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Empirical Research Paper

Sustainability considerations in project delivery

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ABSTRACT

This study explores the factors influencing the integration of sustainability considerations into project delivery. Specifically, the research is conducted to investigate the significance of the presence of (a) formal organizational structures for embedding sustainability, (b) types of sustainable business practices, and (c) triggers and constraints to the perceived degree of sustainability achieved in project delivery.

This research is based on a questionnaire survey of more than 500 project practitioners and analysed using Structural Equation Modelling (SEM) through SmartPLS software. The results show how formal organizational structures and different types of incentives prompt managers to adopt more sustainable measures. By doing this, the research aims to identify the key determinants that influence the perceived level of sustainability adopted in project delivery.

The managerial implications lie in the alignment of project success criteria with sustainability objectives, e.g., use 'sustainable business practices', their triggers, and the organizational structures to achieve project success through sustainability objectives. Secondly, the research can inform policymakers and professional associations on how to incorporate the identified sustainable practices into policies and professional certification frameworks. Thirdly, public administration institutions can enhance the sustainability of their projects by integrating these findings into the criteria for public bids and tender processes.

1. Introduction

In project management literature the terms 'sustainability' and 'sustainable development' are well known, defined, and discussed. However, in practice, their implementation is fraught with complexities and takes many different forms. Different contexts would focus on distinct sustainable objectives, e.g., in construction, considerations over CO2 emissions are predominant whereas in product development, it is low energy consumption design; and different actors would pursue different approaches, e.g., in a construction project the main contractor would assess CO2 emissions whereas in product development, designers and engineers would evaluate different design solutions to achieve low energy use.

The project management field has been making great strides towards the adoption and inclusion of sustainability objectives and practices both in project deliverables and project delivery processes. Project management academics, professional associations, and practitioners' groups are actively engaged in addressing sustainability issues at multiple levels (Agrawal et al., 2019; Atasu et al., 2020; Sabini, 2016). Silvius (2017) recognised that, within PM, the focus on sustainability is a distinct academic school of thought, and professional associations (i.e., APM, PMI and IPMA) regularly commission and prize research on these topics. Indeed, several activists' groups have been set up by project management practitioners to push further the sustainability agenda (Thompson and Williams, 2024). Moreover, project management academic literature has long recognised the importance of sustainability with interest in this topic having grown exponentially within the project management field (Huemann and Silvius, 2017)

Project management scholars have primarily looked at projects as tools to deliver a sustainable good or service (Gasparro et al., 2022; Terenzi et al., 2025). Recent scholarship has emphasized also the need to have greater attention to human-centricity, resilience, and sustainability (Romero-Torres et al., 2026). However, it is also necessary to recognise that focusing on the project delivery aspects (regardless of the project aim or main output) are equally important, from a sustainability perspective, as project activities traditionally make use of many

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resources. These activities usually consider, e.g., how and which raw materials input, type and amount of energy to use, characteristic and type of waste, and its management. Some recent studies have begun investigating sustainable project delivery in major infrastructure projects (Luo et al., 2024), but this is still limited.

Project management literature advises on the importance that sustainability plays in the implementation of projects (Sabini et al., 2019) with Caron et al. (2026) highlighting how environmental, social and governance (ESG) principles integration in projects remains fragmented and under-theorized despite growing practitioner and regulatory attention. In all, there is no clear consensus on which sustainability objectives or performance indicators should guide project delivery, creating inconsistency and fragmentation across practices.

Indeed, while practitioners are advancing rapidly through trial-and-error approaches to embed sustainability into their projects, these efforts remain largely ad hoc, with no overarching, standardized framework to assess the actual impact of the actions they take. Moreover, some empirical contributions on how project managers are embedding 'sustainable business practices' exist (Maqbool and Sridhar, 2024), but with a lack of understanding on whether these practices have a tangible and meaningful influence on the overall project sustainability level. The lack of clarity about whether specific sustainable practices lead to measurable improvements in overall project sustainability is an important research gap as it prevents practitioners and policymakers from prioritizing the most effective interventions. Without evidence of tangible impact, sustainability efforts risk becoming symbolic or inefficient, hindering the ability to allocate resources strategically and maximize environmental, social, and economic outcomes.

For these reasons, in this research we focus on sustainable practices in project delivery. By focusing on this gap, we explore how the actions and decisions taken by project managers to adopt 'sustainable business practices' links to the overall level of sustainability in project delivery. Adding to this, we also explore the wider sets of triggers and constraints project managers face in the management of projects, which may be related to the adoption of 'sustainable business practices', which are linked to the perceived level of project sustainability. Therefore, by doing this, we provide an innovative way to understand the problem of sustainability transitions. We argue that the benefit of this approach lies in its balanced remit – i.e., not too abstract so that it cannot be implemented in practice, and not too specific so that it prevents adaptation to analogous settings.

The research is based on a survey among 500 Italian project managers. This survey was conducted to examine recurring archetype of 'sustainable business practices' that tend to be considered more in project delivery. Moreover, on the same line of thought, we also investigate further this ground by looking at triggers and constraints impacting the adoption of sustainable practices. Thus, we ask the following research question: **to what extent do sustainable business practices, formal organizational structure, and specific triggers and barriers impact the perceived level of sustainability adopted in project delivery?**

The rest of paper is organized as follows. In the next section, we examine project management literature to understand to what extent project activities can become more sustainable and present a series of hypotheses. This is followed by a discussion of research methodology and research results. The paper concludes with a discussion of the managerial implications of our findings and proposed directions for future research.

2. Sustainability consideration in the context of projects

Despite increasing societal awareness of sustainability and the resulting societal pressures (Aarseth et al., 2017), project professionals' approach to tackling these issues is not consistent. Indeed, decisions regarding sustainability can differ significantly over time and from project to project (Martens and Carvalho, 2016). Some plausible explanations for this phenomenon lie in the relative novelty of sustainability considerations in business practices (Banihashemi et al., 2017), with different understanding of its meaning by decision makers (Bolis et al., 2014; Salas-Zapata and Ortiz-Muñoz, 2019), and the uncertainty regarding its long-term consequences (Ton, 2012).

This divergence is problematic as the sustainability aspirations are affected and driven by the type of actions and processes adopted in the delivery. With a clear lack of understanding between the actions/processes and the achieved level of sustainability, confusion arises with the resulting reluctance to implement sustainable actions (Coad and Pritchard, 2017). This challenge is further amplified by the fact that sustainability research and practice often examine strategy, portfolio management, and project delivery in isolation, with limited attention to how these levels interconnect, leaving practitioners without an integrated framework to guide consistent and effective sustainability implementation (Silvius and Marnewick, 2022). Also, a growing organizational complexity, the involvement of multiple actors, and emerging uncertainty around the expanding expectation for projects do not ease a sustainable, resilient, and just futures (Whyte et al., 2022).

To investigate the relationship between different types of 'sustainable business practices' adopted in projects delivery and the level of sustainability achieved, it is necessary to factor in also the determinants of those choices made by project managers (i.e., 'formal organizational structures' and 'incentives'). Although it is widely accepted in the literature that industry and corporate commitment direct the type of sustainable practices adopted (Nitkin and Brooks, 1998), it is also recognised that it is impossible to measure and compare specific decision toward sustainability objectives (Boiral and Henri, 2017). Moreover, from the behavioural perspective, looking at project management decisions, it is also noted that in project delivery "there is a gap between the perception of importance and the actual use of sustainability" (Martens and Carvalho, 2016, p. 39).

The presence of constraints or triggers often is a reason for hindering or enabling the reduction of this gap between perception and importance of sustainability. Indeed, possible constraints hindering the actual adoption of 'sustainable business practices' can be the high implementation costs (Hwang and Tan, 2012), complexity (Ndhlovu and Sabini, 2023; Sabini and Silvius, 2023), tension between long vs short term objectives (Talbot and Venkataraman, 2011), hostile project environment (Sabini and Alderman, 2021), ambiguity over key constructs (Gregersen et al., 1994) and lack of technical sustainability knowledge (Brones et al., 2014). However, by looking at the other side of the same coin, i.e., triggers to increase adoption of sustainable practices, literature evidence an improvement of project long term performance (Russell and Shiang, 2012), increase of project resilience (Perrini and Tencati, 2006) and performance (Brent et al., 2007). More recent work has also identified that stakeholders moral imperative and ethical concern (Silvius et al., 2013; Silvius and de Graaf, 2019), presence of strong regulations or public incentives (Sabini and Alderman, 2021), and the existence of contractual clauses (Sabini et al., 2017) are also powerful instruments to incentive project managers and project stakeholders in implementing 'sustainable business practices' in their projects.

3. Hypotheses formulation

The main objective of this study is to understand how the implementation of specific sustainable business practices impact the perceived degree of sustainability deployed in project delivery (DSP). In this study, DSP does not refer to the environmental performance of projects, compliance with sustainability standards, or the achievement of triple bottom line outcomes. Rather, it captures project managers' perceptions of the extent to which sustainability principles are embedded in the processes through which projects are planned, executed, monitored, controlled, and governed.

Conceptualising and measuring sustainability in projects has long

been recognised as challenging within the project management literature. Existing studies have adopted a variety of approaches, ranging from assessments of environmental and triple bottom line performance (Silvius and Schipper, 2014) to the use of project-specific indicators developed by organisations to address contextual requirements (Damtoft et al., 2025). In practice, organisations frequently rely on ad hoc measures tailored to the priorities of project sponsors and executives. These inconsistencies reflect both the multidimensional nature of sustainability and the idiosyncratic characteristics of project settings, making the development of universally applicable indicators problematic.

Given these challenges, this study adopts a perceptual measure of DSP grounded in the experiences of project managers. Consistent with the assumptions of rational choice theory, project managers form judgements based on the information, resources, constraints, opportunities, and strategic interactions that characterise their decision environment. Accordingly, DSP is defined as the perceived degree to which the "planning, monitoring and controlling of project delivery and support processes" incorporate environmental, economic, and social considerations throughout the life cycle of project resources, processes, deliverables, and effects, with the aim of creating stakeholder benefits in a transparent, fair, ethical, and participatory manner (Silvius and Schipper, 2014).Therefore, the dependent variable represents a perceived composite assessment of the integration of sustainability practices into project delivery processes, rather than an objective measure of sustainability outcomes or compliance.

To address this research gap, this paper first identifies the most common 'sustainable business practices' suggested in the project management literature; then examines these alongside formal organisational structures and the type of constraints and enablers that can induce a project manager to adopt, or otherwise, these practices. We subsequently formulate several hypotheses (Fig. 1) testing if project managers 'sustainable oriented' choices relates to the level of project sustainability taking into account the presence of formal organizational structures, constraints (normative, regulative and organizational barriers) and enablers (triggers and incentives).

3.1. 'Sustainable business practices'

The consideration of sustainable business actions and practices adopted in projects has been discussed in the academic literature, which describe and suggest how sustainability can be achieved in projects. Studies in this area include how environmental aspects are considered during the execution of projects by following public policies and rigorous professional guidelines (Labuschagne et al., 2005) (Labuschagne et al., 2005), inclusion of sustainability objectives during the feasibility studies in construction projects where historically the focus had been only on economic performance (Shen et al., 2010; Shen et al., 2010), and the importance of the project manager influence during the formative stages where the project is shaped, its execution roadmap designed, and sustainability targets and issues considered (Goedknegt, 2012).

However, since most of the findings in the literature are based on qualitative case studies, no systematic non-context-specific set of 'sustainable business practices' is suggested for implementation to improve project sustainability. The literature, given the continuous development in the field, explores Sustainable Project Management from a specific empirical context and personal experience.

In one of the few quantitative analyses (Martens and Carvalho, 2017), highlight and discuss four key factors driving sustainability in a project management context: (a) 'environmental policies and resource savings'; (b) 'economic and competitive advantage'; (c) 'stakeholder management'; and (d) 'sustainable innovation business model'. These four categories are a very good attempt, in practical terms, to establish which sustainable objectives should be considered in a specific project.

Indeed, our work links to (Martens and Carvalho, 2017) empirical contribution, to provide evidence on how projects and project managers are embedding 'sustainable business practices' through their decisions within projects. However, very often these activities do not happen following a systematic formal decision-making approach, rather often through an unplanned process of trial and error. Indeed, Manetti and Toccafondi (2012) point that all actors "pursue their own business, professional or ideological interests, without any real guarantee as to the reliability of the evaluation carried out" (Manetti and Toccafondi, 2012, p. 365).

To shed more light on how 'sustainable business practices' impact the overall perceived degree of DSP, we consider the range of adopted sustainable practices within a project. To achieve this, we identified and consider the most popular 'sustainable business practices' implemented in different project contexts (Martens and Carvalho, 2017; Raderbauer, 2011), being conscious that specificity of the project context will play an important role in determining these practices. Therefore, in this research the sustainable business practices act as decision architectures that influence project managers by increasing awareness of sustainability issues. We posit that sustainable practices impact DSP as they alter the decision context within which project managers make trade-offs and allocate attention to sustainability considerations. This is in line with the rational choice theory which suggests that social outcomes emerge from the aggregation of these individual decisions based on availability of information, resources, constraints, and costs (Scott, 2000).

Therefore, we state the following hypothesis:

Hypothesis 1. Adoption of a set of 'sustainable business practices' has a positive impact on the perceived degree of sustainability deployed in the project.

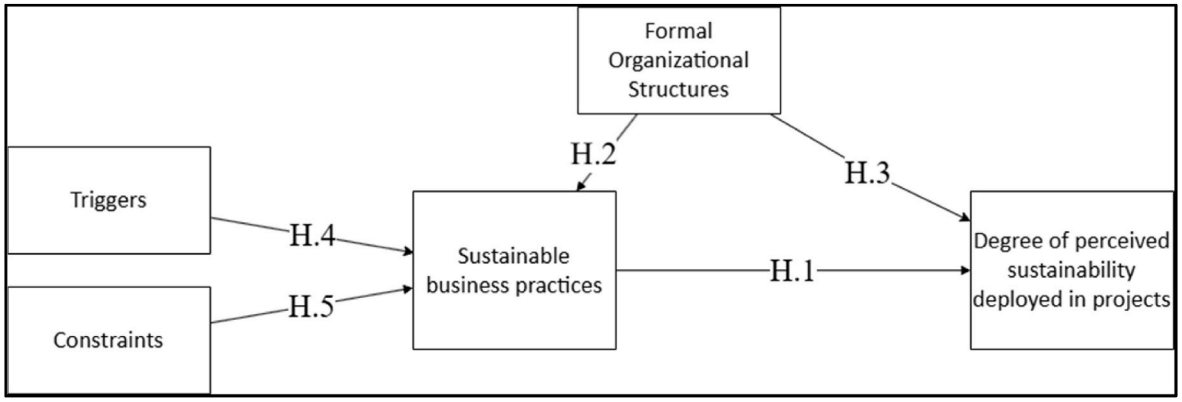


Fig. 1. Conceptual model.

3.2. Governance and formal organisational structures

Few studies have analysed how the presence of structures for the definition and implementation of sustainability influence the adoption of sustainable practices in organizational activities. (Nitkin and Brooks, 1998), in corporate sustainability reporting, underline how the adoption of 'sustainable business practices' is contingent upon several factors (e.g. corporate commitment, sector, auditing transparency). However, since most of these practices are voluntary, the adoption of such practices can range from an "elementary level to a sophisticated integrated assessment of social, environmental, labour, sourcing and trading, and governance issues" (Nitkin and Brooks, 1998, p. 1499). For this reason, it is important to appreciate and understand that corporate structures tend to be related to organisational intentions regarding sustainability (Schaltegger and Hörisch, 2017).

When considering projects within this wider organizational environment and structures, it becomes clear that project managers do not always possess the necessary knowledge, power, and authority to implement formal policies, set Key Performance Indicators (KPIs) and define strategies to achieve and improve sustainability in their projects (Svejvig and Andersen, 2015). Indeed, project managers "actions, decisions and behaviours are understood as being embedded in and continuously re-shaped by local patterns of power relations" (Cicmil et al., 2006, p. 676). Therefore, as a first step, some research suggests that, to increase the effectiveness of sustainability outputs, it would be sensible to narrow knowledge gaps and compensate project managers' lack of power by employing formal organisational structures (Brones et al., 2014). These structures should be deputed in guiding the type of sustainable practices adopted.

In this sense, formal structures could shape decisions on sustainable practices as they define: who participates in decisions, approves trade-offs, is accountable; report information, prioritise criteria (Bansal and DesJardine, 2014). Therefore, the governance structures can communicate the overall organisational priorities (Mintzberg, 1979). In the project delivery, the governance can directly affect DSP through audits, reporting obligations, review gates, and oversight (Muller, 2011). From another perspective, governance structures can also link to project actors through incentives, authority relationships, and accountability mechanisms that extend beyond the formal adoption of practices (Muller, 2011).

We, therefore, posit that the presence of formal structures, that enables a meaningful comparison, assessment and direction of 'sustainable business practices' and objectives over time and across projects can be a powerful tool to increase the perceived degree of DSP. Therefore, we state the following hypotheses:

Hypothesis 2. *Projects with a strong presence of formal organizational structures committed to sustainability, have a higher adoption of 'sustainable business practices'.*

Hypothesis 3. Projects with a strong presence of formal organizational structures committed to sustainability, achieve a higher perceived degree of sustainability deployed in the project.

3.3. Triggers and constraints to sustainable practices

The triggers and constraints influencing the adoption of sustainable practices are inherently heterogeneous in nature. Within the project management literature, and depending on the underlying theoretical traditions (e.g., institutional theory, behavioural theory, economic incentives), these factors are conceptualized in different ways. In this study, however, the constructs are defined based on their functional role – as incentives (triggers) or barriers (constraints) – rather than their theoretical origin. Indeed, project management literature acknowledges the willingness of project stakeholders, driven by "moral imperative", to push for sustainability considerations and to achieve sustainable objectives when implementing projects (Silvius et al., 2013) (Silvius et al., 2013). However, very often, without the presence of (a) public regulation, (b) public incentives, and (c) contractual clauses in the project contracts the intention to adopt sustainability practices is not converted into implemented actions. Indeed, Schaltegger and Hörisch (2017), taking a sceptical view, point that usually an organization adopts sustainability for two main reasons: profit seeking (to exploit win-win situations), and legitimacy and reputation seeking (react to social pressure).

For organisations adopting sustainability for profit seeking, the presence of financial triggers would become a powerful instrument to incentive project managers and project stakeholders in implementing 'sustainable business practices' in their projects. In this context, the project management literature suggests that 'sustainable business practices' are most likely to be implemented if it is possible to connect such practices with the project 'long term performance' (Russell and Shiang, 2012), project resilience (Perrini and Tencati, 2006), alignment between strategic goals and tactical objectives (Herazo et al., 2012), and project management performance improvement (Brent et al., 2007). However, when this condition is driven to the extreme, it can happen that accounts on environmental objectives do not match project environmental performance and lead to greenwashing behaviours (He et al., 2022).

For organisations adopting sustainability for legitimacy and reputational reasons, a powerful element that enable project managers to adopt 'sustainable business practices' within project delivery is pragmatism, i.e., "when there is good application for sustainability" (Silvius and Schipper, 2020, p. 361) and these practices are connected to the values and ethical concerns of the project stakeholders (Silvius et al., 2013). In addition, and from the individual perspective of project managers, there is an increased tendency for adoption of sustainable practices within the project delivery if project managers believe that this will lead to a potential increase in their professional recognition and reputation among peers and potential employers (Sabini et al., 2017).

In all, triggers represent factors that increase the perceived benefits or incentives associated with adopting sustainable practices and constraints represent factors that increase the perceived costs, risks, or barriers to their adoption. This is in line with the lens of rational choice theory where decision-makers evaluate actions by weighing expected benefits against costs. Thus, despite their heterogeneous origins, these elements are unified through their role in influencing rational decision-making. Therefore, either for profit or for legitimacy and reputation seeking reasons, the above cited considerations can constitute triggers, or (on the other side) can create constraints to the adoption of sustainable practices; in lieu of these, we state the following hypotheses:

Hypothesis 4. The presence of triggers to sustainable actions in a project has a positive impact on the adoption of 'sustainable business practices'.

Hypothesis 5. The presence of constraints to sustainable actions in a project has a negative impact on the adoption of 'sustainable business practices'.

4. Methodology

4.1. Data collection and sample

Most studies in the sustainability field adopt a qualitative methodology with data collected generally through case studies. The application of quantitative methodology to test the links between practical sustainability related practices is limited with virtually none in the context of project delivery.

As this study is about testing concepts from the literature rather than theory building, a quantitative methodology involving Statistical analysis to test the hypotheses included in the conceptual model presented above (Fig. 1) is adopted. For this purpose, a survey questionnaire was built and administered to participants in charge of managing and

delivering projects. For this reason, the target population comprises active project managers working in different kinds of projects. Indeed, project managers occupy a central coordinating role and are often among the few actors with visibility across governance arrangements, sustainability practices, organisational constraints, and project-level outcomes. Consequently, the use of project managers as key informants is consistent with prior project management and organisational research relying on knowledgeable respondents to provide integrated assessments of project characteristics.

The survey was sent to members of the Italian Association of Project Management (ISIPM) via their website (www.isipm.org) and their social media group on LinkedIn. With the endorsement of the ISIPM president, all LinkedIn group members received a personalized email from one of the researchers through the platform. Reaching participants through personalized messages circumvented the common problem of poor response rate in data collection for web-based surveys (Lefever et al., 2007). From the 2000 members of the ISIPM reached through the website and the LinkedIn group, 510 responses were received representing approximately a 25% response rate. The survey sample includes a broad mix of professionals. Most respondents are between 25 and 54 years old (91% overall), with the largest groups aged 25–34 (30%), 35–44 (30%), and 45–54 (31%). In terms of experience, nearly four in ten participants (39%) have more than 10 years in their field, while 31% have 2–5 years, and smaller shares have under one year (8%) or 6–10 years (22%).

Industry representation is diverse, with the highest participation from ICT (138 respondents), Engineering (59), Consultancy (40), and various other sectors such as Energy, Environmental services, Infrastructure, Financial services, and Product development. This distribution reflects a multidisciplinary and experienced respondent population.

4.2. Measures

The items measuring the constructs (Table 1) included in the conceptual framework were derived from previous research in the field of sustainable project management (Huemann and Silvius, 2017; Sabini et al., 2019) and 'sustainable business practices' (Raderbauer, 2011) and this helped to elicit the survey questions. In this context, the "Degree of Sustainability Deployed in Projects - (DSP)" is developed from the definition of sustainable project management by (Silvius and Schipper, 2014), provided in the appendix, and is represented by a single item measured through a score ranging from 1(No deployment) to 10 (Exceptional deployment) construct measure. The items representing the construct 'Sustainable Business Practices' (SBP) are taken from Raderbauer (2011) and the items for the construct "Formal Organizational Structures - (FOS)" originate from the Global Sustainability Standard (AASHE, 2010) standard. The items related to the constructs "Triggers - (TR)" and "Constraints - (CON)" are developed both from previous research.

Answers to the SBP, TR, and CON constructs' questions were collected on a 7 point Likert scale indicating level of usage (SBP) and relevance (TR, CON) whereas answers related to the FOS construct were gathered through a 3 points Likert scale indicating level of implementation (this is a measure of the presence of these structures rather than their intensity).

The questions are built drawing from concepts in the project management literature. The constraints to sustainability in project delivery are: high implementation costs (Hwang and Tan, 2012), balancing long vs short term objectives (Talbot and Venkataraman, 2011), low regulation (Sabini and Alderman, 2021), limited public awareness regarding sustainability (Al-Saleh and Taleb, 2010), adverse project environment (Sabini and Alderman, 2021), ambiguity over key constructs (Gregersen et al., 1994), knowledge and skills gap (Brones et al., 2014). The triggers to sustainability in project delivery are: long term performance (Russell and Shiang, 2012), moral imperative/ethical concern (Silvius et al., 2013; Silvius and de Graaf, 2019), project resilience (Perrini and Tencati, 2006), regulation and public incentives (Sabini and Alderman, 2021), presence in the contractual clauses (Sabini et al., 2017), improvement of overall project performance (Brent et al., 2007).

Table 1
List of items for each construct.

Construct	Items
DSP	DSP1: Degree of sustainable project management
FOS	FOS1: Formal policies about 'sustainable business practices'
	FOS2: Clear defined KPI for sustainability
	FOS3: Scheduled checks on sustainability practices
	FOS4: Scheduled reports of sustainability performance
	FOS5: Scheduled reports of sustainability performance to external stakeholders, such as contractors, investors, local community
	FOS6: Strategies to improve sustainability performance
SBP	SBP1: Took measures to reduce energy consumption
	SBP2: Introduced water saving measures
	SBP3: Introduced anti air pollution measures
	SBP4: Implemented measures to reduce usage of other resource and/or increases recycling
	SBP5: Purchased materials based on the energy consumption and/or pollution effects
	SBP6: Reported project (progress) reflecting indicators of environmental and/or social sustainability
	SBP7: Considered the impact of the entire project lifecycle (product disassembly, reverse logistics)
	SBP8: Took into account the financial benefits originating from environmental and social good practices
	SBP9: Offered local stakeholder access to project information
	SBP10: Supported ethical behavior (fair trade, competition and anticrime policies, codes of conduct, etc)
	SBP11: Selected and evaluated suppliers and contractors based on their sustainable attitudes
	SBP12: Sponsored and/or supported at least one community action or group
	SBP13: Designed the project's deliverables to improve health and safety conditions
	SBP14: Avoided negative impacts on local communities (child labor, human rights, indigenous rights, forced and compulsory labor)
TR	TR1: Improved long term project performance
	TR2: Increased my professional recognition/reputation
	TR3: Matched my ethical concern about environment & society
	TR4: Mitigated project risks
	TR5: Were required by law
	TR6: Were supported by public incentives
	TR7: Were required by contractual clause
	TR8: Aligned strategic with tactical objectives
	TR9: Increased project success likelihood
	TR10: Were recommended from other project partners and/or stakeholders
	TR11: Reduced project operational costs
	TR12: Reduced negative impacts on social, cultural and ecological environment
	TR13: Improved the relationship with the local community
CON	CON1: Difficulty in demonstrating long term commercial benefits
	CON2: Complexity which cannot be translated into practical strategies
	CON3: Lack of support and information from other stakeholders in the project
	CON4: Increase in time and manpower in everyday operations
	CON5: Other priorities in the project
	CON6: Difficulties in balancing long vs short term objectives
	CON7: Lack of legally enforced regulation
	CON8: Lack of education/training in project management team
	CON9: Limited public awareness with regard to the need for sustainability
	CON10: Hostile/contentious project environment
	CON11: Ambiguities on what it needs to be done to achieve it
	CON12: Knowledge gap on how to implement them

In addition to the above, the survey included also questions on the characteristics of the project and the demographics of the respondents.

To test the reliability of the questionnaire and the content of the questions, we conducted a pilot study with some critical friends – i.e., academic colleagues with expertise in surveys (to ensure methodological rigour) and PM practitioners (to assess the quality of the questions). Results from the pilot survey helped to refine the questionnaire layout

and content of some questions (reconsider and rephrase some of the 'sustainable business practices' identified).

Moreover, several procedural remedies were incorporated during survey design to reduce the likelihood of common method bias. Respondents were assured of anonymity and confidentiality, reducing social desirability pressures and evaluation apprehension. Established measures were adopted from prior literature and adapted carefully to the project management context.

4.3. Data analysis and results

The research adopted a Partial Least Squares (PLS), a type of Structural Equations Modelling (SEM) which is deemed suitable for testing causality relationships between latent variables. PLS offers the advantage of being suitable in cases where the sample size is small as it is the case with the number of responses to this study's survey, moreover, unlike other methods that focus solely on model fit, PLS-SEM is designed to identify the 'drivers' or causes of endogenous constructs (Hair et al., 2021).

The collected responses were checked for missing values and, in line with recommended practice, entries with more than 15% missing responses were omitted from the analysis (Samani, 2016) – this primarily used for screening out observations that have too much missing information to be reliable. Two hundred responses passed this test and were used for analysis. Missing values within these responses (total less than 15%) were indicated in the software SMART-PLS V3, which was used to carry out the statistical analysis.

4.4. Evaluation of the model

The first stage of the statistical analysis focused on checking the reliability and validity of the model's constructs. This stage is a prerequisite for the following hypotheses testing stage and aims at assessing whether the items included in the questionnaire are able to represent the constructs.

Reliability was tested through Cronbach-α values, which, if exceeding 0.7, indicate a good reliability (Hair et al., 2021). The values of Cronbach-α for all constructs are well above 0.7 indicating a high degree of constructs' reliability (See Table 2)

Validity testing involves convergent validity and discriminant validity. Convergent validity is tested through the following criteria (i) item loading values of standardized items higher than 0.7 and statistically significant, (ii) composite reliability (CR) for each construct higher than 0.8, and (iii) average variance extracted (AVC) for each construct exceeds 0.5. The list of the items satisfying the loading value criteria and the CR and AVC values for all constructs, which indicate high level of convergent validity, are given in Table 2. Discriminant validity is tested via a rule, which stipulates that the square root of the AVC for each construct is higher than its correlation with other constructs (Fornell and Larcker, 1981). Table 3 provides the values for each construct's square root of AVC and its correlation with other constructs. Although the rule is satisfied, there is a moderate correlation between some constructs (for example 0.511 between the constructs TR and SBP), which may indicate the presence of multicollinearity. Therefore, we conducted the Variance Inflated Factor (VIF) test, which was successful as the VIF for the constructs varied from 2.045 to 3.295, well below the threshold value of 10. Following these tests, it was concluded that the model satisfies all the validity requirements.

4.5. Partial least square analysis results

Testing of the model hypotheses constitutes the second stage of the SEM based statistical analysis. This was conducted through the SMART-PLS V3 software and the results are presented in Table 4 including path coefficients and p-values.

The results indicate that hypotheses H1, H2, H3, and H4 are supported. The path coefficients (β) values are 0.27, 0.202, 0.301, and 0.568 for hypotheses H1, H2, H3, and H4 respectively. The p-values for these hypotheses are well under 0.05 at 0.000 (H1, H2, and H4) and 0.001 (H3). The only hypothesis not supported is H5 with a path coefficient value of 0.035 and a p-value of 0.516, well above 0.05. The R-Square values are 0.241 are 0.486 for the constructs DSP and SBP respectively. This indicates that 24.1% of the variability in the degree of sustainability in projects is explained by the constructs SBP and FOS and 48.6% of the variability in the adoption of 'sustainable business practices' is explained by the constructs TR.

These findings mean that the degree of sustainability deployed in projects is affected by the level of adoption of business sustainable practices in projects and by the formal organisational structures

Table 2
The values of Cronbach-α, composite relilability and average variance extracted.

Construct	Cronbach-α	Loading Values	Composite Reliability	Average Variance Extracted
FOS	0.877	FOS1: 0.710 FOS2: 0.808 FOS3: 0.796 FOS4: 0.849 FOS5: 0.782 FOS6: 0.771	0.906	0.620
SBP	0.953	SBP1: 0.843 SBP2: 0.877 SBP3: 0.821 SBP5: 0.880 SBP6: 0.846 SBP11: 0.773 SBP14: 0.774	0.937	0.683
TR	0.923	TR1: 0.728 TR3: 0.836 TR5: 0.810 TR6: 0.777 TR7: 0.734 TR9: 0.760 TR12: 0.872 TR13: 0.816	0.931	0.629
CON	0.891	CON2: 0.844 CON4: 0.716 CON6: 0.828 CON10: 0.912 CON11: 0.850	0.832	0.692

Table 3
Construct values and correlations.

	FOS	TR	CON	SBP
FOS	**0.787**			
TR	0.436	**0.793**		
CON	0.263	0.207	**0.832**	
SBP	0.506	0.507	0.341	**0.826**

The bold values represent the square root of AVE for each construct.

Table 4
Partial least square analysis results.

Hypothesis	Supported	Path Coefficient (β)	p-value	R-Square
H1: SBP-DSP	Yes	0.270	0.000	0.241
H2: FOS-SBP	Yes	0.202	0.001	0.486
H3: FOS-DSP	Yes	0.301	0.000	
H4: TR-SBP	Yes	0.568	0.000	0.486
H5: CON-SBP	No	0.035	0.516	

deployed in projects. Similarly, the presence of formal organisational structures in a project facilitates the implementation of business sustainable practices.

With regard to the impact of triggers and constraints on the adoption of 'sustainable business practices' in projects, the findings are mixed. Whereas they indicate that triggers are related to the adoption process, the constraints bear no effect on this process and do not influence the level of implementation of the practices.

5. Findings and discussion

In line with a fast growing body of literature, this study confirms the importance of adopting 'sustainable business practices' to increase overall project sustainability. This study set out to examine how sustainable business practices, formal organisational structures, and project-level triggers and constraints shape the integration of sustainability in project delivery. The findings provide a coherent picture of sustainability adoption in project delivery as a multi-level and pressure-driven process, while also revealing a notable gap between organisational intentions and project-level outcomes.

The model explains about one fourth (24.1%) of the variance in the perceived degree of sustainability deployed in projects and about half (48.6%) of the variance in the adoption of sustainable business practices. These results indicate moderate explanatory power for project-level sustainability outcomes and substantial explanatory power for organisational sustainability adoption. Taken together, this suggests that while organisational conditions are strongly related to whether sustainability practices are adopted, translating these practices into project delivery remains considerably more complex and context dependent.

Indeed, the relatively modest explanatory power observed for perceived degree of sustainability deployed suggests that sustainability implementation in projects is influenced by a broader range of factors than those captured in the present model. While governance arrangements, organisational triggers, constraints, and sustainable project behaviours explain a meaningful portion of the variance, a substantial proportion remains unaccounted for. This finding is perhaps unsurprising given the inherently complex and multi-dimensional nature of sustainability within projects.

The results provide support for four of the five hypothesised relationships.

The adoption of sustainable business practices has a positive effect on the degree of sustainability deployed in projects (H1: $\beta = 0.27$, $p < 0.001$). This confirms that organisational sustainability practices do contribute to project sustainability outcomes. These results are aligned with those reported in previous research (Aarseth et al., 2017; Martens and Carvalho, 2016, 2017), which establish a clear direct causal relationship of such specific practices on the overall project sustainability. However, the moderate effect size suggests that these practices operate alongside other project-level influences. In practical terms, organisational commitment creates enabling conditions but does not fully determine project behaviour.

Another contribution of this study lies in the consideration of formal organizational structures impact on the degree of sustainability deployed in a project. Indeed, in line with Svejvig and Andersen (2015), the presence of formal organizational structures deputed to support the adoption of 'sustainable business practices' is a potent catalyst both for their adoption within the project processes. Formal organisational structures committed to sustainability show two distinct and significant effects. First, they are positively associated with the adoption of sustainable business practices (H2: $\beta = 0.202$, $p < 0.001$). Second, they directly impact the degree of sustainability deployed in projects (H3: $\beta = 0.301$, $p = 0.001$). The stronger direct effect compared with the indirect pathway suggests that governance mechanisms, procedures, and formal accountability structures play a particularly important role in shaping project sustainability. This finding highlights the importance of embedding sustainability within organisational governance rather than relying solely on voluntary or informal initiatives. Indeed, from an institutional perspective, this finding suggests that formal organisational structures do more than facilitate the adoption of individual sustainability practices. By embedding sustainability within governance arrangements, decision-making procedures, accountability mechanisms, and reporting systems, organisations institutionalise sustainability as a legitimate and expected component of project delivery. Consequently, sustainability becomes embedded within organisational routines rather than depending solely on the commitment or initiative of individual project managers. We argue that the presence of a direct relationship between formal organisational structures and perceived degree of sustainability deployed in project delivery further suggests that governance mechanisms influence project sustainability through multiple pathways. While part of their contribution occurs through encouraging the adoption of sustainable business practices, formal governance structures may also affect strategic prioritisation, resource allocation, monitoring, organisational learning, and accountability, thereby creating an organisational environment in which sustainability is systematically reinforced throughout the project lifecycle.

The strongest relationship in the model is the effect of triggers on the adoption of sustainable business practices. This study highlights the importance of triggers as a prompt for the adoption of 'sustainable business practices' in projects (Sabini et al., 2017; Schaltegger and Hörisch, 2017; Silvius et al., 2013) – here the triggers are referred to as the conditions, which make the adoption of a given sustainable practice more likely. This substantial effect (H4: $\beta = 0.568$, $p < 0.001$) indicates that sustainability adoption is largely driven by pressures such as project success (long term performance, risks mitigation, strategic alignment, project performance, reduced costs), personal motives (increase professional recognition/reputation, matched personal ethical concerns), and mandatory or strongly encouraged circumstances (required by law, supported by public incentives, required by contractual clause, recommended by stakeholders, enhanced relationship with local community) the 'sustainable business practices' are most likely to be implemented. From an institutional perspective, these findings suggest that the adoption of sustainable business practices is primarily associated with external institutional pressures (Hwang and Colyvas, 2010; Lawrence and Suddaby, 2006) rather than being driven solely by internally held sustainability values (Poon and Silvius, 2019). Many of the identified triggers – including regulatory requirements, contractual obligations, stakeholder expectations, and public incentives – could reflect coercive pressures encouraging organisations to conform to prevailing institutional expectations. Similarly, professional recognition and ethical concerns can be interpreted as normative pressures that shape acceptable managerial behaviour within the project management profession. The strength of this relationship therefore suggests that sustainability practices are frequently adopted because they enhance organisational legitimacy by demonstrating conformity with the expectations of regulators, clients, professional communities, and society more broadly. Rather than representing purely voluntary initiatives, sustainability practices appear to function as responses to institutional environments in which sustainability has become an increasingly legitimate and expected way of managing projects.

In contrast, the hypothesised negative effect of constraints on the adoption of sustainable business practices is not supported (H5: $\beta = 0.035$, $p = 0.516$). Unexpectedly the presence of constraints to the adoption of sustainable practices does not seem to impact their effective implementation. In this study, the results show that the identified constraints are not statistically significant in hindering the adoption of sustainable practices. However, while this finding does not suggest that constraints are absent from projects, it indicates that they may not constitute the primary determinants of sustainability practice non-adoption. Looking once again through an institutional theory lens, as sustainability becomes increasingly embedded within regulatory requirements, contractual obligations, stakeholder expectations, and

professional norms, organisations may continue adopting sustainable practices despite facing internal organisational constraints. In such circumstances, external institutional pressures may outweigh resource limitations or operational barriers, encouraging organisations to conform to socially accepted expectations to maintain legitimacy.

Looking through this angle, we can interpret that organisations may seek to preserve their legitimacy by demonstrating compliance with evolving societal expectations. Consequently, sustainability practices may increasingly be viewed as necessary organisational responses rather than discretionary initiatives that can be postponed when constraints arise.

Moreover, another angle to look at is through the paradoxical nature of project management (Sabini and Alderman, 2021), where sustainability objectives, rather than being hindered by constraints, could simply coexist, requiring practitioners to balance competing demands rather than abandon sustainability altogether. We know that project managers have to navigate tensions between traditional project constraints with those of sustainability, however these constraints may be shaping how sustainability is implemented rather than whether it is implemented. From this perspective, constraints may influence implementation strategies, prioritisation, or the selection of sustainability practices without necessarily reducing their overall adoption (Bechtel et al., 2025).

Overall, this result does not imply constraints not to exist or not to prevent implementation of sustainable practices in a project, rather calls for further studies to explore and identify the constraints to adoption of sustainable practices. With this we encourage further research into plausible constraints that would hinder the adoption of sustainable practices.

Taken together, these findings suggest that organisations may be more responsive to positive institutional incentives than constrained by organisational barriers. When sustainability becomes embedded within regulatory requirements, contractual arrangements, stakeholder expectations, or professional norms, organisations appear willing to overcome internal constraints in order to maintain legitimacy and satisfy institutional expectations. This finding reinforces the institutional argument that organisational behaviour is not solely determined by resource availability or operational constraints but also by the need to conform to socially accepted practices (Lam, 2000; Lawrence and Suddaby, 2006). Moreover, the findings also suggest a strong relationship in which triggers strongly impact the adoption of sustainable business practices, while formal organisational structures and sustainability practices jointly shape project-level sustainability outcomes. However, the reduction in explanatory power between organisational adoption and project implementation highlights the difficulty of translating strategic intent into project execution.

This pattern reinforces the view that sustainability implementation in projects is a multi-level phenomenon shaped by organisational pressures, governance mechanisms, and project-level dynamics. The results therefore contribute to understanding the persistent gap between sustainability strategy and project delivery, suggesting that achieving consistent sustainability outcomes requires not only organisational commitment but also stronger integration between corporate governance and project practices.

Advancing sustainability in project delivery requires a multi-level approach. Organisations must simultaneously create strong sustainability triggers, institutionalise sustainability within organisational practices, and develop project-level capabilities that enable the consistent implementation of sustainability in project delivery.

6. Conclusions

To deal with the rigor-relevance gap of project management highlighted by (Ika and Munro, 2022), a survey with more than 500 project practitioners was conducted and data analysed with Structural Equation Modelling through Smart Partial Least Square software. The results show the perceived degree of sustainability deployed in project delivery to be advanced by a specific set of 'sustainable business practices' (Martens and Carvalho, 2017; Raderbauer, 2011). As presented in the discussion, several factors trigger these practices (Sabini et al., 2017; Schaltegger and Hörisch, 2017; Silvius et al., 2013) which are related to the formal organizational structures (Svejvig and Andersen, 2015) put in place in the project context. The analysis of constraints to the adoption of 'sustainable business practices' is inconclusive.

The survey highlighted that essential (but not limited) 'sustainable business practices' to achieve project sustainability relate to specific environmental, social, economic, and managerial practices. Adding to this, the sustainable practices are more likely to be adopted if certain conditions, i.e., project success, personal motives, and mandatory or strongly encouraged circumstances are coupled with them. In this picture, the presence of formal policies, KPI, checks, and reporting mechanisms on sustainability are implemented in the project context by project organization. For this, the research contribution resides in establishing a clear causal relationship between these variables and paving the way to evidence-based advice on how to boost sustainability transitions in project delivery.

There are some interconnected limitations to this study.

Firstly, the selected sample is predominantly based in one country; secondly, there are no distinctions among industries; and thirdly, the level of sustainability in the project is inferred from project managers' perceptions. Following on from these results, further studies could (a) survey a larger and more heterogeneous sample which would supply a stronger grounding for generalization; (b) isolate industry specific type of 'sustainable business practices' that have more impact on the overall project sustainability for that specific industry; and (c) develop unbiased measures to assess the overall level of sustainability deployed in a project.

Secondly, the study relies on a dependent variable which is a single survey item based on the perceptions of the project managers. Future studies could approach this complementing the results with qualitative data with a mixed-method research approach.

Thirdly, the explanatory power obtained for perceived degree of sustainability deployed in project delivery also highlights the possibility that relevant determinants were not included in the model. While the study focused on governance mechanisms, organisational triggers and constraints, and sustainable project behaviours, future research could incorporate additional organisational, project-level, and institutional variables to develop a more comprehensive understanding of sustainability implementation. Furthermore, the perceptual measurement approach may not fully capture the complexity and diversity of sustainability outcomes across projects and organisational contexts.

Lastly, because all variables were collected from the same respondents at a single point in time, the possibility of common method bias cannot be completely ruled out. Consequently, the observed relationships should be interpreted with appropriate caution, and future research could employ multi-informant designs, longitudinal data collection, or objective performance indicators to further strengthen causal inference.

In all, aligned with the call to improve the field contribution to the society (Netessine, 2021), the consideration of sustainability in project delivery can greatly benefit from the results of this study, particularly if considered in relation with studies on the personal motivation on adoption of sustainability (Roels and Staats, 2021; Silvius and de Graaf, 2019; Silvius and Schipper, 2020). Future studies, on the one hand should dig deeper into potential barriers to sustainability, and on the other hand could be targeting industries idiosyncrasies and assess how more sustainable project delivery decisions affect their sustainability levels. Moreover, another suggestion lies in further testing the causality of these variables.

7. In memoriam

This work is dedicated to the memory of Reda, who tragically passed away while this manuscript was undergoing revision. Reda's insights and dedication were instrumental to the development and execution of this manuscript. Beyond his invaluable contributions to this manuscript, Reda was a foundational mentor the first author during their early career at the University of Hertfordshire, offering wisdom, patience, and encouragement that shaped them as a researcher. He was not only a respected scholar and colleague but also a genuinely warm, generous, and engaging person whose company was a pleasure and privilege to enjoy. His kindness, sense of humour, and ability to connect with others left a lasting impression on all who had the opportunity to work with him. He is deeply missed.

CRediT authorship contribution statement

Luca Sabini: Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Reda M. Lebcir:** Writing – review & editing, Methodology, Formal analysis.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.plas.2026.100241.

Appendix

Silvius and Schipper (2014)Silvius and Schipper (2014) definition: "Sustainable Project Management is the planning, monitoring and controlling of project delivery and support processes, with consideration of the environmental, economical and social aspects of the life-cycle of the project's resources, processes, deliverables and effects, aimed at realising benefi ts for stakeholders, and performed in a transparent, fair and ethical way that includes proactive stakeholder participation."

Data availability

Data will be made available on request.

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