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The Sustainable Development Goals (SDGs): a rising tide lifts all boats? Global reporting implications in a post SDGs world

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Abstract
Purpose – We investigate the integration of the United Nation's Sustainable Development Goals (SDGs) into the Global Reporting Initiative (GRI)– based reporting thus exploring the factors that influence the adoption of the SDGs by organizations.
Design/methodology/approach – We analyzed the GRI dataset provided by the GRI data secretariat. We analyzed 14,308 reports provided by 9,397 organizations between 2016 and 2017.
Findings – Larger organizations are more likely to integrate the SDGs into their reporting than smaller organizations. Secondly, publicly listed firms are more likely to address the SDGs. Thirdly, industries with higher sustainability impacts are more likely to address the SDGs in their reporting. Fourthly, our data confirm a regional effect with regard to SDG reporting. Moreover, organizations that follow international sustainability guidelines and standards such as becoming a member of the GRI Gold Community or using the GRI Content Index services and having external assurance are more likely to report on the SDGs.
Research limitations/implications – Corporations play an essential role in the achievement of the SDGs, which shape the future of the world's sustainable development. Nevertheless, SDGs reporting needs more research to analyze the factors that can influence it. The study contributed to the academic literature on CSR and legitimacy theory by analyzing institutional and regional factors that impact SDGs reporting.
Practical implications – The study provides insights about the integration of the SDGs into organizational reporting and accounting, including the adoption of the SDGs by small and medium enterprises (SMEs) and the benefits of the SDGs as a framework for strategic corporate sustainability.
Social implications – A global sustainability framework, such as the SDGs can be integrated into organizations sustainability reporting and accounting in a meaningful way.
Originality/value – This is the first study that analyzes the integration of the SDGs into GRI-based reporting. The study contributes to legitimacy theory by highlighting the factors, which contribute to the legitimacy-based adoption of the SDGs, including organizational size, being publicly listed, being from high-impact industries and certain global regions, etc. SDG reporting can help firms increase their organizational legitimacy across their stakeholders.

Keywords Sustainable development goals, Corporate reporting, Global reporting initiative, Sustainability
Paper type Research paper

Introduction
In 2015, the United Nations adopted the Sustainable Development Goals (SDGs), which are a framework for achieving global sustainability until 2030 (United Nations, 2015). The 17 goals

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incorporate 169 targets along with 232 indicators that can help to track the progress toward each goal objectively (PWC, 2018; Scheyvens *et al.*, 2016). The introduction of the SDGs represents a watershed moment in CSR reporting (Grainger-Brown and Malekpour, 2019) though it could not be expected. In contrast to CSR reporting tools and indicators, such as the Sustainability Accounting Standards (SASB), the Task Force on Climate-related Disclosures (TCFD) or the Global Reporting Initiative (GRI), the SDGs are a global frame. However, about 60% of the companies across various sectors analyzed in a study by Pwc (2018) have started to mention the SDGs in their reports. Also, Corporate Social Responsibility (CSR) standards, such as the Sustainability Accounting Standards Board (SASB) and the Global Reporting Initiative, have incorporated the SDGs into their reporting frameworks (Elalfy and Weber, 2019). Consequently, since 2015, corporations have started to integrate the SDGs into their corporate sustainability strategies as well as into their corporate reporting (United Nations Global Compact and KPMG International, 2015; PWC, 2018; Rosati and Faria, 2019; Scheyvens *et al.*, 2016).

Though recent studies have analyzed how businesses integrate the SDGs into their business strategy, the question remains which external factors and firm institutional characteristics support SDG reporting. Therefore, the objective of this study is to understand the connection between firm characteristics and external impacts on the integration of the SDGs into corporate reporting.

Studies have analyzed the impact of SDG reporting on improving corporate sustainability performance, as well as enhancing organizational legitimacy. Donoher (2017), for instance, found that multinationals adopt a sustainability agenda if their stakeholder network has a variety of interests and beliefs. In another recent study, Rosati and Faria (2019) highlight the relationship between SDG reporting and internal organizational factors. The authors conclude that SDG reporting correlates positively with higher intangible assets, higher commitment to external sustainability assurance and the corporation size. Furthermore, Avrampou *et al.* (2019) found that businesses connect the SDGs with their business strategy. Consequently, the authors highlight the need to assess the changes in the CSR reporting domain across sectors considering mainstreaming the SDGs framework

Based on legitimacy theory (Suchman, 1995) we analyze corporate SDG reporting by testing four hypotheses; (H1) firms that are larger, (H2) firms that have higher sustainability impacts, (H3) firms from regions with high environmental and social standards and (H4) firms that have better CSR reporting practices such as adhering to international guidelines and frameworks are more likely to adopt the SDGs in their reporting.

To analyze the hypotheses, we used the data about 14,308 reports provided from GRI's data secretariat (Global Reporting Initiative, 2020). We used the data from 2016 to 2017. The data have been analyzed using statistical tests such as χ^2 tests for categorical data as well as logistic regression for multivariate analyses.

Agreeing with the fundamentals of legitimacy theory, we found that bigger companies are more likely to integrate the SDGs into their reporting than smaller companies. Secondly, the results suggest that publicly listed firms are more likely to address the SDGs. Furthermore, we found that industries with higher sustainability impacts are more likely to address the SDGs in their reporting than those with lower influences. Fourthly, our data confirm a regional effect with the highest percentages of SDG reporting in South America and Europe. Also, organizations that adopt international standards, adopt external assurance services and use the GRI services such as the SDG mapping, which help map reporting indicators toward achieving the 17 goals are more likely to report on the SDGs.

The structure of this paper is as follows: first, we provide a review of the evolution of CSR reporting, reporting frameworks and the SDGs. Then, we discuss legitimacy theory as the basis of our empirical research. Subsequently, we describe our research methods and our results. We finish the paper with our conclusions and a research outlook.

Literature review

Standardized corporate reporting started in the 1920s in the form of conventional financial reports, where organizations report to investors and management on their financial results. Reporting evolved in the 1960s to incorporate a social dimension, which started in France, when organizations began reporting to civil unions on social performance, such as employees' working conditions (Carroll, 1999). Environmental reporting came next in the 1970s, especially after the Brundtland Commission's agenda, which emphasized the importance of sustainable projects that meet the growth requirements of the present generation without compromising the needs of the future generation (Brundtland, 1987). In this era, the term "sustainable development" has evolved within the reporting discourse. Corporations have been reporting on their environmental performance, such as the use of raw material and natural resources, waste management and energy efficiency, thus gaining a competitive advantage that results from environmental stewardship (Wang *et al.*, 2016).

Corporate social responsibility reporting took a broader dimension in the 1990s after the introduction of the triple bottom line (3BL) framework by Elkington (1998). The framework highlights the importance of balancing the economic, environmental and social performance of businesses instead of exclusively addressing the financial bottom line (Buallay, 2019) that has been dominating corporate reporting (Turner *et al.*, 2006; Milne and Gray, 2013).

Furthermore, the term sustainability has been integrated into corporate strategy and reporting domains in the form of eco-efficiency promoted by the World Business Council for Sustainable Development (Stigson, 2001). This approach was the first to claim a win-win-situation between corporate sustainability and financial performance (Winn *et al.*, 2012). Consequently, in the new millennium, corporations started using "sustainability reports" as an evolvement of CSR in a way that reflects the connection between sustainable development and business (Adams, 2017).

The current literature on firm characteristics and sustainability reporting found differences in reporting practices between sectors (Kolk, 2004, 2008). High impact sectors, such as utilities and oil and gas, conduct more CSR reporting than sectors with lower environmental and societal impact, such as telecommunications. Furthermore, the connection between CSR reporting and corporate social performance (CSP) is discussed controversially (Dimaggio and Powell, 1983; Zhilong *et al.*, 2009; Buallay, 2019). Also, CSR reporting is driven by different external pressures such as regulations (Cheung *et al.*, 2009; Dobers and Halme, 2009; Dutta *et al.*, 2012) and stakeholder pressure (Cho *et al.*, 2017; Dhaliwal *et al.*, 2014). Firms may publish CSR reports to increase their legitimacy by addressing the needs of their shareholders and other stakeholders (Suchman, 1995; Wilmshurst and Frost, 2000). Nevertheless, CSR literature has suffered from lingering skepticism by academic scholars and practitioners as a result of its vague definition (Jamali and Karam, 2016). Reporting has been used as a marketing tool to paint a positive image about corporations while ignoring all the negative implications of a company's operations (Milne and Gray, 2013).

Further, Porter and Kramer (2006) shed light on the flaws of conceptually lauded and incongruencies of the CSR domain. Kolk (2008) argues that the lack of strategic orientation undermines companies' progress toward sustainable development and result in greenwashing practices, where CSR activities are treated as philanthropic add-ons that serve as public relation tactics catered to serve public opinions (Schaltegger and Burritt, 2010; Nguyen *et al.*, 2019). As a response to the highlighted shortcomings of the CSR domain, Drucker (1984) introduces the notion of strategic CSR, where he emphasizes that managers need to address the core operations in a way that transforms decision-making toward more sustainable practices thus achieving sustainable development. Werther and Chandler (2010) define strategic CSR as "the incorporation of a holistic CSR perspective within a firm's strategic planning and core operations so that the firm is managed in the interests of a broad set of stakeholders to achieve maximum economic and social value over

the medium to long-term" (Werther and Chandler, 2010, p. 40). The authors denote key four variables that distinguish strategic CSR from other literature in the field:

(1) Firms develop their CSR agendas within a strategic planning process that is cascaded across all function of the organization,

(2) CSR strategies are directly related to a firm's core operations,

(3) Firms incorporate all impacted stakeholders,

(4) Firms shift the scope from a short-term to a long-term outlook that aims to optimize decision-making processes.

The SDGs represent a transformational shift from yearly CSR tactics to long-term strategies since corporations start to assess their contribution toward agenda 2030, which is in line with the framework of strategic CSR (Bansal and Song, 2017). The SDGs also necessitate a strategic collaboration among a tripartite of the governments, the private sector and civil society members (United Nations, 2015).

The SDGs

With the advent of the SDGs in 2015, CSR literature started to focus on the role of the private sector in achieving the 17 goals. (Bowen *et al.*, 2017) address policy issues related to the implementation of the SDGs. These are cultivating collective action by stakeholder interaction, addressing tradeoffs and top hold actors accountable. The private sector has a critical role in contributing toward the implementation and financing of the SDGs that require $5 to $7 trillion annually until 2030 to achieve the targeted agenda (Mawdsley, 2018; Weber, 2019). Consequently, some studies developed concepts on how the industry could help to finance the SDGs (Avrampou *et al.*, 2019; Dahlmann *et al.*, 2019; Etzion *et al.*, 2019; Schramade, 2017).

The main goals of the SDGs are the protection of the earth's life support system and poverty reduction at the same time (Griggs *et al.*, 2013) though the SDGs are criticized for their economic growth approach that is in contrast to notions of the ecological economy (Hickel, 2019). Consequently, some scholars also doubt whether the SDGs are compatible with current business practices (Spaiser *et al.*, 2017) though the SDGs are endorsed by many businesses (Williams *et al.*, 2019).

Addressing environmental issues in addition to poverty reduction distinguished the SDGs from the Millennium Development Goals (MDG) (Sachs, 2012; Halisçelik and Soytas, 2019). Also, unlike the state-centered Millennium Development Goals, the SDGs represent a cooperative tripartite dialog between governments, the private sector and the civil society (Rosati and Faria, 2019) including the business sector. There are, however, no tools available to integrate the SDGs into corporate strategies and consequently into reporting (Grainger-Brown and Malekpour, 2019). Consequently, Scott and Mcgill (2019) found that 72% of all companies mentioned the SDGs in their report but only 14% disclosure-specific SDG targets, and only 1% measure their SDG performance.

Bebbington and Unerman (2018) emphasize that the SDGs play a critical role in the advancement of CSR research academically as well as CSR reporting from an industry perspective. Recent industry reports also suggest that developing CSR agendas toward targeting the 17 goals can help firms advance the quality of their sustainability reports as well as their legitimacy in the countries in which they operate (PWC, 2018). However, the report also identified heterogeneity in SDG reporting between industries and regions. Therefore, our study will use legitimacy theory to analyze differences in SDG reporting between industries, company types, general reporting performance practices and regions.

Reflecting on the reporting domain, studies show that external influences can impact CSR reporting, such as jurisdictions in which cultural and legal norms expect compliance with more sustainable activities will push companies that operate within those jurisdictions to produce more reports (Dutta *et al.*, 2012). Likewise, organizations operating in industries that are perceived to have more significant negative impacts on the world should expect to be in a more precarious position in terms of their perceived legitimacy. As a result, these firms expend more resources to prove their legitimacy and accountability via their CSR reports (Post and Preston, 2012). Reporting on the SDGs has been increasing in a way that aligns with the concept of the Social License to Operate (SLO), which has increased as a response to the calls for more stakeholder engagement and sustainability practices by corporations. The SLO is defined as a "grant of permission to undertake a trade or carry out a business activity" (Nielsen, 2013, p. 1,585). In essence, corporations are expected to report on their contribution to the achievement of the SDGs (Schramade, 2017). Nevertheless, the issue remains in examining whether corporations tackle SDGs reporting from a strategic lens that aligns with Werther and Chandler (2010) or solely a legitimacy-driven phenomenon.

In a recent study by Rosati and Faria (2019), the authors highlight that CSR reporting has a positive correlation by the size of the firms, where large organizations are more likely to report to enhance their accountability and operational legitimacy. Accountability refers to being responsible for diverse stakeholders via sanction and reward power (Beu and Buckley, 2001; Tamvada, 2020). Accountability has been a driver for CSR reporting, where firms communicate on their performance, vis-a-vis the stakeholders via CSR reports. Finally, Hickman (2020) highlights that publicly traded firms report more on their CSR performance and tend to follow the Global Reporting Initiative (GRI) more frequently as a reporting framework to meet the mandates of dispersed investors.

The global reporting framework (GRI)

Reporting on a firm's sustainability performance to internal and external stakeholders should enhance its reputation and operational legitimacy as well as reduce information asymmetry (Hamrouni *et al.*, 2019). CSR reporting also helps external stakeholders and investors understand a firm's vision, mission and operations in a way that increases the valuation of a firm's goodwill (Brammer *et al.*, 2012). Several institutions have been working on the standardization and harmonization of sustainability reporting. For example, the International Organization for Standardization (ISO) has issued several certifications that measure sustainability performance such as ISO 14001, which provides organizations with better frameworks for environmental management. Other ISO certificates have also focused on environmental management communication such as ISO 14063 as well as the ISO 26000, which focuses on firms' CSR. ISO standards have been widely adopted across various sectors as a response to stakeholders' demands for eco-efficient strategies (Clapp, 1998).

Another reporting framework is the Integrated Reporting Council (IIRC), which is a coalition of NGOs, regulators and companies that have been working on providing an integrated reporting framework for all parameters of corporate performance (Morros, 2016). Another renowned guideline has been developed by the Sustainability Accounting Standards Board (SASB), which focuses on providing a set of material indicators that helps managers disclose useful information for investors as well as other stakeholders (Sustainability Accounting Standards Board (SASB), 2017). Recently, a new framework was introduced in 2015 in response to the G20's request to provide material reports on the financial implications of climate change issues, namely the Task Force on Climate-related Financial Disclosures (TCFD). This new framework has developed guidelines that can help firms, especially in the financial sector, to manage environmental risks and helps in defining the governance need to manage these risks (Task Force on Climate-related Financial Disclosures, 2017).

Finally, the last and most accepted and adopted reporting guideline has been the Global Reporting Initiative (GRI), which is an independent international organization that has had extensive efforts since the 1990s to institutionalize sustainability reporting. GRI aims at helping businesses, governments and institutions understand and communicate their impacts on global sustainability issues (Global Reporting Initiative, 2020). The GRI's original scope was to create an accountability mechanism for corporations to help them engage in environmentally responsible management practices. This initiative was in response to the United Nations Environment Programme (UNEP) in 1997. In 2014, the GRI developed the Global Sustainability Standards Board (GSSB), which has been responsible for the development of the reporting guidelines (Sethi *et al.*, 2017). The GRI has provided four generations of reporting guidelines (G1, G2, G3 and G4) and finally, the Standards in 2017.

It is worth mentioning that there has been a significant collaboration between the GRI board, SASB and IIRC after the concerns of multiple corporations about the negative implications of competition between the three entities. SASB and IIRC provide material reporting frameworks; yet the GRI initiative has been more successful in transforming niche individual corporate efforts in CSR reporting into a more standardized global trend. In essence, GRI has been adopted by the majority of global market-leading companies for CSR reporting and continuous to be replicated across different sectors (Fifka, 2013). In April 2017, the Ceres Conference was held in San Francisco and included renowned sustainability nonprofit organizations. During the meeting, Tim Mohin, Chief Executive of GRI, announced that the new standards define sustainability reporting from a strategic approach that identifies "material aspects and boundaries" and adopts a more robust framework for stakeholder engagement and better governance mechanisms (Mohin and Rogers, 2017).

Additionally, in September 2020, the largest four reporting frameworks on sustainability namely CDP, GRI, SASB and TCFD have issued a statement on their intention to standardize their indicators toward comprehensive reporting. The report emphasizes the increasing demand to understand the contribution of the businesses towards the SDGs (The Impact Management Project, World Economic Forum, 2020). For our sample, we are analyzing the SDGs datasets as corporations have collaborated with the GRI to mobilize their business strategies toward the achievement of the goals since the adoption of the 17 goals. Recent industry reports highlight that drafting sustainability agendas through targeting a number of SDGs can improve the quality of their CSR reports (PWC, 2018).

Theory

Firms across various sectors conform to rules in the market to sustain their operational legitimacy and enhance their corporate image. Suchman (1995, p. 574) highlights that "legitimacy is a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions". A company's adoption of sustainability reporting is influenced by distinct factors such as compliance with laws and regulations as well as pressures from internal and external stakeholders. Legitimacy theory has a rich academic background rooted in theoretical frameworks of stakeholder theory, institutional theory and management theory. The conceptual foundations of institutional theory aim at explaining why and how institutions behave in a similar way across different organizations (Fernando and Lawrence, 2014). Institutional theory links firms' practices, such as sustainability reporting, to norms and values of the society in which a firm operates. The changes in the practices can result from coercive, memetic and normative pressures (Powell and DiMaggio, 1991). To elaborate, coercive isomorphic change occurs when mandated by supranational institutions for example governments as evident in the South African case, where sustainability reporting is currently mandatory. In essence, all publicly traded companies on the Johannesburg Stock Exchange must have a sustainability report integrated with their annual financial reports

(Dupont-Enzer, 2014). Mimetic isomorphism occurs when firms imitate one another to respond to societal needs and as a result gain societal legitimacy. Finally, institutional change can result from normative pressures where good corporate citizenship can bring positive spillovers (Fifka, 2013).

Additionally, legitimacy theory has been depicted by the fundamentals of stakeholder theory (Freeman, 1984) where companies tend to address topics in their reports that can help to legitimize their role in society and toward stakeholders (Post and Preston, 2012). Based on legitimacy theory, this strategy is rather reactive to stakeholder expectations than proactive. Also, it reacts to events, such as the adoption of the SDGs by the United Nations, where firms tend to report on positive aspects related to the event (Gómez-Carrasco *et al.*, 2020). Some studies, however, doubt that legitimacy is the major driver for CSR reporting because a high percentage of CSR communication is not related to major sustainability-related events or stakeholder pressure (Post and Preston, 2012). Furthermore, firms that feel a stronger need to legitimize, such as those in industries with higher societal and environmental impacts, bigger organizations and firms in regions with higher pressure to disclose environmental and societal issues, are expected to report more about the SDGs.

Drafting CSR agendas toward meeting a number of SDGs can help solve this legitimacy dilemma since the long-term 2030 agenda can contribute positively toward the economy, society and the environment (Bebbington and Unerman, 2018). Recent studies have assessed the impact of reporting on SDGs in relation to improving sustainability performance (Morioka *et al.*, 2018) through enhancing corporate legitimacy (Donoher, 2017) as well as supporting the firm to realize a competitive advantage via sustainability stewardship while contributing toward the achievement of the SDGs (Sullivan *et al.*, 2018). The SDGs provide a robust framework for strategic CSR since the goals have an outlook of 2030, which reduces the trade-off between economic gains and comprehensive sustainability strategies (Hamrouni *et al.*, 2019). Unlike the state-centered Millennium Development Goals (MDGs), the SDGs also represent a transformative governance dialog that incorporates a tripartite of stakeholders namely the private sector, governments and civil society members. This stakeholder-oriented approach should result in better accountability practices among participants as well as enhancing reporting quality and assurance practices (Zavyalova *et al.*, 2018). Finally, the 17 goals provide measurable 169 targets with unique 232 indicators, which is more understandable from a business decision-making framework. Recent studies have shown that the SDGs can help enhance corporate sustainability performance through the transformation toward long-term decision-making tools (Morioka *et al.*, 2018).

Research questions and hypotheses

As mentioned above, the SDGs are not a corporate reporting tool. They do not provide any reporting guidelines or corporate indicators. Furthermore, they do not address the materiality of the SDG or their indicators for businesses. Hence, the question remains whether the same legitimacy mechanism that applies for reporting standards, such as GRI or SASB is also valid for SDG reporting. Hence, based on the literature review on the fundamentals of legitimacy theory, we first hypothesize that large firms are more likely to report on SDGs than smaller firms. Our rationale is that large organizations, which have 250 [1] or more employees, tend to or expected to have implemented more robust reporting practices than smaller ones. Larger firms have more stakeholders' pressure to operate in a socially responsible and sustainable manner (Wickert *et al.*, 2016). Large organizations have more exposure to the public, and their goodwill is more vulnerable to public opinion and social media reactions (Ali *et al.*, 2015). Large firms also have more resources; hence the expectations from diverse stakeholders increase with regard to incorporating the SDGs into their strategies as well as CSR agendas and reports (Munro and Arli, 2019).

Secondly, we hypothesize that publicly listed companies integrate the SDGs more into their reporting than nonlisted companies. CSR activities of publicly listed companies are evaluated more critically by their stakeholders (Panwar *et al.*, 2014), have a higher number of stakeholders (Hickman, 2020) but also have more resources for disclosure (Díez-de-Castro *et al.*, 2018). Therefore, they have and can perform better with disclosing their CSR activities. Consequently, publicly listed companies will address topics that are of high value for society, such as the SDGs.

Our third hypothesis addresses industries and SDG reporting. We hypothesize that organizations operating in industries with higher expected environmental and social impacts tend to report on the SDGs more frequently than those in less impactful industries. Firms that operate in sectors with high environmental externalities such as manufacturing and energy sectors tend to have more pressures from their stakeholders concerning legitimacy as well as reporting on their sustainability performance in a way that addresses societal needs (Bebbington and Unerman, 2018; Fallan, 2016). Since the SDGs are widespread amongst stakeholders, companies from industries with higher impacts will more frequently integrate the SDGs into their reporting.

Fourthly, we hypothesize that reporting on SDGs will vary geographically. Due to the lack of consistency of CSR reporting frameworks, scholars argue that comparing reports from different countries is a complicated process (Carnevale *et al.*, 2011). The economic, political, and social contexts of each country can influence how firms operate, which also applies to their CSR reports. Nevertheless, several studies highlight that CSR reporting can be more advanced in some regions, such as Europe (Weber, 2014). Despite the emergence of global reporting standards, we argue that regional pressures, such as the existence of government regulations, will be a driver for SDG reporting.

Sample and methods

For our study, we used the GRI report database between 2016 and 2017. The categories used in the following sections are also defined in this database. Information about the categories is available in the GRI Sustainability database (Global Reporting Initiative, 2020). Later dates have not been included because they were not yet available at the time of this study. Additionally, although the GRI database does extend back to 2015, this was the year that the SDGs were adopted so they would not be expected to have been integrated into reports from that year. Therefore, we removed all 2015 data. Consequently, our sample comprises 7,155 reports published in 2016 and the 7,153 published in 2017.

Overall, the sample has 14,308 entries by 9,397 firms from 39 industries. Large organizations represent 61% of the sample, with 28% being multinational and 11% SMEs. The categories, such as large companies, multinationals, SME, etc. have been taken from GRI's classification (Global Reporting Initiative, 2020).

The regions in which the reporting entity is headquartered are distributed as presented in Table 1. A reporting entity can be the whole organization, such as a firm, or a subdivision of an organization, such as a plant.

With regard to the type of GRI report, we identified 1,628 reports citing GRI, while 6,783 use the G4 standard. Furthermore, 5,633 are non-GRI reports. Nonspecified GRI standards are used by 563 reports, and one report used the GRI G3 standard. Furthermore, 2,323 reports provided assurance.

The use of the Organisation for Economic Co-operation and Development (OECD), the United Nation's Global Compact (UNGC), the Carbon Disclosure Project (CDP), and the International Finance Corporation (IFC) standards is presented in Table 2. Overall, 4,843 reporting firms used at least one of the international standards. For further analyses, we

coded the use of standards into two categories. Category 1 means that the reporting entity uses at least one of the standards, and category 2 indicates that none of the standards is used.

To analyze the sample with regard to differences in mentioning the SDGs we use χ^2 tests to analyze the connection between SDGs reporting and other variables. For multivariate analyses, we use logistic regression that is suitable for binary outcomes (Kleinbaum *et al.*, 2002).

Results

We begin with a descriptive overview of SDG reporting and univariate χ^2 testing. The SDGs have been addressed in 1730 reports. This is a rate of 12%. SDG reporting significantly increased from 2016 to 2017 from 545 to 1,185 reports ($p < 0.0001$, $\chi^2 = 269.53$, $N = 14{,}308$).

Next, we present the appearance of the SDG in reports related to organizational characteristics, such as size, type of organization and publicly listed versus private companies. The results are presented in Table 3.

We found significant differences between reporting entities with different sizes ($p < 0.0001$, $\chi^2 = 63.13$). Multinationals report significantly more about the SDGs than other large companies, while SMEs report significantly less about the SDGs. Cooperatives and private companies report significantly more frequently about the SDGs, while public institutions and state-owned firms report significantly less about the SDGs ($p < 0.0001$, $\chi^2 = 60.430$). There is no significant difference between listed and nonlisted companies with regard to SDG reporting.

Furthermore, we conducted a logistic regression with the company characteristics and independent variables and SDG reporting as the dependent variable. The year is used as the control variable. The logistic regression is significant ($p < 0.0001$, $r^2 = 0.03$). However, the only significant coefficient is for the type of organizations (coeff. $= -0.126$, $p < 0.0001$) and the year as the control variable.

Next, we analyze the influence of the sector on SDG reporting. To conduct this analysis, we transferred the GRI activities into Global Industry Classification Standards (GICS) sectors (Bhojraj *et al.*, 2003). In addition to the GICS sectors, we used "Government/Public

Region	*N*
Africa	894
Asia	5,422
Europe	4,506
Latin America and The Caribbean	1783
Northern America	1,324
Oceania	379
Total	14,308

Table 1. Regional distribution

Standard	*N*
OECD	553
UNGC	2,639
CDP	1,464
IFC	187
Total	4,843

Table 2. International standards

Firm characteristics	SDG yes	SDG no
1) Size of organization		
Large	1,014	7,766
MNE	596	3,373
SME	110	1,435
2) Type of organization		
Cooperative	25	151
Governmental	0	2
Non-profit	48	326
Partnership	9	61
Private cooperation	1,389	9,257
Public institutions	33	367
State-owned	113	1,554
Subsidiary	112	853
3) Listed versus non-listed		
Listed	1,157	8,550
Nonlisted	560	3,944

Table 3. Organizational characteristics

Organizations", "NGO/Non-profit", "Equipment", and "Others". These industries initially appear in the GRI list but are not part of the GICS sectors.

Based on legitimacy theory, our second hypothesis is that sectors that are more exposed to the public report more about the SDGs. The percentage of reports per sector mentioning the SDGs is presented in Table 4. The energy, communication technology, utility sectors contribute positively to SDG reporting, while health care, real estate, equipment and others contribute negatively. Overall, there is a significant difference between the sectors ($\chi^2 = 94.59, p < 0.0001$).

Next, we analyze differences between regions. We found a significant difference in SDG reporting between regions ($\chi^2 = 138.46, p < 0.0001$). African reports mention the SDGs in

Sector	SDG reporting
Energy^{++} ($N = 882$)	14.17%
Materials ($N = 1782$)	13.15%
Industrials ($N = 1710$)	12.75%
Consumer discretionary ($N = 1,631$)	11.83%
Consumer Staples ($N = 1,104$)	12.86%
Health care^{-} ($N = 618$)	9.55%
Financials ($N = 2025$)	12.63%
Information technology ($N = 574$)	12.20%
Communication technology^{++} ($N = 396$)	21.72%
Utilities^{++} ($N = 667$)	14.54%
Real Estate^{-} ($N = 532$)	9.59%
Government ($N = 166$)	8.43%
NGO ($N = 390$)	13.08%
Equipment^{-}($N = 335$)	6.87%
Others^{-}($N = 1,488$)	7.39%
Total ($N = 14,308$)	12.09%

Note(s): (++: significant positive contribution to SDGs reporting, –: significantly negative contribution to SDGs reporting)

Table 4. SDG reporting by industry

6.06% of their reports, while Asian reports have a rate of 10.81%. The highest percentage has Latin America with 19.24%, followed by Europe with 12.94%. North America and Oceania have a very similar percentage of 11.63 % and 11.61%. Significant negative contributions come from Africa and Asia, while Europe and Latin America contribute positively to the differences between sectors.

Besides, we analyze the impact of reporting characteristics on SDG reporting. Featured reports talk more frequent about SDGs than nonfeatured reports ($\chi^2 = 82.68, p < 0.0001$). The same is true for members of the GRI Gold Community ($\chi^2 = 277.00, p < 0.0001$), and reports using stakeholder panels ($\chi^2 = 171.13, p < 0.0001$) report significantly more frequently about the SDGs than their counterparts.

There are also significant differences in SDG reporting with regard to the GRI adherence level. Reports in accordance with GRI address the SDGs significantly more frequently than the undeclared reports ($\chi^2 = 68.53$, $p < 0.0001$). Finally, reports with GRI content index, adopting materiality disclosures service and those with the SDGs mapping service report significantly on the SDGs than others without these additional GRI practices ($\chi^2 = 88.76$, $p < 0.0001$).

Finally, we conducted a multivariate logistic regression analysis with bootstrapping with SDG reporting as the dependent variable and the items mentioned above as the independent variables (see Table 5). We used the year as a control variable. The function is significant ($p < 0.0001$) with a pseudo $r^2 = 0.13$. All independent variables but being a featured report (coeff. = 0.096), have significant coefficients. This is also true for the year with more SDG reporting in 2017. Also, other report quality characteristics, such as being an integrated report and having external assurance have been tested. Integrated reports ($\chi^2 = 9.14$, $p = 0.002$) as well as reports with external assurance ($\chi^2 = 1{,}600$, $p < 0.0001$) report more frequently about SDGs than their counterparts.

Furthermore, function 5 in Table 5 shows the impact of international standards on SDG integration. Overall, reports following one or more of these standards report significantly

Independent variable	Function 1	Function 2	Function 3	Function 4	Function 5	Function 6	Function 7
Year	0.879***	0.903**	0.906***	0.910***	0.971***	1.127***	1.921***
Region		0.172**	0.168***	0.162***	0.107***	0.144***	−0.021
Size			−0.084	−0.068*	−0.038	−0.015	−0.122
Type			−0.116***	−0.123***	−0.117***	−0.081**	−0.086
Listed			0.007	0.029	−0.010	0.133	−0.205
GICS				−0.007***	−0.005***	−0.004**	−0.002
Int. Standard					1.401***	0.676***	0.307*
Integrated						−0.156	−0.229
Assurance						1.228***	0.939***
Featured							−0.310
Gold community							−0.727**
Stakeholder panel							−0.359
Adherence							−0.198
GRI service							0.185**
Const	−4.253	−4.827	−4.084	−3.856	−4.237	−4.637	0.511
p	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
R^2	0.026	0.032	0.034	0.037	0.086	0.107	0.128

Note(s): *** <0.0001, ** <0.01, * <0.05

Table 5. Logistic regression analysis with SDG reporting as the dependent variable

more frequent about the SDGs than those that do not follow the standard ($p < 0.0001$ for all standards, respectively). The function is significant ($p < 0.0001$) with a pseudo $r^2 = 0.13$.

With regard to reporting characteristics, all independent variables, yet being a featured report (coeff. = 0.096), have significant coefficients. This is also true for the year with more SDG reporting in 2017. Also, other report quality characteristics, such as being an integrated report and having external assurance, have been tested. Integrated reports ($\chi^2 = 9.14$, $p = 0.002$) as well as reports with external assurance ($\chi^2 = 1{,}200$, $p < 0.0001$) report more frequently about SDGs than their counterparts.

The results of the logistic regression suggest that adding regions, the size and type of the organization, industrial sectors, international standards and GRI reporting characteristics contribute to predicting the use of the SDGs in reporting. Remarkably, function 7 in Table 5 shows that being a member of the GRI Gold Community contributes to higher reporting on the SDGs as well as being a publicly listed company. The negative signs are caused because of the coding of the yes / no category. Furthermore, the region has an impact on SDG reporting when used in function 2 but loses significance if other factors are added. Hence, adhering to GRI standards and quality criteria, such as providing GRI service, has a stronger impact on SDG reporting than regional effects. GRI standards are global, and therefore, regional differences in reporting disappear.

To summarize, our data confirmed a size effect (hypothesis 1), a public listing effect (Hypothesis 2), an industry effect (Hypothesis 3) and a regional effect (Hypothesis 4) when integrating the SDGs into sustainability reported, which is presented in our GRI sample results.

Conclusion, limitations, and future research

Based on legitimacy theory, the study analyzed 14,308 reports with regard to addressing the SDGs. The results suggest the rejection of all four null hypotheses. In detail, we found that bigger companies are more likely to integrate the SDGs into their reporting than smaller companies (hypothesis 1). Secondly, the results suggest that publicly listed firms are more likely to address the SDGs (hypothesis 2). Furthermore, confirming legitimacy theory, we found that industries with higher sustainability impacts are more likely to address the SDGs in their reporting than those with lower impacts (Hypothesis 3). Fourthly, our data confirm a regional effect with the highest percentages of SDG reporting in South America and Europe.

Also, the reporting quality measured by following international standards, having external assurance, being a member of the GRI Gold Community and those using GRI services, such as SDG mapping is correlated with the likelihood to report about the SDGs. Finally, we did not find differences between the types of reporting organizations, for instance, corporations versus government organizations. We conclude that SDG reporting can be explained using legitimacy theory as we describe in detail in the following paragraphs.

First, based on legitimacy theory, reporting reacts to events and societal pressure to legitimize their role in front of society and stakeholders (Suchman, 1995; Cho and Patten, 2007). The SDGs are a globally accepted framework. Though it is not particularly addressing the corporate world, stakeholders have adopted the framework. Consequently, firms adopt the framework to maintain their legitimacy. Hence, this study contributes to the research that assesses the legitimacy and effectiveness of global sustainability frameworks (Voegtlin and Pless, 2014). Our study shows that global sustainability frameworks are adopted by organizations because of legitimacy reasons though they do not particularly address corporate issues.

As found in other studies, our results suggest that bigger organizations tend to conduct more sophisticated sustainability disclosure and consequently are more likely to integrate the SDGs into their reporting because of legitimacy (Wickert *et al.*, 2016). Therefore, research is

needed about how to increase the likelihood of addressing the SDGs for smaller reporting entities or more in general about tools that increase SMEs sustainability reporting (Corazza, 2018). The same is true for reporting entities that are not publicly listed. In line with other studies (Panwar *et al.*, 2014), we found that the likelihood of SDG reporting is higher for listed companies than for nonlisted entities. Therefore, research is needed to increase the engagement of nonlisted entities with the SDGs.

These findings also call for answers to the question of whether organizations report about the SDGs because of legitimacy reasons or whether they also address them strategically. Guthrie and Parker (1989) doubt that reporting is mainly motivated by legitimacy. Hence, though all our results suggest legitimacy-motivated reporting, it might be interesting to analyze whether reporting organizations also embed the SDGs into their strategic decision-making. This research, however, has to go beyond the analysis of reporting and should explore managerial decisions.

Some insights about addressing the SDGs because of strategic reasons might come from our result that organizations from industries with higher impacts are more likely to address the SDGs. On the one hand, the effect can be explained based on legitimacy theory. High-impact industries feel more stakeholder and institutional pressure than low-impact industries (Bebbington and Unerman, 2018). On the other hand, high-impact industries might address the SDGs to improve their sustainability performance if it is correlated to their financial performance (Eccles *et al.*, 2012) as highlighted by Mancini and Sala (2018) in their study for the mining industry. This study focuses on validating the fundamentals of legitimacy theory on a new phenomenon, which is reporting on the SDGs (Whetten, 2002); yet future studies might provide more details to answer the question of whether SDG reporting is rather strategically or legitimacy-driven.

In agreement with other studies, for instance, on the UN Global Compact (Janney *et al.*, 2009), we found differences in SDG reporting across regions. In addition to a high adoption rate in Europe, we found the highest rate in South America, which stems from the higher governmental regulations and institutional isomorphism (Amoako *et al.*, 2017). Nevertheless, if we add firm characteristics and accountability measures, such as external auditing, the regional effect becomes nonsignificant. Similar to the study on the UN Global Compact (Janney *et al.*, 2009), North American organizations are less likely to adopt a UN framework such as the SDGs.

Further, additional measures that contribute to the quality of organizational nonfinancial disclosure affect reporting practices on the SDGs. Our results show the SDGs can serve as a framework of strategic CSR, where current frameworks can map their indicators toward the achievement of the SDGs (The Impact Management Project, World Economic Forum, 2020). SDG reporting is in line with and not in contrast to GRI reporting. To elaborate, GRI featured reports, members of the GRI Gold Community and reports using stakeholder panels are more likely to report on the SDGs. The result suggests that organizations that follow GRI's guidelines and reporting index tend to integrate the SDGs into their sustainability reports. (Global Reporting Initiative, 2018). Reporting on the SDGs does not contract existing reporting schemes since there is a strong relationship between the SDGs and other frameworks as highlighted by Szennay *et al.* (2019). Consequently, the SDGs provide an opportunity to extend current reporting schemes instead of adding yet another guideline. This is also true for other international standards, such as the OECD, CDP, IFC, ISO and the UN Global Compact standard. SDG reporting is in line with these standards. Organizations that follow these international standards are more likely to report on the SDGs.

Though the literature is discussing the effects of external assurance on social and environmental reporting controversially (Buallay and Al-Ajmi, 2019; Hickman and Cote, 2019) (Kolk and Perego, 2010; Park and Brorson, 2005), we found that external assurance correlates positively with SDG reporting. Since external assurance increases the credibility

and quality of reporting (Simnett *et al.*, 2009; Kılıç *et al.*, 2019), externally verified SDG adoption means that the reporting organizations are serious with addressing the SDGs.

Overall, this study validates the fundamentals of legitimacy theory by highlighting the institutional factors that contribute to the legitimacy-based adoption of the SDGs, including organizational size, being publicly listed, being from high impact industries, certain global regions, etc. Reporting on the SDGs by firms is a strategic response to the needs of a tripartite of stakeholders namely governments, the private sector and civil society members. Accordingly, firms that are striving for a license to operate from their stakeholders can gain their legitimacy and consequently increase their goodwill and mitigate their operational risk. (Djoutsa Wamba *et al.*, 2018).

To summarize, corporations play an essential role in the achievement of the SDGs, which shape the future of the world's sustainable development and transform the sustainability agendas of firms toward a strategic framework. Future qualitative research is needed to analyze how reporting the SDGs has contributed to corporate sustainability. The study contributed to the academic literature on CSR and legitimacy theory by analyzing institutional and regional factors that influence SDGs reporting.

Note

1. This is based on the GRI data legend: https://www.globalreporting.org/SiteCollectionDocuments/GRI-Data-Legend-Sustainability-Disclosure-Database-Profiling.pdf

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