Performance measurement systems in an era of complexity, uncertainty and grand challenges

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Abstract

The current uncertain and emergency environment is challenging business management like never before. Companies are called to face many complex and wicked problems affecting society on a global scale. Climate change, global pandemics, social inequalities, war conflicts, digital transformation, and energy supply shortages are only a few of the critical issues companies must deal with daily. Performance measurement systems and management control practices can have a key role in addressing such a turbulent environment. Accordingly, the literature has recently started investigating their role in supporting companies facing societal "Grand Challenges". The scientific debate on this topic is intense but still in its infancy leaving open wide research areas that need to be further explored and investigated. The articles included in this volume fuel the ongoing debate by analysing the role of performance measurement systems and management control tools in several contexts and under uncertain and emergency conditions.

Keywords: Performance measurement systems; Sustainability, Digitalization, Societal Grand Challenges

1. Introduction

Over the past ten years, the world has experienced many global challenges, including climate change, global pandemics, social inequalities, war conflicts, shortage of energy supply, food security, hunger, and not only, affecting society on a large scale (e.g., Benschop, 2021; Grimes and Vogus, 2021; Gümüsay et al., 2022; Reinecke, 2018). This emergency scenario (Opitz and Tellmann, 2015) has called for prompt actions and decision-

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Management Control (ISSN 2239-0391, ISSNe 2239-4397), 2024, 2 – Special issue
Doi: 10.3280/MACO2024-002-S1001

making from businesses and organizations in the present to foster a better future (Beckert, 2021).

To date, however, companies still struggle to provide a concrete contribution to addressing these challenges (e.g., Dyllick and Muff, 2016; Van Zanten and Van Tulder, 2021). For example, in the sustainability field, there is still a great decoupling between companies' sustainability practices and the progress made in reaching sustainable development at a global level (Van Zanten and Van Tulder, 2021). According to the UN SDSN World SDG Dashboard 2024, only 16% of the SDG targets are on track to be met globally by 2030, with the remaining 84% showing limited progress or a reversal of progress.

The variety of themes and actors that characterize the "grand challenges" of the present and the near future, make the context in which companies operate more complex and uncertain than ever (e.g., Ferraro et al., 2015). This complexity is even accentuated if we consider that some of the great themes companies must face may conflict with each other, generating tensions and paradoxes (Haffar & Searcy, 2017).

For example, digitalization and the rise of Artificial Intelligence solutions represent a great opportunity for business management. Nonetheless, such technological innovations require an ever-increasing electricity consumption, producing significant environmental impacts (e.g., Cupertino & Vitale, 2024). Even being sustainable can have negative implications from a business perspective. Sustainability, in fact, can be costly for companies that, to improve their environmental and social impacts, may have to sustain significant costs that can reduce short-term profitability (Cupertino et al., 2022). Those mentioned are just some of the possible tensions between the different management issues, but many others could be made. The core of the reasoning is that today the complexity of business management does not lie in the multitude of issues to be addressed but in the fact that those issues can conflict, generating tensions.

This renewed complexity of the reference context and the strong uncertainties that currently affect business management implies that accounting and performance measurement tools may not be as effective as they should be (e.g., Gomes et al., 2023; Micheli and Muctor, 2021; Nudurupati et al., 2021). Therefore, under the current emergency scenario, traditional approaches to performance measurement may not be able to ensure proper trustworthiness (Norreklit and Cinquini, 2024). Consequently, we should question the role of performance measurement systems in the modern environment and how they should be redesigned to fit the new corporate challenges better.

In this regard, scholars and practitioners should wonder: in the heterogeneity of issues to be addressed and in the extreme complexity of the surrounding environment, what is the right business path to take? What should a company's priorities be? What performance aspects should take the lead? In case of conflicts between these aspects, how to manage the relative tensions? Performance measurement systems can assume a new and key role by supporting managers in facing these issues.

Considering all the above, the literature recently started to investigate the role of performance measurement systems in complex and emergency contexts as well as under operational uncertainties and future unknowability (e.g., Beckert, 2021; Mitchell et al., 2021; Leoni et al., 2021; Otley, 2012; Rikhardsson et al., 2021). In so doing, the literature evolved in many streams that, without claiming to be exhaustive, will be briefly reported in the next lines.

A first and large body of literature focused on the grand challenges related to sustainability as the latter is widely considered one of the most urgent concerns to face (e.g., Doh et al., 2019; Reinecke and Ansari, 2016). From this point of view, some authors have emphasized the current limits to sustainability measurement and reporting, pushing towards the development of new accounting solutions useful to improve corporate impacts on the environment and society (e.g., Adams and Abhayawansa, 2022; Bebbington and Unerman, 2020; Quattrone, 2021). In the wake of this line of thinking and relying on corporate sustainability conflicts and paradoxes, other scholars underlined the need to formulate new accounting solutions aimed at detecting and revealing the possible tensions that arise from the multifaceted nature of sustainability challenges (e.g., Jørgensen et al., 2022). This can help managers to identify the best trade-offs (Haffar and Searcy, 2017; Hann et al., 2010) and properly manage the tensions arising from the several business aspects and challenges.

Another fervent topic currently drawing scholars' attention regards the role of new digital advancements, such as Big Data and Artificial Intelligence, in affecting business performance measurement systems (e.g., Fähndrich, 2023; Visani et al., 2024). On this topic, several scholars have highlighted how recent technological advances can strengthen performance measurement practices (e.g., Korsen and Ingvaldsen, 2022) making them more objective, effective and efficient (Visani et al., 2024) while minimizing information deficits (e.g., Fähndrich, 2023). In this line of research, however, some scholars conversely emphasize the possible negative effects of the progressive digitalisation of performance measurement practices. The more advanced the technology becomes, the more complex it is to use, and this could reduce the ability and propensity to measure performance (Chenhall & Moers, 2015). Furthermore, the digitalization of measurement and control practices can lead managers never to question the data provided by the machine and this can undermine the maieutic function of accounting systems, leading managers to make wrong decisions faster (Quattrone, 2016). Indeed, information trustworthiness, data reliability and algorithm processing represent some of the most important problems affecting recent technological innovations that need to be solved so that digitalisation can concretely support accounting and performance measurement systems (e.g., Janssen et al., 2020; Vitale, 2023). Accordingly, the challenge for future research is understanding how and to what extent performance measurement practices can be digitalised (or delegated to Artificial Intelligence), minimising negative side effects and addressing the ever-increasing technology complexity.

Moving to another stream of literature, many scholars have focused on how accounting and performance measurement tools can support companies in dealing with emergencies or unexpected situations (e.g., Ahrens and Ferry, 2021; Mitchell et al., 2021). This area of research has been particularly enriched in recent years due to the global COVID-19 pandemic. Indeed, most of the articles belonging to this research area focused on how measurement practices and accounting tools supported companies and governments in facing the emergency caused by COVID-19 (e.g., Ahrens and Ferry, 2021; Leoni et al., 2021; Mitchell et al., 2021). In particular, during the pandemic period, measurement and accounting practices allowed governments to keep a low death rate (Mithell et al., 2021) and companies to make exceptional decisions in the face of such an unexpected crisis (Leoni et al., 2021).

Lastly, another stream of literature investigated how measurement practices can support managers in dealing with future uncertainty and unknowability (Otley, 2012) by allowing them to imagine multiple future scenarios and shaping the present based on the most desirable imagined future (Beckert, 2021; Patvardhan & Ramachandran, 2020). In this perspective, performance measurement systems can have a key role in shaping reality and ensuring that corporate outcomes and performance will be as close as possible to future projections (Beckert, 2021).

In the same research area, other scholars focused on the inverse relationship, namely how environmental uncertainty affects the design of performance measurement systems (Rikhardsson et al., 2021). In this case, future uncertainty can induce companies to increase the variety of performance measures to be considered even if such an increase in variety is not linked to management satisfaction or firm performance (Rikhardsson et al., 2021).

On all the above topics, the scientific debate is fervent and ongoing. Nevertheless, despite the research efforts made so far, the debate on the role of performance measurement systems in this era of complexity, uncertainty and grand challenges is still in its infancy. Accordingly, large research areas remain still little explored and need to be further investigated. The present volume fuels the current scientific debate as the papers it includes addressed many of the above topics thus enriching the relevant research streams.

2. The volume's contents

The first article of this volume is by Vilma Kilpinen, Jean Claude Mutiganda and Matti Skoog who investigated the significance of reward systems in performance-based management control across five Finnish organizations. By blending Agency Theory (which emphasizes maximizing self-interest through financial rewards) with Self-Determination Theory (which stresses intrinsic motivation) the authors found that a well-designed reward system should combine monetary and social rewards to significantly improve employee motivation and performance. Besides, reward systems proved to be crucial management tools, but their success relies on transparency, fairness, communication, and understanding of what motivates employees at various levels.

The second paper, written by Edoardo Borlatto, Elisa Truant, Elisa Giacosa, and Luca Maria Manzi, investigates the intersection of Environmental, Social, and Governance (ESG) criteria and Performance Management Systems (PMS). The study aims to understand how businesses can integrate non-financial ESG metrics into their performance management to enhance sustainability and strategic outcomes. In so doing, the authors performed a Systematic Literature Review developing the state of the art of ESG integration within performance measurement systems. The authors conclude by emphasising the need to create a more standardized and universally acknowledged measurement framework and proposing a structured agenda for future research.

The third study of this volume is by Silvia Cantele, Silvia Valcozzena, Bettina Campedelli, Chiara de' Stefani, and Marco De Luca and examines the integration of sustainability governance and management control systems (MCS) through a detailed case study of the Italian firm "SIT".

The paper underlines the key role of corporate governance bodies (i.e., Corporate Sustainability Director, Board of Directors and Sustainability Committees) in fostering corporate sustainability. In particular, a structured sustainability governance system with well-defined roles and responsibilities ensures the effective implementation of sustainability goals. Additionally, the authors highlighted that sustainability integration into management control systems allows companies to ensure their sustainability efforts are proactive, consistent, and aligned with long-term business success.

The fourth article of this volume is that of Rosanna Spanò, Ilaria Martino, Flavio Spagnuolo, and Alessandra Allini. The paper examines the challenges organizations face in aligning their commitment to Environmental, Social, and Governance (ESG) issues, particularly focusing on the discrepancies between individual managers' perceptions and organizational culture towards ESG in Italian companies. The authors highlighted the importance of cultural alignment for effective ESG strategies and stakeholder satisfaction, while also noting the influence of individual characteristics such as age, job grade, and tenure on these discrepancies. The study suggests that addressing the above issues is crucial for enhancing ESG accountability and value creation and calls for further research to explore additional factors influencing perceived ESG discrepancies.

Riccardo Giannetti, Lino Cinquini and Andrea Dello Sbarba wrote the fifth contribution of this volume. Their paper discusses the complexities of Management Accounting Change (MAC) through the lens of Kurt Lewin's force field theory, emphasizing the dynamic interactions between various forces that influence MAC within organizations. It highlights the case study of Società Aeroporto Toscano S.p.A (SAT) from 1994 to 2007, illustrating the processes of adopting and adapting management accounting practices, particularly in budgeting systems, driven by financial control needs. The research proposes an enhanced framework for understanding MAC, validating Lewin's theory, and emphasizing the importance of longitudinal studies to capture the evolving nature of forces influencing change.

The sixth study of this volume was carried out by Federico Barnabè, Riccardo Santoni and Manuel Mechi. Their paper explores the drivers of organizational resilience in times of crisis with a specific focus on the COVID-19 period. To pursue their research aim, the authors developed a single case study analysing the Italian case of FASI (Fondo Assistenza Sanitaria Integrativa), a not-for-profit organization that operates in the healthcare assurance sector that was strongly impacted by the COVID-19 pandemic. The case study's empirical results showed that the different challenges induced by the pandemics led the company to develop three different types of resilience: reactive behaviour – bouncing-back to the previous equilibrium (type 1), adaptive behaviour – bouncing-forward to a higher level of equilibrium (type 2), and proactive behaviour – preparing for a possible future shock (type 3). In this scenario, a fundamental role is played by three categories of drivers, namely the personal top management characteristics (i.e., the human dimension), the management control systems, and the external support provided by stakeholders, knowledgeable experts and associations.

Sonia Vitali, Michele Guidi and Marco Giuliani developed the seventh contribution of this volume.

Their study aims to explore how technological, organizational, and environmental factors influence the adoption and implementation of virtual annual general meetings (AGMs) among companies, using the theoretical lens of the technology-organization-environment (TOE) framework. The research was conducted through an inductive content analysis of AGM minutes from Italian companies listed on the FTSE-MIB, considering the years 2019, 2020, 2021, and 2022. The study emphasizes a general reluctance of Italian listed companies to shift to digital meetings. Indeed, although the COVID-19 pandemic represented a compelling opportunity to foster corporate digitalisation, the adoption of virtual formats for annual shareholder meetings seems to be still limited in Italy. According to the authors, technology costs and complexities, the absence of formal organisational structures, the lack of governmental support and inadequate infrastructures represent the main factors for this reluctance.

The eighth article of this volume is that of Assunta Di Vaio. Her study explores how digitalization impacts performance management systems (PMSs) in the shipping industry, focusing on the case study of a small shipping agency in Italy. The research is grounded in stakeholder theory and focuses on how shipping intermediaries, such as agencies, adapt to digital transformations and improve their performance management through advanced digital tools. The author found that digitalization had a general positive effect on the shipping agency's PMSs, making them more efficient and better aligned with stakeholder needs. However, to fully exploit digitalization improvements, the agency must further develop its use of KPIs and invest in proper training programs.

Fabio Nappo, Federico Schimperna and Maria Schimperna are the authors of the ninth contribution of this volume. In their study, they explored the challenges faced by university spin-offs, particularly in the realm of planning and control, which are critical for their survival. The article draws on the concept of ambidextrous intellectual capital, which combines both the exploitation of current capabilities and the exploration of new opportunities. From an empirical standpoint, the authors conducted a survey of senior experts from university spin-offs to understand their awareness of management tools and to what extent they use them to balance short- and long-term goals. The research emphasizes that although there is awareness of the importance of ambidextrous planning and control systems, their application is limited. Accordingly, the authors proposed a framework that offers a structured approach to address the challenges faced by university spin-offs, potentially reducing their high failure rates.

The last paper of the volume is that of Nadia Ardito, Natalia Aversano, Diana Ferullo and Paolo Tartaglia Polcini. In their paper, the authors examined how board gender diversity influences the financial and non-financial performance of Italian public healthcare organizations (HCOs) during the COVID-19 pandemic. In so doing, they used an OLS regression model to assess the effect of gender diversity in top governance positions (General Manager, CEO, and Chief Health Officer) on both financial and non-financial performance. Data were collected from 150 Italian public HCOs, covering financial reports and governance structures from 2021, during the height of the pandemic. Lastly, the authors relied on Resource Dependence Theory (RDT), which posits that organizations depend on external resources, and gender diversity on boards enhances access to these resources by fostering diverse perspectives and decision-making capabilities. The study shows that the presence of women in leadership positions positively contributes to the financial health of healthcare organizations, especially in times of crisis like the pandemic. However, this gender diversity does not impact non-financial aspects like staff development, which may require different strategies to address during emergencies.

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