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RESEARCH ARTICLE

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SUSTAINABILITY IN PROJECT MANAGEMENT AND PROJECT SUCCESS WITH TEAMS IN VIRTUAL ENVIRONMENT

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ABSTRACT

After the coronavirus pandemic, virtual work environment solutions increased dramatically in human history, proving to be a viable and much more sustainable method of project management and overall organization work. Teams working on projects in a virtual environment help reduce the carbon footprint and use resources more efficiently. This study is the first to do a quantitative analysis of the relationship between sustainability in project management and project success in a virtual environment. Based on the Systematic Literature Review, a structured model was proposed, and a 5-point Likert scale questionnaire was prepared and distributed to professionals with project management experience. The survey used SEM to quantitatively confirm both hypotheses: the positive impact of sustainability in project management on project success and the positive moderation of the virtual teams to this relationship.

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INTRODUCTION

In 2020, with the coronavirus pandemic and consequent lockdown established in the vast majority of countries, the world experienced a virtual work environment solution like never before in the history of humanity (Presbitero, 2021; Dias, Lopes & Teles, 2020; Dias, Lopes, 2020). Virtual environment teams geographically distributed are a growing phenomenon in recent years. Despite this reality, the academic research on teams in a virtual environment still does not reflect their increasing presence in projects (Dumitrascu-Băldău et al., 2021). Work solutions in virtual environments still face many challenges. On the other side, they have been proven to be a viable and much more sustainable way of doing project management and the overall organization's work (Stiles & Smart, 2021). Projects with teams in the virtual environment contribute to reducing the carbon footprint and allow for a more reasonable consumption of resources (Dumitrascu-Băldău et al., 2021). Sustainability, when applied to project management processes, is also a factor that can influence

stakeholders' engagement and, consequently, the project's success (Mauro Luiz Martens & Carvalho, 2016b). From some perspectives, in a virtual work environment, project management processes become more sustainable (Dumitrascu-Băldău et al., 2021). The opening keynote presentation at the 2008 World Congress of the International Project Management Association (IPMA) called for the project management profession to "take responsibility for sustainability." Since then, many authors have been calling attention to the importance of sustainability in project management. As a result, there is a growing concern about sustainability in project management; on the other hand, the challenges are significant since the concept of sustainability itself is not yet fully expressed tangibly and concretely in operational terms (Gilbert Silvius & Schipper, 2016b). Moreover, the literature review confirms the trend of integration of sustainability into project management processes, although it is still very embryonic. Nevertheless, projects are the means of changing the world and the core business of many organizations, so they must be addressed to include sustainable principles (Armenia et al., 2019).

This study is the first of its kind to look at the relationship between sustainability in project management (SPM) and project success (PS) in a quantitative way, with a focus to measure the moderation impact of a project team in a virtual environment (VT) to this relationship between these two concepts, through an electronic survey.

LITERATURE REVIEW

Despite the disruptive growth of publications after the coronavirus pandemic, it still not depicts in the same intensity, neither the increasing presence of virtual environment distributed teams in projects, nor the importance of eventual positive or negative moderation influence in project success factors, such as sustainability (Fossum *et al.*, 2020; Dumitrascu-Băldău *et al.*, 2021; Presbitero, 2021). The literature review was essential to confirm the relationship between sustainability and project success and develop a hypothesis related to the moderation of the virtual team environment (Armenia *et al.*, 2019).

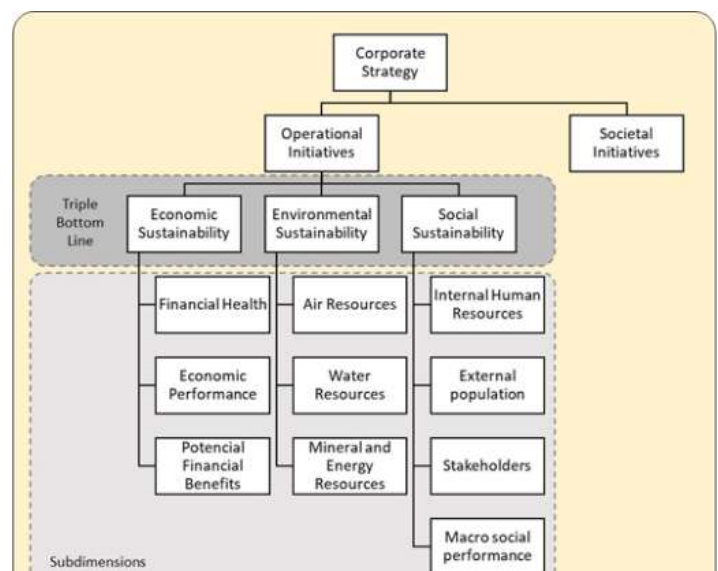
The perspective of Sustainability: Several definitions exist for sustainability, as the different academic fields and disciplines have their own definitions and approaches (Boyko *et al.*, 2006). As an academic term, sustainability was first applied in the literature on the forestry field, bringing the main idea of not harvesting higher than the forest yields in new growth or recovery capacity (Withisuphakorn *et al.*, 2019). In a concise approach, the primary sustainability concern could be summarized as the balance of resource consumption and resource availability for future generations (Dovers, 1990). In 1997, Elkington coined a sustainability-related construct, the Triple Bottom Line (TBL), that expresses the expansion of the environmental agenda in a way that integrates the economic and social lines. TBL provides a framework for measuring the business's performance and the organization's success using three lines: economic, social, and environmental (Elkington, 1997). This broader approach to sustainability gave the world a new perspective on managing the future, considering "people, planet, and profit" as the bottom line of the concept (Alhaddi, 2015). The economic dimension refers to financial aspects and business values, maximizing profit, generating wealth, reducing costs, and generating capital growth and liquidity. The environmental dimension manages the usage and protection of natural resources (e.g., air, land, water, raw materials, and minerals), focusing on preserving the environment. Energy efficiency, climate change management, balancing local ecosystems, waste reduction, environmental accident prevention, emissions reduction, and pollution material use extinction are some examples of environmental dimension objectives. Focused on the relationship among groups and individuals and preserving social capital, the social dimension is about solidarity. It is commonly the last and most challenging aspect to consider for organizations. It concerns conflict-interest balancing, communication and mutual trust structuring, diversity encouragement, equal opportunities and democratic processes providing, responsible governance structuring, and quality of life ensuring (Khalifeh *et al.*, 2020; Elkington, 1997).

Besides, the notion of TBL encompasses the responsibility to a broader spectrum of stakeholders, including the project's environment. "Stakeholders" refer here to any entity (individual or organization) that impacts the project as well as upon which the conduct of the project has an impact, whether directly or indirectly, positively or negatively (Goel, 2013). Sustainability involves efforts on balancing or harmonizing social, environmental, and economic interests" (Gilbert Silvius & Schipper, 2016a; Gilbert Silvius & Schipper, 2016b; Mauro Luiz Martens & Carvalho, 2016a). Despite the uncountable number of definitions of the concept of sustainability, there is a common sense about having the TBL needs balanced (Labuschagne & Brent, 2005; Goel, 2013; Khalifeh *et al.*, 2020). Regardless of the adoption of sustainability in their strategy, many companies need help incorporating sustainability's social and environmental dimensions in their projects. The three metrics of the triple-bottom-line should be put into a framework of constructs,

factors, or variables to support organizations in sustainability improvement (Mauro L. Martens & Carvalho, 2017).

Sustainability in Project Management (SPM): For the last decades, there has been a continuous effort to incorporate sustainability effectively in all fields, including project management (Brundtland, 1987; Keeble, 1988; Dovers, 1990; Elkington, 1997; Labuschagne & Brent, 2005; Marcelino-Sádaba *et al.*, 2015; Goedknecht & Silvius, 2012). However, moving toward sustainability in project management implies significant changes in the organization's economic, environmental, and social strategic objectives (Elkington, 1997). Therefore, projects driven by sustainability principles can have straight ties between strategy and the change required change (Marcelino-Sádaba *et al.*, 2015; Labuschagne & Brent, 2005). Labuschagne and Brent (2005) noted that Project Management frameworks must adequately address social equity, economic efficiency, and environmental performance, the three goals of sustainable development (Labuschagne & Brent, 2005). In order to propose a group of strategic sustainability high-level criteria and other possible indicators to assess sustainability in Project Management, the authors referred to a literature review of sustainable development indicators and environmental performance indicators in which four main groups of project's potential impacts were identified: air, water, land and mined abiotic resources (Labuschagne *et al.*, 2005). They proposed a comprehensive sustainability evaluation framework for corporate strategy, including operational and societal initiatives. For operational initiatives, they consider the TBL dimensions first and then decompose them into subdimensions, as represented in the following Figure 1. Labuschagne and Brent concluded that project management methodology must be reviewed to achieve sustainable development from a business perspective, as it would be easier to implement sustainable development at a strategic business level than at the operational level (Labuschagne & Brent, 2005).

From the project manager's perspective, the Sustainable Innovation Business Model, Stakeholders Management, Economics, and Competitive Advantage and Environmental Policies and Resources Saving were presented as the four factors that explain sustainability in project management (Mauro L. Martens & Carvalho, 2017). Once again, the TBL concept was brought to the discussion proving to be relevant. In addition, these authors explored the challenge of introducing Sustainability in Project management in another paper in which they stated that there is a gap between the perception of the importance of sustainability in project management and the actual use in practice (Mauro Luiz Martens & Carvalho, 2016b).



Source: adapted from Labuschagne *et al.*, 2005

Figure 1. Sustainability evaluation framework for corporate strategy

Silvius (2017) concluded that sustainability in Project Management should be considered as a new and emerging school of project management once it attends to the three criteria that define a school of thought: content, community, and impact (Silvius, 2017). The development of project management methods considering sustainability is emergent, despite the experience with them is still limited and must be evolved (Silvius, 2017).

Integrating sustainability into project management is a complex effort (Chawla *et al.*, 2018). Society and legislations are essential stakeholders of a project, and the need to expand project management boundaries to include sustainable development to attend to mandatory requirements established by them will challenge the future of project management (Daneshpour & Takala, 2017). There is a massive challenge in having a unique framework for SPM that is equally appropriate for application in different industries (Armenia *et al.*, 2019). Depending on the industry, the trend to make project management processes more sustainable is developing differently. Indeed, even with the emerging green IT concept (Koke & Moehler, 2019), information technology projects consider sustainability in project management at a lower rate than construction projects, for example, that directly and strongly contribute to global carbon emissions. These different rates of developing SPM could represent a barrier to converging to common sense on a conceptual structure for SPM. Therefore, it is not only a matter of defining dimensions or variables to establish a framework but finding a way to assess them considering the peculiarities of each industry's projects (Armenia *et al.*, 2019). Appendix I summarizes the prominent authors identified and their contributions to the literature on sustainability in project management. In addition, the literature review helps to identify referenced questionnaires previously tested to be applied in this study.

Sustainability in Project Management (SPM) and Project Success (PS):

The literature review shows that project success is a concept in evolution. Until the end of the 1980s, most publications judged project success considering three fundamental factors – time, cost, and specifications (scope and quality) – referred to as the Iron Triangle of project management (de Wit, 1988). By the 1990s and 2000s, the organization's strategic achievement, technical performance, and the project life cycle became essential aspects of project success judgment (Belassi & Tukel, 1996). In 2019 Castro compiled a process success evolution framework and established four different periods of the literature evaluation – Period 1: Project implementation and handover (the 1960s-1980s); Period 2: Critical Success Factor Lists (1980s-1990s); Period 3: CSF Frameworks (1990s-2000); and Period 4: Strategic Project Management (Castro *et al.*, 2019). New dimensions considered in contemporary studies that evaluate project success (KianiMavi & Standing, 2018), such as project efficiency, business success, preparing for the future, impact on the customer, stakeholder satisfaction, impact on the team, and environmental impact (Castro *et al.*, 2021; Durmic, 2020). Project management practices lead to organizations' infrastructure sustainable success. The organization's culture has a significant influence on strategy definition, that will impact the implementation processes and performances, and consequently affect reflection effectiveness (Liu *et al.*, 2020). Thus, Sustainability in Project Management is highly dependent on company human resources in charge of decision making, policy making and implementation of decisions and policies, from the upper management to the operational staff (Chawla *et al.*, 2018).

In 2016, with the purpose to evaluate project success contribution, Martens and Carvalho identified, and classified key variables related to Sustainability in Project Management and Project Success (Martens & Carvalho, 2016). To evaluate if incorporating sustainability in project management supports project success, Khalifeh *et al.* carried out an SLR on empirical studies. For the author, it became clear that significant interest in this subject only emerged by 2016. The relevant contributions are likely limited to conceptual studies published by only a few authors (Khalifeh *et al.*, 2020). However, despite limitations, in 2017, Carvalho e Rabechini Jr. proposed and validated a measurement model for Project

Sustainability Management that suggested that PSM improves project success and can help reduce negative social and environmental impact. Then, companies should dedicate efforts to introducing sustainability in project management practices (Carvalho & Rabechini, 2017; Gilbert Silvius & Schipper, 2016a). On the other side, there is a gap in the literature of empirical evidence studies published to widely support sustainability in project management that contributes to project success (Khalifeh *et al.*, 2020).

Virtual Team (VT): A virtual team is characterized by discontinuities, or changes in expected conditions, including geography, time zone, organization, national culture, work practices, and technology (Chudoba *et al.*, 2005), (Stiles & Smart, 2021).

A Systematic Literature Review was conducted in the SCOPUS and SCIELO databases, searching "Virtual Team" and "Project Management". The results are illustrated in Figure 2. The study on virtual teams in project management and their impact on project success has become an increasing theme in publications but still needs to represent their frequent presence in projects at the same pace. In this research, we evaluated the moderator effect of the virtual team on the relationship between the other variables.

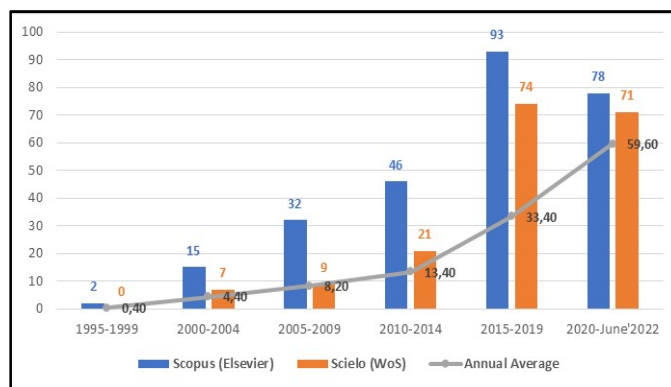


Figure 2. Virtual Team and Project Management publications evolution

In the 1990's, the need to act globally increased and led companies to participate in projects often requiring cross functional teams geographically distributed. Communication and technology seemed to be the major issue, particularly considering the limited tools available (Morelli *et al.*, 1995). In the 2000s, the use of technology was spready and brought improvements to project management (e.g., project documentation distribution and management) (Alavi & Tiwana, 2002). For the other side, a significant gap on supporting activities that characterize integrated collaborative working as a team represented the major challenge (Garner & Mann, 2003). Time-zone dispersion, work-life balance, online communication channels, different native languages, trust, tacit knowledge transferring, and social integration were described by Jimenez (2017) as the main challenges of working in a global virtual team. On the other hand, economic benefits, team diversity, multiregional team's talent, diversity of the resources available, greater autonomy, work environment, conflict reduction and resource saving were proven to be opportunities of working in virtual teams (Jimenez *et al.*, 2017). Indeed, considering that global virtual team's members do not need to move to work on a project, resource savings such as time and financial cost are widely perceived as sustainable aspect (Gubbi *et al.*, 2013) (Dumitrascu-Băldău *et al.*, 2021).

In 2021, Presbitero evaluated cultural intelligence and communication accommodation and their influence on team synergy and team direction in a Global Virtual Team. The main finding of the study reflects that the behavior component of cultural intelligence has a strong influence on team's synergy and direction. Understanding other people's culture values, traditions and practices proved to contribute towards effectiveness of a GVT (Presbitero, 2021). Therefore, special attention must be paid to the team members' selection process, specifically in a virtual team (global or local). In

addition, the team must present basic skills, such as using the tools provided to communicate correctly and efficiently and to adapt to a virtual work environment (Dumitrascu-Băldău et al., 2021).

Virtual Teams (VT) and Sustainability: There is no way to ignore the effect of the COVID-19 pandemic that locked people at home for months from the year 2020 further expanding the acceptance of work in virtual teams, whether local or global. Working in virtual teams become a life-saving solution, particularly in extreme global situations, such as the COVID-19 pandemic. Indeed, organizations familiarly to this project management with virtual teams have substantial advantage in their ability to operate efficiently and to achieve their sustainable goals (Dumitrascu-Băldău et al., 2021). Only one full working day from home can decrease travels duration and increase the likelihood of avoiding peak hour travel even for non-work-related travels, particularly morning peak. Even working from other locations such as malls, cafés, libraries or vehicles increases the likelihood of not traveling at peak hours (Stiles & Smart, 2021). As mentioned, virtual team’s members can work without move to work, therefore, resource savings should be considered as an advantage of this growing practice (Jimenez et al., 2017; Dumitrascu-Băldău et al., 2021).

METHODS AND MATERIALS

In order to achieve the research goal of evaluating the influence of Sustainability in Project Management (SPM) in Project Success (PS), particularly considering the moderation of a virtual environment, the research design merges the systematic literature review (SLR) and the survey-based research (SBR). All questions applied in the survey was based in existing, tested and validated questionnaires already were used in reliable academic sources. Martens and Carvalho (2016) questionnaire was chosen to evaluate the Sustainability in Project Management (Mauro Luiz Martens & Carvalho, 2016a). Castro et al. (2019) contemporary approach of project success criteria was used to evaluate this construct (Castro et al., 2019). To have a complete access of Virtual Team moderation, it was used Davidavucien et. All (2020) and Presbitero (2021) questionnaires to compose the survey (Davidavičienė et al., 2020; Presbitero, 2021). A five-point Likert scale was applied to the questionnaire. The survey respondents were asked to rate their assessment of each construct based on the most recent project they participated in, considering virtual or presential project team experiences. The questionnaire also gathered sociodemographic and background information of the respondents in order to categorize them by background and professional experience in virtual teams. Finally, the respondents were invited considering the profiles of project management experience. For this model analysis, a minimum of 200 responses was required to achieve the objectives of the current study. Therefore, using an estimated response rate of 25 percent based on the average response rate in similar research (Molwus et al., 2017) and considering the proposition of Saunders et al. (2009) sample size = [(minimum sample size required × 100) ÷ Average percentage response rate expected], the survey link was supposed to be sent to 8,000 professionals practicing within Portuguese speakers (84.5 percent Brazilians, 14 percent Brazilians with a second nationality and 0.5 percent foreign (Saunders & Lewis, 2019). The methodology was then composed by the following steps: Step 1 – A SLR was conducted to prepare a conceptual model with variables and constructs, propose hypothesis and identify questionnaires to apply. Step 2 – The questionnaire survey composed by referenced questionnaires was applied for data collection to support this study. Step 3 – Using Structure Equation Model, a quantitative data analyses was conducted to validate hypothesis. First the model components were identified (variables and relations) based on the theory. Then, a hypothetical model was proposed. Lastly the validity of the model was assessed using the data collected. The process of modeling structural equations involves the construction of a Measurement Model and a Structural Model. The Measurement Model represents the theory that shows how the measured variables come together to represent the constructs, while the Structural Model defines the causation or association relationships between constructs.

Structural Equation Model: The dimensionality, reliability, and convergent validity were verified to analyze the quality and validity of the first or second-order constructs. To verify the convergent validity, the criterion proposed by Fornell and Larcker (Fornell & Larcker, 1981), which indicates convergent validation when the Average Variance Extracted - AVE is greater than 50 percent (Henseler et al., 2009) or 40 percent in the case of exploratory research (Nunnally JC, 1994; Nunnally & Bernstein, 1994) Cronbach's Alpha (CA) and Composite Reliability (CC: Chin & Marcoulides, 1998) were used to measure reliability. According to Tenenhaus (Tenenhaus et al., 2005; Tenenhaus et al., 2004), the AC and CC indicators should be greater than 0.70 to indicate construct reliability. In exploratory research, values above 0.60 are also accepted (Joe Hair et al., 2014). To verify the dimensionality of the constructs, the parallel straight criteria (Hoyle & Duvall, 2004) and the Acceleration factor (Raïche et al., 2013) returns the number of construct dimensions. The sample's adequacy for factor analysis was measured using the KMO indicator, which indicates the proportion of data variance that can be considered common to all variables. It is a measure that ranges from 0.0 to 1.0, and the closer to 1.0 (unit), the more appropriate the sample is for applying factor analysis. Therefore, applying Exploratory Factor Analysis to the set of variables is appropriate when the KMO is greater than or equal to 0.50.

Research Model and Hypothesis: The previous discussion supports the model and the hypotheses proposed and referred in the Table 1 and the Figures 3 and 4. This study aims to quantitative evaluate the influence of Sustainability in Project Management (SPM) in Project Success (PS), particularly considering the moderation of a virtual environment. Therefore, the first hypothesis (H1) is that Sustainability in Project Management has a positive influence in Project Success (PS). The second Hypothesis (H2) is that Virtual Teams environment has a positive moderator effect to the relationship proposed in Hypothesis (H1).

Table 1. Description of model hypotheses

Hypothesis	Description
H1	SPM has a positive influence in PS
H2	VT has a positive moderator effect to H1

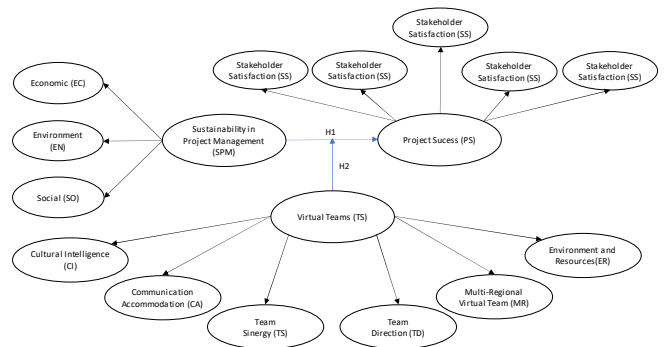


Figure 3. Hypothetical Theoretical Model

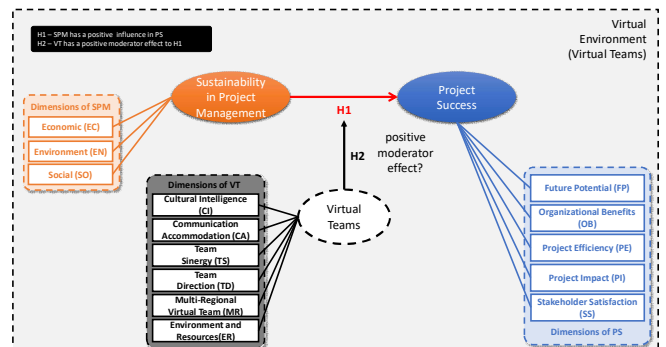


Figure 4. Conceptual Model and Hypotheses

RESULTS

In the Measurement Model (Outer Model) developed to the study, all items presented factorial load greater than 0.50 and, therefore, it was not necessary to remove any of them, as illustrated in Table 2.

Table 2. Measurement Model (Outer Model)

Construct	Item	F.L. ¹	Com. ²	Weight
Sustainability in Project Management (SPM)	Economic (EC)	0,87	0,76	0,44
	Environment (EN)	0,69	0,48	0,17
	Social (SO)	0,91	0,83	0,55
Sustainability in Project Management (SPM) x Virtual Teams (VT)	Cultural Intelligence (CI) x EC	0,82	0,68	0,08
	Communication Accommodation (CA) x EC	0,84	0,71	0,08
	Team Sinergy (TS) x EC	0,78	0,61	0,08
	Team Direction (TD) x EC	0,83	0,69	0,09
	Multi-Regional Virtual Team (MR) x EC	0,66	0,44	0,03
	Environment and Resources (ER) x EC	0,75	0,57	0,08
	Cultural Intelligence (CI) x EN	0,77	0,59	0,04
	Communication Accommodation (CA) x EN	0,79	0,62	0,05
	Team Sinergy (TS) x EN	0,78	0,60	0,05
	Team Direction (TD) x EN	0,81	0,66	0,06
	Multi-Regional Virtual Team (MR) x EN	0,66	0,44	0,01
	Environment and Resources (ER) x EN	0,77	0,59	0,05
	Cultural Intelligence (CI) x SO	0,81	0,66	0,09
	Communication Accommodation (CA) x SO	0,85	0,73	0,10
	Team Sinergy (TS) x SO	0,85	0,72	0,10
Team Direction (TD) x SO	0,88	0,77	0,10	
Multi-Regional Virtual Team (MR) x SO	0,66	0,44	0,04	
Environment and Resources (ER) x SO	0,81	0,66	0,10	
Project Success (PS)	Future Potential (FP)	0,74	0,54	0,20
	Organizational Benefits (OB)	0,86	0,73	0,29
	Project Efficiency (PE)	0,83	0,69	0,30
	Project Impact (PI)	0,83	0,70	0,22
	Stakeholder Satisfaction (SS)	0,83	0,70	0,20

¹ Factorial Load; ² Commonality.

Table 3 presents the results of the analysis of convergent validity, construct reliability, discriminant validity and dimensionality of constructs. Thus, it is possible to affirm that:

- there was convergent validation in all constructs (AVE.>0.40),
- there was discriminant validation in all constructs since the maximum shared variance (M.S.V.) of each was lower than the respective AVE,
- in all constructs, the reliability indexes C.A. and/or C.R. were higher than 0.60, thus evidencing their reliability, and
- according to the Acceleration Factor criterion all constructs were one-dimensional.

Table 3. Validation of the Measurement Model

Construct	Items	AVE. ¹	M.S.V. ²	C.A. ³	C.R. ⁴	Dim. ⁵
Sustainability in Project Management (SPM)	3	0,69	0,19	0,79	0,88	1
Sustainability in Project Management (SPM) x Virtual Teams (VT)	18	0,62	0,23	0,97	0,97	1
Project Success (PS)	5	0,67	0,23	0,88	0,91	1

¹ Average Variance Extracted; ² Maximum Shared Variance; ³ Cronbach's Alpha; ⁴ Composite Reliability; ⁵ Dimensionality

In the Structural Model (Inner Model) developed to this study, presented in Table 4 and illustrated in Figure 5, it is possible to verify constructs relationships quantification. It is noteworthy that the model

presented a Gof (goodness-of-fit) of 38.73 percent. Thus, it is observed that:

- there was a significant influence (p-value< 0.001) and positive ($\beta = 0.44$ [0.34; 0.58]) of Sustainability in Project Management (SPM) on Project Success (PS), therefore, the higher the SPM is, the higher the PS will be,
- there was a significant moderation (p-value = 0.002) and positive ($\beta = 0.51$ [0.18; 0.85]) of Virtual Teams (VT) on the relationship between the Constructs Sustainability in Project Management (SPM) and Project Success (PS), and
- Sustainability in Project Management and its interaction with (moderation by) Virtual Teams were able to explain 23.49 percent of project success variability.

Table 4. Structural Model (Inner Model)

Endogenous	Exogenous	β	S.E. (β) ¹	C.I. percent ²	95 p-value	R ²
Project Success (PS)	Sustainability in Project Management (SPM) x Virtual Teams (VT)	0,51	0,16	[0,18; 0,85]	0,002	23,4 perc
	Sustainability in Project Management (SPM)	0,44	0,07	[0,34; 0,58]	< 0,001	

¹Standard Error; ²Bootstrap Confidence Interval; Gof = 38,73 percent .

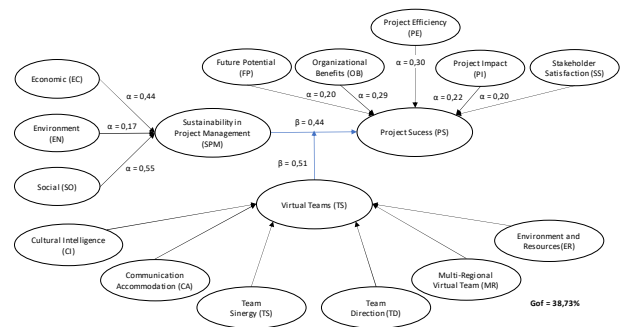


Figure 3. Structural Model Illustration

Table 5. Result of the initial hypotheses of the model

Hypothesis	Description	Result
H1	SPM has a positive influence in PS	Confirmed
H2	VT has a positive moderator effect to H1	Confirmed

CONCLUSION

We identified that many authors had considered Sustainability in Project Management as one of the factors related to Project Success in the publications from the end of the 1990's decade (Carvalho & Rabechini, 2017; Chofreh et al., 2019; Khalifeh et al., 2020; Castro et al., 2021). However, despite the growing number of publications regarding this relationship, quantitative studies still have a gap. Besides, the recent exponential growth of publications related to projects with virtual teams perceived in the SLR raised a complementary discussion concerned with the relationship between sustainability in project management and project success (Stiles & Smart, 2021; Verburg et al., 2013). Therefore, there needs to be more quantitative studies with virtual teams as a moderation aspect of success factors in project management. Based on these insights and considering the project management community recent growing expertise in virtual teams – as a consequence of the pandemic lockdown in 2020 due to COVID19 – a data survey was performed within professionals practicing project management (Swart et al., 2022). The data survey used questionnaires previously tested and referred. Then, it was possible to perform a quantitative analysis using SEM to statistically access the hypotheses proposed. The results were positive, as most of the respondents (54.29 percent) had more than 15 years of experience working with projects, and most (53.81

percent) had 1 to 5 years of experience working with projects in a virtual team environment. Moreover, considering the 5-point Likert Scale adopted – in which one was attributed to "totally disagree" and five attributed to "totally agree" – the confidence intervals strictly greater than 3 (midpoint) indicate agreement. Thus, observing the descriptive analysis result and, particularly the first-order items of Virtual Team and Sustainability in Project Management, it can be perceived that individuals tended to agree with them.

Since 1997, authors started to consider the concept of the TBL (Elkington, 1997; Goel, 2013; Labuschagne et al., 2005; Wang et al., 2014; Carvalho & Rabechini, 2017; Chawla et al., 2018; Gilbert Silvius & Schipper, 2016b; Mauro L. Martens & Carvalho, 2017; Armenia et al., 2019; Liu et al., 2020; Stanitsas et al., 2021; Toljaga-Nikolić et al., 2020). Therefore, in this model proposed, Sustainability in Project Management construct was composed of those three items. On the other side, "Environment and Resources" is also one of the items composing the Virtual Team construct, considered the moderator variable in the proposed model (Stiles & Smart, 2021). Then, the SLR indicates a possible interaction between those constructs in the model.

Implications and Limitations: The study presented has practical implications. SPM (independent variable) moderated by VT explained almost one-quarter (23.49 percent) of project success variability (dependent variable). In other words, as a result of the SEM analysis, the model is good (considering the Gof) and confirms both of the proposed hypotheses. First, it confirmed that Sustainability in Project Management (SPM) is a positive contribution as an independent variable to Project Success (PS), the dependent variable. Furthermore, second, it confirmed that Virtual Team (VT) has a positive moderation to this relationship. Therefore, Sustainability in Project Management should be considered as one of the criteria to be observed when assessing the success of project. Specifically, in projects that happens in a remote context with the challenge of a virtual or hybrid team. Castro *et al.* (2021), defined project success as a composition of criteria that should reflect a modern comprehension of the concept itself as a multidimensional concept that can be adaptable depending on the project context (Castro *et al.*, 2021). Indeed, there is a common sense that the context counts in the project success assessment. The study has implications in related fields of research such as (i) government projects (Teles & Dias, M., 2022; Silva, G.B., Melo, R.C., Dias, M., 2022; Dias & Lopes, 2021); (ii) IT projects (Vieira, P.S.; Dias, M.; 2022); (iii) oil & gas industry (Lopes, R; Massioui, F.; Barros, S.; Dias, M.; 2021); (iv) Trust in project management (Lopes, R.; Massioui, F.; Bahli, B.; Barros, S.; Dias, M., 2021), amongst others.

Projects with the remote environment and virtual teams have become a growing tendency. In the Global Megatrends Report, PMI (2022) described the movement called the Great Resignation cited as one leading cause of a perceived tendency of a talent gap and shortage of labor. The desire to seek better work experience and greater flexibility is shaking the workplace and is a significant issue for companies that need qualified professionals. Offering remote and hybrid jobs to retain their human capital has become the alternative to avoid turnover (Project Management Institute, 2020; Shoup *et al.*, 2022). Therefore, project management is challenged to find out how to address every aspect of the project in this context. Thus, sustainability in project management is one criterion that positively impacts project success, mainly in a virtual team context. Once there is a perceived tendency toward job virtualization, which contributes to sustainable processes in project management, addressing sustainability in project management to seek project success is the most significant contribution from this study. The survey questionnaire was applied only in Portuguese. Then, only Portuguese speakers – even with a nationality other than Brazilian (11,11 percent) or more than one nationality besides Brazilian (14,81 percent) – could participate in composing the sample. Even though 18.52 percent of the respondents referred to international projects geographically distributed (besides Brazil), this represents a scope limitation of this study and should be considered in future research.

Future Research: Future researchers should widen this survey to a global sample with different contexts. Other important recommendation to be addressed in future research is a comparison of both scenarios – presential and remote. It was not an aim of this study to do this comparison, otherwise it would be necessary to ask each participant to respond questions considering projects in both contexts. Then, this can be seen as a second scope limitation of the survey. Finally, the constructs considered in this model are continuously evolving, what could be perceived during the SLR. For example, less than 25 percent of project success was related to the criterium Sustainability in Project Management. Project Success is a multi-criteria construct, as already known. As a suggestion for future research, other Project Success (PS) criteria and their interaction with Sustainability in Project Management (SPM) should be evaluated, particularly in the virtual team (VT) context.

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