Apart from that database a total rank was adopted and considered as a new information in our database.

Also, this database was proposed to answer 5 hypothesis and considered the proxies as independent variables that form the construct sustainability in companies and as dependent variables included all the six proxies, that connected, form the sustainability in company construct: sustainable development commitment; product sustainability level; governance practices; environmental sustainability; economic and financial sustainability; and social sustainability. As part of control variables were identified: ISE portfolio; industry of the companies; TBL dimensions and Industry Project Orientation. The result of this study provided a total ranking by company which this study was based.

This research has considered 34 companies available in the database provided by Alencar *et al.* (2018), related to a quantitative study of the year 2016, This study proposed to explore the variables analyzed in ISE surveys and the results published in the ISE platform, considering the dimensions and best practices approached and possible correlation between them. In order to provide the quantitative research this study constructed the questionnaire based on seven dimensions available in ISE database.

Also, these authors retrieved data from the database and undertake the analysis, the researchers proceeded as follows: (i) database analysis; (ii) questionnaires downloaded by question and dimension; (iii) documents conversion from PDF to Excel format; (iv) refined database analysis; (v) weight assignment to every selected answer by the firms; (vi) sum of weight by firm in a spreadsheet; (vii) template development of the computed weights of the answers by firm and question; (viii) diagram development for the SQL (*Structured Query Language*) database; (ix) service development to retrieve data from the Excel files with questions and answers from every firm; (x) data validation in SQL database; (xi) SQL query development in order to extract data from SQL database in a square matrix; (xii) convert the set of questions that built a dimension into proxies; (xiii) test appliance.

The weights assigned to every selected answer followed the described criterion: the more sustainable is the content of the answer, the higher is the weight of the answer. The weights started from zero and rose according to the number of possible answers. Every total answer was represented in the refined database by a number. On the first test applied through R, the missing value test, it was noticed by the researchers the lack of some answers.

In this way, our study was based on the article by Alencar *et al.* (2018) considering 6 of the 7 dimensions proposed by ISE for evaluating sustainable companies defined as General, Nature of the Product, Corporate Governance, Economic and Financial, Social and Climate Change. Although the Brazilian index has followed the New York index (environmental, social and economic), there are specific peculiarities in the Brazil context that were considered and branched out the top three in seven (Schrippe & Ribeiro, 2018).

What concerns to the project maturity, Kerzner's Five Levels of Project Management Maturity was analyzed as an alternative to define the maturity level of ISE companies. The assessment questionnaire in which allows to achieve Level 2 is composed of 20 questions (<http://bit.ly/2LT65Qd>) that enables companies to explore how mature is concerning about Level 2. The authors checked all ISE companies' website in order to find enough information to answer the questionnaire for each company and evaluate their maturity level.

This assessment structure is described in Table 1 and is based on several years of study and development and is the result of the application of the practice held in world-class organizations, by means of questionnaires that allow to evaluate the level of project management maturity level (Kerzner, 2001).

| Project Management Maturity Level | Description |
|--|--|
| Level 1: Common Language | The organization first recognizes the importance of project management. Level 1 is based upon knowledge of the fundamental principles of project management and the associated terminology. |
| Level 2: Common Processes | The organization makes a concerted effort to use project management and to develop processes and methodologies to support its effective use. The organization realizes that common methodologies and processes are needed such that managerial success on one project can be replicated to other projects. |
| Level 3: Singular Methodology | The organization recognizes that synergism and process control can best be achieved through the development of a singular methodology rather than by using multiple methodologies. |
| Level 4: Benchmarking | The organization uses benchmarking to continuously compare project management practices to recognized leaders to gain information to help them improve their performance. This is a continuous effort of analysis and evaluation. |
| Level 5: Continuous Improvement | The organization evaluates the information learned during benchmarking and implements the changes necessary to improve the project management process. It realizes that excellence in project management is a never-ending journey. |

Table 1. Kerzner's Five Levels of Project Management Maturity

Note. Source. Authors (2018)

Kerzner's Level 2 was assumed for this study, because companies at this level have already understood the importance of project management in their business, besides to make a concerted effort to use project management and to develop processes and methodologies to support its effective use and on reaching Level 2 of the assessment, the companies will evaluate how effectively has achieved common processes for project management (Kerzner, 2001).

To fill in the questionnaire, it was necessary to select the number that corresponds to the opinion of the author respondent. The range of responses are listed in Table 2 and varies from (-3) Strongly disagree to (+3) Strongly agree, according to Project Management Maturity Level (Kerzner, 2001). Then, the responses of each company were summed up, resulting in a maturity level ranking.

| Answer | Score |
|-------------------|--------------|
| Strong disagree | -3 |
| Disagree | -2 |
| Slightly disagree | -1 |
| No opinion | 0 |
| Slightly agree | 1 |
| Agree | 2 |
| Strong agree | 3 |

Table 2. Range of responses - Kerzner's Five Levels of Project Management Maturity

Note. Source. Authors (2018)

Finally, the deals with insufficient data in the variables of interest were excluded. With these procedures, a final sample of 64 companies (n) belong to the ISE index was obtained.

3.2 Dependent Variable

The dependent variable corresponds to the organization performance which is available in the public and official financial statements published on the internet and contains data of success projects.

According to Reckziegel *et al.* (2016), the organization performance can be measured by the revenues related to sales and services. Therefore, this research used as data, the growth or the decrease between the revenues obtained in the years 2015 and 2016.

3.3 Independent Variable

The sustainability level of the companies included in the ISE's portfolio of 2016 was considered the independent variable. Thus, this research has considered the sum of the ISE's survey answers, reported by Alencar *et al.* (2018) which data were obtained from: (i) database analysis; (ii) questionnaires downloaded by question and dimension; (iii) documents conversion from PDF to Excel format; (iv) refined database analysis; (v) weight assignment to every selected answer by the firms; and (vi) sum of weight by firm in a spreadsheet. All weight considered the dimensions: Sustainable Development Commitment, Product Sustainability Level, Governance Practices, Environmental Sustainability, Economic and Financial Sustainability and Social Sustainability.

3.4 Control Variables

In this study, were considered the control variables related to: ISE index; project management maturity level by means of the Kerzner's questionnaire mentioned in the method; and availability of information. The project management maturity level is also part of the independent variables. The control variables are listed in Table 3:

| Control variables | Description |
|-----------------------------------|--|
| ISE index | 75 companies selected from ISE portfolio. |
| Availability of information | Companies that had publicly available information. |
| Project management maturity level | Companies that have achieved maturity level 2 in project management. |

Table 3. Control Variables description

Note. Source. Authors (2018)

Were initially considered the 75 companies belonging to ISE index, however for some companies there was no information available on the websites and social report, although they were public companies listed on Sao Paulo Stock Exchange - BM&FBOVESPA. We consider the first control variable because it was not possible to validate sustainable data from those companies.

Then, project management maturity level was controlled, by means Kerzner's project maturity Level 2. After obtaining the project management maturity ranking was assumed that companies with a very low score would not be considered. And finally, a final sample of 64 companies was obtained.

3.5 Operationalization of Variables

Either dependent variable as independent variable was collected initially as non-categorical. Thus, it used the Kolmogorov-Smirnov to test the normality of the variables, but

none of the tests was confirmed. In other words, none of the tests obtained p-value > .05, as can be seen in Table 4.

| Variable | Normality Test Result (Kolmogorov-Smirnov) |
|-----------------------------|--|
| Sustainability | D = 0.17236, p-value = 5.302e-05 |
| Organization Performance | D = 0.39867, p-value < 2.2e-16 |
| Project Management Maturity | D = 0.15943, p-value = 0.0002963 |

Table 4. Normality test result
Note. Source. Authors (2018)

The normality of the variables was not reached, even applying transformation tests, such as logarithmic and boxcox. Thus, according to Hair, Black, Babin, Anderson and Tatham (2006), it was not possible to use the linear regression to test the hypotheses, since it is a parametric statistic test.

Therefore, the variables were transformed into categorical type, considering the median and the logic shown in Table 5. This transformation allowed to test the relationship between the variables through the chi-square test. The chi-square test is a nonparametric type matching test. The test relies on creating maps through multidimensional scaling with cross data, placing the categories of the variables on a single map. In this way, it makes possible the analysis for questions not viable by traditional methods (Hair *et al.*, 2006).

| Variables | Values | Condition |
|--------------------|--------|--------------------------------------|
| Maturity | Low | Maturity Value <= 0 |
| | Mid | Maturity Value > 0 and <= 41 (Mdn) |
| | High | Maturity Value > 41 (Mdn) |
| Sustainability | Low | Sustainability Value <= 30 (Mdn) |
| | High | Sustainability Value > 30 (Mdn) |
| Revenue | Loss | Revenue Value < 0 |
| | Flat | Revenue Value = 0 |
| | Profit | Revenue Value > 0 |
| Statistic Variable | Low | Maturity Value <= 0 |
| | Mid | Maturity Value > 0 and <= 1148 (Mdn) |
| | High | Maturity Value > 1148 (Mdn) |

Table 5. Categorical values for this study
Note. Source. Authors (2018)

4. Results

The statistical analysis involved non-parametric techniques to the hypotheses testing, such as the chi-square test. The chi-square statistic test is commonly used for testing relationships between categorical variables. However, the chi-square shows the association between the variables, but doesn't demonstrate the direction of this association. The null

hypothesis of the chi-square test is that no association exists on the categorical variables in the population, in other words, it shows that the variables are independent (Hair *et al.*, 2006).

Thus, the result of the tests did not confirm the hypotheses identified in the literature review, *i.e.*, the relation linking the sustainability level and the organization performance was not assured, because the test obtained p-value greater than .05, which means that the null hypothesis was accepted. It is important to highlight that the relation between the sustainability level and the project management maturity was confirmed because the test resulted in a p-value less than .05, corroborating with the study developed by Silvius and Schipper (2015).

Apart from that, the statistic variable was created by the multiplication of the sustainability level variable and the project management maturity variable. However, even the test using the statistic variable did not confirm the hypotheses, as shown in Table 6.

| Relationship | Chi-Square Test Result |
|--|-----------------------------------|
| Sustainability and Project Management Maturity | X2(1) = 4.6083, p-value = .03182 |
| Sustainability and Organization Performance | X2(1) = 1.8572, p-value = .1729 |
| Project Management Maturity and Organization Performance | X2(1) = 0, p-value = 1 |
| Statistic Variable and Organization Performance | X2(1) = 0.015869, p-value = .8998 |

Table 6. Chi-square test result
Note. Source. Authors (2018)

The result cited in Table 6 corroborates with previous studies that there is no correlation between the sustainability level and the organization performance (Castro, 2017; Cristófaló, Akaki, Abe, Morano & Miraglia, 2016; Lima Crisóstomo, de Souza Freire & Cortes de Vasconcellos, 2011).

5. Discussion

In this study, four items of relationship were considered to execute the chi-square test, in which it was noticed the relationship between: i) sustainability and project management maturity, p-value < 0,05, *i.e.*, there is a correlation between the variables; ii) sustainability and organization performance, sustainability and organization performance and, statistic variable and organization performance, p-value > 0,05, *i.e.*, there is not a correlation between them.

5.1. Sustainability and project management maturity

The sustainability is classified as independent variable and the findings of the chi-square test present correlation between this variable and the project management maturity variable. Nevertheless, these relations were not explored, because it was not related to the scope of this study, generating opportunities for future studies.

5.2 Sustainability and organization performance

As presented in Table 6, the findings of the chi-square test identify no correlation between the variables sustainability and organization performance, as shown X2(1) = 1.8572, p-value = .1729., corroborating with some previous studies (Cainelli *et al.*, 2013; Trumpp & Guenther, 2015). However, it is important to highlight that Garcés-Ayerbe and Cañón-de-Franciather (2017) identified relation between the variables cited before, opposing the findings identified in this study.

5.3 Project management maturity and organization performance

There is not a correlation between the variables project management maturity and organization performance once the chi-square test presented p-value > 0,05. Besides, this test also considered the result of the questionnaire of Kerzner, applied for those companies that belong to the ISE's portfolio. It is important to emphasize that none of the studies identified in the literature support this finding.

5.4 Statistic Variable and Organization Performance

The statistical variable stemmed from the understanding of a specific need, it was formed from the sustainability and project management maturity variables. It is explained by Hair *et al.* (2006) as a combination of different weights with a linear combination.

Due to that, in order to verify if the project management maturity moderates positively the relation between the sustainability and the organization performance, a moderating effect was created and named as statistical variable. For this, the effect variable named as project management maturity was multiplied by sustainability to get the statistical variable and then it was transformed into categorical variable to apply chi-square test.

Therefore, the chi-square test did not identify correlation between the statistical variable and the organization performance variable.

6. Conclusion

This study contributes to the literature on the effect of the project management maturity in the relation between the sustainability level and organization performance. Thus, the hypotheses identified in the literature were not confirmed, once the statistic tests did not obtain significant results.

These results are supported by other studies, such as those on the link between sustainability level and the organization performance (Castro, 2017; Cristófalo *et al.*, 2016; Lima Crisóstomo *et al.*, 2011). However, this study showed a significant statistical relation between the sustainability level and project management maturity, corroborating with the research developed by Silvius and Schipper (2015).

7. Limitations and future researches

This research has its limitations. First, the constraints imposed by insufficiencies in the available data that impede additional analyses. For instance, it would be relevant to consider how the final grade achieved for each company, but this information is not public. Second, the project management maturity data was collected through the responses of the questionnaire proposed by Kerzner (2001), in other words, should be interesting to confront these responses with the stakeholder's opinion.

Other limitation concerns the focus on acquisitions in a single sustainability index such as ISE. Future studies considering other indexes may provide a better understanding of the influence of the sustainability level and project management maturity in the organization performance.

8. Conflicts of interest

The authors declare no conflicts of interest.

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