

Collective Intelligence in Law Reforms: When the Logic of the Crowds and the Logic of Policymaking Collide

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Abstract

This paper shows how the two virtues of collective intelligence – cognitive diversity and large crowds – turn into perils in crowdsourced policymaking. That is because of a conflict between the logic of the crowds and the logic of policymaking. The crowd’s logic differs from that of traditional policymaking in several aspects. To mention some of those: In traditional policymaking it is a small group of experts making proposals to the policy, whereas in crowdsourced policymaking, it is a large, anonymous crowd with a mixed level of expertise. The crowd proposes atomic ideas, whereas traditional policymaking is used to dealing with holistic and synthesized proposals. By drawing on data from a crowdsourced law-making process in Finland, the paper shows how the logics of the crowds and policymaking collide in practice. The conflict prevents policymaking fully benefiting from the crowd’s input, and it also hinders governments from adopting crowdsourcing more widely as a practice for deploying open policymaking practices.

1. Introduction

Governments across the world are increasingly deploying crowdsourcing as a knowledge search and citizen engagement method in policymaking [1, 26]. They are thus hoping to harness collective intelligence [28] to create stronger policies, and to apply the principles of open government [18] in open policymaking. The virtues of collective intelligence hold the promise of making those goals come true. The virtues of collective intelligence are cognitive diversity and large participant crowds [25, 33].

Cognitive diversity refers to the ways people perceive the world and categorize and interpret it, and the mental tools they use to solve problems [33]. A large number of participants in democratic processes leads to more inclusiveness, and the more people

included in the process, the higher the likelihood of a better outcome [25].

However, when collective intelligence is channeled to policymaking, its virtues turn to perils. By drawing on data from a pioneering case study in Finland, this paper examines how and why these challenges emerge and how to address them. In the case study, the Finnish government crowdsourced an off-road traffic law reform, also known as the Finnish Experiment. The two virtues of collective intelligence, cognitive diversity and large numbers, were manifested in the Finnish Experiment, but the legislative mechanism was not able to utilize the fruit of those virtues. This paper examines the reasons for that.

The paper is structured as follows: The first section defines crowdsourcing and its role in policymaking as a part of representative democracy. The second section introduces the case profile, research questions, data and methods, and the third section presents the findings. The paper concludes with proposing avenues for resolving the conflict between the logics of the crowds and logics of policymaking.

2. Crowdsourcing and public policymaking

2.1. Crowdsourcing and collective intelligence

Crowdsourcing is an open call online for anybody to participate in a given task [9, 17, 19]. The tasks can be about tagging pictures in a crisis situation [29], organizing data in a citizen science project [37], submitting information for journalists to use in news articles [2], or solving companies’ R&D problems on platforms like InnoCentive [22]. Crowdsourcing is organized by an individual, group of people or organization, and the organizer is called crowdsourcer.

By using crowdsourcing, the crowdsourcer can tap into the collective intelligence of the crowds. Collective intelligence relies on the notion of knowledge becoming more than “the sum of the parts”

[24, 28, 38]. Pierre Levy [28, p. 13] describes collective intelligence as “a form of universally distributed intelligence, constantly enhanced, coordinated in real time, and resulting in the effective mobilization of skills.” The opposite of collective intelligence is reliance on a single agent—for example, on one knowledgeable expert.

Collective intelligence can refer to wisdom, talent, and knowledge alike. Instead of “intelligence,” the concept of “collective wisdom” emphasizes the temporal dimension of the phenomenon, the wisdom extended through space and generations and through collective memory [24]. The difference between intelligence and wisdom can be described as follows. Intelligence is a capacity to solve tasks. Intelligence has been extended from humans to machines with artificial intelligence. Wisdom, instead, emphasizes understanding and responsibility rather than only a capacity to solve problems [24, 6].

Collective intelligence is defined here as wisdom, talent, information and knowledge that emerges in certain online circumstances and can be channeled for problem solving, whether the problem is to find a solution to a chemistry problem, accurate information for a journalistic article or the most fair and effective solution to regulate safety in off-road traffic. Collective intelligence is not differentiated from wisdom, because the concepts function alike in the framework of this study, where the focus is on examining collective intelligence in policymaking.

Crowdsourcing is both modular and atomic in nature, rendering it a suitable method for tapping into the crowd’s collective intelligence, because it brings in parts that can be more than their sum. Crowdsourcing is modular in that larger processes are decomposed into sequences, which can be crowdsourced. In crowdsourced policymaking, the crowdsourcer – the government – modularizes the policymaking process to several sequences. The crowd can be invited to participate in identifying problems with existing policy, in proposing ideas for how to solve those problems and finally, identifying issues with policy drafts. Crowdsourcing is atomic in nature in that the crowdsourced pieces are often in small parts [2]. Those bits and pieces will be compiled into a larger whole, which is the end-result, for instance a law.

2.2. Crowdsourcing in public policymaking

Public policies are instruments for governance. As defined by Guy Peters [34], public policy is the sum of government’s decisions to regulate various issues in society. Public policy is the government’s response to a problem, an attempt to resolve the issue. Public policies are developed for implementing programs for

achieving societal goals [13]. Laws, regulations and strategies are public policies, and public policies can be regulated locally, nationally, or internationally [8].

Public policy-making follows a policy cycle, which has several sequences. Those sequences include problem identification and definition, data gathering, developing options and proposals, consultation, designing and drafting the policy, decisions, evaluation and implementation [16, 20, 35]. Public policymaking is complex in nature, particularly because policies are a result of a series of political decisions, each of which require a consensus of majorities in representative democracy [15].

Crowdsourcing is increasingly used in policymaking by local and national governments. For example, Iceland used crowdsourcing in its constitution reform process in 2011 [26]. In the United States, federal agencies like Federal Emergency Management Agency have used crowdsourcing in strategy reforms.

The goal in crowdsourced policymaking is two-fold: To create stronger policies with crowdsourced knowledge and to engage citizens in policymaking [3]. Thus the governments are hoping to apply the principles of open government, those being collabora-

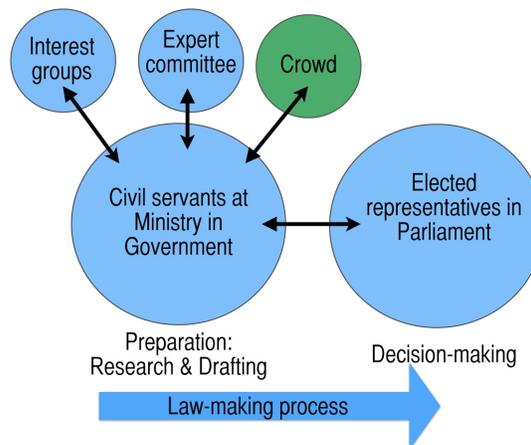


Figure 1. The role of the crowd in a research and drafting stages in law-making.

tion, accountability and transparency. Governments typically use crowdsourcing in research and drafting of a policy [1, 3]. The crowd is invited to submit its knowledge, ideas and opinions to the policy. The policymakers then filter the input and channel it to the policy as appropriate. The final decision-makers about the policy are typically elected representatives.

In the Finnish legislative system it is a Ministry in the government or the Parliament that decides that a bill has to be reformed. Civil servants in the government are then assigned to do research for the bill

and draft it. Civil servants are bureaucrats and officials hired to serve the government; they are not elected representatives. In the research and drafting stage of law-making, the civil servants typically work with an expert committee and interest groups representing stakeholder groups, like associations and trade unions. After the government has accepted the bill, it goes to the Parliament, where the elected Members of the Parliament (MP) decide whether the bill is accepted, rejected, or sent back to the government to be revised.

When the crowd participates in law-making, it serves as an additional data point to the research and drafting mode, as Figure 1 illustrates. The arrows in the figure represent the interaction between the civil servants and participating entities in law-making.

2.3. Crowdsourcing as a method for participatory democracy

Crowdsourcing, thus, is a supplemental method in traditional representative democracy, not a method for direct democracy. In direct democracy it is the citizens who decide directly about policies. An example of direct democracy is participatory budgeting [12], in which the residents of a city or a neighborhood decide by voting how a certain part of the government's budget is spent. Crowdsourcing, instead, is a method for participatory democracy, in which the goal is to activate citizens in civic life (for participatory democracy, see [34]).

Even though crowdsourced policymaking is often designed for knowledge search and not for deliberation, deliberation can occur on crowdsourcing platforms [5]. Horizontal transparency on the crowdsourcing platforms enables this. Horizontal transparency means that the participants are able to see each other's submissions and comments on the platform and exchange arguments about those [3].

Crowdsourced policymaking differs from digital argumentation tools and processes, which are designed to foster online deliberation, that is, reasoned and civil exchange of arguments, often resulting to preference aggregation [21, 23, 30]. In crowdsourcing the primary goal instead is knowledge search, which directs the design and implementation of the crowdsourcing processes.

Crowdsourcing also differs in several aspects from commons-based peer production, which is another popular form of online collaboration mechanism. Commons-based peer production is used for example in Wikipedia creation and open-source software production [7]. In crowdsourcing, the locus of the power is within the crowdsourcer. The crowdsourcer organizes the crowdsourcing initiative, and the crowdsourcer can be a person, a group people or an

organization. The crowdsourcer decides when, where and how crowdsourcing takes place, and also how the crowd's input will be used. In commons-based peer production, instead, the locus of the power is more within the commons, the producers. There is a more flat hierarchy in commons-based peer production, and the producers have more say over the process than in crowdsourcing.

3. Case profile, methods, and data

3.1. Crowdsourcing stages

The Ministry of the Environment in the Finnish government crowdsourced an off-road traffic law reform in 2013 with the Committee for the Future of the Finnish Parliament. Off-road traffic is traffic with motor-powered vehicles beyond established roads, such as snowmobiles in winter. The author of this paper designed and led the crowdsourcing initiative with civil servants in the government and a team of researchers.

The crowd was invited to participate by submitting ideas on an online platform, where information about the law was also published. The idea crowdsourcing was divided to two sequences. The first sequence focused on mapping problems with the current law, and the second sequence focused on identifying solutions. In the first phase the crowd was invited to participate in 10 categories, including safety in off-road traffic, age limits for riding off-road traffic vehicles and route establishing practices, defined by the Ministry. The prompts for participation included information about the law and questions to answer.

The crowd's input was analyzed after the first phase. In the second phase, the categories were based on the ones identified in the crowd's input in the previous stage, including monitoring, safety, and regulations. These broader categories were divided into narrower topic areas with specific questions about each issue. For example the category 'Safety' was divided into the subfields of 'Improving Safety in Off-road Traffic' and 'Safe Transition Traffic Off- and On-road'. There were 34 defined subcategories in the second phase, and thus was a significant increase in categories between the first and second phase.

3.2. Crowd's input

The two phases generated about 500 ideas, 4,000 comments and 25,000 votes (in thumbs up/down modality) from about 700 registered participants. The process stages with the crowd's input are depicted in Figure 2.

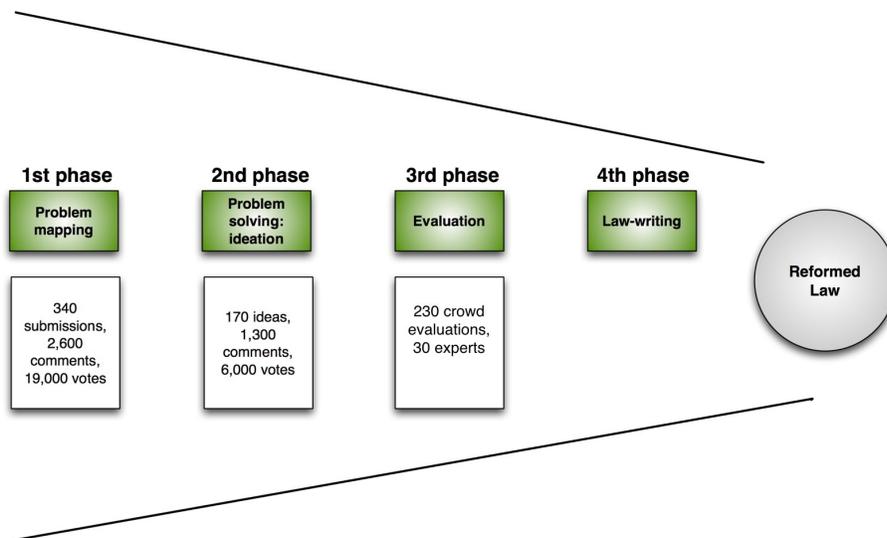


Figure 2. Process phases in the crowdsourced off-road traffic law reform.

To submit an idea, leave a comment or vote, the participants had to sign up on the online platform by using a verifiable email address. The participants could choose to use their real names or to stay anonymous. Most participants chose the latter.

The ideas were evaluated by two methods: a crowd-evaluation tool and an international expert panel. In the crowd evaluation, the crowd was invited to evaluate a random sample of ideas that were produced earlier in the idea-crowdsourcing stages, by using three methods: scoring, ranking and comparisons, resulting to 230 completed evaluations. (For a more detailed description about the crowd evaluation, see [27]). The expert panel consisted of experts in several countries, and they reviewed the ideas by using four criteria: the effectiveness of the proposed policy measure, ease of implementation, cost-efficiency and fairness. The evaluation results were summarized to a report to the Ministry of the Environment in 2013 [4]. The reform was not finalized before the Parliamentary elections took place in Finland in 2015, and it is unclear whether the new government will continue the law reform.

3.3. Methods, data and research questions

To examine how collective intelligence affects policymaking through crowdsourcing, the focus of the inquiry in this paper is on the following four questions: How are the virtues of collective intelligence – large numbers and cognitive diversity – manifest in crowd-sourced policymaking? What are the fundamental differences in the logics of policymaking and crowdsourcing, and how are those differences present in the Finnish Experiment? How do these differences

in the logics affect the use of collective intelligence in crowdsourced policymaking? Logics here means patterns and typical traits in the activity – basically, the nature of crowdsourcing and policy-making.

To address the research questions, a case study methodology was chosen to emphasize discovery [16, 39]. Several types of data were gathered to support inductive analysis. Two surveys were conducted to online participants, during crowd-sourcing and the crowd

evaluation, inquiring about the demographic profile and interest preferences, resulting to 521 responses from 342 unique respondents (127 participants responded in both surveys). Interviews were done with the online participants, politicians, and lobbyists involved in the off-road traffic issue, resulting to 40 interviews with 29 individuals. 11 individuals were interviewed twice in the beginning and at the end of the process. The 250 crowd-submitted ideas were analyzed to understand the nature of the crowd's input. The citations of the crowd's input, which are used later in this paper, represent typical patterns in the data

The survey and interview data and the crowd's input were analyzed by using analytical coding system [39] to induct patterns from the data. Open coding was used in the first round of coding, allowing key themes and patterns to emerge from the data. In the next round of coding, axial coding was used to relate the emerging categories to subcategories, including participant profiles, the nature, quality and amount of input, preference differences and type of knowledge. Finally, selective coding was applied to integrate and synthesize the subcategories to the following main categories: i) participants, ii) input, iii) evaluation, and iv) synthesis. The findings are presented following these main categories and subcategories.

4. The logic of the crowds and the logic of policymaking

Based on the inductive analysis of the Finnish Experiment, 10 differences in the logics of crowdsourcing and policymaking were identified. These differences are summarized in Table 1. They are elaborated in the following according to the order of elements and aspects presented in Table 1, presenting

the logics of the traditional policymaking first, followed by the logics of the crowd.

4.1. Participants

4.1.1. Expert group: Small and known. It is a small and defined number of experts who participate in traditional policymaking. In the Finnish system, the typical participants are civil servants, representatives from stakeholder groups and expert consultants. In the crowdsourced off-road traffic law these stakeholder groups include the Association for Nature Conservation, the Association of Farmers and Landowners, Association for Professional Fishermen, and the Snowmobile Owners’ association. Representatives from these groups in law-making are typically lawyers, and they are professional lobbyists. They work with civil servants in research and drafting part of the law. The participant pool in a law-making process is typically small, up to about 15 people.

Table 1. Comparison of the logic of the crowds and the logic of traditional policymaking

Element	Aspect	The logic of policymaking	The logic of the crowds
Partici-pants	Profile	Defined	Anonymous
	Number	Small	Large
Input	Amount	Small	Large
	Nature	Synthesized	Atomic
	Quality	Known	Varied
	Fittingness with other solutions	Fitting	Unfitting
	Knowledge type	Status-based	Experience-based
	Preference differences	Few; known	Many, unknown
Evaluation Synthesis	Evaluation	In-house; governed by political preferences	External or internal, not a set method
	Synthesis	Input is already synthesized	Big need, not a set method

4.1.2. The crowd: Large and anonymous. In crowdsourcing the crowd is often anonymous, as was the case in the Finnish Experiment. Crowdsourcing strives for a large participant pool to source a large amount of knowledge. Anonymity keeps the threshold of participation low.

In the Finnish Experiment, about 7,000 people visited the crowdsourcing platform, of which about 700 registered. About one fifth (175) of the active

participants produced ideas; others participated by commenting and/or voting. Thus the ideas were largely produced by a small group of super-users. There are five million people in Finland and an estimated 100,000 snowmobile owners. When compared to the size of the population affected by the off-road traffic issue, which is larger than the number of snowmobile owners, the amount of participation is low. However, 700 people is substantially more than the number of people who participate in the typical lawmaking process involving two civil servants and a handful of experts and lobbyists. Thus, the virtue of large numbers was, to a certain extent, reached. The process thus had more inclusiveness in a typical law-reform.

The participant crowd consisted of a diverse set of Finns. They came from all five main geographic areas in Finland, all education levels, and in voting age groups. The participants self-select to contribute to crowdsourced process; there are no pre-requisites for their participation. Anybody can participate, regardless of his or her professional status or previous knowledge about the issue. There were snowmobile hobbyists and professional users of off-road traffic vehicles like fishermen and reindeer herders, environmentalists, landowners, lawyers and neighbors who were worried about the safety and noise of off-road traffic. There were also some who participated as representatives of their organizations, which are stakeholders in the off-road traffic law issue, thus mixing the assumption that in crowdsourcing it is a purely non-expert crowd. To this end, it can be assumed that the participants were cognitively more diverse than those in a typical lawmaking process.

4.2. Input

4.2.1. Handful of holistic, fitting solutions. The goal of policymaking is to find solutions that improve the policy. Policy experts are knowledgeable about the law and its intricacies, and they bring in homogenous knowledge, based on their professional status and expertise. It is a known type of knowledge, and the policy pipeline is used to dealing with it.

The policy solutions are holistic and comprehensive in nature; in lawmaking, they are full bill proposals. The information is thus already synthesized in a proposal. The experts propose a small number of proposals. The expert group is knowledgeable about the law and its intricacies, and they vet the feasibility of their proposals internally before suggesting them to the bill.

Lawmakers look for solutions, which fit with other laws that are related to the law that is being reformed. For instance, the off-road traffic law in Finland is related to numerous other laws, such as the Road

Traffic Act, the Administrative Judicial Procedure Act, the Local Government Act and the Nature Conservation Act. Thus, every idea vetted for a law is considered in relation to its impact on other laws.

4.2.2. Massive, atomic, diverse input. In the Finnish Experiment the participants produced 500 ideas, a fairly large number. After the duplicates were merged, there were 250 ideas. The submitted ideas were diverse in format, quality and content. Some ideas were long, elaborate descriptions; some consisted of one sentence.

The scope of the ideas varied too. Some ideas proposed large nationwide changes to legislation, beyond the off-road traffic law, and some were concerned with a small geographic area. The diversity in the ideas is illustrated in the following excerpts from the crowd's input:

“Snowmobile riding for leisure should be permitted only on routes and it should be regulated under the general Road Traffic Act (267/1981). Snowmobile riding for other purposes than leisure, such as for professional use like reindeer husbandry and professional fishery, should remain permitted off routes.”

“Given that existing powerlines and the sides of fields for agricultural use would be used by off-road traffic, landowners should mark Christmas tree fields so that they do not get destroyed by traffic.”

“Residents in Lapland should have the right to ride freely inside their county. This means they should be allowed to ride off routes and trails.”

“Existing GPS-tracking data of snowmobile traffic should be used when drafting the impact evaluation. The data could be used to verify the amount of traffic and to estimate the impact.”

As these ideas demonstrate, the content and quality of the input varies greatly. Some of them take fittingness with other laws into account, most of them don't. The participants are not aware of other laws that are related and how their ideas impact those other laws.

The diversity in format and quality is partially a result of knowledge asymmetries between the participants. Many of the participants are laymen, regular citizens, who have never participated in policy-making before, whereas some of them are experienced lobbyists and activists, who are used to reasoning their perspectives.

The crowd's input includes a variety of knowledge types. In the Finnish experiment, the types are reflected in content and format of the ideas: Some are very

polished proposals, clearly written by lawyers or other professionals who had already been working on the off-road traffic law issue. Many reflected grassroots knowledge, knowledge that is based on the participants' experience with off-road traffic in everyday life. There is a large variety in the knowledge types, because of the crowd's heterogeneity. To be able to participate, the crowd doesn't need to be an expert in that specific problem domain area. It is enough that the participant has required knowledge about the issue at hand, or even have an opinion about it.

4.2.3. Known, limited preference differences. In traditional policymaking, there are a limited number of preference differences. The preference differences between the parties are known in advance, and they are based on the organization's standing and the affiliation with a political party. When an interest group proposes a measure to the policy, it is known what the other parties think about the proposal. Proposals are used as bargaining power in negotiating the final agreement.

Reaching a consensus is a complex process in itself, as [14] state: “major public policies are the outcome of a complex round of negotiation between interests, choices between values and competition between resources ... there are no single ‘best’ options for any player in this game, for the ‘best’ outcome depends on what others do and what deals are possible.”

The proposed holistic policy reform has to fit with the political power's preferences so that the decision-making body, the Parliament, will approve it. Therefore there are rarely radical changes in policy reforms, but the reforms rather bring incremental changes to policies. For instance in the Finnish case, if the majority of parties and representatives in the Parliament don't support proposed policy, it will not be accepted. It would be thus waste of the civil servants' time to draft bills that do not have the support of the status quo.

4.2.4. Unknown preference differences. Crowdsourcing brings a large number and a variety of unexpected preference differences. It is not known in advance what the crowd might propose and how much preference diversity there will be. The crowd is anonymous, so it is unknown whose goals are being compromised when a crowdsourced idea is rejected from a policy. In traditional policy-making that is never the case.

In the Finnish Experiment, the large number of participants and ideas resulted to an emergence of a large number of preference differences. For instance, the question about how to regulate the snowmobile route construction generated ideas that show almost all potential options considering the landowners' rights.

All the following ideas, among several others, were proposed in the category of “Establishing new routes. Authority to prevent routes, route permission periods, maintenance and reconstruction”:

“It should not be possible to establish a route on private property without the landowner’s consent. Landowners should have an ultimate right to control their own property.”

“It should be possible to establish a route on private property without the landowner’s consent but only when this does not cause harm to the landowner.”

“It should be possible to establish a route on private property, but the need for a route should be justified by more important reasons than improving the public traffic network or common recreational use.”

“There should be more strict and clear criteria in the existing law for justifying bypassing landowners’ consent when establishing a new route.”

“It should be possible to establish a route on private property without the landowner’s consent whenever there’s a need to set up a route.”

A similar pattern emerged in several categories: almost every thinkable option to solve an issue was presented. The number of preference differences cause complications in policymaking, because it is hard for the policy-cycle to digest large number of preference differences.

4.3. Evaluation and synthesis

4.3.1. Merged evaluation and synthesis. In traditional policymaking, evaluation and synthesis of the proposed solutions is done in-house. The civil servants gather the input from the experts and interest groups, and integrate it to the policy draft. Evaluation and synthesis typically happen simultaneously, and there is not a separate stage for each activity. Evaluation and synthesis are a part of preference difference aggregation; what is carried over to the bill is already a political decision. The goal is to maximize the effectiveness of the policy measures, yet taking the political preferences into account.

4.3.2. Synthesizing challenge. Due to a large number of ideas, and its atomic and modular nature, crowdsourcing needs evaluation and synthesis mechanisms, as was evident in the Finnish Experiment. Synthesis can be automatic, particularly when the crowdsourced data are quantitative, or when the data

are unstructured, humans need to do the synthesis, as was the case in the Finnish Experiment.

When crowdsourcing unstructured data, the crowd’s input is in a variety of formats, complicating the synthesis process. The submissions can be long proposals or short sentences. The quality of the input varies too, and it is unpredictable. It is hard to measure the quality of crowdsourced input due to lack of objective criteria for doing that. Regardless of the criteria, the crowd might not follow the criteria and they submit content based on their will.

In the Finnish Experiment, the ideas were evaluated by crowd evaluation and expert evaluation. The goal of was to provide crowd- and expert-generated synthesis of the ideas. The expert panel evaluation resulted in a quantitative and qualitative analysis of the ideas. The result of the expert panel analysis contradicted, in part, with the results of the crowd evaluation. The two methods of analysis that were used, didn’t lead to the type of synthesis, which would have been useful for the government. Instead, the results reflected preference differences about the solutions, complicating the interpretation of the results.

Furthermore, the crowd evaluation created a ranking of ideas based on opinions of a biased sample. Based on the survey results, most of the participants in the crowd evaluation stage were snowmobile enthusiasts. The selection bias is unavoidable due to the self-selective nature of crowdsourcing. The crowd self-selects to participate, and thus it is not a statistically representative sample of a population. Therefore, when using crowd evaluation (essentially, it is crowdvoting) as an evaluation method, we cannot say that the result is “the public opinion”. For a representative sample, random sampling should be used just like in opinion polls. Therefore, any crowd-evaluation or crowd-voting measures are not recommended in crowdsourced policymaking, unless statistical representativeness can be reached by random sampling or by other controlled measures.

But why doesn’t the problem of statistical unrepresentativeness apply in crowdsourcing ideas for policy? It is because when crowdsourcing ideas, the focus is on knowledge search, finding solutions to policy issues. The ideas are then vetted by the government. In that vetting process – ideally – the quality of the idea matters, not who has presented it, or if it has been presented once or multiple times on the crowdsourcing platform. It doesn’t count either, if the idea has been popular, i.e. received many likes, on the crowdsourcing platform or not. But when the crowd evaluates ideas, it is about voting — and voting is about expressing opinions by choosing from existing options. Whereas crowdsourcing ideas is about mapping what those options could be. However,

crowdsourced policymaking should always strive to be as inclusive process as possible, meaning, include as many people as possible. That increases the likelihood of good knowledge discovery and also adds to the legitimacy of the process [3].

5. The collision of the logic of the crowds and the logic of policymaking

The two virtues of collective intelligence were present in the Finnish Experiment, as the analysis shows. A large, cognitively diverse crowd participated, producing a large number of ideas to be considered to the law. The virtues, however, turn into perils in crowdsourced policymaking. This is because the logic of the crowds and the logic of policymaking collide, as is shown in the previous section.

The conflict between these logics is apparent in ten aspects, including the profile and amount of participants, and the amount, nature and quality of the crowd's input. The larger the number of crowdsourced ideas and the more cognitive diversity among the participants, the harder it is to channel the crowd-generated input into policy cycles. The crowd input is atomic and anonymous, whereas policymaking looks for holistic, synthesized solutions from a small, known group of experts. The cognitive diversity of the participants, in part, leads to diverse quality in submissions.

Moreover, in a large number of submissions from a cognitively diverse crowd, there are also a large number of diverse fundamental preferences. Policymakers should then find a compromise between those preferences, but the traditional policymaking apparatus is not capable of handling a large number of atomic crowd-input. Due to the lack of automated synthesis methods, it is time-consuming to categorize and analyze a large number of ideas. The increased demand in human resources is a valid concern to the government, because it affects how sustainable and regularly used method crowdsourcing in policymaking can become.

Crowdsourcing thus undeniably adds to the complexity in policymaking process. To this end, crowdsourcing as a supplemental mechanism in policymaking collides into the policymaking mechanisms that were developed for representative democracy, in which the number of preference differences is typically the number of political parties and interest group. In crowdsourcing, that number is multiplied easily by hundreds.

Because of the conflict between the logic of the crowds and policymaking, in part, the off-road traffic law reform was stalled in the government and is frozen

at the moment. The political authorities, which instigated and started the crowdsourced process, did not know what to do with the atomic crowd input. To use a term from management science: The absorptive capacity in traditional policymaking cycles cannot deal with the input of the crowds. Absorptive capacity means a firm's ability to recognize the value of new information, assimilate it, and apply the solution to its profit [13].

To resolve the conflict, we need to develop better mechanisms for harnessing the crowd's collective intelligence to policymaking. Particularly we need better systems for analyzing and synthesizing that input. The two methods used in the Finnish Experiment, expert and crowd evaluation, were not good enough. There is not an existing aggregation mechanism, which would meaningfully cluster and summarize unstructured crowd input so it could be channeled smoothly into policymaking.

Alternatively, an avenue perhaps worth pursuing would be to ignore the virtues of collective intelligence and not aim for large numbers from a cognitively diverse crowd of participants. However, any restrictions to participation would collide with the goals of crowdsourced policymaking, those of increased inclusiveness, collaboration, and transparency in governance. Another option would be to alter the policymaking processes to be more suitable for crowdsourced input, but that is unlikely to happen because of the strong status quo in governance, which supports existing structures and mechanisms.

Another avenue would be to have the crowd synthesize its own ideas and narrow them down to a fewer options. However, that is a lot of responsibility put to the crowd. It also raises many questions, including those of objectivity of the synthesizing process. Another avenue in a similar vein would be to use commons-based peer production type of collaboration process in policymaking. The crowd would be then writing a policy together in wiki-style on Etherpads or Google Docs types of platforms. That has been tried by an Assemblyman Mike Gatto in California in 2014 and 2015, when he asked the crowd to annotate bills regulating probate process and privacy. Similarly, in May 2015, the White House launched a wikistyle process to improve the Federal IT Acquisition Reform Act.

In both cases, a policy draft was published, and the crowd is asked to work on the draft. That way, the crowd's input is already more synthesized than in an idea crowdsourcing process. Crowdsourcing is thus applied in a later stage of the policy cycle. This approach, however, faces challenges. Neither Gatto's or the White House's process attracted participation. There were hardly any participants. That shows that

contributing wiki-style to a policy might have a higher threshold for participation than contributing with an idea in an earlier stage in a policy cycle.

Another avenue to explore would be to stay away from unstructured crowd-input and only use quantifiable data. That would mean moving towards the wisdom of the crowds –type of collective intelligence, that is, quantifiable predictions and estimates. There would be three major challenges to overcome on this path. First, defining the object of estimations. What would the crowd be estimating? Second, how could the accuracy of such estimates be measured? Third, since crowdsourcing has an inherent selection bias due to its self-selective nature, any estimates the crowd produces are not a statistically representative sample of the population. In crowdsourcing efforts in the private sector that is typically not a problem. However, in public policymaking, in which the policy regulates every citizen's life, the policy decisions cannot ignore the missing representativeness. Then the question would be: What is the use of these estimates? Another problematic downside in this approach would be losing an important aspect of crowdsourcing; as a knowledge search mechanism it has the potential to gather unexpected solutions. And discovering something that is unknown is one reason to use crowdsourcing. Furthermore, we would lose a possibility having hundreds of pairs of eyes following a policymaking process, able to identify more bugs in the policy than a handful of people can.

To conclude, let us apply a metaphor of a puzzle to illustrate the challenges of using crowdsourcing in public policymaking. In traditional policymaking, there are a certain, known number of pieces in the puzzle. The colors and shapes in the puzzle are not wildly different from each other. There is negotiation and bargaining in the process, and the policy cycles make the pieces slowly fit together better and better. At the end, the pieces fit together (seemingly) perfectly.

In crowdsourced policymaking, instead, there are hundred times more pieces in the puzzle. The pieces differ wildly in shape and color, and many of them are extremely unfitting with each other. Some of them have to be discarded; many of them have to be reshaped so that they fit. It is possible to make these pieces to fit; however, it requires sophisticated evaluation and synthesis methods and a strong political will. The gains of solving that puzzle are unknown, because nobody has succeeded in doing that in large-scale. Therefore, we should make serious further attempts for doing so; the gains for the public and society can be even more valuable than we can even think of.

7. References

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