Chapter 12
Crowdsourcing for Sustainability: Case of Sustainable Development Goals

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Abstract Many projects are currently necessary to develop the sustainability commitments that the countries have. In the world in which many resources are destined to the reactivation of economies due to the COVID-19 pandemic, crowdsourcing has gained great importance. On the one hand, green ventures need this crowdsourcing to be likely to develop. Likewise, social media has been recognized as a factor that facilitates the call for crowdsourcing, especially in initiatives that impact the consciousness of Internet users. In this chapter we will detail the various options available to achieve crowdsourcing for sustainability projects, some as disruptive as Ecomuseums, evaluating the trust generated by crowdsourcing initiatives. Also, the role of crowdsourcing in promoting open innovation in sustainability will be discussed, as well as some experiences in some countries that already report crowdsourcing efforts aimed at the development of sustainable projects. Finally, the status of SDG efforts will be reviewed and how crowdsourcing alternatives can specifically contribute to the SDGs will be detailed.

Keywords Crowdsourcing · Sustainability · Sustainable Development Goals · Policy · Policymaker · SDG

12.1 Introduction

The generation of public policies must lead to the participation of various actors in a country (Kendall-Taylor and Levitt 2017), and must be carried out through calls open to citizens, although it is reported that this management approach is not

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common as in the creation of smart cities (Shelton and Lodato 2019). When the Sustainable Development Goals (UN 2015) are established, which include 17 Sustainable Development Goals (SDGs) and 169 targets relating to global challenges, a governmental agenda is proposed at the global level to contribute to achieving these goals. Six years have passed since the SDGs were launched and in many countries their impact is still not what was expected, which could also be explained by the little knowledge and therefore the little participation of citizens in the implementation process. Monitoring of achievements in the field of SDGs is at the national, regional and global levels. In this scenario, it is necessary to know what the possibilities that the public sector must achieve through crowdsourcing to be able to contribute to the achievement of the SDGs.

12.2 Sustainable Development Goals

The Sustainable Development Goals (SDGs) are an urgent call to action at the global level to work in solidarity to achieve results that allow us to have a better world for all. The SDGs propose actions to generate a reduction in inequalities and at the same time they promote the economic growth of countries, contribute to the mitigation of climate change, preserve the oceans, animals and forests globally. At the business development level, the SDGs propose the formulation of fair work for citizens globally and environments of peace for people. The SDGs are not only about a set of goals focused on the environment as it is usually thought, but they also have a multidimensional approach to sustainable development. Citizens have an active role in contributing to the SDGs, considering that 179 targets must be reached, many efforts are needed for constant monitoring and it is there where citizens can play a crucial role.

Given the complexities of cities, which are multidimensional and dynamic systems, it is necessary to plan projects that can successfully impact the SDGs. When the SDGs are considered in the context of the COVID-19 pandemic period as a tool for the resilience of people and countries. The term resilience refers to the ability to cope with borderline situations and, at the same time, to adapt to changing circumstances. Based on the SDGs, it is necessary to generate the economic reactivation of the countries that have been economically impacted by the pandemic. The poorest people are often the most affected by problems like droughts or pandemics. The approaches to urban resilience are transversal to what is established by the 17 SDGs, with SDG 1 (poverty), SDG 2 (hunger), SDG 9 (infrastructure) and SDG 11 (sustainable cities) being particularly relevant.

12.2.1 Monitoring of SDG: SDG Index

The SDG Index is an annual report of the SDGs that shows a quantitative calculation that is characterized by being standardized, transparent and scalable. As pointed out by Alvarez-Risco et al. (2020a), the SDG Index allows establishing 7 aspects:

1. Eradicating poverty and strengthening equity remain high policy priorities
   In high- and middle-income countries, increasing income inequalities and persistent gaps in access to services and opportunities by income or area remain important policy issues.
2. Human rights and freedom of expression are at risk in many countries
   Warlike and social conflicts in many parts of the world continue to cause setbacks in the progress of the SDGs. The loss of stability in a country causes priorities to move away from meeting the SDGs.
3. High-income countries have significant environmental and socio-economic spillovers.
   A global balance must be achieved at the time of the national implementation of the SDGs, that is, the growth of a country should not be achieved with the negative impact on other countries.
4. High-level political commitment to the SDGs falls short of historic promises
   As of September 2019, out of 43 countries surveyed on SDG implementation efforts, 33 have endorsed the SDGs in official statements since January 1, 2018, but only 18 of them claimed that their core budget documents mentioned the SDGs. This gap between rhetoric and action must be closed.
5. The SDGs can be put into practice through six transformations of the SDGs
   The implementation of the SDGs can be organized along the following transformations: (a) Education, gender and inequality; (b) Health, wellness and demographics; (c) Energy decarbonization and sustainable industry; (d) Sustainable food, land, water and oceans; and (e) Sustainable cities and communities; (f) digital revolution for sustainable development.
6. Trends on climate (SDG 13) and biodiversity (SDG 14 and SDG 15) are alarming
   Countries have not achieved relevant results on SDG 13, even if efforts against climate change appear to be effective. The same applies for SDG 14 and SDG 15, as reported by the Intergovernmental Panel on Climate Change (IPCC 2019) and the Intergovernmental Science and Policy Platform on Biodiversity and Ecosystem Services (IPBES 2018).
7. Sustainable land use and healthy diets require integrated agricultural, climate and health policy interventions
   Seventy-eight percent of the world's nations for which data are available earn a "red grade" for sustainable nitrogen management. A third of food is wasted, 800 million people remain undernourished, 2 billion are micronutrient deficient and obesity is on the rise. However, there is day-to-day information that must be reported to have accurate measurements of the SDGs and for that there is a great opportunity to develop projects based on citizen science.

12.3 Citizen Science as Strategy of Crowdsourcing

Various crowdsourcing initiatives have been identified through citizen science to contribute to the SDGs, specifically in the environmental contents of the SDGs. These efforts are initially projects created from the scientific world but that for their operation have the active participation of citizens for the collection of follow-up data such as the case of detection of plastic accumulation in aquatic areas, reporting of inappropriate educational strategies or inadequate management of water resources). Although it is true, this monitoring is not new since there have always been reports from citizens that serve for monitoring (Sullivan et al. 2009; Liu et al. 2014; Welvaert and Caley 2016; Starkey et al. 2017); however, more and more fields have been incorporated in which citizens can contribute by reporting the modifications in nature that have been evidenced due to climate change (Kammermann and Dermont 2018; Kythreotis et al. 2019; Dawson et al. 2020).

The development and wide dissemination of new technologies, added to global access to fast Internet at prices very accessible to the vast majority, allows applications that are installed on smartphones as well as active participation in social networks has allowed the reach of the contributions of citizens is exponential, reducing the diffusion time of the reports because "sharing" is a very widespread habit in the virtual world, often even without any content filter. However, this wide dissemination allows scientists who access these citizen reports to process them, which previously is subject to huge budgets and is now possible due to the active participation of citizens who seek to be more and more protagonists of the world in the one who live.

These initiatives from the citizens are not currently spontaneous activities but are promoted by the authorities as is the case of the Federal Crowdsourcing and Citizen Science Toolkit, released in 2015 by the United States with the purpose of planning, designing and carrying out a crowdsourcing or citizen science project to help federal employees use crowdsourcing and citizen science to advance the missions of their agencies (https://www.citizenscience.gov). But it is not the only institution that seeks to link citizens with their participation since also the National Oceanic and Atmospheric Administration (https://www.noaa.gov/office-education/citizen-science-crowdsourcing), Bürger schaffen Wissen in Germany (https://www.buergerschaffenwissen.de), SDU in Denmark (https://www.sdu.dk/en/forskning/forskningsformidling/citizenscience) among others.

Even citizens are organized to carry out their reporting activities in a more organized and efficient way, also giving more confidence to the data reported, such as the case of the Australian Citizen Science Association (https://citizenscience.org.au) and the European Citizen Science Association (https://ecsa.citizen-science.net). Events such as the Fukushima disaster in Japan also generated crowdsourcing of citizens to periodically report radiation levels and its effects.

Also, there is also unscheduled crowdsourcing as is the case with what citizens think in times of a COVID-19 pandemic. The detailed analysis of what is expressed on Twitter allows generating public policies considering the opinion and sentiment

of citizens, as did Yu et al. (2020) and Chen et al. (2020). However, crowdsourcing also has some dangers, such as the specific case of the dissemination of information about COVID-19 through social networks, much of which is reliable but other contains printed or even false information, as reported by Kouzy et al. (2020) and Alvarez-Risco et al. (2020b).

Citizen science generates different advantages over conventional science, which was always limited by the resources for its development. Additionally, it can be mentioned that the great advantage provided by citizen crowdsourcing is the obtaining of data that could only be obtained tats way, that is, from the specific places where the phenomena occur and that can have an almost immediate report and by the citizens who live in the surroundings; This becomes very valuable when the report of the same phenomenon is achieved from different parts of the world and for a long period of time (Younis et al. 2019).

12.4 Crowdsourcing in Public Policy Making

Globally, crowdsourcing is increasingly being used when planning new policies or wanting to update them by incorporating current aspects that need to be considered. This ranges from more complex and comprehensive legislation such as a political constitution to specific regulations such as the WIPO regulation on Artificial Intelligence. Through crowdsourcing, institutions seek to involve citizens in the formulation of policies, knowing that the vision of the citizen will be very different from the institutional one but at the same time complementary to the policy that must be formulated. There are several examples of the use of crowdsourcing to formulate new legislation, such as the case of crowdsourcing applied to the reform of the Egyptian constitution (Maboudi and Nadi 2016), Iceland (Hudson 2018), Ukraine (Nikitenko 2020), Brazil (de Lacerda Carelli and de Castro Bittencourt 2020), Argentina (Gelb et al. 2020) and others.

Specifically, Aitamurto et al. (2017) reported the crowdsourcing that took place in Finland to generate constitutional changes. Mainly, the participants were men, educated professionals working full time. Although it was a minority, the women who participated in the process produced more ideas than the men. The crowd was motivated by a combination of factors: fulfilling civic duty, deliberating and learning from peers, changing the law for financial gain, among others. A very relevant aspect that was reported is that citizens participated even though they did not expect their contributions to affect the law. Other interesting case of the experience of constitutional reform in Tunisia due to the Arab Spring led to citizens meeting with their representatives to participate in public deliberation on the constitution and to offer proposals for the constitution. Statistical analysis of more than 2500 citizen proposals showed that 43% of public proposals were included in the final draft of the constitution.

The isolation due to the COVID-19 pandemic has generated greater communication through virtual media, which is why participation when developing new

policies is increasingly popular. Crowdsourcing in policymaking is an open government practice that seeks to involve citizens in democratic processes and infuses government with transparency at multiple levels. Crowdsourcing means an open call for anyone to participate in an online task. Crowdsourcing can be applied in various parts of a policy-making cycle.

Ensuring the quality of the data obtained is a crucial issue in crowdsourcing since, since it is an open door for any citizen to freely provide data, the option of irrelevant, false or confusing information can be given. It is here where the principles of research must be followed that ensure, on the one hand, the quality of the data collection instruments, as well as the evaluation of the data to validate them (cleaning process) and to be able to have the final reliable data that serves to the process of building public policies.

A requirement of the management of the data obtained from crowdsourcing is the storage of the data obtained after the cleaning process so that the information can be reviewed by other citizens who did not participate and may have similar opinions. Also, when you have other legislative reforms, you should have this history of crowdsourcing that allows you to analyze the ideas previously obtained and add them with those that are recently collected to achieve a broader and more valuable source. Likewise, given that current digital media make it easy to recognize who generates a certain contribution to legislation, it is vital that people are explicitly recognized in relation to their contribution to the generation of laws in their country, province or city. Nothing as important as the recognition of the authorities to their contribution in the normative construction that generates benefits to their citizens.

In this scenario of recognition, it is required that the scientific publications in which citizens participate by reporting data to researchers, as well as laws that have the active opinion of interested citizens, mention citizens as part of the intellectual contribution and which have finally contributed effectively to the generation of new knowledge. However, to have a broad vision of what can be obtained with crowdsourcing in the generation of public policies, it is important to know in detail the uses that have been given for many years to crowdsourcing, especially digital, to achieve the report, analysis, planning and changes in people's lives.

Queried SciStarter, an online database of citizen science projects from around the world with 1553 projects registered. In relation to sustainability, citizen science has been evidenced in different reports such as Wildschut (2017), Fritz et al. (2019), Sauermann et al. (2020), Shulla et al. (2020) and Schleicher and Schmidt (2020).

There are different approaches for the reporting of citizens so that they can be organized in a functional way for decision making. To achieve a comprehensive report, they can be approached following the approach of Donabedian (1998) of approach of structure, process and result. Focused on the SDGs and following the Donabedian approach, crowdsourcing by citizens can contribute accord to SDG policymaking. Some examples in SDG 1 to 4 can be found in Table 12.1.

Crowdsourcing can be used in policymaking in different levels as ideation, developing of literature and norms review, ideation, argumentation and deliberation as Fig. 12.1 shown.

Table 12.1 Potential contribution of crowdsourcing report in SDG policymaking

	Structure	Process	Outcome
SDG 1	Availability of anti-poverty programs	Concrete actions carried out by anti-poverty programs	% of people benefited Level of impact of food and agriculture programs
SDG 2	Availability of food and agriculture programs	Concrete actions carried out by food and agriculture programs	% of people are benefited Level of impact of food and agriculture programs
SDG 3	Infrastructure of hospitals and health centers	Availability of medical appointments and drugs in pharmacies	% of patients with controlled chronic diseases
SDG 4	Infrastructure of schools Accreditation of universities	Availability of bachelor level in schools	% de graduate in schools who continue students in universities and technology centers % of graduate of universities and technology centers that work in their professional fields

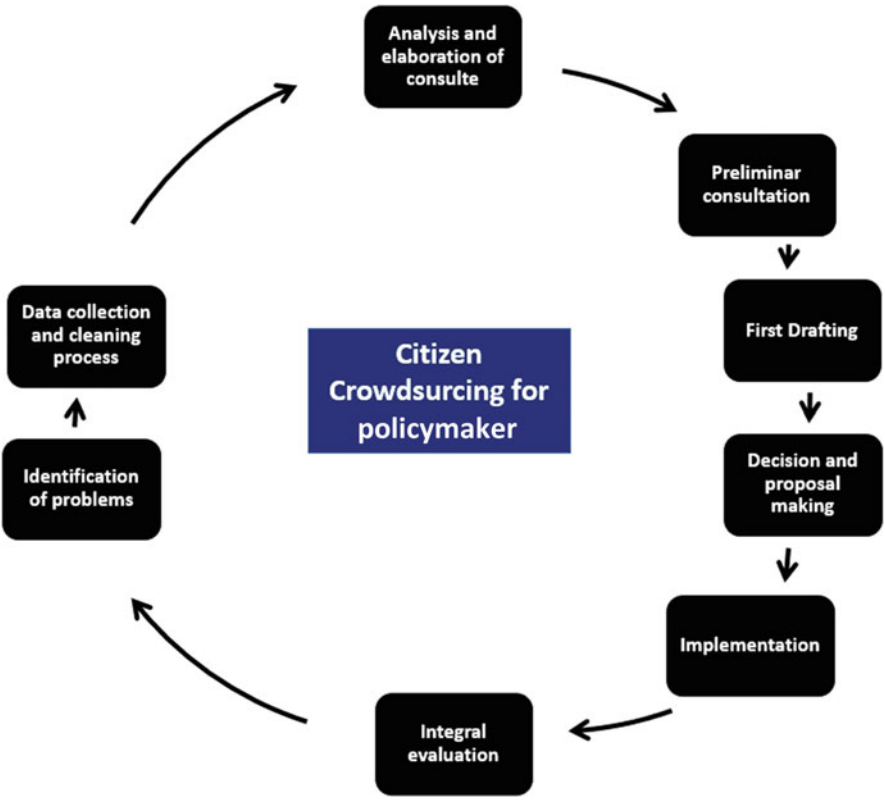

Fig. 12.1 Process of citizen crowdsourcing for policymaker

More recently it has been possible to show that crowdsourcing has escalated to crowdfunding in order to get citizens to formulate and finance their own reform projects. Finally, we must highlight that due to the use of crowdsourcing, the citizens are coproducers of public services. Therefore, they can generate the city and the country that they propose, respect and share.

12.5 Discussion

The participation of people in decision-making in a country is a need that must be addressed by the authorities. In these times, there are a large number of digital tools available that make people's participation much faster and easier. Software such as From the page, Zooniverse and Crowd consortium allow the texts that are written in crowdsourcing activities to be more easily transcribed, compiled, processed and made available to decision makers.

It is also relevant to know that all this effort from citizens to ensure that decision-making is with their real and constant participation also requires tools to capture the expressions in audio, for which there are tools such as Audacity that allows to process the audios of interviews or statements of citizens in an agile way. Likewise, it is used for the generation of podcasts, which will allow citizens to easily report the information from a cell phone when new public policies are formulated.

Although Taeihagh (2017) questioned that crowdsourcing is a new tool for policymaking, there are several countries that have already applied it, but it is still required that more countries and at different levels achieve citizen participation. However, state entities also need to apply crowdsourcing internally because in this way they can gather in the formulation the opinions of the members of the different institutional levels. In this way, young professionals as well as the most experienced ones will be able to express their opinions in such a way that their opinions can be part of the primary proposals.

The current COVID-19 pandemic also needs crowdsourcing since the best measures and regulations will emerge from the citizens since the intimate needs of people can be captured; the same is applicable for obtaining new drugs for specific treatment (Chodera et al. 2020). It is necessary that these crowdsourcing processes can be maximized with the use of machine learning for processing, being able to manage large amounts and types of contributions from citizens for the proposal of new laws (Auerbach et al. 2020).

12.6 Conclusion

Organizations and governments increasingly need to use crowdsourcing so that their employees and citizens can participate in policy making and feel represented. Obtaining diverse opinions allows a broad vision of the problems that must be

solved, so the mission must be not to allow the ideas of the members of an institution or a country to not be heard. The voice of the members must be at the center of the formulation of new normative documents. We hope crowdsourcing will grow at the speed the world needs.

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