Article

Incentive Structures for the Adoption of Crowdsourcing in Public Policy: A Bureaucratic Politics Model

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Abstract: Collective intelligence paradigms have been increasingly embraced by the public sector as a way to address complex policy challenges. The field is limited, however, by our little, comparative understanding of the political economy factors that create incentives around the adoption of certain types of collective intelligence over others in different organizational settings. This article uses a typology of citizen-sourced open innovation models based on the work of Daren Brabham as well as insights from Elinor Ostrom and Archon Fung, in order to produce a theoretical model of the determinants of crowdsourcing adoption decisions in the public sector. The model derives a political economy analysis that matches various administrative scenarios to different collective intelligence modalities and developments. The insights are illustrated through a number of crowdsourcing initiatives and provide important lessons to practitioners designing such collective challenges.

Keywords: collective intelligence; public administration; open innovation

1. Introduction

Public sectors have been the subject of substantial governance reforms in recent years. This transformation has reshaped the values and priorities of public administrations, often placing a stronger emphasis on the role of citizen–government collaborations enabled by numerous forms of democratic innovations [1,2]. One such transformation relates to the way processes of internal innovation unfold in bureaucratic agencies. In an effort to unlock valuable external resources, many public organizations have embarked on open innovation projects. Open innovation is understood as the use of inflows of knowledge to accelerate internal innovation and outflows of knowledge to expand the markets for external use of innovation [3,4]. In particular, the use of so-called *outside-in* open innovation techniques such as crowdsourcing has considerably expanded in more developed institutional settings [5–7]. Crowdsourcing can be defined as *"an online, distributed problem-solving and production model"* [8].

In the public sector, crowdsourcing is thought to improve both the quality of public policies and decisions, as well as the overall depth of democratic participation [9]. Evidence on the outcomes of crowdsourcing suggests it enables successful policy prototypes, increases public engagement, helps organizational learning, and improves government awareness of the benefits of open data and open innovation [10,11]. A remarkable example of crowdsourcing use in government is the U.S. platform *challenge.gov* [12], which regularly launches open "problem-solving" challenges that are believed to be better addressed by stakeholders outside of the public administration. At the same time, crowdsourcing has long been used by firms as a mechanism to mitigate various cognitive biases individual decision-makers suffer from (e.g., self-serving bias, social interference bias, self-confidence bias, and statistical bias, among others) [13]. This technique is also extensively used outside government boundaries to advance open and sustainable innovations across multiple fields [14–18].

However, it is acknowledged that many structural and attitudinal barriers stand in the way of crowdsourced solutions for public policy. Public organizations may, for example, be reluctant to engage in this type of collaboration due to the overall uncertainty it involves. Some of the barriers the literature has recognized include the reduced control crowdsourcing represents for traditional bureaucracies [19], the complexity of contractual and intellectual property issues [19,20], its technical challenges [12], and possible doubts on the quality of participants' contributions [21].

The present endeavor takes on a political economy perspective in order to better unravel public agencies' motivations to adopt policy crowdsourcing innovations. By critically assessing the literature and empirical evidence on the subject, it presents a theoretical model that condenses the most important dimensions affecting public agencies' possibilities to derive public value out of crowdsourcing modalities during the policy process. The model reflects on the risks and opportunities involved in different crowdsourcing designs, the role played by different project- and agency-related capacities for innovation, and the level of risk aversion at the administrative ecosystem level. The analysis resorts to purposefully selected case analyses in order to illustrate how these dimensions operate in practice. Along these lines, the article contributes to an understudied area of public sector innovation: the incentives that public servants face to adopt democratic innovation processes. In doing so, it may help strategize around crowdsourcing initiatives in a more productive way, and further enable public managers to unlock the potential of collective intelligence [22].

The next section offers an overview of the literature on the bureaucratic politics of public sector innovation, with a particular focus on the barriers and drivers of crowdsourcing adoption. Section 3 explains the study's methodology. Section 4 presents a theoretical model of the factors that shape bureaucratic decisions to engage in crowdsourcing for policy, drawing on the extensive (but mostly unconnected) literature on the subject. Section 5 illustrates the key pillars from the model through a series of selected case analyses. Section 6 resumes the academic discussion on bureaucratic motivations to adopt collective intelligence forms of governance and offers more general conclusions on democratic innovations.

2. Literature Review

The classical writings of Wanda Orlikowski on the duality of technology (e.g., [23–25]) first provided a strong foundation for understanding the highly heterogeneous ways in which organizations interact with new technologies. Her structurational model of technology suggests that both managerial intent, as well as broader institutional factors, play a role in defining how technologies are appropriated, absorbed and, subsequently, re-structured [23]. For public organizations in particular, the work of Jane Fountain [26] introduces the *Technology Enactment Framework*—largely inspired by Orlikowski's work— which draws on bureaucratic politics to explain why emerging technologies in government can only be expected to develop in highly unpredictable ways. The framework has relevant implications in terms of how bureaucratic resistance to innovations unfolds. It predicts, for example, that organizations will only choose to enact the technologies that respond to pre-existing power structures, and that they will use those technologies in a way that preserves their "*organized set of responses*" [24], pp. 90–91. In consonance with traditional bureaucratic politics paradigms, the model also predicts that organizations will resist efficiency gains if those mean giving up existing resources [27].

The literature on democratic innovations has provided valuable insights on how these bureaucratic barriers operate [28]. In the area of crowdsourcing in the public sector, [12] offer an analysis of the organizational barriers around the implementation of *challenge.gov*, one of today's most successful examples of government-led innovation. The research points at the organizational and political environment, the legal hurdles, and the capacities enjoyed by the implementation authority. At the same time, a few studies have looked at crowdsourcing adoption motivations in both the private and public sectors (the work of Liu [7] provides a short overview of such studies). Afuah and Tucci [29], for example, predict that motivations to crowdsource problem-solving will be shaped by the nature of the

problem at stake, the knowledge required and the crowd's characteristics. Bonabeau [13] considers that such decisions should be based on how organizations expect to deal with the loss of control and the diversity of inputs, as well as how participatory incentives are designed, how crowd behavior will be policed and how intellectual property will be dealt with. Blohm et al. [30], in turn, explore the implementation challenges companies face when navigating large volumes of crowdsourced ideas. They suggest companies need to develop "*absorptive capacity*" through a series of data capabilities related to platform and filter design, organizational integration, information exchange and community building. Clark et al. [20,22] offer a framework of the strategic dimensions of crowdsourcing that informs its potential benefits, and therefore, should be considered by governments in adoption decisions. These relate to the size and nature of the task, the existing administrative expertise, the level of ideational diversity required, and the level of technical expertise that is being sought. Blohm et al. [31] analyze 19 cases of crowdsourcing, from where they draw a number of lessons on the governance mechanisms that work best for the crowdsourcing designs in private companies. These are classified on the basis of how a task is defined and allocated, how the quality of inputs is controlled, how the incentives are designed, which type of qualification the crowd receives, and the more formal rules assigned to the process.

There is a clear gap in the literature with respect to how public organizations weight different aspects of crowdsourcing and collective intelligence at the time of deciding on their adoption. Most works focused on the potential of innovations for increasing public value take a naïve approach that overestimates technological breakthroughs and heavily underestimates internal power dynamics in the bureaucracy. We know, however, that organizations only enact reforms when the structure of incentives (i.e., the political economy) indicates that the position of key stakeholders is not under threat, and the change in organizational routines does not endanger organizational survival [26]. Considering that this structure of incentives operates at multiple levels, we are in need of an integrative model of crowdsourcing adoption motivations that includes not only technical aspects, but also aspects that play a role at the organizational and broader institutional (system) level.

3. Materials and Methods

The present endeavor contributes to bridging this critical gap by: (a) offering a theoretical framework of crowdsourcing adoption decisions in the public sector, derived from the most prominent literature on the subject, and (b) using secondary sources and online archive material to select paradigmatic cases of crowdsourcing by governments that are able to illustrate the mechanics of the theoretical model.

In information science, the role of theory has been more neglected than in other disciplines [32]. Considering the multiple roles of theory, our theoretical framework is particularly interested in enabling better explanations for the use of collective intelligence in the public administration [33]. By disentangling numerous variables at different ontological levels and illustrating how they shape decisions, the model aims to offer a more complete and realistic picture of why these innovation processes (do not) happen in the bureaucracy.

In order to illustrate the model's mechanics for each dimension and variable, specific cases are purposefully selected. To show the role of crowdsourcing design, four contrasting examples—one for each type of design—are drawn from the city of Amsterdam: *VeleHanden* (distributed tasking), *Amsterdam Sounds* (knowledge discovery), *Hacking Health Amsterdam* (broadcast search) and *crowdsourcing the constitution* (collective ideation). In order to characterize the role of agency and project-related aspects, we resort to exemplary cases in different countries: Civic Bridge (USA), We against the Virus (Germany), FixMyStreet (UK), Red Tape Challenge (UK), Citizens' Briefing Group (USA) and Crowdsourcing the National Flag (New Zealand). To illustrate the role of risk aversion levels in the administrative ecosystem, we contrast two examples of the same type of crowdsourcing initiative in the area of health, one in Denmark (less risk averse), and one in Germany (more risk averse).

4. Theory

Drawing from the most relevant literature on crowdsourcing in the public sector (as listed in Table 1), we first classify adoption motivations by public agencies into two broad categories: (a) an immediate need to mobilize external resources in order to optimize the timeliness, quality and overall effectiveness of public policies, and (b) a desire to increase a public agency's participatory reputation by showcasing inclusive and cutting-edge democratic innovations. At the same time, both immediate objectives are supported by broader narratives operating at the system level. In the first case, crowdsourcing is claimed to help spur economic growth and innovation by engaging a novel community of developers and start-ups in the creation of public value. In the second dimension, the aggregate efforts to introduce democratic innovations are ultimately expected to increase the levels of democratic legitimacy and trust in government. Table 1 summarizes how the selected literature on crowdsourcing argues around these two dimensions.

Table 1. Crowdsourcing: two types of motivations.

Immediate Adoption Motivations	Narratives on Ultimate Adoption Motivations	Arguments for Adoption	Literature
Public policy optimization	Foster economic growth, as well as SME and start-up innovation	• Use of external resources for policy implementation. • Information collection. • Service enhancement.	[20,22]
		• Improve service performance, add public value. • Reduced expenditure of public resources, increased ability to mobilize rare public resources.	[5]
		• Enhance the effectiveness of public services and goods.	[7]
		• Increase the capacity to address complexity in policymaking against reduced budgets.	[34]
		• Service production innovation.	[35]
Increase agency reputation through democratic innovations	Democratic legitimacy and government trust	• Citizen engagement.	[20,22]
		• Increase transparency and broaden citizen engagement and empowerment.	[36]
		• Empower citizens and create legitimacy for the government with the people.	[7]
		• Enhancement of government–citizen relationships.	[34]
		• Increase in citizens' sense of agency.	[37]
		• Enhanced citizen engagement • Improved citizen–government relationship. • "Image making".	[35]

Government agencies can derive gains from crowdsourcing along each of these dimensions on the basis of several factors, namely: (a) the type of crowdsourcing design, (b) the

agency and project-specific aspects that can alter the gains from crowdsourcing, and (c) the overall level of risk aversion in the administrative ecosystem. These different ontological layers (tool, project, agency and ecosystem) are typically recognized as the different levels that interact and shape the evolution of public sector innovations (see, for example, the comprehensive review on barriers to public sector innovation by [28]).

The following subsections expand on the general dynamics operating within each factor.

4.1. Crowdsourcing Design Types

The first of these factors relates to the type of crowdsourcing introduced. Since crowdsourcing is defined along methodological lines, the purpose and substance of crowdsourcing applications may vary. Drawing from the typology first put forward by [19], we find four main types of crowdsourcing: (a) distributed human intelligence tasking (in short: distributed tasking); (b) knowledge discovery and management (in short: knowledge discovery); (c) broadcast search and (d) peer-vetted creative production (in short: collective ideation). This typology has been acknowledged and reproduced in later works on the topic (e.g., [20,22,31]). As [20] suggest, each type of crowdsourcing has a different "production function" and requires different administrative skills. In addition, we argue that the possible benefits from each type vary generically "by design" in terms of how much each contributes to the policy optimization and participatory reputation dimensions, as illustrated in Figure 1.
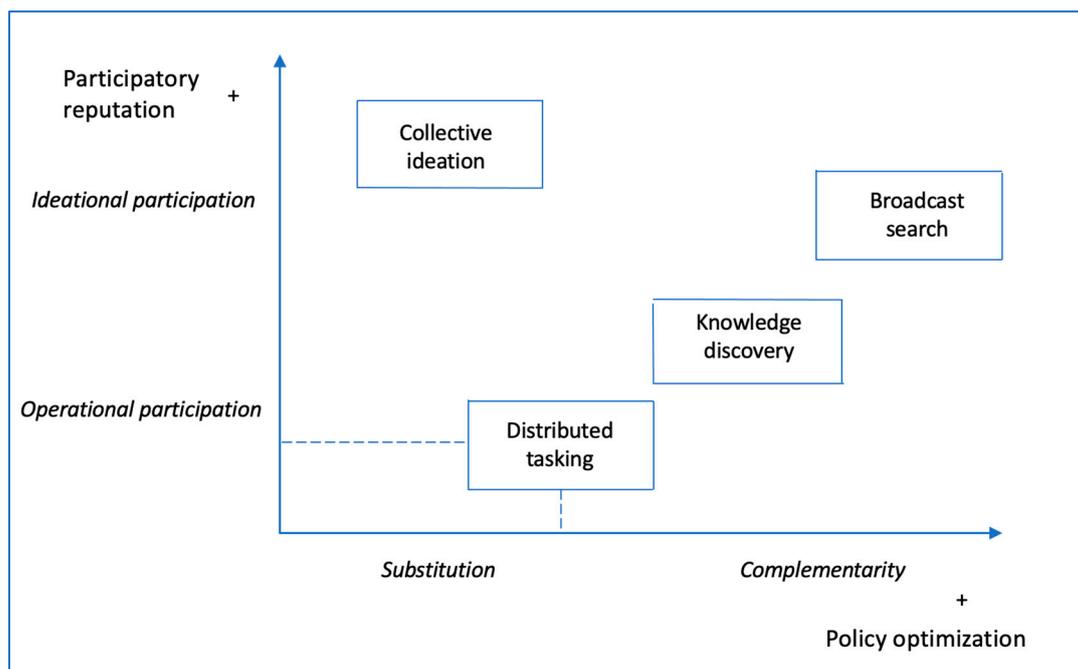

Figure 1. "By-design" gains in policy optimization and participatory reputation from four crowdsourcing types. Source: own elaboration.

The ordering of crowdsourcing types along the policy optimization axis can be argued on the basis of [38] condition of *complementarity*. When proposing a political economy model to illuminate the conditions for successful policy coproduction between governments and civil society actors, [38] defines the complementarity condition as "*coproductive inputs that are legally owned by diverse entities*", and where, "*each* [government and citizens] *has something the other needs*" (: 1082). The potential for policy optimization is then highest when complementary dynamics operate with regard to these inputs, as opposed to being substitutive. In that sense, the broadcast search model bears the highest potential to contribute to the optimization of the policy cycle. In a nutshell, the community provides an original and competitive policy "solution" that directly complements the problem defi-

nition as modeled by the government agency. The latter will, in turn, commit resources and be made responsible for its implementation [19]. This type of crowdsourcing involves the highest complementarities and synergies along the policy cycle. At the same time, the crowdsourced policy ideas are of high technical quality because broadcast searches target large networks of experts that were previously not visible to the administration [39]. This enables new flows of knowledge that make innovative solutions quickly available. In the second place, the knowledge discovery model contributes to the optimization of the policy process because the task of "detecting" the relevant information to initiate or complete a stage of the policy cycle—normally policy implementation—requires voluminous resources that are here easily accessible to the crowd, and much less accessible to the public administration. The crowd then contributes to a qualitative shift in the policy process by resourcing the administration with unique information, while at the same time, it helps accelerate the processing of this information.

In the remaining two models the policy cycle complementarity between citizens and administration is relatively lower and a substitutive logic predominates. The distributed tasking model helps public organizations optimize policy by opening an informational task to the crowd, but in contrast to knowledge discovery, this information is directly owned or controlled by the administration. The crowd's inputs do not add qualitatively new information to the administration, but they greatly help accelerate administrative procedures. Finally, collective ideation involves the substitution of governments' initial ideational inputs for policy by citizen ideation. Citizens are here engaged at the deliberative phase of policy design, and are challenged to give subjective inputs that cannot be assessed through objective criteria [19]. This means a high level of open-endedness in the ideation process, which may contribute to legitimacy, inclusion and collaboration, but not, strictly speaking, to the optimization of an existing policy agenda.

For this same reason, the last model also has the highest potential for participatory agency reputation. The ordering along this second dimension is established on the basis of the democratic "participatory space" as defined by [40]. In a nutshell, this space is determined by how broad, how deliberative and how binding participatory results are for governments. In that sense, the two ideational models are "by design" placed higher than the two informational models, as this ideation normally involves broader participation, greater deliberation and reactions by governments become highly visible.

Collective ideation usually involves low entry barriers for participants, as it does not require expert knowledge. This enables, under normal conditions, higher volumes and diversity of participatory backgrounds. At the same time, participants produce a peer-vetted idea themselves, with less pre-defined standards or constraints than in the other models. In the second place, the broadcast search bears high potential for participatory reputation, given that strategic aspects of policymaking stem from an open process of citizen engagement. It may, however, bring lower reputational gains than collective ideation due to the higher qualifications needed for participants to take part, as well as the more competitive dynamic that exists within the community, where ultimately, the emerging ideas are "owned" by small teams rewarded accordingly.

Because knowledge discovery and distributed tasking mostly deal with non-ideational aspects, they are comparatively less well-positioned to bring participatory reputational gains to the agency. In these two models, the challenges involve specific tasks, which gather narrow but highly interested sets of participants. In comparing the two, knowledge discovery gives citizens more influence over policy implementation and enables more creativity than distributive tasking. The latter tends to involve straightforward and mechanized labor tasks, where individual contributions are valuable but also overall replaceable.

4.2. Project and Agency-Specific Factors

Although crowdsourcing design has important structural implications for potential agency gains, in practice these also depend on a number of specific developments and features within each project and agency. Figure 2 summarizes these factors along each dimension.
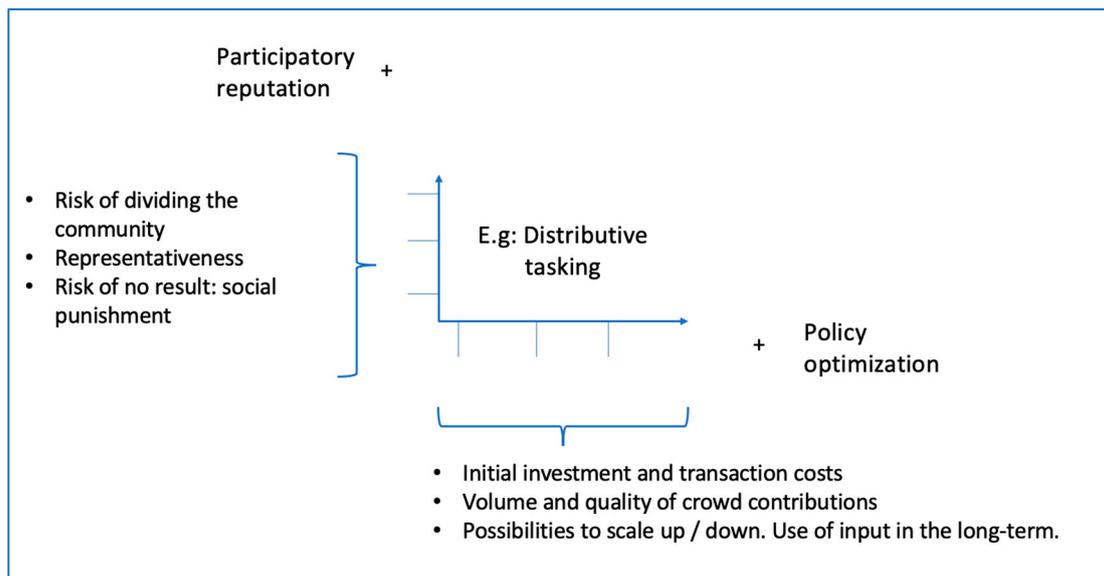
Figure 2. Project and agency-specific factors. Source: own elaboration.

4.2.1. Policy Optimization

The first factor affecting policy optimization is the project's **initial investment and transaction costs** [22]. Transaction costs in crowdsourcing involve the cost of "*finding partners, negotiating with them, and enforcing the contract you have agreed to*" [20]. This means that in addition to the initial financial allocations, the agency requires more sophisticated capacities to handle and disseminate information in novel ways, to acquire a deep understanding of potential stakeholders' skills and motivations, and to establish legal and contractual practices that depart from traditional public procurement. In contrast to what happens in the private sector, governments face stronger limitations when establishing long-term relationships with stakeholders [20], having to remain protective of competitiveness and openness standards instead. By design, crowdsourcing places this transactional complexity at its peak, raising transaction costs and adding to the overall unpredictability of the policy process. These transaction costs are specific to each project but will decrease over time for an agency that gains valuable experience.

A second and related factor that may affect adoption decisions is the **expected volume and quality of crowd contributions**. As mentioned, different crowdsourcing designs will require different levels of ideational diversity, which are, in turn, enabled by the volume of participants [21]. Subject to their expectations, agencies will likely need to design incentive systems that offer symbolic or concrete rewards able to offset participants' time investments while maintaining their administrative capacity to handle large sets of citizen inputs. Whether the project can be made appealing, as well as the costs of dealing with low quality inputs or "waste" [20] (such as wrong information on the state of public infrastructure), will affect the potential gains from involving the crowd.

The third factor is the **ease of project up- or downscaling**. Scaling is understood as "the process of significantly increasing the quality and quantity of value-creating interactions among platform actors, without equally increasing the costs, to result in increased value capture." [41]. In the public sector, the scaling of innovations can happen in multiple, parallel and unsystematic ways [42]. In that sense, crowdsourcing adoption decisions will be affected by the extent to which small experimental approaches can be used to test innovations before making larger investments. At the same time, the costs of terminating an unsuccessful wide-scale initiative will be lower if the project can still be useful at a smaller scale, or if it can tangibly contribute to knowledge accumulation and innovation in the longer term. For example, a platform that invites the reporting of irregularities in the public space (e.g., potholes, broken lighting, illegal parking, etc.) can be scaled

up to cover multiple neighborhoods or cities, and down again if it ultimately works for certain areas only. In contrast, a nationwide initiative to collect public comments on major draft legislation will represent a greater loss if the crowdsourced input does not reach the expected minimum participatory threshold.

4.2.2. Participatory Reputation

Project and agency-specific factors may not only alter the expected gains in the optimization of policy, but also with regard to the second dimension, agency participatory reputation. A first important aspect by which agencies using crowdsourcing will be judged in their democratic contribution is the extent to which public input is **representative of diverse sociodemographic preferences**. Democratic innovations, in general, are commonly criticized for generating uneven opportunities for civic participation [1,43]. This is no different in the case of crowdsourcing, which may reproduce and exacerbate existing inequalities, such as those along the digital divide [20]. In ideational projects where diversity of thought is a key resource, the perception of uneven sociodemographic contributions may be seen as a form of institutional capture by interest groups. The extent to which this may be problematic for agency reputation depends on the nature of the project and how specific the agency mission is, but in general, reputational gains are higher when broader interests are incorporated in the collective effort [39].

A second related aspect refers to **the risk of dividing the community** through broad appeals for input on contentious topics [27]. As [20] point out, every crowdsourcing design requires administrative expertise to understand every angle of a problem rather than focusing on specific technical details. This means that agencies must "*have a sense for the mood or tone of the issue*" and "*plan for discourse*" accordingly (: 61). This requires that the agency itself counts on sufficient epistemic pluralism internally to handle the complexity of collective intelligence. The lack of such expertise may derive into harmful behaviors such as "crowdslapping", which can endanger the entire process [19].

The final factor operating at the project and agency levels relates to the **societal reputational costs associated with a failed project**. Social punishment can be high if a crowdsourced project amounts to an inconclusive result, with the community claiming low democratic intent and showing poor willingness to engage in subsequent opportunities. Alternatively, a proficient and transparent management of the project may enable the community to recognize the agency's efforts as a "*step in the right direction*" without big reputational effects.

4.3. The "Uncertainty Range": Experimentation and Risk Aversion in the Administrative Ecosystem

Mirroring societal punishment, a failed project could unleash negative reactions by the upper authority in the administration. The agency may be seen as uncapable of handling democratic innovations and collaborative governance, leading to reduced chances for experimentation in the future. The governmental costs of a failed project will, in that sense, be largely determined by the degree of risk aversion in the administrative ecosystem. Risk aversion is a well-known barrier to public sector innovation [28,44,45], which often interacts with other administrative traits such as strong hierarchical orderings, lack of an organizational learning culture and lack of agility [28]. In a risk-averse ecosystem, the avoidance of errors predominates as the organizational strategy, and is often exacerbated in contexts where large volumes of users are subject to the innovation, and where there is high media and political accountability [46].

As expressed in Figure 3, a more risk-averse administrative ecosystem will add uncertainty to the expected gains from crowdsourcing. A successful project in a risk-averse environment may represent higher gains and visibility against the backdrop of low public sector innovation, but a failed crowdsourced project, in turn, will represent bigger relative losses in such an environment [45].
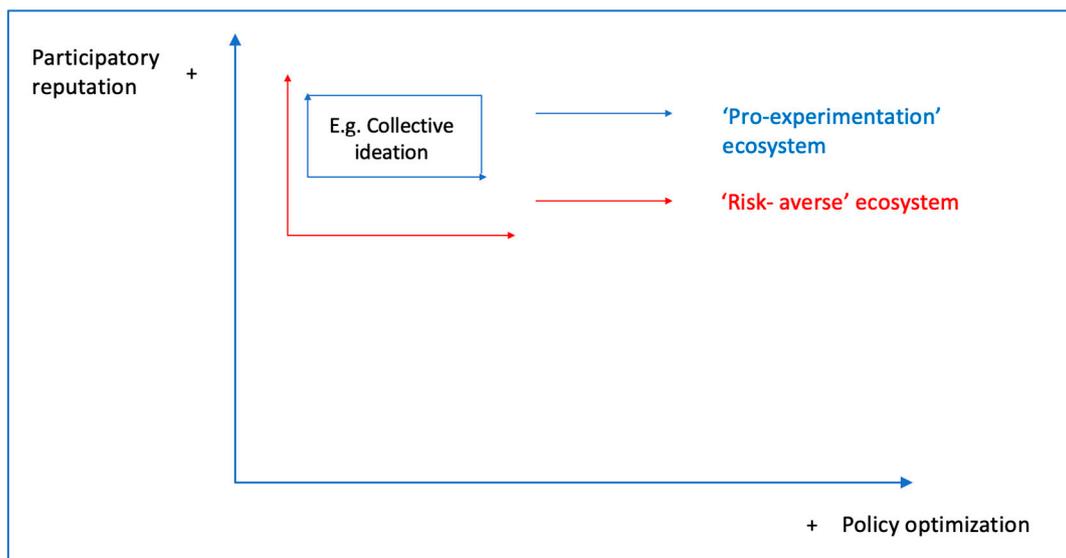
Figure 3. Net gains from crowdsourcing as a function of the administrative ecosystem. Source: own elaboration.

5. Results

5.1. Four Crowdsourcing Types in Amsterdam

The city of Amsterdam has built a strong reputation as a local public sector innovator in recent years. Amsterdam is commonly described as an early adopter of smart city strategies and as one of the smartest cities in Europe [47]. At the forefront of its smart city strategy stands, for example, the platform *amsterdamsmartcity.com*, which aims to enable smart collaboration between different local stakeholder groups and relies on a vibrant community of registered citizens that engage in hundreds of projects at different stages of development. As a keen user of collective intelligence, Amsterdam has experimented with all types of crowdsourcing, an opportunity we use to better understand their different potentials for policy optimization and participatory reputation.

One of the most prominent examples of **distributed tasking** is the platform "Vele-Handen" (ManyHands). Set up by the City of Amsterdam Archives (Stadsarchief) in 2011, it is among the pioneers of archival crowdsourcing. The platform emerged from a Public Private Partnership between the Stadsarchief, two public foundations (Mondriaan Foundation and VSBfonds) who "*want to stimulate people to participate in cultural and socially relevant projects*" [48], and the private company Picturae B.V. In the context of the platform, Dutch archivists ask interested members of the public to help the Municipal Archives with indexing scanned documents and pictures to make them more accessible and searchable by the public [49]. In order to perfect the process, participants are given specific roles related to data processing (double data entry, data control), and are rewarded with vouchers which can be redeemed into scans, museum entry, flowers and chocolate [48]. In terms of impact, already in 2014, indexing grew by about 15 to 20 thousand names a week, with contributions from Brazil, the United States, Sweden, Australia and Senegal. Taking, for example, a genealogy project, over 4.5 million names have been transcribed, a workload of no less than 50 years for the archivists alone [48]. In 2021 the platform has already achieved 80 percent of its scans target, with contributions from 20,840 participants since its inception [50]. These efforts represent an important contribution towards policy optimization, although purely in the form of process acceleration and substitution of in-house (or procured) work. In terms of participatory reputation, the platform is highly regarded for its social engagement, which is sustained in time with time-limited campaigns (such as indexing the Military Register from 2011–2013) and regular presence events, with a specialized community that, at the time of writing, has about 600 stable members [50].

Amsterdam has also engaged with **knowledge discovery** crowdsourcing, particularly in the areas of citizen sensing and reporting. An example of this is the recent "Amsterdam Sounds" project by the NGO Waag and the Municipality of Amsterdam, which invites open contributions to measure and report levels of noise throughout the city. The project was launched in 2019 and is part of a larger set of initiatives on citizen sensing sponsored by Waag. Through various events, the project invites citizens to use low-cost sensors to measure noise pollution in their areas and report it via crowdmapping. Given that the crowd is "closer" to the problem, municipal authorities benefit substantially from the external information feeding into the policy cycle in a more complementary dynamic than in the previous example. All in all, these sensing projects are seen as offering opportunities to integrate new data, build new collaborations, deepen and disseminate knowledge, and ultimately, improve local environmental governance [51]. At the same time, this set of citizen-sensing projects have had a positive impact in terms of participatory reputation for the city, as they led to the EU-funded "Making Sense" project [52], which develops participatory frameworks and tools for citizen-driven innovation such as the Making Sense Toolkit in 2018, among others [53].

In terms of **broadcast search** crowdsourcing, Amsterdam has engaged since 2019 in a number of hackathons to improve public health with the support of Hacking Health Amsterdam (a branch of Dutch Hacking Health [54]). In the context of the coronavirus crisis, a first countrywide hackathon "#HackCorona" was organized in March 2020, in addition to "Hacking Health Amsterdam", organized at the end of October 2021. In these events, multiple awards were given to original ideas to deal with the pandemic, including improving the self-monitoring of social distancing, and providing better COVID-19 information for vulnerable communities and to better protect health workers against the virus. The ideational nature of participants' inputs and the time investment suggests these hackathons have a strong potential to speed up and optimize policy design in contexts of crisis, where public administrations face time pressure and expertise shortages. At the same time, the diversity of expertise areas, ranging from social work to engineering, suggests the public sector can derive high reputational gains from these initiatives, as can also be observed for the case of the German government in the globally famous #*WirvsVirus* ("We against the Virus") hackathon, described in the next section [39].

Finally, Amsterdam has also experimented with **collective ideation**. Taking the crowdsourcing process of the constitution in Iceland 2012 as a role model, the organizations Netwerk Democratie, ISOC and Waag organized in September 2012 an event called "crowdsourcing the constitution" ("*crowdsourcing de Grondwet*"). During this event, 80 participants worked on topics around the foundations of Dutch democracy such as privacy, freedom of speech and the administrative structuring of the Netherlands. The ideation process fostered collaboration and contributed to debates on the foundations of democracy, leading to amendment proposals for articles 7 (freedom of speech) and 13 (on the confidentiality of the mail) in particular. Furthermore, the stakeholders organized an online follow-up discussion some months later, meant to lead to more official civil recommendations for a constitution in 2014 [55]. As some authors suggest, the partly crowdsourced constitutional process in Iceland has contributed to more inclusiveness, which is a key condition of procedural and outcome legitimacy [56]. These types of initiatives, however, do not respond to a logic of policy optimization, in the sense that citizen ideas are disconnected from ongoing policy processes or agency missions, and rather represent foundational deliberation processes that the political system is later required to absorb and implement.

5.2. Project and Agency-Specific Factors

Beyond the potential that different crowdsourcing designs have for policy optimization and participatory reputation, project and agency-specific aspects may substantially alter the expected gains from these innovations. This subsection briefly illustrates how each operates through selected examples from consolidated democracies.

5.2.1. Policy Optimization

The initiative Civic Bridge San Francisco can be singled out as an example of how a flexible and minimalistic approach to the **initial investments** and **transaction costs** incurred by public organizations can increase civil servants' motivation to adopt democratic innovations. Civic Bridge is an initiative by the San Francisco Mayor's Office of Civic Innovation (MOCI) to prototype policy solutions for other local authorities by recruiting pro-bono expert volunteers from the private sector. As a first step, the MOCI openly invites other local authorities to define their own policy challenges. Next, it selects the challenges with the most potential and invites skilled private sector volunteers to donate part of their time for several months in order to design and prototype possible solutions. These projects are then presented to the respective authorities, who may choose to sponsor them, but are not contractually bound to select one. In that sense, the companies (usually large ones such as Google or McKinsey) bear the risk for the prototyping, in exchange for a chance to win or shape future public projects. The investments and transaction costs for the authorities are hence very low, relying entirely on a specialized innovation lab for the process and with complete freedom to opt out at any point.

A second factor influencing adoption decisions is the **expected volume and quality of crowd contributions**. The German hackathon "We against the Virus" (WirvsVirus) that took place in March 2020 is a success case which can be largely attributed to the volume, diversity and quality of projects, in a context where the federal government was in need of fast innovations to tackle the COVID-19 crisis. This event gathered more than 28,000 participants from all over the world, who worked on +1500 challenges, of which +150 projects were subsequently developed, including symptom trackers, 3D printing of ventilators, retail supply optimization, school tutoring and the software SORMAS for COVID-19 management [39]. Apart from being one of the biggest hackathons worldwide, WirvsVirus registered a record number of female participants (close to 40%), as well as a very mixed profile of expert disciplines and backgrounds [57].

A third factor that shapes ex ante adoption decisions is the **ease of up- and downscaling**. In connection to the transaction costs argument, public agencies will also feel more persuaded to rely on collective intelligence if the project's performance does not lead to an absolute win-or-lose situation. In other words, they will feel persuaded if the project can deliver results proportional to its level of scaling, and nuanced decisions can be made about this scaling. The *FixMyStreet* platform in the UK (replicated in other countries) serves as a good illustration of nuanced scaling. The platform allows users across the UK to crowdmap pictures and details of different irregularities in the public space such as potholes, waste, abandoned cars, etc. These are channeled to the corresponding local authority, who, subsequently, reports openly on the status of the issue. The platform may, for example, achieve high citizen engagement in some cities or neighborhoods, and lower engagement in others, a mixture that in itself does not endanger the entire project. Decisions on the platform can be easily made by discarding investments in low engagement areas, or contrastingly, better targeting campaigns to those areas. Because the same code source can be used or adapted to different settings, the low cost of scaling encourages low-risk experimentation.

5.2.2. Participatory Reputation Factors

The participatory reputation that agencies can derive from crowdsourcing will depend on the **representativeness** of the crowd, particularly for ideational projects. When representativeness is questioned, the participatory process can be seen as compromised by certain societal interests. This risk is increased when citizens can self-select, as opposed to using mini-publics or other random sampling techniques. The 2011 Red Tape Challenge was a consultative crowdsourcing initiative launched by the Conservative/Liberal Democrat government in the UK, seeking to collect citizen inputs on how to reduce "administrative burden". Although the initiative was ambitious and attracted an important volume of inputs, the process was, in practice, dominated by a narrow set of actors. Ultimately, the innovativeness brought by collective intelligence was deemed insufficient to alter tradi-

tional forms of policy formulation, and the initiative received criticism from independent analysts [58].

Another important risk that public authorities face when building participatory reputation is that of **dividing the community**. This is exacerbated for ideational projects as well, where crowd contributions are a matter of subjective taste [19]. The Citizens' Briefing Book launched by the Obama administration in early 2009 sought to compile citizen recommendations for countrywide reforms through the *change.gov* website. Some of the most popular initiatives included legalizing marijuana and online poker, as well as removing tax exemptions for the Church of Scientology. In consequence, the initiative led to controversy and polarization, and eventually, popular inputs were disregarded by the administration as they conflicted with a large portion of the Obama voter base [59].

Finally, the **societal cost of project termination** will be considered in connection to participatory gains. If a crowdsourcing challenge leads to inconclusive results and is terminated, the society may punish the organizers through reputational impacts. When New Zealand launched its challenge to crowdsource the design of a new national flag in 2015, none of the proposed designs ended up receiving more votes than the existing flag. The initiative received substantial criticism for its overall monetary cost and for creating social divisions due to colonialism debates linked to the existing flag [60].

5.3. Risk Aversion in the Administrative Ecosystem

To illustrate the effect of ecosystemic risk aversion in the public administration, we compare functionally similar tools for **distributive tasking** in two different administrative ecosystems: Denmark and Germany. Denmark is a well-known frontrunner in the area of public sector innovation, ranking at the top of the UN's E-government Survey. The country has had a vibrant public sector innovation ecosystem for decades, with experimentation and prototyping well embedded in policymaking [61]. Germany, in contrast, is known for its incrementalism and fragmentation [62] which responds, among other things, to a continental, legalistic administrative tradition where broad-scale novelty and innovation are less incentivized [63].

To illustrate the role of the administrative ecosystem, we compare equivalent cases of first response and cardiopulmonary resuscitation (CPR) bystander tools in the two countries. As [19] notes, distributed tasking refers to completing micro-tasks that require human intelligence to be solved. In our cases, the task is everything but "micro" since it may involve saving a life in cases of out-of-hospital cardiac arrest (OHCA). There are three critical measures in the rescue chain that increase the likelihood of victims surviving an OCHA: early recognition, early cardiopulmonary resuscitation (CPR) and early defibrillation [64]. Accordingly, the probability of survival after an OCHA decreases up to ten percent for every minute without intervention, but the average paramedic response time varies largely across countries as well as in urban and rural settings [65]. This limitation of the professional response highlights the importance of bystander intervention. Generally, the positive effect—a two- to three-fold increase in survival rates—of CPR bystanders and automated external defibrillator (AED) use following cardiac arrest on survival rates has been widely documented in the literature [66].

Numerous countries have employed different tools and techniques to increase OCHA survival rates. This includes the use of crowdsourcing to facilitate bystander intervention by notifying volunteers of suspected cardiac arrests in their close proximity. Denmark, for example, has a long history of efforts geared towards improving emergency response outcomes. Between 2001 and 2010 various national initiatives were launched to improve bystander resuscitation rates. Reportedly, Denmark achieved a considerable increase in bystander CPR rates from 22 percent in 2001 to almost 45 percent in 2010. In turn, the increase in bystander CPR rates was significantly associated with survival rates on arrival at the hospital, 30 days later and one year after the incident [66,67]. A broadly used citizen first-response application in Denmark is **HeartRunner** (Hjerteløber). The HeartRunner app is integrated into the Danish local emergency services countrywide, which triggers

an alert assigning volunteers to administer CPR or retrieve a defibrillator depending on distance and location. The app reports a volunteer base of 130,000 people across the country (2021), with a sustained increase since 2017. It also reports that "*three times as many people received bystander defibrillation while waiting for an ambulance when citizen responders were alerted*" [68]. Moreover, since 2016 HeartRunner has collaborated with the Danish Cardiac Arrest Registry in order to document and research the effects of prehospital efforts in cases of cardiac arrest.

In **Germany**, we identify one salient CPR bystander notification tool: **MobileRescuers** (Mobile-Retter). At the time of writing, MobileRescuers had around 500 active volunteers providing first response and 10,000 downloads by potential users (on Android). Since 2014, the app has been activated more than 27,000 times and concluded 14,600 alerts. In contrast to the Danish app, MobileRescuers is not meant to rely on the general public, but is targeted to off-duty physicians, paramedics, nurses or firefighters who may receive an alert following an emergency 112 call. Although MobileRescuers claims that, technically, the app could be linked to half of the German emergency dispatch centers, it has been integrated into the official rescue chain in only 18 cities and regions. Although not broadly used, the app is documented to have positive impacts. Recent studies report that MobileRescuers led to a significantly higher survival rate compared to resuscitation initiated by EMS alone [69,70]. In addition, an analysis of 740 OHCAs using German applications measured the median response time for volunteers using the MobileRescuers app, showing this median to be four minutes compared to seven minutes for EMS [69,70]. More recent initiatives in Germany must be highlighted, where a number of subnational governments are slowly but increasingly showing interest in deploying such tools more systematically in the near future. (This is the case, for example, of the Saving Life app, which is a derivation of the research project MyCityRescues (ended in 2020). Saving Life is to be officially upscaled throughout the state of Schleswig-Holstein in the next few years, and something similar is planned for Brandenburg. Interestingly, this project is part of a German-Danish cross-border collaboration).

6. Discussion

The scholarly interest in the use of collective intelligence in the public sector has seen a marked increase in recent years, with a growing number of works seeking to unravel the advantages, disadvantages, enablers and barriers of these democratic innovations. The literature has, thus far, mostly focused on the design-centered aspects of crowdsourcing in order to inform their adequacy and contributions to policymaking (e.g., [20,22,34]). In doing so, the literature has advanced the understanding of the nuances and commonalities of different crowdsourcing types, but has also missed the opportunity to encompass a more diversified set of aspects shaping ex ante decisions to invest in these technologies. Most notably, the literature lags behind in producing political economy models able to make sense of the overall incentives to adopt crowdsourcing from the public servants' perspectives. This article offers a theoretical model of some key factors that shape the perceived benefits of crowdsourcing along two distinct dimensions alluded to in the literature: the optimization of the policymaking process, and the potential agency gains from participatory reputation. Along each dimension, these perceived gains are thought to vary on the basis of design-centered aspects, but also according to project or agency-specific factors, as well as the overall level of risk aversion in the administrative ecosystem.

We argue that more directly or indirectly, all these factors will shape adoption incentives in the bureaucracy, even when legal mandates, social pressure, political intent or faith in technical solutions dominate the policy agenda. Bureaucratic actors in charge of channeling collective intelligence will carefully consider how the enactment of collective intelligence is likely to affect their agencies. We argue, moreover, that policy optimization and participatory reputation respond to very different political economy dynamics. Additionally, given that both are easy to justify on normative grounds, neither scholars nor practitioners have sufficiently reflected on the implications of distinguishing them

when analyzing adoption incentives. This results in an unhelpful conflation of real motives, which in turn, muddles our understanding of the factors that contribute to one or the other, or the tensions that may eventually emerge between the two. Our model suggests that crowdsourcing design aspects affect policy optimization on the basis of how much design is meant to complement or substitute government and citizen inputs [38]. When the complementarity is achieved, it is considered (ceteris paribus), that the optimization potential is higher. The model also suggests that crowdsourcing designs that encourage broader, more substantive and more actionable participation [40] may, in ideal circumstances, result in a higher participatory reputation for the agency than those that involve narrow informational or operational tasks. The model suggests, however, that many other aspects can shift potential gains from crowdsourcing in each of the dimensions. The gains from policy optimization might be altered by the initial investments and transaction costs the agencies incur, where lower costs will facilitate adoption and experimentation. The quality and volume of participant contributions will naturally impact how much agencies can benefit from collective intelligence. At the same time, these gains will also be affected by the ease of project up- and downscaling, and the proportionality between crowdsourcing efforts and policy achievements. Participatory reputation will, in turn, be severely affected when the representativeness or diversity of the crowd is called into question, when the project encourages divisive dynamics and when result inconclusiveness leads to agency criticism and high social punishment. Finally, how the administrative ecosystem values novelty and innovation affects the uncertainty around the possible gains from crowdsourcing. A more legalistic and procedural public administration will tend to increase the negativity bias around crowdsourcing experiences, which translates into ex ante hesitation to adopt these innovations.

We believe that our theoretical framework should be further tested through systematic empirical analyses in order to validate its explanatory power. Moreover, the framework's many dimensions may operate differently in institutional contexts that differ from those of the cases illustrated here. A future agenda on crowdsourcing in the public sector should continue incorporating the complexity of power dynamics in the equation of adoption decisions, avoiding narrow technological perspectives. For the potential of democratic innovations to be realized, bureaucratic politics must remain in the picture, considering that bureaucratic players continue to be the operational force behind public sector reforms.

References

1. Elstub, S.; Escobar, O. Defining and typologising democratic innovations. In *Handbook of Democratic Innovation and Governance*; Edward Elgar Publishing: Cheltenham, UK, 2019.
2. Cingolani, L. The survival of open government platforms: Empirical insights from a global sample. *Gov. Inf. Q.* **2021**, *38*, 101522. [CrossRef]
3. Bogers, M.; Zobel, A.K.; Afuah, A.; Almirall, E.; Brunswicker, S.; Dahlander, L.; Frederiksen, L.; Gawer, A.; Gruber, M.; Haefliger, S.; et al. The open innovation research landscape: Established perspectives and emerging themes across different levels of analysis. *Ind. Innov.* **2017**, *24*, 8–40. [CrossRef]
4. Chesbrough, H. Open Innovation: A New Paradigm for Understanding Industrial Innovation. In *Open Innovation: Researching a New Paradigm*; Chesbrough, H., Vanhaverbeke, W., West, J., Eds.; Oxford University Press: Oxford, UK, 2006; pp. 1–12.
5. Lee, S.M.; Hwang, T.; Choi, D. Open innovation in the public sector of leading countries. *Manag. Decis.* **2012**, *50*, 147–162. [CrossRef]
6. Prpić, J.; Taeihagh, A.; Melton, J. The fundamentals of policy crowdsourcing. *Policy Internet* **2015**, *7*, 340–361. [CrossRef]

7.   Liu, H.K. Crowdsourcing government: Lessons from multiple disciplines. *Public Adm. Rev.* **2017**, *77*, 656–667. [CrossRef]
8.   Brabham, D.C. Crowdsourcing as a model for problem solving: An introduction and cases. *Convergence* **2008**, *14*, 75–90. [CrossRef]
9.   Noveck, B.S. *Wiki-Government: How Open-Source Technology Can Make Government Decision-Making More Expert and More Democratic*; Brookings Institution Press: Washington, DC, USA, 2009.
10.   Yuan, Q.; Gasco-Hernandez, M. Open innovation in the public sector: Creating public value through civic hackathons. *Public Manag. Rev.* **2021**, *23*, 523–544. [CrossRef]
11.   Lenart-Gansiniec, R. The effect of crowdsourcing on organizational learning: Evidence from local governments. *Gov. Inf. Q.* **2021**, *38*, 101593. [CrossRef]
12.   Mergel, I.; Desouza, K.C. Implementing open innovation in the public sector: The case of Challenge.gov. *Public Adm. Rev.* **2013**, *73*, 882–890. [CrossRef]
13.   Bonabeau, E. Decisions 2.0: The Power of Collective Intelligence. *MIT Sloan Manag. Rev.* **2009**, *50*, 45–52.
14.   Cappa, F.; Rosso, F.; Hayes, D. Monetary and social rewards for crowdsourcing. *Sustainability* **2019**, *11*, 2834. [CrossRef]
15.   Piazza, M.; Mazzola, E.; Acur, N.; Perrone, G. Governance considerations for seeker–solver relationships: A knowledge-based perspective in crowdsourcing for innovation contests. *Br. J. Manag.* **2019**, *30*, 810–828. [CrossRef]
16.   Mazzola, E.; Acur, N.; Piazza, M.; Perrone, G. "To own or not to own?" A study on the determinants and consequences of alternative intellectual property rights arrangements in crowdsourcing for innovation contests. *J. Prod. Innov. Manag.* **2018**, *35*, 908–929. [CrossRef]
17.   Grosse, M.; Pohlisch, J.; Korbel, J.J. Triggers of collaborative innovation in online user communities. *J. Open Innov. Technol. Mark. Complex.* **2018**, *4*, 59. [CrossRef]
18.   Arcese, G.; Flammini, S.; Lucchetti, M.C.; Martucci, O. Evidence and experience of open sustainability innovation practices in the food sector. *Sustainability* **2015**, *7*, 8067–8090. [CrossRef]
19.   Brabham, D.C. *Using Crowdsourcing in Government*; IBM Center for the Business of Government: Washington, DC, USA, 2013; pp. 1–42.
20.   Clark, B.Y.; Zingale, N.; Logan, J.; Brudney, J. A framework for using crowdsourcing in government. *Int. J. Public Adm. Digit. Age* **2016**, *3*, 405–425. [CrossRef]
21.   Dutil, P. Crowdsourcing as a new instrument in the government's arsenal: Explorations and considerations. *Can. Public Adm.* **2015**, *58*, 363–383.
22.   Clark, B.Y.; Zingale, N.; Logan, J.; Brudney, J. A framework for using crowdsourcing in government. In *Crowdsourcing: Concepts, Methodologies, Tools, and Applications*; IGI Global: Hershey, PL, USA, 2019; pp. 194–214.
23.   Orlikowski, W.J. The duality of technology: Rethinking the concept of technology in organizations. *Organ. Sci.* **1992**, *3*, 398–427. [CrossRef]
24.   Orlikowski, W.J. Improvising organizational transformation over time: A situated change perspective. *Inf. Syst. Res.* **1996**, *7*, 63–92. [CrossRef]
25.   Orlikowski, W.J. Using technology and constituting structures: A practice lens for studying technology in organizations. *Organ. Sci.* **2000**, *11*, 404–428. [CrossRef]
26.   Fountain, J.E. *Building the Virtual State: Information Technology and Institutional Change*; Brookings Institution Press: Washington, DC, USA, 2001.
27.   Wilson, J.Q. *Bureaucracy: What Government Agencies Do and Why They Do It*; Basic Books: New York, NY, USA, 1989.
28.   Cinar, E.; Trott, P.; Simms, C. A systematic review of barriers to public sector innovation process. *Public Manag. Rev.* **2019**, *21*, 264–290. [CrossRef]
29.   Afuah, A.; Tucci, C.L. Crowdsourcing as a Solution to Distant Search. *Acad. Manag. Rev.* **2012**, *37*, 355–375. [CrossRef]
30.   Blohm, I.; Leimeister, J.M.; Krcmar, H. Crowdsourcing: How to Benefit from (Too) Many Great Ideas. *MIS Q. Exec.* **2013**, *12*, 199–211.
31.   Blohm, I.; Zogaj, S.; Bretschneider, U.; Leimeister, J.M. How to manage crowdsourcing platforms effectively? *Calif. Manag. Rev.* **2018**, *60*, 122–149. [CrossRef]
32.   Weber, R. Evaluating and developing theories in the information systems discipline. *J. Assoc. Inf. Syst.* **2012**, *13*, 2. [CrossRef]
33.   Gregor, S. The nature of theory in information systems. *MIS Q.* **2006**, *30*, 611–642. [CrossRef]
34.   Liu, H.K. Crowdsourcing: Citizens as coproducers of public services. *Policy Internet* **2021**, *13*, 315–331. [CrossRef]
35.   Nam, T. Suggesting Frameworks of Citizen-Sourcing via Government 2.0. *Gov. Inf. Q.* **2012**, *29*, 12–20. [CrossRef]
36.   Taeihagh, A. Crowdsourcing: A new tool for policy-making? *Policy Sci.* **2017**, *50*, 629–647. [CrossRef]
37.   Seltzer, E.; Mahmoudi, D. Citizen participation, open innovation, and crowdsourcing: Challenges and opportunities for planning. *J. Plan. Lit.* **2021**, *28*, 3–18. [CrossRef]
38.   Ostrom, E. Crossing the great divide: Coproduction, synergy, and development. *World Dev.* **1996**, *24*, 1073–1087. [CrossRef]
39.   Gegenhuber, T.; Mair, J.; Lührsen, R.; Thäter, L. *Strengthening Open Social Innovation in Germany*; Hertie School and Leuphana University Lüneburg: Lüneburg, Germany, 2021.
40.   Fung, A. Varieties of participation in complex governance. *Public Adm. Rev.* **2006**, *66*, 66–75. [CrossRef]
41.   Kohler, T. How to scale crowdsourcing platforms. *Calif. Manag. Rev.* **2018**, *60*, 98–121. [CrossRef]
42.   Andrews, M.; Pritchett, L.; Woolcock, M. *Building State Capability: Evidence, Analysis, Action*; Oxford University Press: Oxford, UK, 2017.

43. Norris, P. *Digital Divide: Civic Engagement, Information Poverty, and the Internet Worldwide*; Cambridge University Press: Cambridge, UK, 2001.
44. Charalabidis, Y.; Loukis, E.; Alexopoulos, C.; Lachana, Z. The three generations of electronic government: From service provision to open data and to policy analytics. In *International Conference on Electronic Government*; Springer: Cham, Switzerland, 2019; pp. 3–17.
45. Potts, J.; Kastelle, T. Public sector innovation research: What's next? *Innovation* **2010**, *12*, 122–137. [CrossRef]
46. Borins, S. *The Challenge of Innovating in Government*; IBM Center for the Business of Government: Washington, DC, USA, 2001.
47. Smith, L. Amsterdam Smart City: A World Leader in Smart City Development. Bee Smart City. 2017. Available online: https://hub.beesmart.city/city-portraits/smart-city-portrait-amsterdam (accessed on 15 November 2021).
48. van Zeeland, N.; Fleurbaay, E. Die Crowdsourcing-Plattform Velehanden.nl. Stadsarchief Amsterdam & Hypotheses. 2014. Available online: https://archivamt.hypotheses.org/759 (accessed on 15 November 2021).
49. Huber, C. Crowdsourcing—Viele Hände und Lernfreudige Maschinen. 2019. Available online: https://vsa-aas.ch/crowdsourcing-viele-haende_lernfreudige-maschinen/ (accessed on 15 November 2021).
50. VeleHanden. VeleHanden-Home. 2021. Available online: https://velehanden.nl/ (accessed on 15 November 2021).
51. Grijns, H. Transforming Citizen Sensing. Waag. 2020. Available online: https://waag.org/en/article/transforming-citizen-sensing (accessed on 1 December 2021).
52. Making Sense. Making Sense: The Toolkit. 2018. Available online: http://making-sense.eu/publication_categories/toolkit/ (accessed on 1 December 2021).
53. Hecker, S.; Haklay, M.; Bowser, A.; Makuch, Z.; Vogel, J.; Bonn, A. *Citizen Science: Innovation in Open Science, Society and Policy*; UCL Press: London, UK, 2018.
54. Dutch Hacking Health. Hacking Health Amsterdam. Samen Werken aan een Betere Gezondheid voor Alle Amsterdammers. 2021. Available online: https://dutchhackinghealth.nl/amsterdam/ (accessed on 22 October 2021).
55. Waag. Crowdsourcing the Constitution: Waag Interface. 2012. Available online: https://waag.org/en/article/crowdsourcing-constitution (accessed on 1 December 2021).
56. Landemore, H. Inclusive constitution-making: The Icelandic experiment. *J. Political Philos.* **2015**, *23*, 166–191. [CrossRef]
57. Innovation in Politics. WirvsVirus Hackathon & Support Programme. 2021. Available online: https://innovationinpolitics.eu/showroom/project/wirvsvirus-hackathon-support-programme/ (accessed on 15 November 2021).
58. Lodge, M.; Wegrich, K. Crowdsourcing and regulatory reviews: A new way of challenging red tape in British government? *Regul. Gov.* **2015**, *9*, 30–46. [CrossRef]
59. Giridharadas, A. Athens on the Net. *New York Times*, 18 September 2009.
60. Davison, I. Flag Referendum: John Key Defends $26m Flag Vote as Critics Accuse Him of Dividing Country. 2016. Available online: NZHerald.co.nz (accessed on 1 December 2021).
61. Buisman, H. Public Sector Innovation Scan of Denmark. 2021. OECD-OPSI. Available online: https://oecd-opsi.org/public-sector-innovation-scan-of-denmark/ (accessed on 1 November 2021).
62. Wollmann, H. Modernization of the Public Sector and Public Administration in the Federal Republic of Germany–(Mostly) A Story of Fragmented Incrementalism. In *State and administration in Japan and Germany*; de Gruyter: Berlin, Germany, 2013; pp. 79–104.
63. Painter, M.; Peters, B.G. The analysis of administrative traditions. In *Tradition and Public Administration*; Palgrave Macmillan: London, UK, 2010; pp. 3–16.
64. Deakin, C.D. The chain of survival: Not all links are equal. *Resuscitation* **2018**, *126*, 80–82. [CrossRef]
65. Nagao, K. Chest compression-only cardiocerebral resuscitation. *Curr. Opin. Crit. Care* **2009**, *15*, 189–197. [CrossRef]
66. Mani, G.; Annadurai, K.; Danasekaran, R. Bystander cardiopulmonary resuscitation in out of hospital cardiac arrest: Need of the hour. *Afr. Health Sci.* **2015**, *15*, 307–309. [CrossRef]
67. Wissenberg, M.; Lippert, F.K.; Folke, F.; Weeke, P.; Hansen, C.M.; Christensen, E.F.; Jans, H.; Hansen, P.A.; Lang-Jensen, T.; Olesen, J.B.; et al. Association of national initiatives to improve cardiac arrest management with rates of bystander intervention and patient survival after out-of-hospital cardiac arrest. *JAMA* **2013**, *310*, 1377–1384. [CrossRef]
68. Heartrunner. Denmark First Country in Europe with Nationwide System. 2021. Available online: heartrunner.com (accessed on 1 December 2021).
69. Stroop, R.; Eckert, M.; Poschkamp, T.; Kerner, T.; Goersch, H. Smartphone based alerting: Aftercare for first aiders-necessary or superfluous? *Resuscitation* **2019**, *142*, e10. [CrossRef]
70. Valeriano, A.; van Heer, S.; de Champlain, F.; Brooks, S.C. Crowdsourcing to save lives: A scoping review of bystander alert technologies for out-of-hospital cardiac arrest. *Resuscitation* **2021**, *158*, 94–121. [CrossRef]