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Governance for achieving the Sustainable Development Goals: How important are participation, policy coherence, reflexivity, adaptation and democratic institutions?

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ABSTRACT

It is widely accepted that the achievement of the 17 Sustainable Development Goals (SDGs) depends on effective governance arrangements. However, it is less clear which modes and aspects of governance are important for which of the 17 goals. Until now, empirical research has mostly studied individual cases, with comparative studies largely missing. Here, we conduct a comparative analysis among 41 high and upper-middle income countries for the year 2015, drawing on the Sustainable Governance Indicators, the Global SDG Indicators Database and other official sources. Using multiple regression, we test the influence of different aspects of governance, namely participation, policy coherence, reflexivity, adaptation and democratic institutions on SDG achievement at the national level, controlling for the effects of additional socio-economic conditions. Of the tested factors, democratic institutions and participation as well as economic power, education and geographic location serve to explain SDG achievement.

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1. Introduction

In September 2015, member states of the United Nations (UN) agreed on the 2030 Agenda for Sustainable Development. With its 17 Sustainable Development Goals (SDGs) and 169 targets, the Agenda demonstrates the international commitment to achieve worldwide sustainable development in its social, economic and environmental dimension (United Nations, 2015). What makes the SDGs special is the broad acceptance and commitment of the international community, the comprehensive definition of sustainable development in its different dimensions made measurable through 232 indicators, and the understanding that these sustainability goals are universal, integrated and indivisible. The emergence of the goals can be understood in the context of and as a response to global problems emerging in the wake of globalization processes and increasing global interconnectedness.

The passing of the SDGs has sparked enormous academic attention. Many consider the interrelation, synergies and trade-offs between the goals (Nilsson et al., 2018; Weitz et al., 2018; Pradhan

et al., 2017; Spaier et al., 2017; Stafford-Smith et al., 2017; Le Blanc, 2015) or the SDG indicators and measurement of the SDGs more broadly (Reyers et al., 2017; Hák et al., 2016; Allen et al., 2017). The role of governance for the SDGs has mainly been addressed from a conceptional or normative point of view (Boas et al., 2016; Meuleman and Niestroy, 2015; Kanie et al., 2014; Bowen et al., 2017). To achieve the SDGs, all states are called upon to integrate the goals into their national sustainability and development plans (United Nations, 2015). Yet, the implementation of the 2030 Agenda poses challenges for different actors at different levels: Research suggests that the complexity and interrelation of the 17 SDGs requires integrated, holistic and coherent policy-making where decision-making, implementation and monitoring involves actors from the public and private sector as well as civil society (Boas et al., 2016; Meuleman and Niestroy, 2015; Kanie et al., 2014). Issues of ambivalence and uncertainty only add to this complexity (Newig et al., 2007). According to Bowen et al. (2017), governance for the SDGs needs to foster an enabling environment for collective action, ensure that the actors involved are held accountable and deal with emerging complex trade-offs between the goals. In this context, governance has been referred to as the “fourth pillar of sustainable development” (Kanie et al., 2014: p.6).

The central aim of this article is to contribute to the debate about

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the conceptualization and effectiveness of governance for sustainable development, particularly in the context of the 2030 Agenda and the SDGs. By means of a comparative analysis covering 41 high and upper-middle income countries, we test the explanatory power of different aspects of governance for sustainable development as defined by the SDGs. The findings provide a snapshot of the 2015 status quo and help derive insights about which features of governance are particularly important for achieving sustainable development in its different dimensions. Compared to their predecessors, the Millennium Development Goals (MDGs), the SDGs are much broader in scope. They underline the need for transformative policy change not only in developing countries, but recognize the role and responsibilities of industrialized countries in advancing global sustainable development (Biermann et al., 2017). Thus, by analyzing the governance characteristics of high and upper-middle income countries and their relation to SDG achievement, we aim at generating insights that can ultimately contribute to more effective SDG implementation. Recognizing that governance should also be analyzed in the light of a country's specific context, this article seeks to provide a basis for further in-depth analyses about the causalities at work in different national contexts.

The remainder of the article is organized as follows. First, we discuss the concepts of governance as regards sustainable development and present the theoretical foundations of governance for sustainable development based on a comprehensive literature review. Subsequently, we introduce our methodology for measuring and comparing SDG achievement across the 41 countries. Finally, we show and discuss the results of the multiple regression analyses examining the relationship between different aspects of governance and the achievement of each SDG at the national level, controlling for the effects of GDP per capita, population size, education and geographic location.

2. Governance, sustainable development and sustainability governance

Despite years of academic debate, governance remains a contested concept, with no universally agreed definition. A common feature across the various definitions of governance is a distinction between government and governance, rejecting a view of the state as monolithic entity and the government as primary and unitary actor responsible for policy-making and implementation (Bevir, 2011; Kooiman, 1999; Meadowcroft, 2011; Pierre and Peters, 1998). Government can rather be understood as a central component of governance (Meadowcroft, 2007). According to new governance approaches, governance involves a plurality of public and private stakeholders, hybrid practices (administrative systems and quasi-market strategies) and is considered to be multi-jurisdictional, i.e. spanning different institutions, sectors and levels of government (Bevir, 2011). Consequently, we understand governance as a multi-dimensional concept covering different actors, processes, structures and institutions involved in political decision-making and implementation (Treib et al., 2007; Driessen et al., 2012).

Similarly, the concept of sustainable development has been considered to be only vaguely defined and highly normative (Newig et al., 2007; Meadowcroft, 2000). The term sustainable development came to prominence in 1987, when the World Commission on Environment and Development (WCED) issued its report *Our Common Future*, also known as the Brundtland Report. Here, development was described as being sustainable when “it meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987: p.8). Since then, many definitions of sustainable development have evolved in

a “constant process of redefinition and interpretation” (Jordan, 2008: p.20) – yet an undisputed, unambiguous concept did not emerge. Over time, triggered by the Brundtland Report, there was a growing understanding that sustainable development requires a simultaneous consideration of social, economic and environmental factors (Meadowcroft, 2000). However, sustainability had often been simply equated with environmental protection or long-term strategies (Newig et al., 2007). Ambiguities in the conceptualization, operationalization and measurability of sustainable development can be attributed to the high complexity of the topic: In the academic discourse, challenges in the area of sustainable development are referred to as so-called “wicked problems” (van Zeijl-Rozema et al., 2008), in which cause-effect relationships and potential solution approaches are subject of controversial debate. Ambivalence of sustainability goals, a large number of actors involved, and complex interactions between technology, society and nature only add to this (Newig et al., 2007). For the first time, with the 2030 Agenda and the SDGs, the international community has reached an agreement on the concept of sustainable development that was operationalized through its 17 goals, 169 targets and 232 indicators, triggering new research approaches which can be highly relevant to the political and societal implementation of the Agenda.

In the context of sustainable development, governance is regarded as an essential and indispensable steering tool (van Zeijl-Rozema et al., 2008). According to Meadowcroft (2007), we speak of governance for sustainability when policy-making and implementation involve complex state-society interactions that aim at achieving a more sustainable future. Scholars of environmental governance, essentially contributing to the broader sustainability governance discourse, equally underline its multidimensional nature (Driessen et al., 2012). However, it remains unclear which specific dimensions or modes of governance are most conducive to the achievement of sustainable development. Current research in sustainability governance often focuses only on one particular aspect of governance such as participation (Bäckstrand, 2006; Newig and Fritsch, 2009; Meadowcroft, 2004; Newig et al., 2018), reflexivity (Voß and Kemp, 2006) or policy implementation (O'Toole, 2004; Bressers, 2013). To our knowledge, there is no comprehensive analysis systematically examining the relationship of governance (understood as encompassing concept including actors, processes, structures and institutions) and sustainable development in its social, economic and environmental dimension as defined by the United Nations in the 2030 Agenda. In the broader context of governance and development, however, valuable contributions have been brought forward by Norris (2012) as well as Holmberg, Rothstein and Nasiritousi (2009).

3. Dimensions of effective sustainability governance

In view of the uncertainty as to which dimensions of governance are particularly important for achieving sustainable development, we seek to synthesize empirical and theoretical findings from previous research and to test their respective relevance for SDG achievement in a structured manner. With this study, we intend to provide insights that help developing a more integrated and holistic concept of effective sustainability governance, thereby contributing to the ongoing theoretical debate.

As pointed out before, governance, in contrast to government, essentially relies on a diversity of participating actors. In the specific context of sustainability governance, the importance of participation in policy-making and implementation has been repeatedly stressed by scholars and practitioners. The inclusion of different actors, for example in the drafting of policy proposals, is deemed to yield more effective results on the basis of mutual

learning (Newig et al., 2018; Armitage, 2008), increased legitimacy and the bundling of resources (Newig et al., 2018; Verweij et al., 2013). In order to ensure effective sustainability governance and exploit potential synergies, it appears crucial to coordinate measures at different levels of government and between interacting policies. Particularly with regard to complex and interrelated sustainability goals, policy coherence can contribute to the reduction of trade-offs between different sectoral policies and thereby lead to more effective implementation (Monkelbaan, 2019). Coordinated measures should be regularly assessed in terms of effectiveness and, if necessary, be adjusted according to a changing environment. Such adaptive governance arrangements can be decisive when dealing with highly dynamic and long-term sustainability problems. This in turn requires reflexivity of institutions and procedures, a governance characteristic that often seems to contradict traditional rationalist problem-solving approaches (Voß and Kemp, 2006). Various studies point to the positive effects of democratic institutions on economic and social development (Halperin et al., 2009) as well as environmental quality (Barrett and Graddy, 2000). Nonetheless, and often with reference to developments in South and East Asia, there is a growing debate on potential trade-offs between democratic institutions and effective (sustainable) governance (Charron and Lapuente, 2010). Consequently, it is important to assess whether democratic institutions, i.e. universal franchise, regular elections, civil rights and political liberties as well as rule of law, positively relate to SDG achievement.

Below, we discuss these four central aspects of governance for sustainable development – participation, policy coherence, reflexivity and adaptation, and democratic institutions – in more detail with a view to building the conceptual foundations of our empirical study.

3.1. Participation

Governance research, with reference to diverse theoretical foundations (e.g. policy network theory, institutional theory or organization theory), suggests that – in the light of an alleged declining capacity of the government to effectively steer societal development – other social actors are needed to fill the emerging void (Peters, 2011; Rhodes, 2007). Scholars have argued that complex problems in particular, such as the challenges posed by interrelated SDGs, require representation and stakeholder involvement due to the various interest and potential trade-offs at stake (Meuleman and Niestroy, 2015; Meadowcroft, 2011; Jordan, 2008; Enroth, 2011; Emerson et al., 2012). In collaborative governance approaches, the institutionalization of state-non-state actor interactions is particularly important for building trust and a shared understanding, as well as for increasing the actors' commitment to collaboration (Ansell and Gash, 2008). It has been argued that greater stakeholder involvement will contribute to knowledge generation and consensus building, and that overall decision-making and policy acceptance will be facilitated by sharing specific knowledge, values and resources (Newig et al., 2018; Verweij et al., 2013). Taken together, participation is expected to generate “a higher degree of sustainable and innovative outcomes” (Heinelt, 2002: p.17). We thus expect higher levels of participation to be positively related to SDG achievement.

For conceptual clarification, we note that participation in this article does not refer to political representation or citizens' right to take part in elections (these aspects form part of the concept of democratic institutions discussed below). Rather, we adopt Heinelt's (2002: p.23) concept of participation who states that “participation in governing activities is not only a matter of being indirectly involved in governmental affairs (by voting,

representation etc.) but also through extended engagement in forms of policy-making”.

3.2. Policy coherence

Particularly from a normative policy perspective, many have stressed the importance of policy coherence and coordination for the achievement of sustainable development (Meuleman and Niestroy, 2015; Meadowcroft, 2011; Bernstein et al., 2014; Derkx and Glasbergen, 2014). In the 2030 Agenda itself, UN member states identified “policy and institutional coherence” (United Nations, 2015: p.27) as important means of implementation. In line with the good governance approach, the Commission of the European Communities (2001) published a white paper advocating a normative governance agenda composed of the principles of *openness, participation, accountability, effectiveness and coherence*. Equally recognizing the importance of policy coherence, the Organization for Economic Cooperation and Development (OECD) (OECD, 2016) published a “*Framework for policy coherence for sustainable development*”, which shall help policy-makers to adapt institutional arrangements and processes in order to increase coherence in policy design and implementation.

Policy Coherence for Sustainable Development (PCSD) had emerged as a prominent concept in the debates surrounding development and aid effectiveness and, more recently, also sustainable development. Although lacking an agreed definition, policy coherence for (sustainable) development can be understood as involving “the systematic promotion of mutually reinforcing policy actions across government departments and agencies creating synergies towards achieving the defined objective” (OECD, 2001: p.90). Due to the interconnectedness of the various dimensions of sustainable development, scholars argue, an integrated and coherent approach is needed to effectively tackle the complex issues at hand (Stafford-Smith et al., 2017; Meuleman and Niestroy, 2015; Meadowcroft, 2011; Jordan, 2008). Policy network theory in particular underlines that coordination – an essential part of PCSD – is a central component of governance to achieve a common goal (Enroth, 2011). Major challenges in this regard include overcoming the silo mentality across policy sectors as well as generating high-level political commitment and strong leadership (Stafford-Smith et al., 2017).

Institutional structures and processes fostering policy coherence are claimed to contribute to the reduction of trade-offs and the enhancement of synergies between policies directed towards sustainable development. By aligning economic, social and environmental policies, PCSD can help to reduce unintended consequences and allows for more informed decision-making (Monkelbaan, 2019). We thus hypothesize a positive impact of policy coherence on SDG achievement. However, it must be noted that the value of PCSD as a dimension of sustainability governance has also been contested by some scholars (Zeigermann, 2018; Carbone, 2016). Critics base their doubts on the assumption that policy coherence is greater in less complex policy areas, i.e. those characterized by less diverging interests, greater targeting and stronger issue focus (May et al., 2006). If this holds true, the complexity and interrelation of the SDGs and targets would render effective policy coherence extremely difficult in many cases or result in highly time-consuming coordination efforts. Further, the effects of coherent and interacting policies might only be assessable with delay depending on the respective feedback loop. Investment in education, for example, can lead to increased productivity, which can result in higher government revenues. These resources collected through effective tax policies could then be used for new investments in education. As these feedback loops may take some time, potential delays might have to be taken into account when

evaluating the effects of policy coherence (Collste et al., 2017).

3.3. Reflexivity and adaptation

Scholars have further underlined that governance for sustainable development requires “critical self-awareness” and the capacity of governments and institutions to modify trajectories and existing behavior to face the complex challenges posed by cross-cutting sustainability issues (Meadowcroft, 2011: p.540). Rooted in institutional theory and taken up increasingly by scholars of sustainability and environmental governance (Feindt and Weiland, 2018), reflexive governance approaches suggest that monitoring performance and the institutionalization of reflexive governance mechanisms are vital in this regard (Voß and Kemp, 2006). This can be supported by creating new mechanisms, e.g. by establishing national sustainable development strategies, or by adapting existing institutions and the political system more generally in the appropriate country context, e.g. ranging from a reform of the electoral system to increasing civic education and public participation (Meadowcroft, 2011).

In this article, we adopt the definition suggested by Feindt and Weiland (2018: p.663) who describe reflexive governance as “governance arrangements where [...] institutions allow for a reflexive adaptation of rules and procedures”. According to Voß and Kemp (2006), reflexivity of institutions, processes and strategies is essential for governing sustainability problems that are characterized by their dynamic, long-term and systemic nature. They identified specific requirements that should be established to make reflexive governance for sustainable development work. These include integrated knowledge generation involving different actors from different disciplines, strategies and institutional arrangements that can be adapted according to changing and ambiguous sustainability challenges, as well as the consideration and scrutinizing of potential long-term repercussions of the strategies chosen. Additionally, policy goals and strategies should be developed in an iterative manner.

According to this rather normative and policy-oriented conceptualization, reflexivity as essential feature of sustainability governance “helps to overcome structurally embedded ignorance of specialized organizations and institutions with regard to the external effects of their own operations” (Feindt and Weiland, 2018: p.665). Thus, reflexive and adaptive governance arrangements can create a public space that fosters deliberation and transdisciplinary knowledge exchange between diverse actors, thereby facilitating innovative and integrated problem-solving considering different problem frames (Monkelbaan, 2019; Termeer et al., 2015). Second, when dealing with complex socio-ecological systems characterized by constant changes, the assessment and adaptation of strategies, goals and institutions can help building resilience and thus lead to more stable and sustainable development (Chaffin et al., 2014). Consequently, we hypothesize that reflexive and adaptive governance structures contribute to SDG achievement by establishing mechanisms that help dealing with the inherent dynamics, uncertainty and complexity related to sustainability problems. However, it might need to be considered that reflexive and adaptive governance structures and institutional change more broadly can result in processes that may require significant amounts of resources, data and time (Chaffin et al., 2014; Munaretto et al., 2014). Thus, the effects of reflexivity and adaptation of institutional arrangements on SDG implementation could not be clearly visible in the short term. While several studies have discussed the conceptualization of reflexive governance approaches and applied case-study analyses to examine the

underlying processes (Kemp et al., 2007; van der Brugge and van Raak, 2007), quantitative analyses investigating their relation with sustainable development are still missing.

3.4. Democratic institutions

The concept of *good governance* has often been brought up in debates surrounding sustainable development. Good governance is widely considered to be strongly normative, and an in itself ambiguous and contested concept (Jordan, 2008; Holmberg et al., 2009; Knill, 2004). As championed by the World Bank, the concept includes “accountability, transparency, rule of law and government efficiency and effectiveness” (World Bank, 1992: p.165) and was seen as decisive for a country’s development. Particularly prominent in the good governance debate is the discussion about *democratic institutions*. Influenced by the New Institutional Economics, institutions are understood as informal and formal “rules of the game” (North, 1990: p.3). Primary functions attributed to institutions are the facilitation of collective action and the reduction of transaction costs (Pomerantz, 2011). Further, Holmberg et al. (2009) suggest that it is not the mere establishment of institutions that matters for development, but the public perceptions about their credibility.

Definitions of democratic institutions differ among scholars, but many agree that freedom of expression, free, fair and inclusive elections, rule of law, effective legislature, checks and balances, alternative information, respect for civil liberties and human rights and an independent judiciary belong to this category (Norris, 2012; Pomerantz, 2011). Democratic theory provides valuable insights regarding the relationship between democratic institutions and development. As Norris (2012: p.187) explains, on a normative account, “legitimate governance should be based on the will of the people, as expressed through the institutions of liberal democracy”. According to median voter theory developed by Meltzer and Richard (1981), democratic institutions in the form of universal franchise and regular pluralist elections produce more equal economic and social outcomes based on pressure exerted by the electorate. Further, taking up Sen’s development theory, leaders are assumed to act in line with the public interest if elected by informed citizens holding them accountable for their actions, if challenged in a competitive political process, and if controlled by a system of checks and balances (Norris, 2012; Siegle et al., 2004; Sen, 1999). This holds true for sustainable development more specifically, as some have argued, as it implies “choices about basic values, about defining the kind of lives citizens wish to live, and the sort of society they wish to build and leave for posterity” (Meadowcroft, 2011: p.537). Accordingly, we expect that democratic institutions foster progress towards the SDGs by ensuring accountability and transparency in the political process.

Many studies have focused on the role of democratic institutions for economic development in particular (Kraay, 2014; Rodrik et al., 2004), but institutions may equally be important to overcome collective action problems in the social and environmental dimensions of sustainable development. Although contested, empirical studies have shown that democracy and civil liberties lead to better economic and societal development outcomes (Halperin et al., 2009). Further research showed that civil liberties increase equality and people’s income (Li et al., 2010) and that countries with greater civil liberties and political freedoms show higher levels of environmental quality (Barrett and Graddy, 2000; Dasgupta and De Cian, 2018). Democracy has further been claimed to better translate economic growth into higher quality calorie consumption than autocracies and hybrid regimes (Blaydes and

Table 1
Description and composition of governance variables.

Variable	Description	Indicators
1. Participation	The capability of economic and non-economic interest groups to propose and assess relevant policy measures and their implementation.	1.1 Association Competence (Business) 1.2 Association Competence (Others)
2. Policy coherence	The extent to which the institutional structure fosters coherent and coordinated policy-making and implementation.	2.1 Interministerial Coordination 2.2 Coherent Communication 2.3 Institutional coherence for implementation
3. Reflexivity & adaptation	The degree of reflexivity and adaptation of institutional arrangements including self-monitoring, capacity for reform, the influence of strategic planning units and regulatory impact assessments.	3.1 Organizational Reform 3.2 Adaptability 3.3 Strategic Planning 3.4 Evidence-based Instruments
4. Democratic institutions	The quality of democratic institutions including electoral process, media freedom and access to information, civil rights and political liberties as well as rule of law.	4.1 Electoral Processes 4.2 Access to Information 4.3 Civil Rights and Political Liberties 4.4 Rule of Law

Note: Individual indicators are taken from the Sustainable Government Indicators (SGI) published by the Bertelsmann Stiftung (2017) and were regrouped by the authors to reflect the concept of the respective governance variable.¹ For more information, see Appendix A.

Kayser, 2011) and to yield higher environmental commitment (Neumayer, 2002). A particular focus regarding democratic institutions has been placed on corruption, with empirical evidence supporting the claims that it negatively affects economic growth (Norris, 2012; Holmberg et al., 2009; Mo, 2001), health outcomes (Norris, 2012; Holmberg et al., 2009; Transparency International, 2006), government spending on social services (Holmberg et al., 2009; Mauro, 1998) and environmental performance (Morse, 2006; Welsch, 2004).

4. Methodology

To examine the relationship between the different aspects of governance described above and the achievement of each SDG, we analyze data for 41 countries (35 OECD countries and 6 additional EU, non-OECD countries), referring to the year 2015. The selection of countries is based on a Most-Similar-System-Design. While the MDGs put a strong focus on developing countries, the SDGs are much broader in scope, equally urging richer countries to introduce major policy change in order to meet the goals (Biermann et al., 2017; Kroll, 2015). The sample includes high and upper-middle income countries belonging to either or both the OECD and the EU. These countries are further characterized by similar contextual conditions, i.e. all being financially and politically stable, rule-based open market economies committed to democratic values (although differing in terms of the quality of democratic institutions). By analyzing the 2015 status quo of richer countries regarding SDG achievement and their respective governance characteristics, we can gain important insights that can contribute to more effective SDG implementation in the future.

To measure the different aspects of governance, we draw on the Sustainable Governance Indicators (SGI) published by the Bertelsmann Stiftung (2017). We regrouped the indicators so that they reflect the underlying concepts of the four governance variables (see Table 1). Data refers to the year 2015.

In order to identify relevant control variables to be included in the analysis, we first scrutinized pairs of countries that were similar

in terms of their governance characteristics but showed considerable difference in SDG achievement. To do so, we rescaled data on governance variables to a scale from 0 to 100, constituting four groups describing the performance for each variable: low (0–24.9), lower-middle (25–49.9), upper-middle (50–74.9) and high (75–100). We speak of considerable differences when countries differ in SDG achievement by more than 25 points (based on normalized values). Subsequently, we hypothesized which potential factors could plausibly have influenced SDG achievement. Accordingly, we tested for the effects of a country's rents from fossil fuels as percentage of gross domestic product (GDP),² GDP per capita,³ geographic location⁴ as well as population and area size⁵ as structural controls. Effects of high fossil fuel reliance on (sustainable) development are being discussed controversially. While some claim it increases growth and trade revenues and thereby serves to fund investment, others refer to the negative effects of the “resource curse”, where rent-seeking behavior of elites and the state increases inequality and corruption (Norris, 2012; Humphreys et al., 2007). GDP per capita serves as a proxy for wealth, thus securing financial resource endowment for the provision of public services, investment and increased income, factors that are equally claimed to be important for (sustainable) development (Norris, 2012). According to Diamond (1999), geographic location (i.e. latitude) affects a country's development insofar as it implies different challenges in terms of climate, disease prevalence, agriculture, transportation costs and access to markets.

Additionally, a commonly cited factor influencing a country's development is education or human capital. Higher levels of education, so the argument, increase labor productivity and foster the emergence of a strong middle class, thereby supporting (economic) development (Norris, 2012; Lipset, 1959). According to Barro

¹ The only exception relates to indicator 2.3, which consists of different indicators that can be found in the original data set under “implementation”. See Appendix A for details.

² Rents from fossil fuels (coal, natural gas, oil) as % of GDP. Difference between value of production and production costs. Own calculation based on World Bank data (World Bank, 2018).

³ GDP per capita, PPP (thousand, constant 2011 international \$) (World Bank, 2018).

⁴ The absolute value of the latitude of the capital city, divided by 90 (to take values between 0 and 1). Own calculation based on data from the Central Intelligence Agency's (CIA) World Factbook, borrowed from Teorell et al. (2016).

⁵ Population size (in millions), area size in thousand sq. km, both based on World Bank data (World Bank, 2018).

(2001), increased human capital positively affects a country's development by facilitating the absorption and diffusion of new technologies. Further, as has been pointed out by the United Nations Educational, Scientific and Cultural Organization (UNESCO) (UNESCO, 2017: p.7), education in the context of the SDGs empowers people "to take informed decisions and responsible actions for environmental integrity, economic viability and a just society for present and future generations". Quality education is a factor that at the same time forms part of the SDGs (goal 4) and thus originally constitutes an outcome variable in this study. At this point, we note that the SDGs themselves can be considered to be means and ends simultaneously. The interrelation and potential synergies between the goals have recently attracted considerable attention by scholars (Nilsson et al., 2018; Pradhan et al., 2017; Le Blanc, 2015). While a detailed assessment of the importance of some of the SDGs as enabling factor for the achievement of others is beyond the scope of this article, we approached this aspect by screening Pearson's correlation among the goals to identify those SDGs showing relatively high significant correlation with other goals ($r > \pm 0.60$ at $p < 0.001$). Here, goal 4 on quality education stood out, showing high significant correlations with six other goals. As this confirmed our qualitative assessment, we decided to include goal 4 as potential control variable.

Of the tested factors, GDP per capita, population size, geographic location and education showed significant results at $p < 0.05$ and increased the goodness-of-fit for some goals when compared to the initial model including the four governance dimensions (higher adj. R^2 and lower AIC). We therefore included these in our analysis.

To measure the achievement of each SDG, we borrowed from the methodology applied by Sachs, Schmidt-Traub, Kroll, Durand-Delacre and Teksoz (2017), authors of the SDG Index and Dashboard. We selected the indicators according to the following criteria:

- 1) Comparability, relevance and applicability: We did not consider those targets and indicators that predominantly describe ambitions for least developed and developing countries.⁶ Indicators had to be clearly defined and measurable at the national level.⁷ Additionally, as noted by Sachs et al. (2017), some of the proposed SDG indicators cannot be ranked or do not allow for setting a comparable threshold (e.g. manufacturing as percentage of GDP) without making highly normative assumptions. We excluded these from our analysis.
- 2) Quality and trustworthiness of sources: To ensure reliability and comparability, we drew on multiple official international databases such as the United Nations Global SDG Indicators Database (United Nations, 2018), UN data (United Nations Statistics Division, 2018) or the World Development Indicators (World Bank, 2018) (for more detail, see Appendix B).
- 3) Coverage: We included only those indicators where timely data was available for at least seventy percent of the countries in the sample.
- 4) Reference year 2015: Data refers to the year 2015 or closest year available.
- 5) Independence: We excluded those indicators that refer to aspects of governance.

In total, we collected 114 indicators reflecting sustainable development in its social, economic and environmental dimension. Applying the above mentioned criteria, we were able to include 70 of the 232 official SDG indicators proposed by the Inter-agency and Expert Group on SDG Indicators (IAEG-SDGs) (United Nations, 2018). For those indicators that did not meet selection criteria 1–3, we tried to identify alternative, closely aligned indicators that capture the idea outlined in the specific target. For this purpose, we screened official databases, reports and peer-reviewed publications for suitable data and included 44 additional indicators in the analysis (see Appendix B). To provide an example, indicator 5.1.1 measuring "whether or not legal frameworks are in place to promote, enforce and monitor equality and non-discrimination on the basis of sex" (United Nations, 2018) did not meet criteria 1 in terms of comparability and applicability. As the provided description is too vague and does not allow for clear measurement and comparison between countries in its original form, we identified suitable alternative indicators primarily from the OECD Gender, Institutions and Development Database (OECD, 2018) providing clear-cut measurements of concrete anti-discrimination laws in accordance with our selection criteria (e.g. existence of specific legislation addressing domestic violence or women's workplace rights).

To compare the achievement of each SDG across our sample, we had to define upper bound thresholds (borrowing from the methodology of Sachs et al. (2017)). Where possible, we used the threshold specified in the target. When the target referred to universal aspirations (such as *eradicate* poverty or *provide universal* health coverage) and no specific value was provided, we set the threshold at 0 or 100 accordingly. In case these proceedings were not possible, we used the scientific or technical optimum for the indicators. Finally, when none of the above was feasible or when most countries already met the threshold outlined in the target, we used the average of the 5 best-performing countries. We then normalized the values, converting them to a scale ranging from 0 to 100 (see Sachs et al. (2017: p. 43)): $x' = (x - \min(x)) / (\max(x) - \min(x))$; where x' represents the normalized value, x represents the actual value, $\max(x)$ denotes the upper threshold and $\min(x)$ denotes the lowest performance. When a country already exceeded the threshold, we set the score at 100. To compute the individual goal scores, we used the arithmetic mean of the normalized indicators for each goal. Using the arithmetic means mirrors the underlying idea that there is no ranking or priority of specific targets over others (Sachs et al., 2017). This equally applies to the computation of the "Total" score, reflecting the average performance of a country with regard to the achievement of all 17 SDGs.

5. Results & discussion

In terms of overall SDG achievement, we found a considerable difference between the countries analyzed. Scandinavian countries show the highest average achievement, followed by Finland, Austria and Switzerland, all scoring above 75 percent. With an average SDG achievement of less than 50 percent, Mexico and Turkey are located at the lower end of the spectrum, leaving behind Southeastern European countries, which score lowest in Europe. In general, we note that also in high and upper-middle income countries, there is still room for improvement in the path to achieve sustainable development. Fig. 1 depicts the overall SDG achievement for each country (see also Appendix C for descriptive statistics).

We conducted a series of multiple regression analyses to examine the relative contribution of different dimensions of governance to the achievement of each SDG as well as for the average SDG achievement at the national level. For each goal, we ran five different models: While model 1 included the four

⁶ Example for type of excluded indicators: "10.6.1 Proportion of members and voting rights of developing countries in international organizations" (United Nations, 2018).

⁷ Example for type of excluded indicators: "13.3.1 Number of countries that have integrated mitigation, adaptation, impact reduction and early warning into primary, secondary and tertiary curricula" (United Nations, 2018).

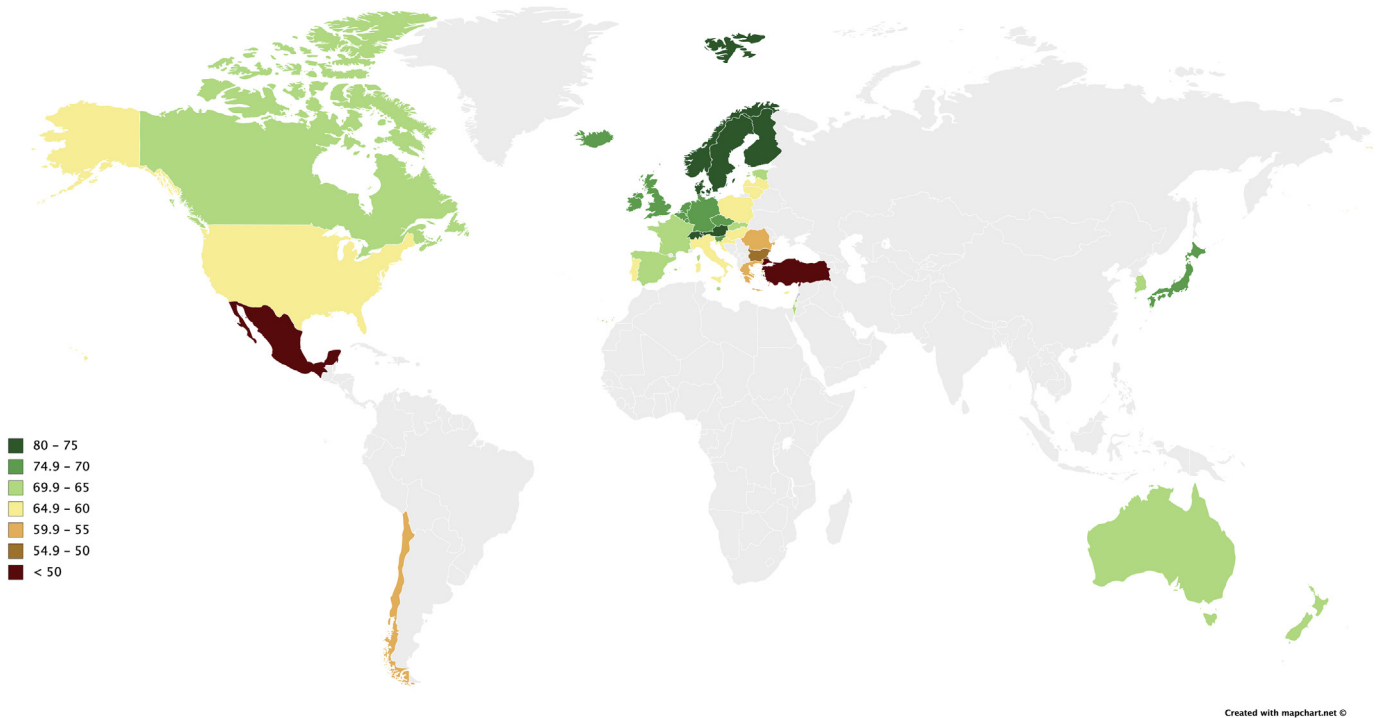


Fig. 1. Overall SDG achievement by country (%).

governance variables, model 2-5 additionally controlled for the effect of GDP per capita (PPP, constant 2011 international \$), population size, education and geographic location. Table 2 shows the resulting regression models.

For goal 2 (*zero hunger*), 12 (*responsible consumption and production*) and 13 (*climate action*), neither of our models fit the data well. Results show non-significant F -statistics in all models for goal 2 and 12, and low goodness-of-fit for all models regarding goal 13 (adjusted $R^2 \leq 0.17$, as well as a non-significant F -statistics for model 3.13). We therefore decided to exclude these goals from our analysis. For goal 6 (*clean water and sanitation*) and 15 (*life on land*), we further excluded models 1.6, 3.6, 5.6, 3.15 and 4.15 due to non-significant F -statistics.

While the inclusion of control variables led to increased model fit for all goals, results show that governance variables play an important role for SDG achievement. From the dimensions tested in model 1, participation stands out as the aspect of governance that most often shows significant positive relation to goal achievement, relating to goal 1 (*no poverty*), 3 (*good health and well-being*), 10 (*reduced inequalities*), 17 (*partnerships for the goals*) and the total average SDG achievement. For goal 5 (*gender equality*), participation, next to reflexivity and democratic institutions, becomes a significant predictor when controlling for the effects of education (model 5.5, $\beta_{Part} = .29^*$, $\beta_{Ref} = -0.39^*$, $\beta_{Demo} = 0.59^{***}$). This model shows the highest fit for this goal, with a slightly increased adj. R^2 of 0.59 (compared to .56 in model 1.5) and decreased AIC. Participation remains a significant predictor of the above-mentioned goals when controlling for the effects of population size and geographic location. However, the inclusion of GDP per capita (models 2.1, 2.3, 2.10, 2.17 and 2.T) and education (models 4.1, 4.10, 4.17 and 4.T) displaces participation. An exception is model 4.3, controlling for the effects of education on health and well-being, where participation and education jointly predict goal achievement, constituting the best model for this dependent variable (model 4.3, adj. $R^2 = 0.58$, $\beta_{Part} = .31^*$ and $\beta_{Edu} = 0.71^{***}$). In line with policy

network theory, our findings tend to confirm that participation can lead to better decision-making and implementation processes for some goals on the basis of collaborative knowledge generation, a shared understanding of the problem at stake, greater policy acceptance and increased trust among actors (Newig et al., 2018; Verweij et al., 2013; Ansell and Gash, 2008). In the case of Norway for example, which ranks fourth on goal 1 and second on goal 3, economic and non-economic interest associations are deeply involved in the policy-making process. Their representatives are highly skilled and consultation processes are firmly institutionalized. For instance, participation of these associations in the policy-making process has been deemed crucial for improvements made in terms of pension plans or health insurance (Sverdrup et al., 2015). In contrast, Hungary, scoring lowest in participation, ranks 36th on both goal 1 and 3. Here, major economic associations often consent to the government's policy proposals without formulating own substantive alternatives. Funding has been withdrawn from independent non-economic interest associations, while those loyal to the government are still being supported financially (Ágh et al., 2015). This points to a lack of pluralistic deliberation and trust influenced by the absence of participatory governance processes, negatively affecting more sustainable policy outputs.

Contrary to expectations, we only find evidence of a significant relationship between policy coherence and the achievement of the SDGs with regard to goal 15 (*life on land*, models 1.15, 2.15 and 5.15) and 17 (*partnerships for the goals*, model 4.17). However, the proportion of variance explained by models 1.15 and 2.15 (adj. $R^2 = 0.18$ and 0.16 respectively) is considerably low. As scholars have argued before, "Policy Coherence for Sustainable Development appears as a political discourse while its added-value for governing sustainable development remains controversial" (Zeigermann, 2018: p.145). While many have championed the approach on a normative account, our findings do not yield strong empirical evidence to support this view. According to our interpretation, policy coherence can lead to mixed results with regard to the achievement of

Table 2

Results of multiple regression analyses. Shown are regression models for each SDG and the average overall SDG achievement (Total) as dependent variable. In model 1, independent variables are the four governance aspects (participation, policy coherence, reflexivity and adaptation and democratic institutions). Model 2–5 control for the effect of GDP per capita (PPP, constant 2011 international \$), population size, education and geographic location respectively. Depicted are standardized beta values.

	Goal 1 (no poverty)					Goal 2 (zero hunger)					Goal 3 (good health & well-being)					Goal 4 (quality education)				
Model no.	1.1	2.1	3.1	4.1	5.1	1.2	2.2	3.2	4.2	5.2	1.3	2.3	3.3	4.3	5.3	1.4	2.4	3.4	4.4	5.4
Participation	.36*	.12	.36*	.25	.36*	-.10	-.09	-.10	-.23	-.10	.51**	.25	.21**	.31*	.51**	.28.	.08	.28.	—	.28.
Coherence	.02	-.13	.05	-.03	.01	.12	.13	.13	.08	.13	.10	-.06	.08	.02	.11	.11	-.01	.12	—	.10
Reflexivity	.08	.26	.18	.11	.09	-.01	-.02	-.01	.03	-.03	-.29	-.10	-.33	-.23	-.31	-.09	.06	-.04	—	-.07
Demo. Inst.	.33.	.13	.22	.12	.28	.23	.24	.22	-.02	.30	.28	.06	.32	-.10	.41*	.53**	.37*	.48**	—	.42*
GDP p.c. (log)		.52**					-.03**					.57**					.42*			
Pop size (log)			-.23					-.01						.08				-.09		
Education				.40*					.46.					.71***					—	
Geo					.10					-.12					-.21					.18
R ²	.45	.57	.49	.53	.46	.06	.06	.06	.15	.07	.41	.55	.41	.64	.44	.54	.62	.55	—	.56
Adj. R ²	.39	.51	.42	.46	.38	-.05	-.08	-.08	.03	-.07	.34	.48	.33	.58	.36	.49	.56	.48	—	.50
F-value	7.42***	9.35***	6.72***	7.79***	5.92***	.53	.42	.41	1.26	.49	6.17***	8.44***	4.88**	12.24***	5.45***	10.57***	11.29***	8.45***	—	9.01***
AIC	320.53	312.40	319.61	316.51	322.07	340.45	342.44	342.45	338.00	342.00	317.28	308.23	318.97	299.23	317.07	319.67	314.16	321.08	—	319.61
Intercept	7.38	-34.16*	12.69	8.89	5.62	50.88**	52.99*	51.15**	52.55***	53.08**	30.15**	-11.33	28.46*	32.60***	33.80**	-4.10	-40.00*	-1.65	—	-7.67
Observations	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	—	41
	Goal 5 (gender equality)					Goal 6 (clean water and sanitation)					Goal 7 (affordable and clean energy)					Goal 8 (decent work and economic growth)				
Model no.	1.5	2.5	3.5	4.5	5.5	1.6	2.6	3.6	4.6	5.6	1.7	2.7	3.7	4.7	5.7	1.8	2.8	3.8	4.8	5.8
Participation	.30.	.28	.32*	.25	.29*	.03	-.32	.02	-.16	.03	-.04	-.07	-.04	-.17	-.04	.34.	.04	.34.	.24	.34.
Coherence	.06	.05	.07	.05	.05	.12	-.08	.11	.05	.13	.16	-.14	.21	.11	.13	.13	-.06	.14	.09	.12
Reflexivity	-.41*	-.40*	-.34.	-.40*	-.39*	-.16	.10	-.21	-.10	-.16	-.13	-.11	.03	-.09	-.09	-.07	.16	-.03	-.04	-.06
Demo. Inst.	.72***	.70***	.62***	.63***	.59***	.44*	.15	.50*	.08	.44.	.67***	.64**	.50*	.42*	.41*	.24	-.02	.20	.03	.18
GDP p.c. (log)		.05					.75***					.07					.67***			
Pop size (log)			-.14					.12						-.34*				-.08		
Education				.16					.66**					.47*					.39.	
Geo					.22.					-.01					.43**					.10
R ²	.60	.61	.62	.62	.64	.18	.43	.19	.38	.18	.41	.41	.50	.51	.54	.31	.51	.32	.38	.32
Adj. R ²	.56	.55	.56	.56	.59	.09	.35	.08	.30	.07	.34	.33	.42	.44	.47	.23	.44	.22	.29	.22
F-value	13.35***	10.42***	10.99***	10.96***	12***	2.00	5.25**	1.69	4.37**	1.56	6.30***	4.90**	6.91***	7.29***	8.17***	4.05**	7.17***	3.23*	4.28**	3.25*
AIC	247.27	249.17	247.85	247.94	245.65	318.54	305.85	319.95	308.88	320.53	332.03	333.90	327.50	326.40	323.94	314.82	303.14	316.52	312.48	316.43
Intercept	48.88***	46.98***	45.78***	49.14***	46.60***	48.13***	.59	45.78***	50.12***	48.35***	0.93	-4.88	9.87	2.87	-7.97	18.75.	-25.35.	20.39.	19.96.	17.25
Observations	40	40	40	40	40	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41
	Goal 9 (industry, innovation and infrastructure)					Goal 10 (reduced inequalities)					Goal 11 (sustainable cities and communities)					Goal 12 (responsible production and consumption)				
Model no.	1.9	2.9	3.9	4.9	5.9	1.10	2.10	3.10	4.10	5.10	1.11	2.11	3.11	4.11	5.11	1.12	2.12	3.12	4.12	5.12
Participation	.34.	.06	.34.	.18	.34.	.43*	.29	.43*	.25	.42*	.30	.22	.30.	.15	.30	.05	.28	.05	.15	.05
Coherence	.18	.01	.15	.12	.17	.12	.02	.11	.02	.08	-.17	-.22	-.09	.18	-.18	.14	.28	.14	.18	.15
Reflexivity	-.03	.17	-.13	.02	-.01	-.58*	-.45.	-.55*	-.47*	-.53*	.07	.13	.32	-.17	.09	-.14	-.31	-.13	-.17	-.16
Demo. Inst.	.21	-.02	.32	-.10	.10	.28	.14	.25	-.04	.08	.30	.24	.03	.43	.19	.23	.43.	.22	.42	.37
GDP p.c. (log)		.60**					.30					.17					-.50*			
Pop size (log)			.21					-.04						-.52***				-.02		
Education				.59**					.54*					-.36					-.36	
Geo					.20					.32.					.19					-.23
R ²	.35	.51	.38	.51	.37	.35	.39	.35	.48	.42	.26	.27	.46	.27	.28	.07	.18	.07	.13	.11
Adj. R ²	.28	.44	.29	.44	.28	.26	.28	.23	.39	.32	.17	.16	.38	.17	.18	-.03	.07	-.06	.01	-.02
F-value	4.79**	7.19***	4.32**	7.27***	4.19**	3.96*	3.64*	3.07*	5.29**	4.18**	3.09*	2.56*	5.91***	2.64*	2.73*	0.72	1.58	.56	1.08	.86
AIC	351.08	341.62	350.89	341.38	351.36	282.20	281.99	284.14	276.33	280.03	317.52	318.85	306.53	318.50	318.13	333.81	330.61	335.79	333.08	334.22
Intercept	-7.60	-71.22**	-14.30	-4.64	-12.46	40.37*	19.24	42.76*	46.79*	37.83*	45.88***	35.00.	56.05***	46.49***	42.97***	39.37**	75.39	39.78**	38.15**	43.16**
Observations	41	41	41	41	41	35	35	35	35	35	41	41	41	41	41	41	41	41	41	41

	Goal 13 (climate action)					Goal 14 (life below water)					Goal 15 (life on land)					Goal 16 (peace, justice and strong institutions)				
Model no.	1.13	2.13	3.13	4.13	5.13	1.14	2.14	3.14	4.14	5.14	1.15	2.15	3.15	4.15	5.15	1.16	2.16	3.16	4.16	5.16
Participation	-.34.	-.20	-.34.	-.26	-.34.	.02	-.22	.04	-.06	.04	-.11	-.18	-.11	-.15	-.12	.35.	.27	.35.	.22	.35.
Coherence	-.29	-.21	-.27	-.26	-.29	.43	.39	.36	.43	.39	-.47*	-.51*	-.48*	-.49*	-.50*	-.21	-.26	-.20	-.26	-.23
Reflexivity	-.01	-.11	.06	-.04	-.00	-.15	-.08	-.18	-.14	-.14	-.06	-.02	-.09	-.05	-.02	-.36.	-.30	-.35	-.32.	-.33.
Demo. Inst.	.16	.28	.09	.33	.13	.39*	.26	.47*	.26	.48*	.33	.28	.36	.26	.10	.44*	.37.	.42.	.18	.22
GDP p.c. (log)		-.30					.43*					.14					.18			
Pop size (log)			-.14					.15					.06					-.04		
Education				-.31					.28					.13					.49*	
Geo					.05					-.15					.39*					.37*
R ²	.23	.27	.25	.27	.23	.39	.47	.41	.42	.40	.26	.27	.26	.26	.37	.33	.34	.33	.44	.42
Adj. R ²	.15	.17	.14	.17	.12	.31	.38	.31	.31	.30	.18	.16	.16	.16	.27	.25	.25	.23	.36	.34
F-value	2.72*	2.63*	2.30	2.69*	2.14*	4.82**	5.11**	2.48**	4.13**	3.93**	3.14*	2.55*	2.48	2.54	4.03**	3.37**	3.62**	3.42*	5.49***	5.10**
AIC	321.41	321.17	322.63	320.93	323.33	261.02	258.28	262.09	261.60	262.28	342.23	343.73	344.06	343.78	337.86	337.70	338.84	339.64	332.21	333.51
Intercept	110.29	-34.16*	113.10***	109.29***	109.55***	4.83	-25.60	1.99	6.35	5.97	90.16***	77.45**	88.48***	90.71***	81.98***	54.16***	38.33	55.13***	56.23***	5.97
Observations	41	41	41	41	41	35	35	35	35	35	41	41	41	41	41	41	41	41	41	41

	Goal 17 (partnerships for the goals)					Total (average SDG achievement)				
Model no.	1.17	2.17	3.17	4.17	5.17	1.T	2.T	3.T	4.T	5.T
Participation	.48*	.17	.48**	.36.	.48*	.35*	.10	.35*	.16	.34*
Coherence	-.12	-.30.	-.06	-.16*	-.14	.04	-.11	.06	-.03	.02
Reflexivity	.10	.33.	.29	.14	.13	-.24	-.05	-.16	-.18	-.21
Demo. Inst.	.12	-.14	-.08	-.11	-.05	.59***	.39*	.51**	.24.	.45*
GDP p.c. (log)		.67***					.53***			
Pop size (log)			-.39*					-.16		
Education				.43*					.67***	
Geo					.28.					.25.
R ²	.31	.50	.42	.39	.36	.56	.68	.57	.76	.60
Adj. R ²	.23	.43	.34	.30	.27	.51	.63	.51	.73	.54
F-value	3.97**	7.08***	5.04**	4.49**	3.96**	11.27***	14.75***	9.44***	22.8***	10.46***
AIC	361.48	349.79	356.21	358.15	360.07	264.52	253.32	264.82	240.42	262.34
Intercept	-0.86	-78.81**	12.59	1.49	-8.57	34.37***	10.85	36.44***	35.79***	31.77***
Observations	41	41	41	41	41	41	41	41	41	41

Note: Statistical significance is depicted as (.) $p < 0.1$, (*) $p < 0.05$, (**) $p < 0.01$, (***) $p < 0.001$.

sustainability objectives. Interministerial coordination for example, which is a central indicator for this variable, might in some cases facilitate the achievement of a target, particularly in cases that do not involve controversial trade-offs. In cases where complex weighing of interests is involved, however, coordination efforts might result in extremely time-consuming or intractable processes. This in turn could then hamper goal achievement significantly. Alternatively, as has been argued before, feedback loops between interacting policies might result in delayed effects of policy coherence (Collste et al., 2017) and might thus not yet be reflected in our analysis.

Also contrary to expectations, when analyzing the effects of reflexivity and adaptation, we detect, if any, only a negative relationship. For goal 10 (*reduced inequalities*) and goal 5 (*gender equality*), reflexivity remains a significant negative predictor throughout all models (although only at $p < 0.1$ in models 2.5 and 2.10). With regard to goal 16 (*peace, justice and strong institutions*), the effects of reflexivity (at $p < 0.1$) vanish when controlling for GDP per capita and population size, while remaining visible in the strongest model controlling for education (model 4.16, adj. $R^2 = 0.36$). On the one hand, this could possibly be attributed to a time component. As our analysis is only a snapshot of the 2015 status quo, we hypothesize that this result is associated with a lagged effect of adaptive and reflexive governance structures. This seems to corroborate considerations about delayed effects of adaptive governance arrangements and broader institutional change (Chaffin et al., 2014; Munaretto et al., 2014). Indicators for this variable include the capacity to change and adaptation of institutional arrangements, the influence of strategic planning units and the application of regulatory impact assessments. All these processes are time-consuming and could imply administrative burdens, which might hamper the achievement of the defined objective in the short term. On the other hand, self-monitoring and consequent adaptation of institutional structures and strategies could result in constant reformulation of goals, which could equally influence the speed of implementation when it comes to sustainability policies.

For goal 4 (*quality education*), 5 (*gender equality*) and 7 (*affordable and clean energy*), democratic institutions show a constant positive relationship with goal achievement in all models tested. With regard to goal 4, only GDP per capita (model 2.4, $\beta_{GDP} = .42^*$, adj. $R^2 = 0.56$) appears as significant predictor next to democratic institutions. Its inclusion in the model reduces the significance of democratic institutions, yet their effects still remain visible ($\beta_{Demo} = 0.37^*$ compared to $\beta_{Demo} = 0.53^{**}$ in model 1.4). Other controls appeared insignificant. We can thus suppose a joint effect of governance and wealth on the achievement of quality education. Notably, regarding goal 5, none of the tested control variables appeared to have a significant relation with goal achievement. While model 5.5 including education showed the highest goodness-of-fit (adj. $R^2 = 0.59$ and decreased AIC), results of this model only show a significant relation with governance variables, i.e. participation ($\beta_{Part} = .29^*$), reflexivity ($\beta_{Ref} = -0.39^*$) and democratic institutions ($\beta_{Demo} = 0.59^{***}$). Governance consequently appears to be a decisive factor when it comes to gender equality. For goal 7 (model 1.7, $\beta_{Demo} = 0.67^{***}$, adj. $R^2 = 0.34$), the positive relationship between democratic institutions and goal achievement equally remained significant in all models, yet slightly weakened after inclusion of GDP per capita (model 2.7, $\beta_{Demo} = 0.64^{**}$, adj. $R^2 = 0.33$), population size (model 3.7, $\beta_{Demo} = 0.50^*$, adj. $R^2 = 0.42$), education (model 4.7, $\beta_{Demo} = 0.42^*$, adj. $R^2 = 0.44$) and geographic location (model 5.7, $\beta_{Demo} = 0.41^*$, adj. $R^2 = 0.47$). In the latter model, which fitted data best, democratic institutions and geographic location ($\beta_{Geo} = 0.43^{**}$) jointly predict goal achievement. Interestingly, we note that economic

power or wealth does not significantly relate to higher performance in terms of progress towards affordable and clean energy.

One possible explanation is that goal 4 on quality education, goal 5 on gender equality and goal 7 on clean energy cover rather popular topics that are commonly discussed by media and civil society, such as equal pay for women and men or energy transitions. In countries with functioning democratic institutions, political liberties ensure that media and civil society are granted the rights to voice their opinion. Thus, they are able to raise awareness on these topics, exert pressure on policy makers and contribute to the political agenda setting in a country. Additionally, regarding goal 5, one could argue that in a country where democratic institutions are stronger, civil society and policy makers show greater respect for democratic values such as equality. Taken together, results point to a confirmation of the hypothesis that democratic institutions foster sustainable development based on increased transparency in policy-making and implementation, greater accountability of political leaders and pressure by competitive elections and the electorate, thus ensuring political responsiveness (Norris, 2012).

Further, democratic institutions show a positive relation with goal 16 on peace, justice and strong institutions. It is the only significant predictor in model 1.16 ($\beta_{Demo} = 0.44^*$, adj. $R^2 = 0.25$). When controlling for GDP per capita and population size in model 2.16 and 3.16 (explaining a similar amount of variance as model 1.16), democratic institutions still appear as significant predictor at $p < 0.1$ ($\beta_{Demo} = 0.37^*$, adj. $R^2 = 0.25$ and $\beta_{Demo} = 0.42^*$, adj. $R^2 = 0.23$ respectively). Its significance vanishes however when adding controls on education (model 4.16, adj. $R^2 = 0.36$) and geographic location (model 5.16, adj. $R^2 = 0.34$). Goal 16 includes indicators such as the percentage of people feeling safe in their neighborhood or the share of unsentenced prisoners in custody. Stronger rule of law, a key measurement as part of democratic institutions, could lead to an increased perception of security among citizens and protect them against political arbitrariness.

Altogether, results point to the importance of governance, particularly participation and democratic institutions, for the achievement of the SDGs. Nonetheless, the provision of financial resources and strong human capital appear to serve as crucial enabling factors in the path to sustainable development. Of the tested models, model 2 controlling for the relative contribution of GDP per capita as a proxy of wealth and funding capacity performed best in predicting the achievement of many of the goals. Specifically, it was the single explanatory variable in model 2 for goals 1 (*no poverty*), 6 (*clean water and sanitation*), 8 (*decent work and economic growth*), 14 (*life below water*) and 17 (*partnerships for the goals*). It also performed best for goal 4 (*quality education*), where it significantly influences goal achievement in conjunction with democratic institutions. These goals include several indicators measuring the fulfillment of central government tasks that require the provision of public funds, such as for example the existence of social protection systems, government spending on education and health, safely managed drinking water and sanitation services, full employment and economic growth. Consequently, the achievement of these targets appears to be strongly influenced by a state's social and economic policy and its respective funding capacity.

Further, model 4 controlling for the effects of education on SDG achievement performed best among the five models in the context of industry, innovation and infrastructure (goal 9), reduced inequalities (goal 10), peace, justice and strong institutions (goal 16) as well as for the total average. The model also showed the highest fit for goal 3 on health and well-being, adding to the significant contribution of participation to goal achievement (model 4.3, $\beta_{Part} = .31^*$, $\beta_{Edu} = 0.71^{***}$, adj. $R^2 = 0.58$). These findings suggest that education as across-cutting issue for sustainable development

deserves particular attention. Its positive relation with attainment of goal 9 (model 4.9, $\beta_{Edu} = 0.59^{***}$, adj. $R^2 = 0.44$) corroborates the argument that skilled labor is needed for faster adoption and diffusion of new technologies, thereby fostering development (Barro, 2001). Findings regarding goal 10 seem to be in line with Lipset's (Lipset, 1959) argument that education promotes the emergence of a stronger middle class, thus creating a supportive environment for more equal growth and development. Further, findings on the positive effect on health outcomes point to the importance of increasing peoples' knowledge about topics such as communicable and non-communicable diseases, sexual and reproductive health or risks of drug addiction in order to foster progress on goal 3 (UNESCO, 2017).

Finally, model 5 including geographic location (measured in terms of absolute distance from the equator) as a proxy for a country's structural conditions performed best for goal 5 (*gender equality*), 7 (*affordable and clean energy*) and 15 (*life on land*). Regarding goal 5 (model 5.5), however, governance variables, i.e. democratic institutions ($\beta_{Demo} = 0.59^{***}$), reflexivity ($\beta_{Ref} = -0.39^*$) and participation ($\beta_{Part} = .29^*$), rather than geographic location, were shown as significant predictors for successful implementation. Nonetheless, having added this control resulted in slightly improved model fit (adj. $R^2 = 0.59$ compared to .56 in model 1.5). For goal 7, geographic location ($\beta_{Geo} = 0.44^{**}$) and democratic institutions ($\beta_{Demo} = 0.41^*$) jointly predict the level of attainment. We understand these findings as a confirmation of Diamond's (1999) hypothesis, arguing that geographic location affects development based on its effects on a country's vulnerability in terms of climate and diseases, access to world markets and societal modernization more generally. This further underlines that progress on the SDGs globally needs to pay particular attention to universal and inclusive development as has been pointed out in the 2030 Agenda.

Acknowledging the multi-dimensional nature of sustainability governance, this study seeks to contribute to the current debate about effective governance for sustainable development and the SDGs more specifically. By testing the effects of different aspects of governance on aggregated SDG indicators, we aimed at providing first insights that might guide future more in-depth analyses. Taken together, our results indicate that participation and functioning democratic institutions can have a positive effect on sustainable development in its social, economic and environmental dimension. Although our analysis does not allow for identifying a clear causal relationship, the observed trends at the aggregate level seem to confirm that inclusive deliberation, trust and knowledge-sharing as well as accountability and transparency in the policy process form important aspects of governance for achieving the SDGs.

As far as reflexivity, adaptation and policy coherence are concerned, our findings should not be taken as evidence of their insignificance. Rather, our interpretation of the results is that their effects might be more sensitive to the degree of complexity and the trade-offs involved in single targets. Consequently, we recommend reassessing our findings at the target level, as working with aggregated indices for each SDG can have disguised individual varying effects. Further, as reflexivity, adaptation and policy coherence relate to institutional change, sophisticated coordination mechanisms and feedback loops between interacting policies, it might be worth scrutinizing potential lagged effects of these governance dimensions by means of in-depth or longitudinal analyses.

Finally, we note that the tested dimensions of governance do not suffice to explain successful SDG implementation alone. In our sample of high and upper-middle income countries, structural and socio-economic factors such as GDP per capita, education or geographic location show significant effects on the achievement of sustainable development. While these could to an extent also be

influenced by governance arrangements, their impact on SDG achievement should not be underestimated, particularly with regard to less or least developed countries.

6. Conclusion

Particularly since the drafting of the 2030 Agenda and the SDGs, the importance of governance for sustainable development has gained considerable attention in research and public debate. While both concepts had been characterized by predominantly vague and ambiguous definitions, the emergence of the 17 SDGs provided an internationally agreed framework for measuring sustainable development in its social, economic and environmental dimension. This article aimed at contributing to develop a clearer understanding of sustainability governance by empirically assessing the relationship of different aspects of governance with the achievement of the SDGs at the national level.

Our analysis of the 2015 status quo of 41 high and upper-middle income countries showed that most of the OECD and European countries included in this study still have considerable room left for improvement when it comes to the implementation of the SDGs. While primarily Northern European countries, first and foremost Denmark, Sweden and Norway, show a rather positive status quo in terms of average SDG achievement (above 75 percent), Turkey and Mexico score less than 50 percent.

The results of multiple regression analyses suggest that the enhancement of democratic institutions and participation could lead to greater progress in SDG implementation. Both participatory and democratic governance structures seem to facilitate the decision-making process, implementation and acceptance of policies directed towards the achievement of sustainable development. Findings further seem to support the hypothesis that democratic institutions create a conducive environment for SDG achievement by ensuring accountability and transparency in policy-making as well as political responsiveness. While we did not find strong evidence supporting the hypothesis that political coherence is important for the achievement of the SDGs, our results show, if any, a negative correlation with regard to reflexivity and adaptation. We assume that these aspects of governance relating to the design of the institutional structure as well as to processes of coordination, iterative policy-making and strategy adaptation produce mixed results depending on the complexity of the trade-off at stake. Further, considering that our findings are based on an assessment of the 2015 status quo, we assume a lagged effect of allegedly time-consuming reflexive governance structures and policy coherence for dealing with highly dynamic and complex questions of sustainable development. This assumption requires further investigation by researchers.

We must note, however, that economic power (GDP per capita) appeared to be a significant predictor for the achievement of many of the goals. Several SDG indicators measure the fulfillment of central government tasks such as the existence of social protection systems or the provision of health care services. Our findings could thus point to the importance of adequate government funding for the provision of public services in order to *leave no one behind*, as the underlying principle of the 2030 Agenda reads. Moreover, our findings seem to underline the importance of education for sustainable development. While an educated workforce may contribute to the establishment of a solid middle class, thereby promoting reduction of inequalities, skilled labor can further contribute to faster adoption and diffusion of new technologies beneficial to modernization and development. Increased knowledge and related behavioral change with regard to health risks could further contribute to achieve sustainable development in its different dimensions.

While it needs to be adapted to national circumstances, the SDG framework can provide supportive guidance for fostering global sustainable development in its social, economic and environmental dimension. At this point, we remark however that some of the proposed SDG indicators may not be fully suitable to adequately capture the achievement of specific targets. One can at least question whether the number of fixed broadband subscriptions, for example, appropriately measures the ambitions of target 17.6 to “Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation (...)” (United Nations, 2018). Further, we reiterate that our findings apply to the sample of high and upper-middle income countries, member states of either or both the EU and the OECD. While recognizing that the implementation of the SDGs should always be assessed in the light of the specific country context, we aimed at providing a proxy for future research on governance for the goals. Additionally, we acknowledge that this study relies on indicators that need to be treated with caution. To ensure comparability in terms of SDG achievement, we drew on official international databases. However, in some cases, these rely on self-reported data from national governments, which needs to be considered with regard to the reliability of the indicators used. The data provided by international sources might not always reflect most recent statistics or might have been modified for the purpose of consistency (Sachs et al., 2017). In terms of the selected governance indicators, we note that the SGI drawn on in this article rely on qualitative expert assessments. According to the authors of the SGI, while being based on subjective evaluation by country experts, validity and reliability of the data is ensured by a multi-stage peer review process (Bertelsmann Stiftung, 2017).

This article intends to stimulate the academic discourse about governance for SDG implementation by presenting empirical findings of a comparative analysis covering 41 high and upper-middle income countries. With the rather broad approach of analyzing governance arrangements for the SDGs at the national level, we present first insights that can serve as a proxy and provide guidance for further in-depth studies or verification of our results by means of a longitudinal analysis. We encourage future research to look more closely at different aspects of governance and their relation to SDG achievement, specifically focusing on the causalities at work. Studies assessing potential lagged effects of reflexive and adaptive governance structures or policy coherence could contribute to this endeavor. While being beyond the scope of the present article, an assessment of the interaction between the different dimensions of governance e.g. by means of a qualitative comparative analysis would contribute to further develop the concept of sustainability governance and its relevance for SDG implementation more specifically. Finally, revisiting our findings in the context of low income countries could yield additional valuable insights regarding the importance of specific aspects of governance for SDG achievement in different country contexts.

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Declaration of competing interest

None.

Appendix A-C. Supplementary data

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