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Information dissemination related to the Sustainable Development Goals on German local governmental websites

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Abstract

Purpose – The purpose of this paper is to investigate information dissemination related to the United Nations' Sustainable Development Goals (SDGs) on German local governmental websites in metropolitan areas. With the growing importance of urban areas for sustainable development, the Association of German Cities recommended an official commitment to the SDGs of all cities. In this paper, the author analyzes which cities report about their commitment to the SDGs on their governmental websites, what thematic information with regard to the SDGs is published on these websites and the role of partnerships and citizen participation in relation to the SDGs.

Design/methodology/approach – Content analysis of local governmental websites of the 15 largest German cities was conducted in July 2018.

Findings – The SDGs found their way into several German cities and their corresponding governmental websites. The most prevalent topics linked to the SDGs are education, climate protection, fair trade, energy and mobility. The cities have different strategies in informing about the goals. Most cities emphasize the role of citizen participation and partnerships on their websites.

Research limitations/implications – The analysis of websites can only provide a snapshot of reality as the content changes permanently. Further, a limited number of cities were considered which should be expanded in future research.

Originality/value – This study shows examples of German cities raising awareness on the SDGs and demonstrates gaps in doing so. It can help other cities in identifying possibilities and opportunities to deal with the SDGs and raise awareness on them by publishing related information on governmental websites.

Keywords Germany, e-Government, Smart city, Sustainable Development Goals, Citizen participation, Information dissemination

Paper type Research paper

Introduction

In 2015, the Sustainable Development Goals (SDGs) were adopted by the United Nations within the Agenda 2030. The SDGs are 17 goals "to end poverty, protect the planet and ensure prosperity for all" (United Nations, 2015a, para. 1). The most common definition describes sustainable development as a "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, p. 37). The goals, listed in Table I, address sustainable development regarding several dimensions, including social, environmental and economic aspects. Each goal consists of further, more concrete targets, adding up to a total amount of 169 objectives. In contrast to former similar strategic plans like the Millennium Development Goals (MDGs), the agenda does not only focus on sustainable development in developing countries, but demands action of all countries. This is an ambitious task, as different objectives shape different societies regarding social, economic and environmental goals (Sachs, 2012).

A crucial point for contributing to a sustainable development and measuring progress on the SDGs is the availability of information and data. Hence, information science research can play a key role for sustainable development. Spink (1995, p. 207) argued that "[t]he Information explosion problem that has driven the field exists within the broader

No.	Goal
1	No poverty
2	Zero hunger
3	Good health and well-being
4	Quality education
5	Gender equality
6	Clean water and sanitation
7	Affordable clean energy
8	Decent work and economic growth
9	Industry, innovation and infrastructure
10	Reduced inequalities
11	Sustainable cities and communities
12	Responsible consumption and production
13	Climate action
14	Life below water
15	Life on land
16	Peace, justice and strong institutions
17	Partnerships for the goals

Table I.
The Sustainable
Development Goals

Source: United Nations (2015a)

framework of the problem of sustaining development and subsequently humanity, but the problems of sustaining development may potentially present a new larger challenge for Information science." Furthermore, "since information forms an integral part of every development and innovation, sustainability should become a mainstream research topic within information studies" (Chowdhury, 2013, p. 617).

The role of information is also integrated in the Agenda 2030 for Sustainable Development and similar strategic plans. Chowdhury and Koya (2017) conducted an analysis on four UN policy documents and the importance of information-related concepts embedded in these documents. Considering the SDGs, information access and information sharing seem to be of particular importance. Already in the Agenda 21, the predecessor of the Agenda 2030, information, integration and participation played a major role for sustainable development (Nolin, 2010).

Furthermore, for the first time a goal on sustainable cities is embedded in the agenda. Klopp and Petretta (2017) referred to SDG 11 as the "Urban Sustainable Development Goal (USDG)" and argued that it needs to be realized at the city scale. With more than half of the world's population living in cities, sustainable development in general cannot be achieved without cities. The United Nations estimated that by 2050 the number of urban residents will grow even more up to 68 percent. With 74 percent, Europe currently already counts to the most urbanized regions of the world (United Nations, 2017b). Today, many cities transform to smart cities, i.e. prototypical cities of the knowledge society. A smart city can be conceptualized "as an icon of a sustainable and livable city" (Chourabi et al., 2012, p. 2289). According to Corbett and Mellouli (2017), smart sustainable cities can contribute to the SDGs by an integrated information ecosystem. Thereby, an improvement of aspects like participation, equity and mobility can be achieved (Bibri and Krogstie, 2017). Politics and administration in the form of e-governance and e-government are building blocks in this process (Barth et al., 2017). Through governmental websites, a city can disseminate information and encourage transparency, which are important factors for sustainable development.

There are already some studies dealing with governmental websites, e.g. regarding the assessment of factors like maturity and usability (Mainka et al., 2013; Fietkiewicz et al., 2017) or maturity and credibility (Huang and Benyoucef, 2014). Some studies further explored sustainability information on governmental websites. Navarro-Galera et al. (2016) analyzed 17

Spanish regional governments and their online dissemination behavior of sustainability information. Overall, they found numerous information about sustainability, but could not identify regional governments who publish sustainability reports. The authors stated that the level of online transparency with regard to sustainability information has to be further expanded. Brusca *et al.* (2016) investigated how austerity has influenced online sustainability information in Italy and Spain. Therefore, the authors analyzed websites of Italian and Spanish local governments with more than 100,000 inhabitants and the dissemination of financial, social and environmental information. They concluded that in both countries the disclosure of these topics is low and could be enhanced in order to improve transparency. Tirado-Valencia *et al.* (2016) expanded the analysis of sustainability information on 142 European cities. In their study, the economic dimension is the most represented aspect on governmental websites, whereas environmental and social information are rare. The authors emphasized that a sustainability strategy is not possible without a balance between all three dimensions. Janowski (2016) emphasized the importance of digital government for the SDGs and called for more research in this area.

This article aims at contributing to research on the dissemination of sustainability information by local governments. With the adoption of the SDGs, a new relevance for sharing information on sustainable development arose. Also the German Federal Government adopted a sustainability strategy based on the SDGs (Bundesregierung, 2017). With an urban population of 77 percent and the USDG, the role of cities for sustainable development in Germany comes to the fore. The Association of German Cities (Deutscher Städtetag, 2015) recognized the importance of urban areas for sustainable development and recommended German cities to commit themselves to the SDGs by signing a resolution template prepared by the association. Hence, our first research question aims at investigating which cities report on their commitment to the SDGs on their websites:

RQ1. Which German cities announce their commitment to implement the SDGs on their official governmental websites?

Although the SDGs demand action of every nation, be it a developing country or a high-income economy, societies are shaped by divergent priorities, capabilities and intentions. "Almost all the world's societies acknowledge that they aim for a combination of economic development, environmental sustainability, and social inclusion, but the specific objectives differ globally, between and within societies" (Sachs, 2012, p. 2206). Due to these differences, Lior *et al.* (2018) recommended to develop separate indicators for measuring the state of sustainable development for developed, medium-developed and poor countries. Although sustainability indicators for Germany were positive for the most part (Blum *et al.*, 2017), Open Data Watch (2017) recommended Germany to publish more data regarding environmental statistics. With our second research question, we aim to identify topics that local governments link to the SDGs on their websites, in order to investigate thematic priorities of German cities:

RQ2. Which topics linked to the SDGs do German municipalities inform about on their websites?

Sustainable development cannot be managed by one contributor alone. With SDG 17, the role of partnerships for achieving the SDGs is thus highlighted. In particular, five main fields are addressed in this goal (United Nations, 2017a): finance (e.g. additional financial resources for developing countries), information and communication technology (e.g. the expansion of broadband access), capacity building (e.g. international support for developing countries), trade (e.g. a growing share of international trade for developing countries) and systematic issues (e.g. official commitment to the SDGs as well as data, monitoring and accountability). At the urban level, "[t]he USDG thus raises the question of the relationship – and coordination – between

cities and other subnational as well as national governments in relation to implementation of the goals and monitoring" (Klopp and Petretta, 2017, p. 95). Thereby, citizens can also become partners for contributing to sustainable development. Sriskandarajah (2018, p. 302) even argued that "[t]he Sustainable Development Goals (SDGs) will not be achieved without significant public awareness and engagement." Hence, with our third research question, we address the role of citizen participation and partnerships in the cities:

RQ3. What roles do citizen participation and partnerships play in achieving the SDGs according to the governmental websites?

In the following section, the methodological approach for answering *RQ1–RQ3* is described. The corresponding results are presented subsequently.

Methodology of research

According to the OECD (2018), urban areas with a population size of at least 500,000 are classified as (large) metropolitan areas. To analyze German local governmental websites and the information about the SDGs shared on these websites, the 15 largest cities in Germany provided our starting point (German Federal Statistical Office, 2018) were chosen as our sample. With a total of over 13.8m inhabitants, these cities make up 17 percent of the whole German population. Table II lists the cities with the corresponding official governmental websites.

These websites were sighted manually during July 9-17, 2018, and analyzed by the means of a content analysis (Mayring, 2015; Krippendorff, 2018). Content analysis allows the evaluation of any kind of communication and is also accepted as an appropriate method for web content (McMillan, 2000). Figure 1 summarizes the methodological approach for this study based on the three research questions (Step 1). As a starting point, German and English search terms related to the SDGs (SDG, Sustainable Development Goal(s), Agenda 2030, Nachhaltigkeitsziele, UN, United Nations, Vereinte Nationen) were entered into the websites' search interface to investigate the information given. Thereby, different spellings of the above-mentioned terms were considered. The resulting pages were sighted manually in order to detect further relevant search terms. This recursive approach was used until no additional relevant content could be found (Step 2). As each website provides different search functionalities, the combination of the terms differed in each case. Some websites allow a search for phrases or the use of Boolean operators, others do not. We checked all hits for relevance and duplicates. A page was only deemed

City	Inhabitants	Governmental website
Berlin	3,574,830	www.berlin.de/
Hamburg	1,810,438	www.hamburg.de/
Munich	1,464,301	www.muenchen.de/
Cologne	1,075,935	www.stadt-koeln.de/
Frankfurt	736,414	www.frankfurt.de/
Stuttgart	628,032	www.stuttgart.de/
Düsseldorf	613,230	www.duesseldorf.de/
Dortmund	585,813	www.dortmund.de/
Essen	583,084	www.essen.de/
Leipzig	571,088	www.leipzig.de/
Bremen	565,719	www.bremen.de/
Dresden	547,172	www.dresden.de/
Hannover	532,864	www.hannover.de/
Nuremberg	511,628	www.nuernberg.de/
Duisburg	499,845	www.duisburg.de/

Table II.
Largest German cities with number of inhabitants (German federal statistical office, 2018) and link to governmental website
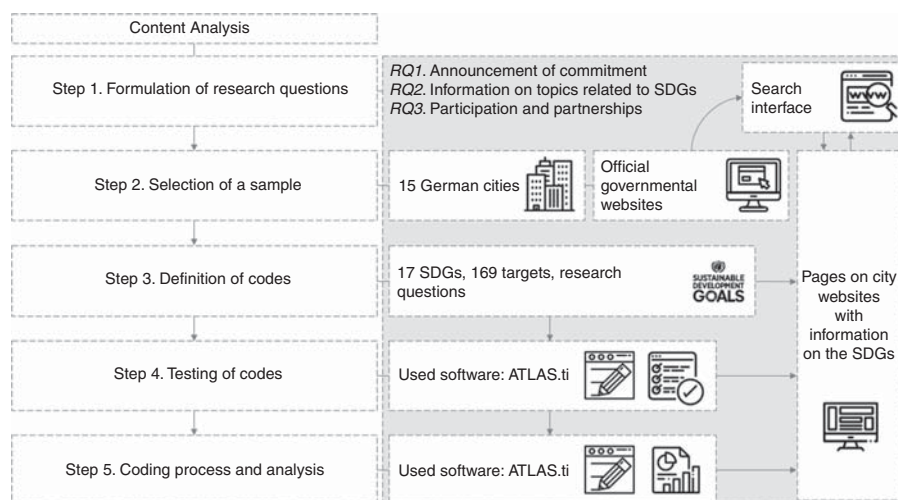
Figure 1.
Methodology
of research

relevant, if a direct connection to the SDGs was apparent. Further, we only analyzed information that is directly embedded on the governmental websites; information on websites of third parties was not included in the analysis. The final set of webpages was stored and imported into the software ATLAS.ti[1].

For the actual coding process, we used a list of terms and phrases generated from the descriptions of the SDGs and their targets (United Nations, 2015b). Regarding *RQ1* and *RQ3*, special attention was given to the availability of information regarding the resolution template and indications on participation and partnerships (Step 3). To ensure reliability, two coders analyzed 20 percent of the webpages for each city and tested the application of the codes (Step 4). Then, each webpage was read and coded with the coding tool of ATLAS.ti and the provided list of terms. Each passage that contained a link to one of the categories was marked (Step 5).

Results

On 14 of the analyzed websites, information regarding the SDGs was found. Only the search on the website of Bremen did not reveal any information. The amount of hits differed notably, ranging from only a couple of relevant hits in the cities Frankfurt, Stuttgart, Dresden and Duisburg to approximately 50 in Berlin and Hannover. In five cities, informing on the SDGs expands on the local Agenda 21 and its MDGs. All examples found on the governmental websites that are included below are listed in Table AI.

Announcement of official commitment to the Sustainable Development Goals

According to the non-profit organization Engagement Global (2018), 78 German municipalities signed the Agenda 2030 resolution until the end of July 2018. Among the 15 analyzed cities, ten appeared on this list and officially committed themselves to implement the SDGs on the local level (Table III). From these, four cities (Munich, Cologne, Leipzig and Hannover) informed their citizens about the resolution on their official website by publishing the official council decision and the corresponding resolution template. For three further cities (Hamburg, Düsseldorf and Nuremberg), information on the signature of the resolution could be found embedded as a side information, e.g. in news articles or presentation slides for workshops. Six cities gave a general overview on the SDGs and

City	Signed resolution (Engagement Global, 2018)	Official commitment on website	Council decision to sign resolution	Note
Berlin	(X)	(X)		Resolution signed by the district Treptow-Köpenick
Hamburg		X		Commitment not through official resolution
Munich	X	X	June 2016	
Cologne	X	X	September 2017	
Frankfurt				Request available to sign resolution
Stuttgart	X			
Düsseldorf	X	X	June 2016	
Dortmund				
Essen				
Leipzig	X	X	January 2017	
Bremen	X			
Dresden	X			
Hannover	X	X	March 2016	
Nuremberg	X	X	October 2017	
Duisburg				

Table III.
Cities and their commitment to the SDGs on the local level

included explanatory text as well as related links. For example, Düsseldorf provided an overview page where the city categorized information regarding the SDGs into various topics. There, general documents related to the Agenda 2030 can be found as well as information of third parties, e.g. explanations of the SDGs in a simple language or enriched with pictures in order to also inform children.

Hamburg did not officially sign the resolution by the Association of German Cities, but the city still committed itself to implement the SDGs and announced this on the local website. In Frankfurt, the resolution has not been signed yet, but the network "Learning Sustainability in Frankfurt" has formally requested the city to commit to the SDGs and sign the template provided by the Association of German Cities. In other cities, similar requests or proposals to follow the call of the Association of German Cities were published. The initiator often differs in the cities. In Hannover, the Agenda 21 and sustainability office proposed a council order to sign the resolution in January 2016. Therein, the importance of increasing public information and awareness was emphasized. A similar resolution proposal was composed one year later in Leipzig by the department of environment, public order and sports as well as the department for urban development and construction.

Although Bremen was listed among the cities that signed the resolution, not a single information regarding the SDGs can be found on the city's official website. In Berlin, the district Treptow-Köpenick signed the resolution, but not the whole city. The commitment of this district was also announced on the official governmental website of Berlin. Furthermore, the advisory board for development cooperation of Berlin recommended to implement guidelines for a development policy in line with the SDGs. Three cities (Dortmund, Essen and Duisburg) neither signed the resolution template nor officially committed to the SDGs on their websites.

Thematic priorities related to the Sustainable Development Goals
In the analysis, the most prevalent topics associated with the SDGs are education, climate protection, fair trade, energy and mobility. Table IV lists these topics and their embedment in the SDGs and the corresponding more concrete targets.

Topic	No. of cities	Focus	SDG	Corresponding target description (United Nations, 2015b)
Education	9	Education for sustainable development (ESD)	4.7	"By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development" (p. 19)
Climate protection	8	Measurement and awareness	13.2	"Integrate climate change measures into national policies, strategies and planning" (p. 25)
			13.3	"Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning" (p. 25)
Trade	7	Fair trade towns	17.10	"Promote a universal, rules-based, open, non-discriminatory and equitable multilateral trading system under the World Trade Organization, including through the conclusion of negotiations under its Doha Development Agenda" (p. 29)
			17.11	"Significantly increase the exports of developing countries, in particular with a view to doubling the least developed countries' share of global exports by 2020" (p. 29)
			17.12	"Realize timely implementation of duty-free and quota-free market access on a lasting basis for all least developed countries, consistent with World Trade Organization decisions, including by ensuring that preferential rules of origin applicable to imports from least developed countries are transparent and simple, and contribute to facilitating market access" (p. 29)
Energy	6	Renewable energy	7.2	"By 2030, increase substantially the share of renewable energy in the global energy mix" (p. 21)
			7.a	"By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology" (p. 21)
Mobility	5	Public transport and traffic	11.2	"By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons" (p. 24)

Table IV.
Most prevalent
focus topics on
governmental
websites and their
embedment in
the SDGs

Education

The most often occurring topic linked to the SDGs among all cities is education, which was found on the governmental websites of nine cities. Education is embedded in the Agenda 2030 with its own goal (SDG 4: quality education). This goal addresses several targets including the provision of free primary and secondary education for all girls and boys (target 4.1), an increase of qualified teachers (target 4.c) and the elimination of gender disparities (4.5). The information published on the analyzed websites focus especially on target 4.7, which aims at ensuring education for and promotion of sustainable development. In some cities, a corresponding department or position for Education for Sustainable Development (ESD) has been established, which often organizes activities and events connected to the SDGs. In 2017, the responsible center for ESD of the Berlin district of Charlottenburg-Wilmersdorf initiated a film series named "#2030" together with the regional center for political education and a local cinema. The aim of this event series is to

raise awareness for the SDGs by showing a relevant film (e.g. "No" by Pablo Larraín) and discussing related aspects like democracy or citizen participation afterwards. In 2017, the initiative "Hamburg Learns Sustainability" of Hamburg's authority for environment and energy was honored by the Federal Ministry of Education and Research and the German UNESCO Commission for its contribution to ESD. The initiative is involved in the World Action Program ESD in Germany and organizes events for the realization of the SDGs in the city.

Climate protection

Another prevalent topic on the cities' websites is climate change and protection, which is included on the website of eight cities. In the Agenda 2030, the corresponding goal is SDG 13 on climate action. Goal 13 consists of five targets, from which two are addressed in particular on the analyzed websites: the integration of climate change measures into national policies, strategies and planning (target 13.2), as well as the improvement of education and awareness-raising on climate change mitigation (target 13.3). For example, the city of Essen published a report on their integrated energy and climate concept in which it is stated that the SDGs have to be addressed in further local climate protection concepts. In Hamburg, the initiative "My tree – my city" aims at planting trees dispersed throughout the city. On the local website, the city informs about this initiative and refers to the importance of the SDGs in this context. The environmental agency of Dortmund supports social engagement for sustainable development and climate protection. Individuals as well as legal entities can apply for a climate protection fund. Eligible applications have to be relevant for sustainable development, the SDGs or climate protection. On the governmental website of Dortmund, an application form for the fund is available.

Fair trade

Fair trade, which is not dedicated to one particular SDG, but can be related to several sub targets, is a further subject of seven cities. Trade-related aspects are linked to (United Nations, 2015b):

- the reduction of hunger by preventing trade restrictions (target 2.b);

- an economic growth by increasing Aid for Trade support in developing countries (target 8.a);

- the reduction of inequalities by implementing special and differential treatment and aid for developing countries in accordance with the provisions of the World Trade Organization (target 10.a); and

- the support of partnerships by promoting a universal, non-discriminatory trading system (target 17.10), by increasing exports of developing countries (target 17.11) and by realizing an implementation of duty-free and quota-free market access for all least developed countries (target 17.12).

In the analyzed cities, the main focus with regard to fair trade lies on SDG 17, the strengthening of partnerships. The cities contribute to fair trade by taking part in the network "Fair Trade Town," which aims at bringing together civil society, politics and economy. In order to qualify for the title Fair Trade Town, cities have to fulfill certain criteria, including media campaigns for promoting their application. All 15 cities in this analysis are currently Fair Trade Towns, though with differing entry dates (Fairtrade Deutschland, 2018). For example, Dortmund was the third city in Germany qualifying for the title and thus, the first among the analyzed cities. Hannover, which was the 13th city in Germany, further reports on its award as a Fair Trade Town in relation to the SDGs. With

its fair trade campaign and related activities like a "fair brunch" or a "fair week," the city aims at contributing to the SDGs. With its brochure entitled "Engaged Berlin – how Berlin becomes a sustainable city with responsibility in the One World," the city provides comprehensive information on projects of engaged actors who contribute to the SDGs on the local level. Besides the emphasis of the importance of cities and education for the SDGs, fair trade is a central topic in the brochure, by informing, *inter alia*, about the city's application as a fair trade town, which was granted in November 2018 as the 574th city in Germany (Fairtrade Deutschland, 2018).

Energy and mobility
The topics energy and mobility occur in relation to the SDGs on the local websites of six and five cities, respectively, often in one context. While there is a concrete SDG on affordable clean energy (SDG 7), mobility is not embedded in the Agenda 2030 with its own goal, but as a subtopic of SDG 11, sustainable cities and communities (target 11.2 mobility). Thereby, mobility and energy are deeply related, as the improvement of mobility in terms of public transport, less cars and more bikes in a city have a direct impact on energy consumption. Four cities emphasize these two topics in relation to each other. For example, the aforementioned brochure "Engaged Berlin" reports on the European Energy Forum situated in Berlin as a reference site for a smart city strategy which tests interconnected mobility and energy concepts. Further, Hannover reports on its master plan "Mobility 2025." Several initiatives are included in this plan to create a well-developed, accessible, resource-saving, safe and preferably barrier-free mobility offer. Among the projects are campaigns for electro mobility, car sharing and car free Sundays. In addition, Nuremberg reports about concrete measurements of these two topics. In a meeting on the topic "Agenda 2030 – What is the relation to my work," Nuremberg's department of environment and health reported on the city's state on the way to sustainable urban development. Therein, the topics mobility and energy are emphasized. The targets of SDG 7 and 11.2 are listed. Further, the concrete indicators for measuring the progress on these SDGs (energy and power consumption, CO_2 emmissions, means of transportation) are provided. Statistics for Nuremberg are presented and the importance of a digital data acquisition and evaluation is emphasized.

Other topics
Besides the common topics education, climate protection, fair trade, energy and mobility, other topics related to the SDGs only occur rarely on the cities' websites. For example, in the context of the SDGs the subjects gender equality, poverty, health and peace are only mentioned on the websites of each two cities. In contrast, Hannover aspires to convey comprehensive information on each individual SDG and its various topics in a creative format. With the project "Nachhaltige Ge(o)heimnisse" ("sustainable secrets"), the city expands its service for citizens to explore the region by geocaching. Since January 2018, this program includes geocaches that are dedicated to specific SDGs. For example, the first geocache addresses SDG 10 which deals with reduced inequalities. To log this cache, the geocacher has to identify several inequalities. Other topics that are embedded in the program are sustainable cities and communities (SDG 11), zero hunger (SDG 2), quality education (SDG 4), life on land (SDG 15), sustainable consumption and production (SDG 12), affordable clean energy (SDG 7) and clean water and sanitation (SDG 6). The city aims at creating a geocache for each SDG by the end of 2018. On the website, for each "sustainable secret" information is given on the particular SDG and its relevance for everyone together with advice on how to contribute to this goal. General information on the SDGs with additional links further enables citizen to engage with the topic. In line with sustainability, the city asks geocachers to use bicycles to log caches instead of cars.

The role of citizen participation and partnerships for the Sustainable Development Goals
For the implementation of the SDGs on a local scale, seven cities count on citizen participation and communicate this on their website. For the cities Berlin, Hamburg, Munich, Cologne, Leipzig, Dresden and Hannover the importance of participation in relation to sustainable development was recognized and promoted on the governmental websites. For example, the authority for environment and energy of the city of Hamburg organized a workshop series with the title "SDGs for Hamburg" which aims at bringing together government agencies and civil society to discuss the SDGs and their relevance for the city. Among the topics is a workshop on "process and participation," in which speakers emphasize the importance of inter-agency cooperation for contributing to sustainable development. Besides, it is stated that there are some issues which the city cannot cope with alone. As a result, an active participation of the citizens is desired. Likewise, Dresden invites its citizens to work on visions for the future of the city by taking part in several workshops. The realization of these visions resulted in 96 projects to which each citizen can contribute. The city thereby states that it tries to act in line with the SDGs. Sample projects are restaurants for the reduction of food waste and an information portal on the use of solar power. In Berlin, citizen participation and the SDGs could be linked to each other in a different way. The city hosts its own participation platform "My Berlin" in which several participation projects are presented. Among them is the collection of ideas for the future of the former airport Tempelhof. Two proposals focus on the SDGs and imagine the airport as a place for education and research oriented toward common good.

Similar to citizen participation, partnerships are emphasized on several governmental websites. In ten of the analyzed cities, partnerships play a role in connection to the SDGs. In Cologne, a network named "one-world city Cologne" is established which aims at motivating citizens to engage with sustainable development and provides a platform for exchanging ideas and making new contacts. Other cities count on town twinning and promote the SDGs in this context. For example, in Essen a workshop on "green twinning" took place with the partner cities Grenoble, Nischni Nowgorod, Zabrze and Essen. According to the website information, projects of the cities with an orientation toward the Agenda 2030 were discussed in an innovative and participative format. In 2018, Stuttgart celebrated the year of its town twinning and emphasizes the importance of partnerships also with regard to the Agenda 2030. In Munich, Green members of the city council requested the expansion of international project partnerships for supporting the SDGs. It is reported on long-term project partnerships with Subotica, Serbia to strengthened democracy and self-government as well as with Cape Town, South Africa, oriented toward climate protection. Reference is made to SDG 17, partnerships for the goals, and the necessity of municipalities to contribute to this goal is stated. In Munich, proposals like this are available on the city's website through a newsletter of the city hall, which further includes current news and events and responses to city council requests.

Practical implications and recommendations
This study revealed insights into information dissemination related to the SDGs of the 15 biggest German cities. Prime examples to raise awareness on the goals can be found in cities like Berlin or Hannover. Through events like film series and geocaching, these cities convey information regarding sustainable development in a creative format that might attract also those citizens who were not familiar with the SDGs before. The analysis could help cities to scrutinize their own information dissemination with regard to the SDGs on their governmental websites. Examples of other cities can thereby help in identifying possible chances to deal with the SDGs. Thereby, the cities can learn from each other and further build upon citizen participation and partnerships in order to contribute to sustainable development. Berlin, Hamburg, Hannover and Nuremberg publish a great

amount of information regarding the SDGs. In other cities, there is still room for improvement for disseminating related information. Especially in Bremen, where not a single link to the SDGs was found, improvements can be made. Following Sriskandarajah (2018, p. 302), who states that the SDGs "will not be achieved without significant public awareness and engagement," we recommend all cities to raise (further) awareness on the SDGs and all its embedded topics.

As a first step, we recommend cities to commit to the SDGs by officially signing the resolution template by the Association of German Cities and benefit from the corresponding network. Publishing an official resolution or council decision, emphasizes the commitment of the city and ensures transparency. In addition, a general overview page about the SDGs embedded on the governmental websites can help citizens to inform themselves about the purpose of the goals and the relevance for the city. Providing comprehensive information and links to further websites gives citizens the possibility to expand their knowledge.

In order to evolve into a smart city, or "an icon of a sustainable and livable city" (Chourabi *et al.*, 2012, p. 2289), cities have to identify aspects that concern the citizens. Therein, the SDGs can provide a framework. With suitable forms of citizen participation, a city may identify topics related to the SDGs that are deemed relevant. The provision of information is a necessary step in this regard. Governmental websites give one possibility in doing so.

Besides the availability of general information on the SDGs, a way to improve transparency is the publication of data and indicators regarding sustainable development for a certain city. In the analysis, the availability of corresponding data on the governmental websites was not prevalent. Possible reasons for this can be separate (open) data portals hosted by the city where such information is embedded. Nonetheless, linking to these kinds of portals on the official website and preparing the data for greater clarity would further enhance transparency.

Discussion and conclusion

The analysis of 15 local governmental websites in Germany revealed some interesting aspects on the information dissemination of these cities in relation to the SDGs:

- Not even half of the analyzed cities promote an official commitment to the SDGs on their governmental websites.

- In relation to the SDGs, topics that were mentioned most frequently on the websites of the analyzed cited are education, climate protection, fair trade, energy and mobility.

- The mentioned topics are deeply embedded in the SDGs with its own goal or through several targets, in particular the SDGs 4, 7, 11, 13 and 17 are addressed.

- Topics that are less represented on the governmental webpages about the SDGs are gender equality, poverty, health and peace.

- The way in which information is published differs notably. While some cities create a subpage to broadly inform on the SDGs and its implications for the city, others merely mention the goals in reports on related topics.

- Half of the cities emphasize citizen participation for implementing the SDGs on a local scale, whereas two-thirds highlight the role of partnerships.

In line with the USDG and the recommendations of the Association of German Cities, many German cities have already recognized the relevance of the SDGs on the urban level and agreed to implement the Agenda 2030 at the local scale. This supports the argumentation of Klopp and Petretta (2017) to realize sustainable development at the city scale.

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Coming back to the assumption that most societies "aim for a combination of economic development, environmental sustainability, and social inclusion, but the specific objectives differ globally, between and within societies" (Sachs, 2012, p. 2206), the thematic emphasis on education, climate protection, fair trade, energy and mobility reflects the development status of Germany as a prosperous industrial state. A comparison with the information dissemination in a developing country, but also other developed or transitional countries would reveal further insights into thematic differences. Although the Agenda 2030 demands action of all countries, the concrete realization is dependent on cultural and economic factors.

Education seems to be the most important aspect in relation to the SDGs in the analyzed German cities. UNESCO (2017, p. 7) saw ESD as "a key instrument to achieve the SDGs." Many German cities support this idea by offering several learning opportunities that are oriented toward sustainable development. Besides students, the target group can consist of every interested citizen, by offering workshops, film series and similar activities with relevance to the SDGs for everyone.

Besides the emphasized topics, there are several issues the governmental websites do merely inform about in relation to the SDGs. This supports previous works on information dissemination about sustainability on European governmental websites (Brusca *et al.*, 2016; Navarro-Galera *et al.*, 2016; Tirado-Valencia *et al.*, 2016).

This study has some limitations. First, the analysis of websites can only provide a snapshot of reality as the content changes permanently. Second, a limited amount of cities was considered which should be expanded in future research. Future research could further analyze not only information dissemination with regard to governmental websites, but also corresponding social media accounts. Besides, we presented information dissemination with regard to the SDGs, but did not analyze in what sense citizens accept and adopt these, which is an essential aspect when considering sustainable development. Nonetheless, the analysis revealed some prime examples and topics that large German cities deem relevant with regard to sustainable development. This work can act as a starting point for further analyses on information dissemination in relation to the SDGs and the role of cities in this regard, also in other contexts.

Note

1. https://atlasti.com/

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Appendix

Title	Link	Accessed
Berlin		
Film series #2030	www.berlin.de/ba-charlottenburg-wilmersdorf/aktuelles/pressemitteilungen/2017/pressemitteilung.627011.php	July 9, 2018
Brochure "Engaged Berlin"	www.berlin.de/sen/wirtschaft/wirtschaft/europa-und-internationales/landesstelle-fuer-entwicklungszusammenarbeit/entwicklungspolitik/broschuere_engagiertes_berlin.pdf	July 9, 2018
Participation platform "My Berlin"	https://mein.berlin.de/	July 9, 2018
Hamburg		
SDGs Hamburg	www.nachhaltigkeitlernen/agenda2030/	July 9, 2018
SDGs and education	www.nachhaltigkeitlernen/nachhaltigkeitlernen/veranstaltungen/10172002/2-jahreskonferenz-wap/	9 July 2018
My tree – my city	www.nachhaltigkeitlernen/mein-baum-meine-stadt2017/8531452/mein-baum-meine-stadt2017/	July 9, 2018
Process and participation	www.nachhaltigkeitlernen/contentblob/8163846/ea6f68b4df8b7ee4593f929a513c8003/data/d-dokumentation-prozess-und-partizipation-sustainable-development-goals-fuer-hamburg.pdf	July 9, 2018
Munich		
Proposal on international partnerships	https://ru.muenchen.de/pdf/2016/ru-2016-12-21.pdf	July 10, 2018
Cologne		
Network "One-world city Cologne"	www.stadt-koeln.de/politik-und-verwaltung/internationales/eine-welt-stadt/ziele-des-netzwerkes	July 10, 2018
Frankfurt		
Request to sign the resolution	www.frankfurt.de/sixcms/detail.php?id=2855&_ffmpar%5b_id_inhalt%5d=33458590	July 11, 2018
Stuttgart		
Town twinning year 2018	www.stuttgart.de/staedtepartnerschaftsjahr2018	July 12, 2018
Düsseldorf		
Agenda 2030 information page	www.duesseldorf.de/agenda21/weitere-informationen-im-netz.html	July 12, 2018
Dortmund		
Climate protection fund	www.dortmund.de/media/p/umweltamt/downloads_umweltamt/klimaschutzfonds/Klimaschutzfonds_Anlage_1_Antragsformular.pdf	July 12, 2018
Essen		
Green Twinning	www.essen.de/meldungen/pressemeldung_1097552.de.html	July 13, 2018
Energy and climate concept	https://media.essen.de/media/wwwessende/aemter/59/klima/bilanzbericht_2016_riss.pdf	July 13, 2018
Leipzig		
Resolution proposal	www.leipzig.de/fileadmin/mediendatenbank/leipzig-de/Stadt/02.3_Dez3_Umwelt_Ordnung_Sport/Lokale_Agenda_21/Ratsbeschluss_Musterresolution.pdf	July 13, 2018

(*continued*)

Table AI.
List of examples
on websites

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Title	Link	Accessed
Resolution	www.leipzig.de/fileadmin/mediendatenbank/leipzig-de/Stadt/02.3_Dez3_Umwelt_Ordnung_Sport/Lokale_Agenda_21/Ratsbeschluss_Musterresolution.pdf	July 13, 2018
Dresden		
Future picture	www.dresden.de/de/leben/gesellschaft/buergebeteiligung/zukunftsstadt/zukunftsbild.php	July 16, 2018
Hannover		
Agenda 2030 in Hannover	www.hannover.de/Leben-in-der-Region-Hannover/Umwelt-Nachhaltigkeit/Nachhaltigkeit/Agenda-21-Nachhaltigkeit/Agenda-2030-f%C3%BCr-nachhaltige-Entwicklung/Agenda-2030-in-Hannover	July 16, 2016
Nachhaltige Ge(o)heimnisse	www.hannover.de/Leben-in-der-Region-Hannover/Umwelt-Nachhaltigkeit/Nachhaltigkeit/Agenda-21-Nachhaltigkeit/Aktiv-werden/Nachhaltige-Ge-o-heimnisse	July 16, 2018
Fair Trade Town	www.hannover.de/Service/Presse-Medien/Landeshauptstadt-Hannover/Aktuelle-Meldungen-und-Veranstaltungen/Hannover-weiterhin-%22Fairtrade-Stadt%22	July 16, 2018
Master plan "Mobility 2025"	www.hannover.de/Leben-in-der-Region-Hannover/Umwelt-Nachhaltigkeit/Nachhaltigkeit/Agenda-21-Nachhaltigkeit/Nachhaltige-Kommune/Hannover-auf-dem-Weg-zur-Nachhaltigkeit/Nachhaltige-Mobilit%C3%A4t-voranbringen	July 16, 2018
Nuremberg		
Sustainability report	www.nuernberg.de/imperia/md/partnerstaedte/dokumente/ib/sproesser-agenda_2030.pdf	July 17, 2018

Table AI.

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