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RESEARCH ARTICLE

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The adoption of the key performance indicators to integrate sustainability in the business strategy: A novel five-dimensional framework

Ivo Hristov[1] | Andrea Appolloni[1,2,3] | Antonio Chirico[1]

[1]Department of Management and Law, University of Rome Tor Vergata, Rome, Italy

[2]Cranfield Scholl of Management, Cranfield University, Cranfield, UK

[3]Institute for Research on Innovation and Services for Development (IRISS), National Research Council (CNR), Naples, Italy

Correspondence
Andrea Appolloni, Department of Management and Law, University of Rome Tor Vergata, Rome, Italy.
Email: andrea.appolloni@uniroma2.it

Abstract

Over the past few years, the role of the organization has radically changed, moved from the traditional value creation process, based on the accounting data and cost analysis, to an innovative and proactive approach, sustainability oriented. The resulting sustainable development (SD) issues and their integration in the business strategy for managing environmental complexity are more relevant than ever. Despite the growing interest of the literature related to these themes, a more in-depth analysis on the key value drivers of sustainability, positively perceived by managers, and their integration at a business level is strongly required to support an effective SD process. Accordingly, to generate a strategic alignment in the sustainability transition process, scholars and practitioners require a clear view of the key drivers, metrics, and potential solutions. To this end, we focused on two main purposes aimed (1) to provide a sustainable key performance indicator (KPI) system useful to support decision-making process of managers and (2) to identify how can sustainable indicators be integrated into business strategy with a view to performance improvement, suggesting future paths to analysis. In view of the research proposes addressed, based on semistructured interviews with 110 managers specialized in sustainable practices, we provided a novel five-dimensional framework, built on a specific set of SD indexes. The model aims to provide a structured way to adequately integrate sustainability at a strategic level. The results generate a robust roadmap for future analysis in this research field.

KEYWORDS

business strategy, performance management, sustainability and key performance indicators, sustainable development

1 | INTRODUCTION

The Sustainable Development Goals (SDGs) discussed with the Paris Agreement in 2015 in view of the Agenda 2030 are far from to be integrated in the organizations. In fact, despite a large part of the literature suggests that the strategic alignment of SD drivers is positively correlated to the company's performance (Adams & Frost, 2006; De Villiers et al., 2016; Figge et al., 2002), its integration with performance management system (PMS) remains suboptimal and not adequately addressed (Braune et al., 2019; Hristov, Camilli, & Mechelli, 2022; Searcy, 2011) mainly for the absence of a strategic system based on sustainable performance indicators able to support

List of Abbreviations/Acronyms: GRI, Global Reporting Initiative; KPIs, key performance indicators; PMS, performance management system; SD, sustainable development; SDGs, Sustainable Development Goals; TBL, triple bottom line.

managers in decision-making process (Hristov et al., 2021). Limited research has focused on practical approaches supported by the managerial experience in developing current solutions to integrate the main key value drivers of the sustainable development (SD) in the business strategy (Hristov, Chirico, & Ranalli, 2022; Lisi, 2016). In fact, a large part of the managerial practices continues to focus exclusively on the financial information provided by financial reporting and cost analysis. This can result from a lack of willingness to bring innovation to the company because the processes already adopted are considered "best practices" (Nair, 2006). Managers have a lack of confidence in the sustainable indicators, and this does not allow them to fully commit to their use (Hristov & Chirico, 2019: Schaltegger & Burritt, 2018).

Despite the potential positive contribution of the sustainable approaches on performance and the several studies related to these themes (Arifeen et al., 2014; Fullerton & Wempe, 2009), a clear vision able to provide the main sustainability dimensions considered relevant in practice, the connected value drivers and a sustainable key performance indicator (KPI) system is strongly requested by the scholars and managers. This justified the interest of the authors of this paper in adding knowledge to the existing literature in the research field. Accordingly, the research problem and origin of the research idea underlying this study clearly emerge. To contribute to overcoming the existing gap in the literature and practice, the research focuses on the literature and managerial perceptions of SD drivers and connected measures. Considering these premises, in responding to goals defined previously, this paper follows two main research questions:

> **Rq1.** How to build a sustainable KPI system useful to support the implementation of a SD strategy?

> **Rq2.** How can sustainable indicators be integrated into business strategy with a view to performance improvement?

Accordingly, to address the research questions and improve what we know on the specific field explored, the authors conducted semistructured interviews with a sample of 110 experts, who focusing on the role of the sustainability metrics in supporting sustainable strategy implementation. More specifically, with regard to the first research question, we provided a clear view on the key value drivers (connected to five main dimensions emerged: environmental, social, economic, organizational, and cultural) that are qualitatively connected to the sustainable performance. Accordingly, we provided an additional step in the research field by extended the existing literature, which was mainly addressed to explore the triple bottom line (TBL) dimensions, purely from a quantitative point of view, suggesting a new perspective of analysis and future paths of research. In particular, results suggest that more focus is required on the cultural and organizational dimensions, which are positively perceived by managers as qualitative drivers to integrate into the business strategy. Moving to the second research question, we discussed the potential solutions, with the managers, to integrate the sustainable dimensions into the corporate strategy. To this end, specific questions of the questionnaire were addressed, aiming to analyze and discuss the practical approaches, sustainability transition challenges and critical issues on the research field addressed, to find a suitable way to practically support the strategic alignment. In this context, we provide a five-dimensional model based on a set of qualitative sustainable indicators, designed to implement, monitor, and support SD process in the organization. This approach is very important because it can be considered a structured system to drive managers in their decision-making process, based on the fundamental drivers of the SD strategies. In addition, we found that to integrate the sustainable dimensions at a strategic level, it needs to be incorporated in the organizational culture. Results suggest that SD is, firstly, a cultural process that requires understanding and acceptance. This aspect represents an important critical issue and challenge to be explored by further researches.

The paper is structured in six main sections: Section 1 includes the introduction of the research; Section 2 provides a theoretical background on the main research streams on the purposes addressed; Section 3 discusses the research method applied, which is followed by the research findings (Sections 4 and 5). Finally, in the Section 6, main conclusions and future paths of research are provided and discussed.

2 | MAIN CONCEPTS USED IN THE RESEARCH

2.1 | The KPI system as a sustainable business strategy tool

The KPI system, used as a key concept in this paper, assumes a fundamental role in the management accounting studies, defined as an integrated tool based on several processes that monitors and implements the performance of a specific strategic system in a holistic manner (Aguinis, 2012; Armstrong & Baron, 2005). In this context, each KPI is linked to a quantitative and/or qualitative variable that provides significant, synthetic, critical, and priority information, crucial for the decision-making process of managers (Aguinis, 2009). Over the past few years, the role of the organization has changed. Therefore, the KPIs are indicators that monitor the performance of a specific business process, allowing management not only to measure corporate events but also to plan corporate activities, determining the objectives in the medium to long term (Othman, 2008). The importance of these indicators is due to their efficiency in extrapolating useful information, not only from the financial statements but also from other factors external to the economic ones, such as social and environmental factors, which today have a fundamental importance in the life of all companies. Now, the focus of the corporate governance is to set strategies that have sustainable effects mainly using an economic, social, and environmental metrics. Behind the indicators are the performance metrics. Metrics can be classified as quantitative, which are based on economic and financial aspects of performance, or qualitative, based on characteristics of a phenomenon under observation (Broadbent & Laughlin, 2009; Singh et al., 2016). Different studies have analyzed the sustainable KPIs for the evaluation of a firm's

sustainability and the way, mainly from a quantitative point of view. In this context, particularly appreciable is the contribution provided by Hristov et al. (2021), who clearly identified the performance indicators associated to the TBL dimensions. In the same way, Addison et al. (2020) provided an excellent analysis on the crucial role of the KPIs, focusing on the biodiversity and green practices, while Chiarini (2017) provided a set of environmental KPIs based on the integrated Global Reporting Initiative (GRI), for evaluating suppliers' performance. However, a large part of these studies not consider adequately the relevance of the qualitative KPIs in the integration of the SD drivers at the business strategy. In this paper, we addressed these key issues in order to contribute to the literature and to stimulate further research to explore the sustainable KPIs, from qualitative point of view, in the SD strategy implementation.

2.2 | SD dimensions in the accounting literature

In recent years, there has also been a radical change in the principles that define the environment in which companies operate (Lisi, 2018). The search for new drivers of performance improvement is continually challenging existing organizational dynamics and creates new concepts of business performance (Scapens, 2008). Interest in SD has rapidly increased in the recent years with particular regard to the theme of corporate sustainability, a business approach that creates and supports the sustainable value creation process in the organizations by embracing the TBL dimensions, emphasizing the urgent needs for aligning SD drivers and corporate strategy (De Villiers et al., 2016). Accordingly, as introduces by the Brundtland Report in 1987, SD can be defined as a process designed to meeting the needs of the present without compromising the ability of future generations to meet their needs (Gond et al., 2012). The main stream of research recognizes the TBL as a key to implement sustainability (Figge et al., 2002). The environmental dimension is oriented to include the green value drivers in the corporate strategies (Trianni et al., 2019). The social dimension requires the capacity of providing for citizens' welfare with equal distribution among different classes (Hristov & Chirico, 2019). In fact, as argued by Guerci et al. (2016), in this dimension, stakeholders' perception plays a central role. In this context, the socio-ethical and cultural determinants have become fundamental to create a radical change and structured foundation that allows social sustainability to penetrate at the business level.

The last key dimension of the TBL mostly discussed in the literature is the sustainable economic development, introduced by the World Summit on SD in Johannesburg (2002). In fact, the summit drew attention to the fact that development must be considered a priority with respect to economic growth, as suggested by the Agenda 2030 with the SDG 8, related to the decent work and economic growth.

Nevertheless, part of the recent literature (Hristov et al., 2021; Naciti et al., 2021) argues that many organizations feel SD as a constraint to the financial performance. It seems that the integration process in the managerial practices is not addressed adequately mainly due to the cultural barrier in corporate governance and the absence of trust in the economic value associated to the adoption of a SD strategy (Bortolotti et al., 2015). Therefore, sustainability is, firstly, a cultural issue that requires more attention in the implementation of the sustainable strategy. To this end, a cultural dimension is required to contribute to achieving an integrated view of the company's system.

Finally, another very interesting issue was emerged by the recent trend in the literature. Most of the scholars have suggested that in practice exists a structural gap between strategy oriented to sustainability and its practical implementation. They focused on the lack of adequate assets, information system and digital transformation to support the implementation process. If exist a cultural orientation to SD, but the organizational structure is not ready to implement this change, probably the development of the TBL will be inefficient. The implementation of an organizational-oriented strategy requires a structured organizational control system with particular regard to aspects such as information system, innovation, and developing internal skills and provides a way to manage organizational change (Fry & Slocum, 2008; Hubbard, 2009).

From the theoretical background outlined is evident that the main sustainability dimensions used to implement SD strategy are related to the TBL approach, extended to two additional dimensions: cultural and organizational. In the following sections, we explore the key value drivers associated to each of the five dimensions emerged by the literature analysis.

3 | RESEARCH METHODOLOGY

As previously stated, one of the greatest challenges facing the contemporary research and academic world is to review the relationship between SD and the PMS. However, to date, sustainability and corporate strategy are still not adequately integrated in managerial practices. Several criticisms are connected to its effectiveness and its practical implementation. To this end, a survey among 235 managers of Italian companies was conducted, together with semistructured interviews with 110 middle and senior managers who specialize in SD issues, as explained below.

3.1 | Sample design process

Data were gathered mainly through semistructured interviews, a common method that field researchers use to interact with and collect data from managerial practices (Dai et al., 2019; Evans et al., 2015). In order to increase the contribution to the existing literature and provide a practical implication, structured interviews gathered 110 experienced professionals' evaluations on the research questions addressed. More specifically, a double process selection was applied: (1) survey questionnaire for the sample design and some preliminary data and (2) interview questionnaire for data collection and data analysis. In this context, our research was supported by the relevant role played by

the managers in providing a structured analysis of the practices and measures connected to the SD process at a strategic level.

In order to select the sample to interview, thanks to the AIDA[1] database and personal contacts, a web-based questionnaire survey was emailed to 936 managers in order to identify some of their basic information and experience with sustainability issues and KPIs adopted in their practices. More specifically, the criteria for this selection were only companies with more than a thousand employees because they were expected to adopt a more structured PMS to manage the SD issues (Lisi, 2018) and the availability of a web page or an email address. Accordingly, the result brought a total of 235 responses, with a 25% response rate (Malagueño et al., 2018), from January to March 2021. In some cases, in an attempt to increase the response rate, we sent three follow-up emails, in order to solicited managers' response. Of these returned questionnaires, 13 were discarded because the respondents declared that the topics under investigation did not apply to the company. The subsequent analysis, therefore, focused on the 222 completed questionnaires in order to identify the managers to be included in the final sample for the interviews.

The questionnaire used for the survey was divided into two parts and consisted of 10 questions in order not to excessively burden the procedure, nor risk reducing the response rate. In particular, the first section of the questionnaire was aimed at revealing demographic data of a generic nature on the sample under investigation (age, gender, job position, company tenure, and work experience). The second section, on the other hand, aimed to determine information on the knowledge, use, and experience in sustainability and management control issues.

At this point in the research, in order to guarantee the quality of the selection (Hristov & Chirico, 2019), those managers to be included in the final sample, based on their professional experience and job position in the organization, were identified. In particular, we included only middle and senior managers with more than 5 years managing SD issues. Thus, a total of 142 managers were netted and contacted by phone or email in order to verify their availability to have an interview (online), which resulted in 110 managers who confirmed their availability (Figure 1). Therefore, in order to contribute to the existing literature and to provide a practical implication, we conducted semistructured interviews with 110 managers, from April to June 2021, who specialized in management control and qualitative analysis.

3.2 | Search strategy and data collection

Accordingly, to build our model, we aimed to improve the literature results using data provided by the managerial practices. As previously introduces, the study was drawn from two data sources, a survey and semistructured interviews. Thus, two questionnaires associated with each phase can be distinguished: (1) The first, adopted in the survey, aimed at collecting information related to the personal details of the respondent and their knowledge about managerial control, sustainability analysis and strategy formulation (Ferreira & Otley, 2009); and (2) the second questionnaire (Lisi, 2018) was used for interviews to be administered to the final sample (electronically). Once we received managers' confirmation of their availability, we discussed with them of the main purposes of the research by email. The interviews were realized by using Teams or Skype. Each interview lasted 71 min on average (ranging from 46 to 96 min), and all were transcribed and coded for analysis (Eisenhardt & Graebner, 2007). The interview questionnaire (37 questions) was composed of four main sections (Appendix A). In developing the questionnaire structure, the research questions were used to support each phase. The first section focused on the key value drivers of SD mostly considered in practice, the second to the strategic goals and KPIs to implement the SD, the third section on the SD metrics, and the last section on the main challenges and future paths of research connected to the implementation of an efficient sustainable model. Through a specific set of questions, for each of the sections, addressed to the managers, the information that was aimed to address the first purpose was obtained. To this end, qualitative data were analyzed by categorizing the responses into major conceptual areas, identifying the main sustainability dimensions, considered relevant by managers for adopting sustainable strategies, and connected goals and KPIs. Finally, coherently to the second purpose, the practices and metrics to align SD and business strategy were investigated, together with the main sustainable approaches and critical issues related to the integration process (Section 3 of the

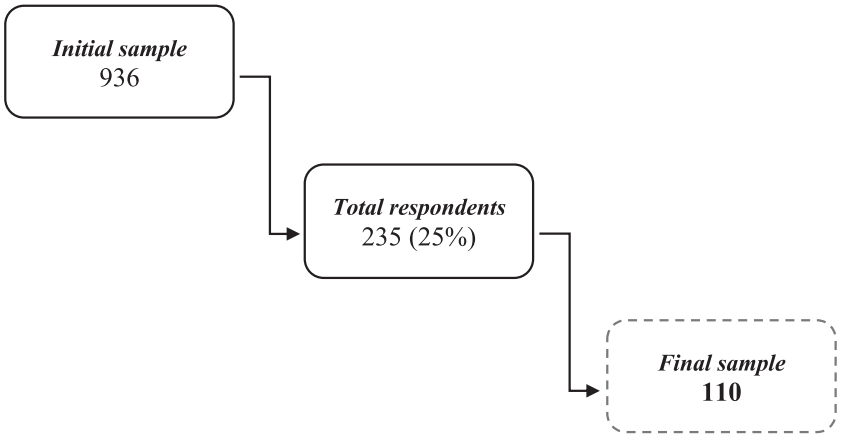

FIGURE 1 Sample selection process

questionnaire). Figure 2 describes the sample of the interviews, dividing it based on the gender, functional area, education, industry, age, work position, experience, and company type.

As shown in Figure 3, the sample presents managers actually working in the manufacturing industry (48%), services (25%), information technology (21%), transportation (11%), and agriculture (5%).

3.3 | Rigor and validity of the research method

According to the research design adopted in this paper, in order to improve the validity of the process, the authors followed a specific and rigor procedure during the interviews. In particular, we asked the respondents to verify the accuracy of the information provided in the transcribed interviews to highlight possible errors. The interview process was prepared based on the Ferreira and Otley (2009) framework, which supports the research process. All the raw data were transcribed, which were coded and translated into the defined conceptual areas. Moreover, qualitative data were further processed by categorizing the responses into major conceptual groups. In a following step, the sample of interviewees was requested to check the transcribed track and to verify any possible mistakes. In taking this step, the validity of the process was improved (Bortolotti et al., 2015). At the same time, we triangulated all data obtained by the interviews, literature, and the secondary data.

4 | RESEARCH FINDINGS

The research findings were divided into two parts. The first aims to build a sustainable KPI system useful to support decision-making process of managers (*Purpose 1*). The second part, presented in Section 6, aims to identify a way that is useful to support the future avenue for the integration process between the five sustainability dimensions and the PMS (*Purpose 2*).

According to the first purpose, managers' responses were analyzed, including similar information across a specific cluster/dimension. Once the dimensions were implemented, the respondents again

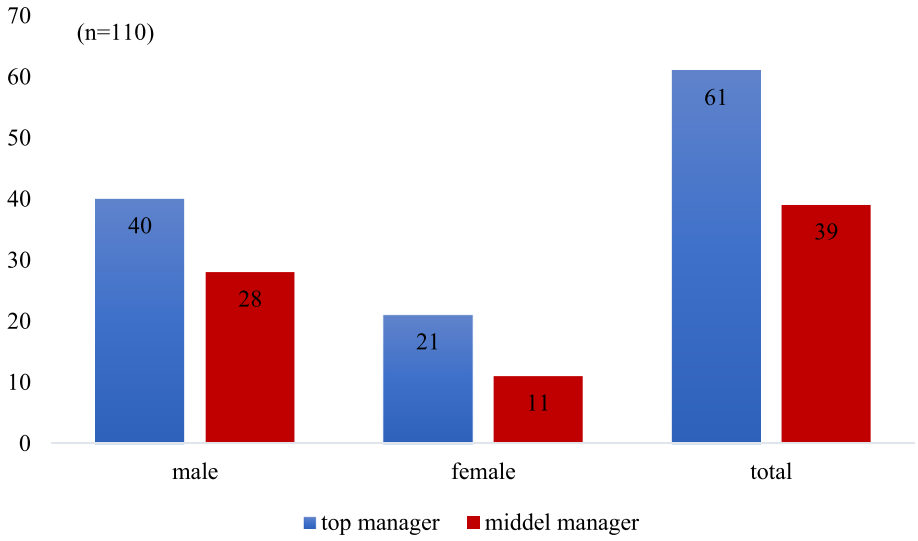

FIGURE 2 Sample position and gender (%) [Colour figure can be viewed at wileyonlinelibrary.com]

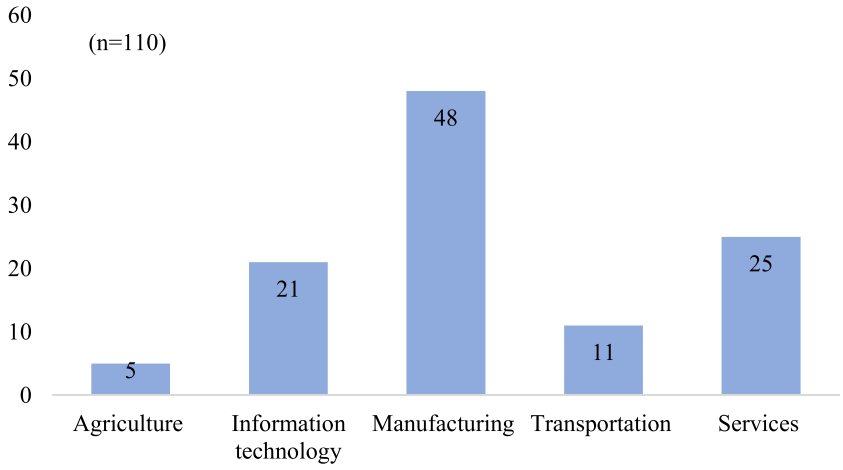

FIGURE 3 Sample industry [Colour figure can be viewed at wileyonlinelibrary.com]

(first round) were contacted to discuss the interpretation of the qualitative data in order to incorporate the changes required. After this process, five strategic KPIs were built, which represented the drivers of the alignment of the SD value drivers at the strategic level, as explained below.

4.1 | Sustainable value drivers

In line with our first purpose, we have focused on the key value drivers of the SD strategy addressed in the organizations. In particular, we asked managers to provide three key value drivers for each dimension discussed, considered mostly relevant in the managerial practice in achieving SD value (Question 3 of the questionnaire) for each sustainability dimensions. It is important to specify that, in this phase, managers were completely free to provide their answers (Brinkmann & Kvale, 2008). In view of the data provided, the authors sorted out the outputs, and they provided the five mostly frequent drivers for each dimension selected. Therefore, we sorted out all questionnaires returned, extracted, classified, and counted keywords one by one of the questions, and then, we presented the main output in statistical charts and tables useful to show the opinions of interviewees.

First, as described in the Figure 4, managers have strongly confirmed the relevant role of the environmental drivers in implementing sustainability strategies. In particular, a large part of them (91 of the total sample) suggested to integrate consumption as a key environmental dimension in the SD process. Moreover, this dimension seems to be very relevant in the manufacturing and transportation industries (100% of the managers), where consumption is considered as a key concept strictly correlated to the core business. We attempt to explain this through the consolidated, and partly mechanized, practices characterizing these sectors. It is likely, for example, that manufacturing sector managers perceive their focus to be mostly on environmental dynamics, which are apparently the most relevant for the final economic results they are especially interested in. The second dimension mostly frequent is the waste reduction, with 73% of the answers. This driver is mainly considered by the managers who works in manufacturing (88%) and, surprisingly, in the information technology (71%) industry. In the same way, as previously discussed, the sector plays a very relevant role, and consequently, the results can be changed substantially moving from an industry to the other. In addition, we found that the emission received 62% of the preferences, particularly relevant in the transportation industry (91% of the answers), while renewable sources received 55% of the preferences, the core driver of the agriculture industry (100% of the answers). Finally, eco-efficiency was suggested by some managers (27%) as a key driver in the transportation industries (with 55% of the managers).

With regard to the other dimensions of the sustainability, as shown in the figures, we can identify the most frequently drivers perceived by managers as fundamental to implement SD strategy in the organizations. To this end, with regard to the economic dimension (Figure 5), a large part of the managers interviewed (respectively 66% and 61% of them) suggested to implement a strategy aimed to enhance product technology and to guarantee a high standard quality of the products services provided, retained particularly relevant by managers who worked in the Information technology industry (100% of them). Moving the discussion to the value drivers identified in the social dimension, Figure 6 provides a clear picture on the interview results. In particular, image and reputation (75%) and environmental and work conditions (74%) are positively perceived by managers in the social value creation process. Service industry (84%) is particularly active in promoting the key role covered by the image and reputation in the decision-making process. With regard to the work conditions, all of the managers interviewed who works in the agriculture industry argued to integrate strategic goals aiming to integrate this crucial element. In the organizational dimension (Figure 7) the main focus is on an organizational structure able to practically implement the sustainable strategy. Here, the internal skills (with 72% of the preferences; 88% of them works in the services) and the implementation of an

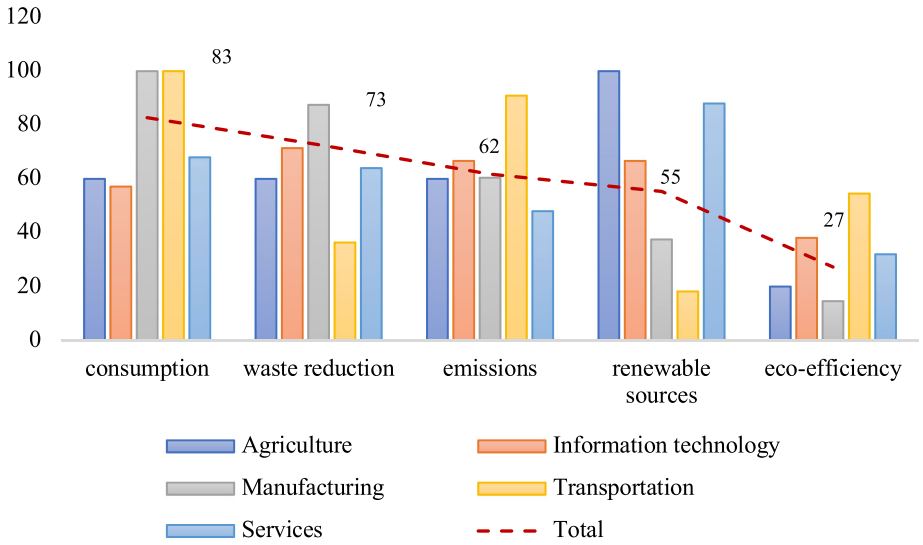

FIGURE 4 Key environmental drivers (%) [Colour figure can be viewed at wileyonlinelibrary.com]

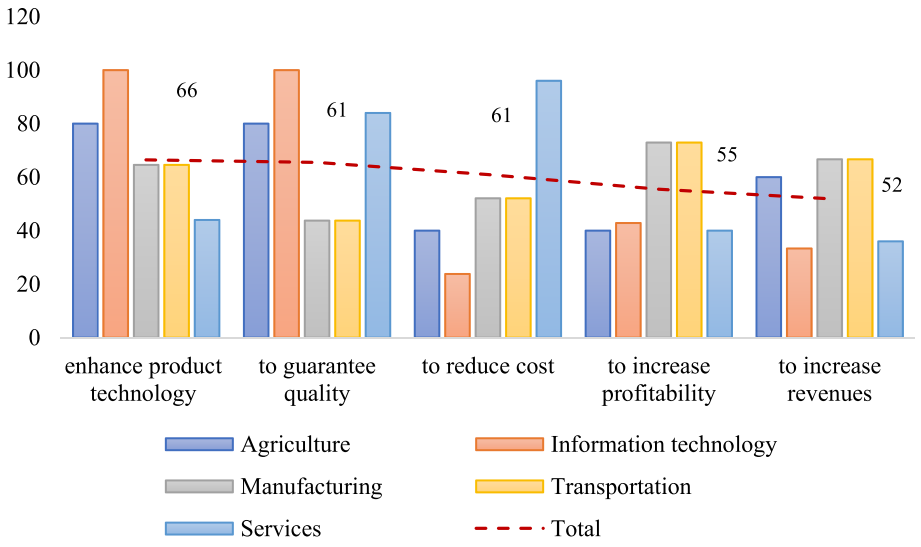

FIGURE 5 Key economic drivers (%) [Colour figure can be viewed at wileyonlinelibrary.com]

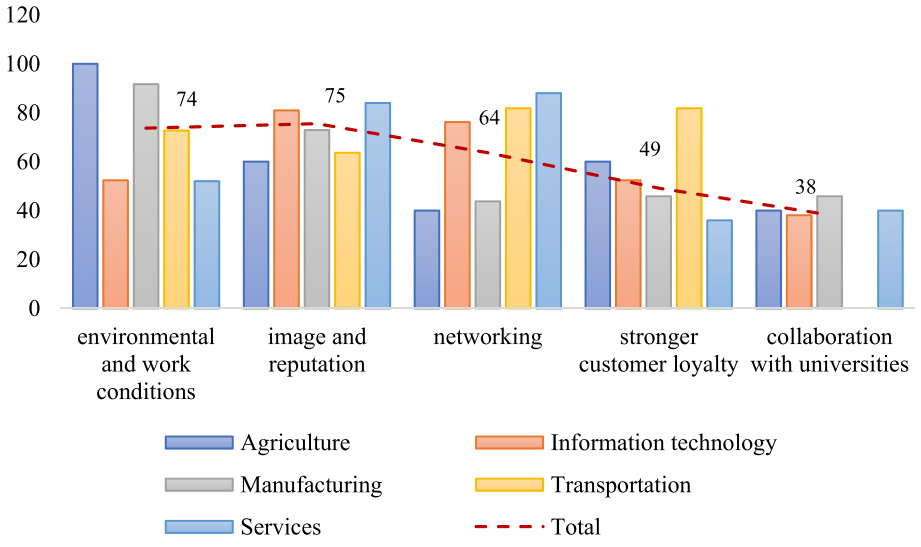

FIGURE 6 Key social drivers (%) [Colour figure can be viewed at wileyonlinelibrary.com]

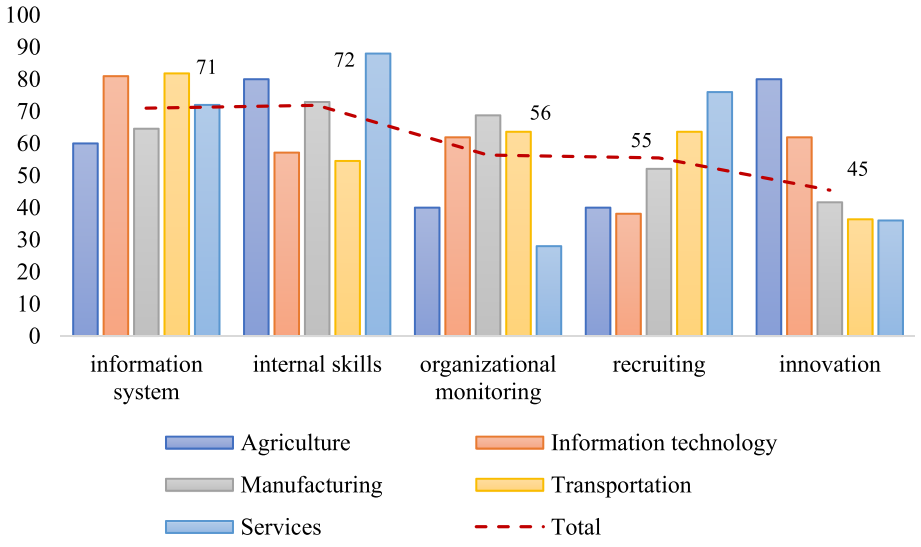

FIGURE 7 Key organizational drivers (%) [Colour figure can be viewed at wileyonlinelibrary.com]

efficient information system (with 71% of the preferences; and 82% of them works in the transportation) are considered crucial drivers to more deeply analyzed.

Finally, in Figure 8, all key drivers of the cultural dimension are identified. The results show that coworking and learning and growth processes, respectively the 83% and 71% of the respondents, play relevant role in the managerial practices to implement a sustainable strategy. Such initiatives are oriented to generate personal behaviors of the company's actors oriented to fully understanding the importance of including sustainable practice in the strategy. Figures 5–8 provide a clear overview on the managers' preferences.

4.2 | Critical issues and main challenges

According to the managers' contribution, results suggest that the sustainability dimensions have assumed a growing relevance in the management decision process. However, results have suggested that, to achieve this integration, several critical issues need to be overcome.

In fact, the strategic alignment is not going far enough, mainly because of a cultural barrier existing in the organization due to the absence of trust in the financial contribution derived from an integrated approach. In addition, results highlight that managers are still too focused on the short-term financial benefits and this represents an important criticism that hinders the effectiveness of the integration. To this end, a cultural change (CC) is required to contribute to achieving an integrated view of the company's system. All goals and related measurements require a high-level degree of culture and experience within the organization. Employee training is essential because it increases the degree of knowledge at all levels and, therefore, organizational learning, which is progressively and increasingly found to be a source of competitive advantages for organizations. The propensity to enhance its human capital guarantees benefits for the corporate governance and especially for the people involved, optimizing the resources used and production processes. Given the significant organizational and cultural implications that emerged from managerial practice, the lack of consideration of these dimensions prevents their full effectiveness.

In addition, one of the major critical issues that emerged from the interviews is the way to measure the value created by sustainable strategies and, consequently, the impact on the overall performance of a company. This represents a subjective bias of a manager, and qualitative data need to be interpreted and contextualized. Therefore, interpretation of the objectivity cannot be assured. Sustainable KPIs need to be adequately selected considering aspects such as commitment growth, involvement in decision making, work quality, and so on.

According to all the managers interviewed, the benefits linked to the implementation of qualitative strategies exceed the costs. However, there is a problem that concerns the quantification of costs and benefits. This represents an important criticism that impacts on the managers' decision to implement an integrated approach. All of the managers, confirmed also by the literature (Bhattacharya & Sen, 2004; Epstein & Wisner, 2001), explained that a large part of the decision-making process is driven by the financial expectation in terms of cost reduction and revenue increase. Specific qualitative and quantitative metrics need to be provided, aimed at evaluating the performance of the strategy adopted. This can be considered a hard challenge to address in future studies and managerial practices.

Monitoring indicators should ideally be such that they can be measured at short intervals thereby enabling close monitoring.

4.3 | Managerial practices and measures

As introduced in the previous section, following the discussion of the key value drivers and critical issues, we analyzed the potential way useful to support the integration process (Purpose 2). We analyzed the responses provided by the experts, identifying the key value drivers emerging from managerial perspective, including main

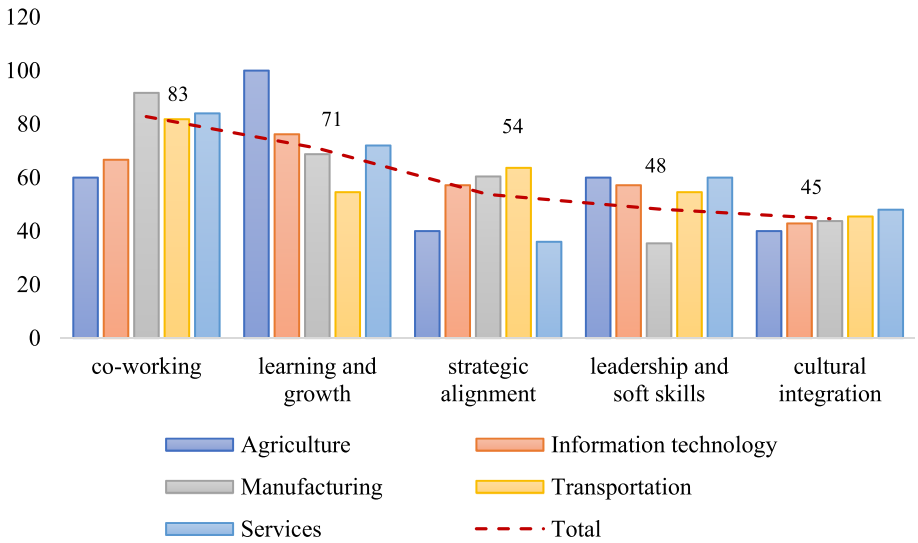

FIGURE 8 Key cultural drivers (%) [Colour figure can be viewed at wileyonlinelibrary.com]

challenges and critical issues to align SD process into the business strategy. Accordingly, we used the results to build a qualitative sustainable KPI system aiming to integrate SD drivers at a strategic level.

After our analysis, we contacted managers once more (second round), summarizing our interpretation of the data generated, in terms of critical issues and the future challenges we perceived, and provided them with the SD indexes built. All changes requested were made. Afterwards, a definitive specific and synthetic set of KPIs was built, aimed to support management decisions in evaluating, monitoring, and implementing an integrated sustainability-oriented approach. In particular, for each dimension, a KPI was generated according to the Likert scale, which aimed to build a score by asking respondents about their views (ranging from 1 = *completely disagree* to 7 = *completely agree*) on the statements concerning their perceptions regarding each of the key value drivers that emerged (De Vries et al., 2015; Malagueño et al., 2018; Torelli et al., 2020).

Accordingly, the score assigned for each of the key dimensions was obtained as an average of the score awarded to the SD dimensions' items (Appendix A, Section 3). In this context, a sustainable economic value added (SEVA) index was built, as an average of the score attributed by the managers on each of the key value drivers that emerged through the interviews (enhance product technology, sustainable quality, to reduce cost, to increase profitability, to increase revenues), as previously discussed. This index aims to implement, monitor, and evaluate the strategic dimension oriented to the increase in the economic dimension of sustainability. The second KPI generated is the environmental (ENVI) index, as an average of the score attributed by the managers on each of the key value drivers that emerged through the interviews (renewable sources, waste reduction, emissions, eco-efficiency, consumption), as previously discussed. This index aims to implement, monitor, and evaluate the environmental dimension of sustainability to increase its integration in the business strategy. Turning to the social dimension, the stakeholder perception score (SPS) was built, as an average of the total scores provided for the key value drivers (environmental and work conditions, image and reputation, loyalty, networking, collaboration with universities). Accordingly, one of the most relevant strategic goals perceived by this index is the strengthening of external relationships. The fourth KPI generated is the organizational integration (OI) index associated to the organizational dimension, calculated again as an average of the score attributed by the managers on information system, internal skills, recruiting, organizational monitoring, and innovation. It is useful to specify here that regarding the third KPI (SPS), the main goal is to strengthen relationships, but the OI index is internally oriented. In the same way, the cultural dimension plays a crucial role in supporting strategy implementation. As argued by one of the senior managers:

TABLE 1 SD KPIs' description

Key dimension	Strategic goal	KPI generated	Measure	Analysis
Economic	To increase the economic value derived from the sustainable initiatives	*SEVA index*	An average of the score attributed by the employees (from 1 to 7) on each of the key value drivers (enhance product technology, sustainable quality, to reduce cost, to increase profitability, to increase revenues)	Monthly questionnaire
Environmental	To increase the environmental value derived from the sustainable initiatives, respecting the well-being of our planet while also benefitting the organization	*ENVI index*	An average of the score attributed by the employees (from 1 to 7) on each of the key value drivers (renewable sources, waste reduction, emissions, eco-efficiency, consumption)	Monthly questionnaire
Social	Strengthen relationships with stakeholders	*SPS*	An average of the score attributed by the stakeholders (from 1 to 7) on each of the key value drivers (environmental and work conditions, image and reputation, loyalty, networking, collaboration with universities)	Quarterly questionnaire
Cultural	To disseminate sustainable culture between company's actors	*CC index*	An average of the score attributed by the managers (from 1 to 7) on each of the key value drivers (coworking, learning and growth, strategic alignment, leadership and soft skills, cultural integration)	Quarterly questionnaire
Organizational	To build an organizational structure able to implement sustainable strategy	*OI index*	An average of the score attributed by the managers (from 1 to 7) on each of the key value drivers (information system, internal skills, recruiting, organizational monitoring and innovation)	Quarterly questionnaire
SD	To guarantee adequate attention to the sustainability dimensions	*SDS index*	An average of the indexes attributed to each of the key value dimensions (economic, environment, social, cultural and organizational)	Yearly questionnaire

"once cultural change is computed, the likelihood of achieving a strategic alignment, oriented to implementing a qualitative approach, grows exponentially." Surprisingly, this crucial aspect is not adequately addressed in the existing accounting literature, and more work is required accordingly. A CC index was developed for the cultural dimension, as an average of the score attributed by the managers on each of the key value drivers (coworking, learning and growth, strategic alignment, leadership and soft skills, cultural integration), aiming to disseminate the information between employees, management, and all stakeholders. Finally, examining all dimensions, the sustainable development solutions (SDS) index is calculated as an average of all indexes generated, aimed at providing practical and real integration between sustainability issues and the business strategy.

All strategic goals and connected sustainability KPIs, as shown in Table 1, can be considered as a useful way to integrate the specific SD dimension at a strategic level. All of them, as specifically discussed with the managers, were designated to implement, monitor, and manage sustainability issues. Accordingly, a small step was added in order to facilitate the integration process in managerial practices. It is important to state that the KPI system presented below can be considered as a starting phase that requires practical application and additional exploration by further researches.

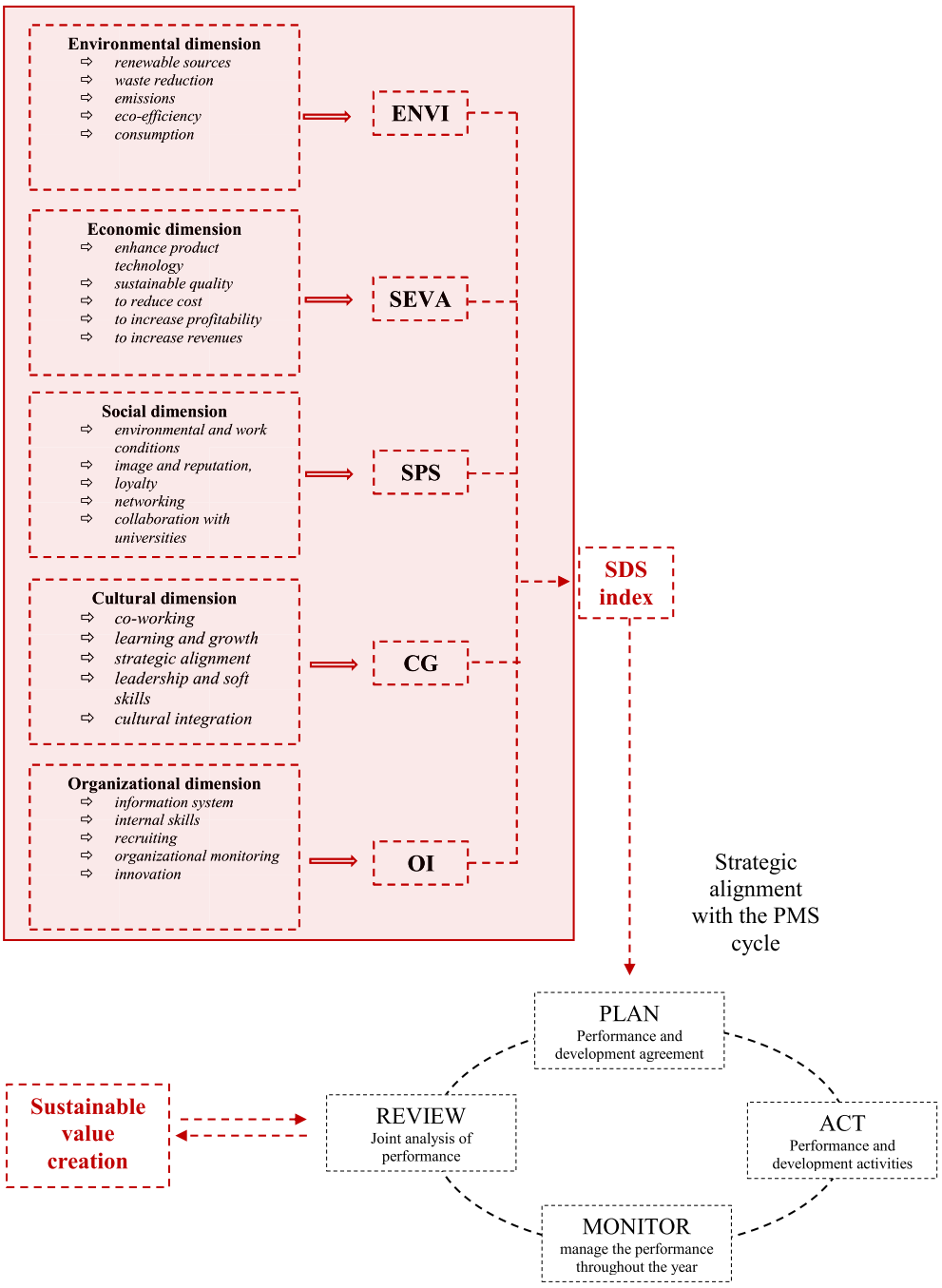

FIGURE 9 Strategic integration between sustainable KPIs and PMS [Colour figure can be viewed at wileyonlinelibrary.com]

In fact, managers unanimously agree on one point: A sustainable KPI system is a suitable tool to vehicle managers in the SD decision-making process.

5 | THEORETICAL DEVELOPMENT

According to the research conducted in this paper, the findings underscored several key issues useful to contribute to the existing literature and best practices on the alignment between SD and business strategy. The new perspective allows the sustainability dimensions to be considered as an integral part of the corporate strategy.

Based upon the analyses and the results presented previously, a theoretical model is developed as shown by Figure 9, designed to support a structured and sustainable approach to integrate SD into the PMS cycle (Rq2). In particular, it provides a clear view on the main drivers in the integration process, highlighting the fundamental role of the sustainable indexes specificality built, aimed to implement the five SD dimensions at a strategic level (in the red area of the figure). To this end, these dimensions need to be integrated at an early stage (strategic plan) of the PMS cycle, as showed by the figure, in order to generate a strategic alignment between sustainable goals and the mission and vision of the company.

Results suggest that their inclusion, in the early stages of the PMS, positively impact on the sustainable performance in terms of image and reputation, stakeholders' perception, financial performance, and would have relevant cultural implications related to the environmental context (Hristov et al., 2021). We generated the SDS index as a synthetic KPI, designed to planning the implementation of a strategy SD oriented, supporting executives in each phase of the decision-making process.

Thus, through a rigor and careful analysis of the related literature and the contribution of the managers' experiences, we provide a clear view of the what (SD value drivers), how (KPI system aligned to the strategy), and why (to support the SD process in the organizations) of implementing SD strategy. From the outlined context, a management model for a new, much more active participatory and challenging social reality is prefigured. It is, therefore, a matter of promoting a culture for a selected business according to an approach that considers the interests of all stakeholders who can provide multivalue logic. This not only changes the way of "doing business" but also, as highlighted, inevitably brings desirable system innovations, triggering partnerships and alliances for change, which requires a deep knowledge of social choices.

In defining the objectives and the consequent choice of the KPI system, maintaining strategic coherence between these elements assumes crucial relevance. This process allows driving management decisions in the value creation process. In fact, from the analysis, managers highlighted that companies able to integrate sustainability and strategy are also those able to gain benefits from it, improving their competitiveness and, therefore, the sustainable value creation over time in terms of CC, OI, social, environmental, and economic development.

Accordingly, the sustainable KPI system indirectly supports the strategic integration of the SD drivers, generating alignment of the corporate culture. Moreover, the proposed sustainable indexes can be considered as an important step in supporting scholars and practitioners in manage sustainability issues at a strategic level.

Obtaining a high-level CC index, for example, means that the company is ready to implement a sustainable strategy. This is a crucial step strictly correlated to the success of implementing the following dimensions. In the same way, once the CC is achieved, the organization needs to adequately manage its structure to incorporate the TBL development (OI). Employees will be able to perform the production processes efficiently, supporting the green transition process (ENVI), respecting the regulations, ethical norms, and equity, and this will allow the achievement of goals related to the reduction of cost of production processes, increasing customer satisfaction (SPS). A company that is sustainable from an economic point of view enjoys a good image and reputation, reducing risk related to rejected credit lines and risk management reputation (SEVA). Moreover, a company that has a good reputation creates new opportunities and is able to invest in training and skills' development, thus ensuring efficient use of resources to invest in innovative processes connected to monitoring organizational climate, green practices, and employee satisfaction.

6 | CONCLUSIONS AND FINAL REMARKS

6.1 | Implications of the study and recommendations for the future research

The integration between sustainability dimensions and business strategy, through a development of a sustainable PMS, as discussed in this paper, represents a very relevant topic in existing literature and managerial practices. The growing strategic importance of the problems related to SD issues and the related performance metrics have stimulated interest in integrating the dimensions previously described within the PMS. Several research issues emerged from the analysis conducted, both in terms of theoretical and managerial implications, as explained below.

We added knowledge to the existing literature by addressing two research questions aimed to explore what we currently know about the SD value drivers, metrics, and main challenges (Rq1) and how to address the alignment between SD process and business strategy (Rq2). Accordingly, the research findings providing a clear picture of the main SD dimensions and connected drivers, considered relevant for the value creation process by managers (Rq1), are presented in five main perspectives: environmental, social, economic, organizational, and cultural. This helps contributing to the existing literature by clearly delineating and improving what it is known about the main SD drivers considered relevant at a strategic level by the same managers, which need to be studied mostly from a management accounting point of view. The results can be considered an additional step of the work made by the research stream (Addison et al., 2020; Hristov & Appolloni, 2021; Hristov et al., 2021; Mio et al., 2020; van Zanten &

van Tulder, 2021) who focused in the recent years, from the introduction of the SDGs in 2015, on the sustainability issues in the business strategy. However, management scholars are urgently called to use these results in order to analyze the key items linked to each of the sustainable drivers discussed in this paper, which need to be transformed in specific strategic goals and to find the way to translate them into economic performance useful in stimulating the sustainability integration in the organizations.

In addition, the answer to our second research question contributes to improve the existing knowledge on the research field, supporting academics and practitioners in implementing a structured PMS sustainable value oriented. Managers can use the suggested five-dimensional framework (Rq2), as a potential starting point to integrate sustainability at a strategic level. Thus, our results provide managers with a set of key sustainable drivers and measures, directly derived from management experience and, therefore, strongly correlated to everyday matters. The theoretical framework helps to pinpoint the key value drivers of the SD from an integrated view, by providing a specific set of indicators aimed to implement sustainable strategy, with important implications for practice.

The main challenge in the existing management and accounting literature is to achieve strategic alignment between sustainability and business strategy, translating companies' initiatives in financial terms. In this regard, future research may answer, for instance, the following research questions: Does the sustainability integration at a strategic level can impact on the company's profitability? Does a sustainable KPI system, as suggested by this paper, can support sustainable decision-making process? How the implementation of a sustainable PMS affects stakeholders' view?

In this vein, further analysis will continue to explore various issues around sustainable integration in the organizations. Future studies can use the results of our paper to test the efficiency of the model, provided by a pilot test or a practical case study, analyzing its impact on the company's performance in a specific time period (3 or 5 years).

6.2 | Limitations of the study

As with any research, this study is not exempted from some limitations. More specifically, the results are based on those managers more open toward SD implementation in the organizations, potentially leading to subjective bias. To this end, the objectivity of the management perception cannot be totally assured. In addition, statistical justification is not provided. Further empirical work is necessary to statistically test the results outlined in this paper.

ORCID

Ivo Hristov https://orcid.org/0000-0002-6662-2844
Andrea Appolloni https://orcid.org/0000-0001-5741-398X

ENDNOTE

[1] Online database including accounting data on over 500,000 joint-stock and financial companies in Italy.

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APPENDIX A: INTERVIEW QUESTIONNAIRE

Section 1. Key value drivers of SD

1. What do you think about the role of corporate sustainability?
2. Are managers interested in implementing strategy oriented to sustainability improvement?
3. Let's talk about the most relevant value drivers involved in the PMS's implementation that impact on the sustainable development. According to the managerial literature, we can identify five main dimensions: (1) green/environmental, (2) social, (3) economic, (4) organizational, and (5) cultural. What is your perception associated for each of them, based on your personal experience in the organization?
4. What are your views on the role of these dimensions in monitoring and implementing strategy?
5. In addition, can you identify 3 main strategic items (called value drivers) mostly used for integrate each of the dimensions selected in the business strategy?

Section 2. Strategic goals and KPIs

6. What are your thoughts on the most relevant sustainability dimensions considered in the literature (connected to the traditional TBL)?
7. For each dimension considered, can you provide the most relevant KPIs used in your organization, if exist?
8. For each KPI considered, can you provide the most relevant measures?
9. What do you think about the role of cultural change process as a key driver of the performance?
10. Do you maintain that this dimension impacts on the performance? How?
11. What are the main strategic tools/certifications used in practice to integrate sustainability into strategy?

Section 3. Sustainable development metrics

Environmental dimension

Please provide a score, from 1 (*not important at all*) to 7 (*exceptionally relevant*), to indicate the relevance in your organization with regard the implementation of the following practices:

12. Tools, measures, and certifications oriented to implement **renewable sources** strategy.
13. Tools, measures, and certifications oriented to implement **waste reduction** strategy.
14. Tools, measures, and certifications oriented to implement **emissions reduction** strategy.
15. Tools, measures, and certifications oriented to implement **eco-efficiency** strategy.
16. Tools, measures, and certifications oriented to implement **natural resource reduction** strategy.

Cultural change

Please provide a score, from 1 (*not important at all*) to 7 (*exceptionally relevant*), to indicate the relevance in your organization with regard the implementation of the following practices:

17. Tools, measures, and certifications oriented to implement **coworking** strategy.
18. Tools, measures, and certifications oriented to generate a **strategic alignment** between sustainability and corporate level.
19. Tools, measures, and certifications oriented to implement **learning and growth** strategy.
20. Tools, measures, and certifications oriented to implement sustainable **cultural integration** in the organization.

Organizational process

Please provide a score, from 1 (*not important at all*) to 7 (*exceptionally relevant*), to indicate the relevance in your organization with regard the implementation of the following practices:

21. Tools, measures, and certifications oriented to implement **innovation** strategy (absence of alignment in/with corporate strategies, safety problems in the workplace, managers' weaknesses, and inefficiency of management control)?
22. Tools, measures, and certifications oriented to implement **internal skills** improvement strategy.
23. Tools, measures, and certifications oriented to implement an efficient **recruiting** process.
24. Tools, measures, and certifications oriented to implement an efficient **information system**.
25. Tools, measures, and certifications oriented to implement **organizational monitoring** strategy.

Economic dimension

Please provide a score, from 1 (*not important at all*) to 7 (*exceptionally relevant*), to indicate the relevance in your organization with regard the implementation of the following key economic drivers:

26. **Sustainable profitability**.
27. **Sustainable quality**.
28. **Sustainable investments**.

Social dimension

Please provide a score, from 1 (*not important at all*) to 7 (*exceptionally relevant*), to indicate the relevance in your organization with regard the implementation of the following practices:

29. Tools, measures, and certifications oriented to generate external **partnership**.
30. Tools, measures, and certifications oriented to increase the **loyalty of the main company's stakeholders**.
31. Tools, measures, and certifications oriented to implement **networking** strategy.
32. Tools, measures, and certifications oriented to implement a system oriented to improve **environmental and work condition**.
33. Tools, measures, and certifications oriented to implement a system oriented to improve corporate **image and reputation**.
Section 4. Main challenges and future paths of research
34. What are the main critical issues in integrating sustainability at a strategic level?
35. How can the critical issues connected to this integration be overcome?
36. How the sustainable KPIs could be integrated at a strategic level to support decision-making process?
37. How can a risk-oriented integrated framework be implemented?