E-Participation Maturity Model Development based on the Cases of Germany, Japan and Switzerland

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Abstract

Following the definition put forward by the UN, e-participation is understood as the use of ICTs for the design, decision and implementation of policies, with the goal of delivering this process in a participatory, inclusive and deliberative way. Based on this definition, the concept of e-participation can be measured in the form of an index. The index in turn can be used to build an e-participation maturity model. While e-government maturity models are common in the literature, there is less focus on e-participation e-maturity models. The latter are usually components of e-government maturity models. In addition to building an evidence-based e-participation maturity model, this case-study-based research helps the international observer interested in e-democracy to get a better understanding of digital participation tools currently available in Germany, Japan and Switzerland.

Keywords

Digital democracy, Digital governance systems, Co-creation, E-government maturity model

1. Introduction

According to the definition by the UN, e-participation is understood as the use of ICTs for the design, decision, and implementation of policies, with the goal of delivering this process in a participatory, inclusive, and deliberative way. The terms "e-participation", "digital participation", and "digital political participation" can be used as synonyms. Based on this definition, the theoretical concept of e-participation can be measured in the form of an index which can then be used to build an e-participation maturity model. While e-government maturity models are common in the literature, there is less focus on e-participation e-maturity models. As the latest thorough e-government maturity model literature survey by [1] shows, 11 out of the 39 studies add or integrate political participation, digital democracy, open participation or e-democracy on top of their respective e-government maturity models. However, digital governance systems can and should also be understood as a domain on its own. In addition, previous research shows that e-government maturity does not necessarily go hand in hand with a high level of e-participation [2]. Whereas many e-government maturity models were developed on a purely

Proceedings EGOV-CeDEM-ePart2023, September 4–7, 2023, Budapest, Budapest, Hungary
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conceptual basis without further empirical evidence, the approach taken here is to move from conceptual work to building a measurement tool first, then applying it to actual cases, and building an empirically based stage model of e-participation maturity.

In addition to developing an e-participation maturity model, this case-study-based research helps the international observer interested in e-democracy to get a better understanding of digital participation tools currently available in Germany, Japan and Switzerland, respectively. Japan, for example, is a particularly interesting but not well-understood case due to the language barrier. The present study makes use of the DigiPartIndex methodology in order to first measure, then map and compare e-participation for the three selected cases. As alternatives to the DigiPartIndex the UN e-participation index EPI or one of its variants could have been applied [3]. However, we have reservations regarding their validity, already discussed elsewhere[4], and hence prefer to build an e-participation maturity model based on an index built from scratch.

In the remainder of the paper, the measurement of e-participation in the form of an index is specified further. After a description and comparative analysis of the DigiPartIndex values for Germany, Japan and Switzerland, a way how an e-participation maturity model can be built is outlined. The paper concludes with a discussion of limitations and directions for future work.

2. Concepts and Approach

In order to develop an e-participation maturity model we are making use of previous work, namely the DigiPartIndex. Due to the lack of space, more detail can be found in [4]. Simply put, the DigiPartIndex divides up the concept of digital political participation (or e-participation) into the three following dimensions well known from the literature: opinion formation as the basis of an individual decision-making process, co-creation as an exchange between individuals and state authorities, and decision-making as the final stage of a political process. The DigiPartIndex consists of seven e-participation indicators and four types of adjustment points. The application of adjustment points varies for each indicator. The indicator values are aggregated and standardized such that the index ranges from 0 to 100 points. For the calculation of the index, the three dimensions are weighted equally. This dimensional differentiation of digital participation is well-known and acknowledged in the literature [5]. In the first step, the three dimensions can be measured using the seven indicators on a scale from 1 to 5. The value for each adjustment point is 0.2. The value is chosen at a level avoiding that adjustment points alone would be enough to jump from one level to the next higher or lower one. Each indicator attempts to capture an underlying conceptual meaning into a numerical value. In one sentence, the question is how in a certain constituency one can discuss, learn, monitor, be heard, voice, identify, and decide on the Internet on public affairs.

E-deliberation, as a first indicator for the dimension of opinion formation captures the options to discuss political topics online. The closer the applications are to the formal political process, the higher the score. Civic education, as the second indicator, is a crucial skill in democracies. Learning tools, should therefore also be available in the digital space. Applications should not only provide pure knowledge but also lead toward critical thinking. The more interactive and competence-oriented applications are the more points on the index we give. For e-transparency as the third indicator, the question is whether (political) information is digitally available,

allowing the larger public to follow and critically monitor the political process. Such efforts are commonly based on open government or open data strategies.

In the second dimension of the DigiPartIndex, the focus is on organised digital exchanges between state and civil society organisations and institutions. The two components, e-consultation and e-demand, capture this dimension we can also call co-creation. The two instruments differ in terms of where the initiative originates from. For an e-consultation, the starting point is a government agency (top-down). For an e-demand such as an e-petition, societal forces are at the origin of the process (bottom-up). For e-consultation tools as the fourth indicator, we ask whether they can at least potentially influence the political decision-making process. For e-demand as the fifth indicator, we ask whether people can voice their opinion and make suggestions with the help of online tools and how far-reaching in a political system the consequences of these demands are.

Digital tools can be used to allow for decision-making. As a technical foundation, there should be some form of electronic identification, i.e., an e-ID which can be used not only for digital transactions but also for voting or signing a petition online. For e-identification as the sixth indicator, we determine how and for which public services an online identity can be used. Higher values can be reached if e-identification systems can be used directly and repeatedly for a government service, especially for digital participation. For the seventh and last indicator measured, internet voting, we check whether there were efforts to introduce a digital voting channel and how technologically advanced they were.

The selection of the three cases, Germany, Japan, and Switzerland, is a convenience sample not claiming to be representative of other countries in any respect. The selected countries are only used as illustrations for the approach taken. Further validation of the developed e-participation maturity model would require a larger empirical basis. Data collection took place in the time between December 2022 and January 2023. In the first round, each country was coded independently by one team member. This was done through desk research and literature review. The first drafts were then compared and discussed in a second round with all the team members. During this consolidation phase, two or more sets of eyes were involved in all annotations. In order to reach as consistent an assessment as possible for the seven indicators, flowcharts were developed. For an in-depth explanation of the methodological choices involved and how the DigiPartIndex can be calculated, we refer to previous work [6].

3. Germany

3.1. Opinion formation

Social media presence is the norm these days for all major political institutions and actors. There is also a dedicated platform for young citizens to discuss political issues, which is used only scarcely. In the summer of 2022, there was a pilot project with a digital citizens' council. Two hundred randomly selected citizens participated in an online citizens' council on AI in care. Although this citizens' panel was only a pilot in the context of a research project, we gave out 3 points for e-deliberation. There was a deduction of 0.2 points for a lack of inclusiveness (targeted at young people or a sample of citizens). In total, Germany received 2.8 points for that indicator.

Civic e-education is very advanced in Germany. General information about the political system is available online. There are several voting advice applications (VAA) to inform citizens about candidates for national elections [7]. There is even a dedicated federal department for civic education, the Bundeszentrale für politische Bildung. It provides a wide range of materials for political education in schools. There is also playful content to inform users about political processes. The full 5 points were awarded for this indicator. As there are additional measures to make these tools inclusive, for example, by providing content in sign language on the Bundestag website, we awarded a bonus of 0.2 points. However, we also awarded a penalty of 0.2 points for usability, as civic e-education is not organised as a one-stop shop. These bonus and malus points cancel each other out and do not change the score of 5 points.

Germany has a comprehensive open government data strategy. Parliamentary proceedings and live streams of parliamentary sessions are available online. There is also an open government data portal that provides datasets and lists applications that use this data. In addition, there are several open-source tools that process this data in an intelligent way. The tool 'Abgeordnetenwatch' provides citizens with the option to check how Members of Parliament (MP) have voted on specific legislation and also allows them to ask questions directly to MPs. These are two important aspects of accountability allowing citizens to evaluate the promises that politicians made for their election and to hold them accountable by interacting directly with them. Another interesting tool is 'Openparliament TV', which makes MPs' speeches searchable by keyword. This tool makes it easier to monitor MPs' activities. Therefore 5 points are awarded. We deduct a small penalty of 0.2 points because, for the full score, all tools should be available in one place to make them more accessible. A total of 4.8 points is awarded.

3.2. Co-creation

Regular consultations on new legislation with political stakeholders are common. However, most of these consultations do not make use of digital tools and material has to be submitted by email. For a few instances, ad hoc surveys were used instead of feedback by email. However, some government agencies occasionally hold advanced consultations on action plans and strategies. It is worth mentioning that at the sub-national level, there are several initiatives for sophisticated e-consultation tools as well. However, these are not taken into account in this paper as we only focus on the national level. Therefore, 4 points are awarded. However, as this is not yet standard procedure, we deduct 0.2 points for use. This gives a total score of 3.8.

In Germany, there are several private e-petition platforms that are regularly used. Some of them, such as OpenPetition and change.org, are also available in other countries. The portal 'Frag den Staat' is widely used and allows citizens to ask questions and get answers from the Federal Government. There is also a central petition platform on the website of the German Bundestag, where people can start petitions [8]. Once they reach a certain quorum, the petitioners are heard by a committee. For e-demand tools, Germany gets 4 points. We also add a small bonus of 0.2 points for usage, as this petition platform is often used, and many petitions reach the quorum and are heard in Parliament. Therefore, the score is 4.2 points.

3.3. Decision making

In Germany, there is an e-ID card with an online identification function. It allows digital identification via a card reader or a mobile application. This e-identification solution is not seamless as it requires a physical card. However, it can be used for a variety of different services. Most of the different e-government portals at the federal and the sub-national level are interoperable, and citizens only have to register once. Therefore, 4 points are awarded.

There is currently no e-voting system in Germany for political elections, mainly due to legal restrictions, further consolidated by the German Supreme Court in 2009 [9]. According to this court ruling, the technology applied for state elections must allow laypeople to understand how the election result came about. However, below the threshold of state elections, there have been some pilot projects with e-voting in different institutions (parties, universities and others). There will be some experiments with social partner elections in 2023. However, according to a parliamentary hearing in the German Bundestag, generalised internet voting for national elections will not be an option in the near future. Therefore, only 1 point is awarded.

4. Japan

4.1. Opinion formation

Political discussions on private social media channels are common in Japan. For example, the most popular video blog on Japanese politics on YouTube, Kazuya, has 677,000 followers and a lively comments section. More targeted, officially supported e-discussion channels for politics are not yet beyond the trial stage (see also: e-consultation). In the first place, the Japanese government uses social media channels such as Facebook, Instagram, YouTube and Twitter to disseminate information, not to engage in a discussion with the wider public. Both the House of Representatives and the House of Councillors primarily use social media to communicate election results. The social media accounts of Parliament do not provide a forum for interaction with citizens. However, citizens and politicians can interact through politicians' personal accounts. Research for the most recent election campaigns examined trends in MPs' use of social media on the Internet. Almost all MPs had an account. Instagram, in particular, has been growing year by year. For e-deliberation, therefore, the score is 2 points for having official social media channels, with a bonus for variety, for a total of 2.2 points.

There seems to be no conscious effort trying to take civic education online. For information on the political system, people have to rely on general resources on the Internet. However, one successful exception are VAAs. For example, the 'Policy Square' platform, launched in 2013, is designed to help Japanese voters make more informed decisions by providing information on political parties and candidates' positions on various policy issues. Users answer a series of questions related to their political preferences, and the platform matches them with political parties and candidates that align with their views. Another example is 'Minna no Seiji' (Everyone's Politics), launched in 2016 by the Tokyo-based NPO 'Public Mind'. There are usually 5-6 VAAs available before each election in Japan, some operated by large media corporations. VAAs can therefore be considered to be common in Japan [10]. For the variety of VAAs, a bonus can be applied. In total, 2.2 points can be attributed for this part of the index.

Digital monitoring of the political process in Japan is possible by consulting the proceedings of plenary sessions and committee meetings on the National Diet's website. These documents are available in digital form from the first Diet session from May 1947 onwards. The respective website is fully searchable by date, speaker and keywords. Results can be displayed as text or pdf. Furthermore, the government promotes and maintains a comprehensive open data strategy with an open data portal. The range of data is wide. However, there do not seem to be any monitoring tools making use of the available open data or trying to visualise political data dynamically. We, therefore, give 4 points on the index scale for e-transparency.

4.2. Co-creation

There are platforms in Japan attempting to digitally open up policy-making to crowd-sourcing and collecting opinions from a wider audience. A website which is part of the e-government portal of Japan run by the Digital Agency allows the public to comment on upcoming government regulations. Users do not necessarily need a login. The results of these comments are made public and the authorities in charge provide a proper answer or feedback. However, this website does not seem to be used much. Furthermore, in 2018, a student at Keio University initiated a web-based service called poli-poli, which allows the government to consult the public on proposed policies. So far, the platform is mainly used by a few provincial or local governments. Users can also post their opinions. There are currently two instances of poli-poli. On poli-poli gov, institutional actors such as ministries, and provincial or local governments post their proposals to gather the wisdom of the crowd. On poli-poli itself, politicians, political parties, and voters post policy proposals and collect opinions from other users. Requests for new policies can also be posted. This feature can be seen as an ephemeral e-petition portal. Users can register as experts if they are particularly knowledgeable about a policy area. The attributed score for e-consultation is therefore 2.2 points.

There is no e-petition platform in Japan linked to one of the national political institutions. According to the Japanese Petition Law, there is no requirement that signatures for petitions must be self-signed, which means electronic signatures are acceptable. However, the only way to make online demands in Japan on the national level is through the Japanese branch of change.org. Petitions regularly receive tens of thousands of digital supporters. As stated in their impact report for Japan in 2021, there are over 3 million individual users registered, and 1,638 petitions had been handed in. Five hundred twenty-three of them were accepted and declared successful. The acceptance rate on change.org in 2021 was, therefore approximately, one third. It is not fully clear what the criteria are for a petition to be declared successful. An alternative to change.org Japan, although not much used, is the e-petition functionality on poli-poli. Therefore, the total score for the e-demand component of the index is set to 2 points.

4.3. Decision Making

The electronic identification system in Japan is called MyNumberCard. It consists of a 12-digit number and a physical card containing an RFC chip that can be used either with a card reader or a smartphone app [11]. The system was adopted in October 2015. While it is possible to apply for the card digitally, it is still necessary to pick it up at the city hall in person, where the applicant's

identity is verified on the spot. Based on data provided by the Ministry of Internal Affairs and Communications, the registration rate reached only 8.84% by May 2017. Aiming for a higher registration rate, the government initiated a campaign called maina-point in September 2020 and January 2022, respectively. MyNumberCard users were able to collect points equivalent to up to 20,000 JPY that could be used for cashless payment in regular stores. The campaigns were quite successful. By February 2023, the registration rate reached 63.5%. The range of services available with the MyNumberCard is constantly growing. For example, during the first year of the COVID-19 pandemic, it was possible to receive an individual government subsidy by digital identification instead of filling out a paper application form. Users can also go to one of the many convenience stores in Japan and use the MyNumberCard to print out certificates that would otherwise have to be obtained from a government office in person. The MyNumberCard was also used as a means of identification in Tsukuba City's internet voting trials (see e-voting below). In the near future, the government plans to replace health insurance cards with the MyNumberCard. For its e-identification services, Japan scores 4 points on a 5-point scale, minus 0.2 points for requiring personal identification to obtain the MyNumberCard. The total score for this tool is therefore set at 3.8 points.

Japan started to use e-voting machines on the municipal level in 2002. However, the technology got outdated and the machines are no longer operated [12]. Since 2018, two internet voting trials have taken place in Japan, using blockchain technology for storing the votes. Both pilots were conducted in Tsukuba City, a science city close to Tokyo, where many Japanese research facilities and the University of Tsukuba are located. Voting took place on a platform developed by a private technology startup called "Vote For". To protect the voters from coercion up to 15 repeated votes are possible with the current system, similar to the approach taken in Estonia. For the identification of voters, the e-identification solution MyNumberCard was used. One of the trial votes on smart city projects in August 2019 also experimented with face recognition for identifying voters. For this trial, 150 digital votes were cast. Since Japan has a legal basis allowing internet voting (2 points) and some pilots were carried out on a municipal level only (minus 0.2 points), 1.8 points are assigned to this indicator.

5. Switzerland

5.1. Opinion formation

Swiss political institutions such as the parliament regularly use social media like Twitter or Instagram as an information channel. During election campaigns, the use of social media by candidates is common these days [13]. Some of the members of the seven-headed executive have social media channels of their own. However, due to the semi-direct political system of Switzerland, with up to four national referendum voting days per year, campaigning on social media is resource intense. Besides the commercial social media channels, there is no dedicated platform to discuss national policy issues. We award 2 points for e-deliberation. We give a bonus point for diversity, as several institutions, such as the Parliament and the government, use several social media channels. Since the channels are used as an information tool rather than to interact with citizens, there is no bonus for use, although there are frequent posts. Overall, Switzerland scores 2.2 points.

General information about the Swiss political system and how to vote is readily available online. Respective instructions and explanations are provided by governmental or privately initiated institutions. With the frequent referendum votes throughout the year, one would think that Swiss citizens need a high degree of political knowledge and hence a higher offer of civic education options in schools and in general. While this is a somewhat controversial topic among experts in Switzerland, civic education is not particularly prevalent as a school subject in most parts of the country. Making civic education teaching units available online or providing gamified content is also not very common yet. However, there are several websites offering didactic material for school teachers. There is also a website sponsored by the Swiss government that offers tips and tricks for parents and children in the area of media literacy. However, the availability of voting advice applications became very much the norm. Typically, about a quarter of the electorate consults one of them during an election campaign phase. Several of them help citizens to form an opinion during an election campaign phase. Furthermore, there is also considerable evidence for them to positively affect turnout. The Federation of Swiss Youth Parliaments also developed a smartphone application providing slightly simplified information with arguments in favour and against the national referendum votes. All such information in Switzerland typically needs to be provided in German, French and Italian. While the general situation in schools could be better, we still attribute a total of 4 points for all the available online options. We also give a bonus of 0.2 points for inclusiveness as the information on the upcoming referendum votes is also available in sign language. In addition, the Parliament's website is also available in simplified language. There is an additional bonus of 0.2 points for having a variety of VAAs. In total, Switzerland is awarded 4.4 points.

Since 2014 Switzerland has had its own open government data strategy and a corresponding online data portal. Subnational administrative entities such as the Swiss cantons continuously integrate their data as well, albeit slowly and at times reluctantly [14]. In addition, the data emerging from political processes in Parliament or the government are readily accessible online. There are also web portals processing parliamentary data to create further insights for citizens and help them to monitor what is going on in politics. This is worth 5 points. There is a 0.2 point penalty for not having a single point of entry. Users have to know about these websites and search for them separately. In total, Switzerland, therefore, receives 4.8 points.

5.2. Co-creation

The procedure of consultation before a law is brought to Parliament is well-established in Switzerland. The consultation procedure allows the Swiss cantons, interest organisations and increasingly civil society at large to get heard early on in the legislative process before a bill enters parliamentary committees. Most consultation procedures these days are also open to individuals. Consultations take place regularly and follow a highly institutionalised process. Whereas the current legal projects are listed and readily available online on Fedlex, the official national publication platform, there are no other digital options available for making an input on a legal project other than to send off an email to the administrative department in charge. The open discussion forum on Git Hub for the e-ID law project was an exception. Therefore, only 1 point is awarded with a bonus of 0.2 points for frequent use. In total, Switzerland receives 1.2 points.

The Swiss political system offers an elaborate set of direct democracy instruments. Citizens can either block legislation that was already passed by Parliament or initiate constitutional changes by collecting signatures and reaching the required threshold within a certain timeframe. Therefore, the right to petition does not play as important a role as elsewhere and no official petition platform has evolved so far. However, there are several private, non-partisan e-petition platforms (e.g. openpetition, change.org, WeCollect). This is worth 2 points. As there are many different platforms that are used regularly, there are two bonuses of 0.2 points each for use and variety. In total, Switzerland receives 2.4 points.

5.3. Decision Making

Switzerland on the national level does not offer a real e-ID yet. However, there is a login that can be used for e-services on the national public administration website. This login does not necessarily need to be verified. Existing cantonal e-ID solutions can also be used to create the national one. The first attempt to implement a nationwide e-identification solution was based on a private consortium composed of large financial companies and telecommunication firms. However, the respective law was opposed and failed in a referendum vote in March 2021. Currently, there is a new legislation attempt that wants to introduce an electronic identification, this time not run by private companies but issued and managed by the state itself. The respective legal project is expected to be ready for parliamentary committee discussion in Fall 2023. Switzerland receives a total of 2 points for the e-identification indicator.

Since 2013 Switzerland has had a proper legal basis for internet voting. The Swiss cantons as the main organisers of national votes are free whether to offer internet voting or not. Between 2003 and 2018 there have been several pilot projects involving half of all cantons, making the electronic channel available for referendum votes as well as elections inside of Switzerland and for Swiss living abroad [15]. Due to technical or financial concerns, all three different software solutions which originally had an authorisation by the Federal Council to be operated during the pilot phase had to stop. Whereas turnout rates in the aggregate did not increase due to the availability of internet voting, the new voting channel became highly popular among the many Swiss living abroad [16]. Only one system, the one by Scytl was developed further by the Swiss Post and underwent an intense testing phase including public intrusion tests. For the referendum votes of June 2023, three cantons are again scheduled to continue with internet voting trials using an improved version of the software. In total, Switzerland receives 2 points.

6. E-Participation Maturity Model Development

Using the DigiPartIndex as an assessment tool for the level of e-participation reveals that among the three selected cases, Germany comes out at the top with a value of 61 points (see column DPI in Table 1). Japan and Switzerland follow at some distance with 43 and 33 points, respectively. However, a closer look at the values across the three dimensions shows that they are not necessarily distributed evenly, except for Japan with a relatively homogeneous pattern.

Among the three cases, Germany excels with a dimensional score of 80 points for opinion formation, mainly due to an advanced digital infrastructure for civic education and transparency measures allowing to monitor state activity. For co-creation, Germany reached a high score

Table 1
DigiPartIndex dimensional and total scores, calculated with geometric (DPI) and weighted mean (WMean).

Country	WMean	DPI	Opinion Formation	Co-Creation	Decision-Making
GER	64	61	80	75	38
JAP	43	43	45	40	45
CHE	30	33	70	20	25
HLL	29	30	82	18	18
LLH	39	30	18	18	82
LHL	50	30	18	82	18
HML	45	42	82	50	18
MHL	55	42	50	82	18

of 75 points, mainly due to developed e-consultation tools and an e-petition platform for the German Bundestag. The latter allows to directly reach a parliamentary committee which can take it forward to parliamentary debate. This is by far the highest score for co-creation among the three selected country cases. The stalemate situation regarding internet voting is responsible for Germany's lower score of 38 points in the decision-making dimension.

In Japan, we can see the foundations for a higher level of e-participation being already present. However, what takes the dimensional score for opinion formation down is the lacking effort to provide civic education tools online. Furthermore, the reliance on commercial social media platforms for e-deliberation and e-demands pushes Japan towards the lower bracket of an overall medium score on the DigiPartIndex. Attempts to experiment with internet voting or e-consultation could also be taken further in the future in order to increase the overall score.

E-participation in Switzerland attains a score of 33 points for the DigiPartIndex. If we break up the range from 0 to 100 into five large categories, this is not a very low but still a low score. Only in the opinion formation dimension, Switzerland scores high with 70 points. The lower scores are found in the decision-making and co-creation dimensions with 30 and 20 points, respectively. The co-creation dimension is unlikely to change significantly in the near future as there appear to be no projects aimed at improving digital political participation in this area. However, there are some major changes in the decision-making dimension on the horizon. Efforts to introduce an e-ID and the resumption of internet voting trials in June 2023 will most probably lead to a gentle improvement of the overall score in the near future.

The variance of scores across the three dimensions defining e-participation can be exploited for the development of an e-participation maturity model. Assuming that the three dimensions can be arranged in stages building upon each other, so that opinion formation forms a basic ground level for e-participation to take root in a constituency, leading to an advanced technology-driven level for decision-making. Both levels together form the basis for a level in which digital tools can be applied to enter a deeper stage of crowd-sourcing and interaction between the state and society. We, therefore, posit an e-participation maturity model not only based on the score of the DigiPartIndex but also on the order of its dimensional parts, such that: Opinion formation→Decision-Making→Co-Creation. However, a model is only a model and it should be possible to evaluate it empirically. Therefore, in the first step, the main concern is to find a way to measure the suggested stage model and to represent it in a numerical value. For that purpose,

the dimensions were attached weights with the decision-making dimension DigiPartIndex value getting multiplied by the factor 2, and the co-creation factor by the factor 3. The weighting factors for the three dimensions are ultimately arbitrary. However, the calculation should be easy to understand and transparent. As displayed in Table 1, compared to the original DigiPartIndex value based on the calculation of a geometric mean (DPI), the weighted average (WMean) is able to capture the desired e-participation maturity level in the sense of a stage model as described above. The impact of using the weighted mean can be exemplified with some illustrative configurations for dimensional values. Only a fraction of all possible permutations with repetitions allowed are displayed. L stands for a low, M for a medium, and H for a high DPI score. Countries with a pattern of high and low scores only (HLL/LLH/LHL) get lifted upwards considerably when their dimensional scores are high for decision-making or even higher for co-creation. The higher scores express a higher level of e-participation maturity. The same holds true when a country displays a configuration of the whole range of scores, low, medium and high, respectively. As soon as co-creation has a high score, there is a substantial difference between the DPI and the weighted mean. The score for the weighted mean (WMean) can therefore, in principle, be applied to assess the e-participation maturity level of a country.

7. Conclusion

One of the goals of this paper was to establish that there is a need to consider e-participation as a domain of its own and find ways to come up with an empirically well-grounded e-participation maturity model, comparable to the multitude of e-government maturity models one can find in the literature. For that purpose, the concept of e-participation was divided up into the three dimensions of opinion formation, co-creation and decision-making. Seven indicators were defined in quite some detail, allowing each of them to vary on a five-point Likert scale. The defined measurement model allows measuring the level of e-participation as an index. To further corroborate the feasibility of the measurement the three cases of Germany, Japan and Switzerland were annotated. The results demonstrate that the DigiPartIndex can be used as a valid building block for the establishment of an e-participation maturity model. Bringing in a stage model giving the decision-making and the co-creation more weight in the measurement than opinion formation tools, further helps to differentiate countries regarding their respective e-participation maturity model. Whereas we consider the development of this measurement tool as a solid, empirically based step towards the establishment of an e-participation maturity model, there are undoubtedly some aspects still lacking or not yet covered here. The dynamic nature of e-participation development in a country was not taken into account in the case studies, for example. In addition, the sequence of the three measured dimensions of e-participation as such is not yet part of the measurement either. The proposed order of this sequence, i.e. Opinion formation→Decision-Making→Co-Creation, can be questioned. However, it is possible to cover that aspect in a future study by broadening the number of cases, establishing the empirical patterns and validating them. Also, by only focusing on the national level the presented approach fails to factor in what e-participation tools might be available on a lower state level. There might be perfectly justified reasons why in a certain polity it makes more sense to offer digital participatory tools rather on the regional or local than on the national level.

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