

# IDENTIFYING CITIZENS' NEEDS BY COMBINING AI AND CI

Building a Repository of Tools and an Evidence Base  
for Augmented Collective Intelligence

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 **GOVLAB**

## ABOUT THE GOVLAB

The Governance Lab's (The GovLab's) mission is to improve people's lives by changing the way we govern. Our goal is to strengthen the ability of institutions – including but not limited to governments – and people to work more openly, collaboratively, effectively and legitimately to make better decisions and solve public problems. We believe that increased availability and use of data, new ways to leverage the capacity, intelligence, and expertise of people in the problem-solving process, combined with new advances in technology and science can transform governance. Housed at New York University (NYU) Tandon School of Engineering, The GovLab is funded by various donors and partner organizations.

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The research for this report originates in the commission of a study by Dubai' The Model Center (DTMC) on the application of AI for CI in the context of their annual Needs and Expectations Study of customers of government services in Dubai; Dubai' The Model Centre is a centralized department established in 2011 by the General Secretariat of The Executive Council of Dubai. It focuses on researching, documenting, and disseminating best practices in the field of public service competitiveness at local and international levels. Dubai' The Model Centre seeks to raise the level of public services quality in Dubai to unprecedented levels of innovation and efficiency through internationally accredited methodology and practices.

The Dubai The Model Center was especially interested in understanding the advantages of applying AI for CI to generate new insights on customer expectations that are not satisfactorily captured through traditional surveys. DTMC commissioned The GovLab to develop the five case studies included in this report, a comparative assessment of AI and CI tools, as well as a matrix of best available knowledge on the application of AI to CI.

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# BUILDING A REPOSITORY OF TOOLS AND AN EVIDENCE BASE FOR AUGMENTED COLLECTIVE INTELLIGENCE

## INTRODUCTION

Around the world, public and private leaders are seeking new ways to improve governance, solve public problems, and better represent their constituents. This search is driven, in part, by increased public discontent. As shown by recent protests in high-income economies, people feel disconnected with the institutions claiming to represent them. Public trust in government has plummeted.<sup>1</sup>

Much of the discussion on improving public engagement focuses on two recent innovations. The first is artificial intelligence (AI), which offers unprecedented abilities to quickly process vast quantities of data to deepen insights into public needs. The second is collective intelligence (CI), which provides a means for tapping into the “wisdom of the crowd.”<sup>2</sup> So long as advocates address the serious risks these technologies pose, they can be used to meet public demands for more responsive governance.<sup>3</sup>

Recently, researchers have explored how these tools can come together to generate new opportunities for governance.<sup>4</sup> Examples include Wikipedia’s use of AI bots to help edit articles, identify and remove vandalism, and categorize and tag articles to eliminate unnecessary human

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<sup>1</sup> Bersoff et al., “2019 Edelman Trust Barometer.”

<sup>2</sup> The Governance Lab has a series of recent white papers on the use of collective intelligence in governance, including: CrowdLaw, CrowdLaw for Congress, The Open Policymaking Playbook.

<sup>3</sup> AI’s risks include low-quality data and systems distorting results. CI’s risks include the time and resource costs of making sense of inputs and selection bias in participation. For more detail, see: Verhulst, “Where and When AI and CI Meet.”

<sup>4</sup> Ibid.

effort.<sup>5</sup> Companies such as Figure Eight (formerly CrowdFlower) use CI to expose biases embedded in datasets that AI could not.<sup>6</sup> Initiatives like MIT's MoralMachine use CI to study the ethical implications of AI tools.<sup>7</sup>

One relatively under-examined area of study is the role of AI and CI in improving how governments represent and deliver services to their citizens. With the growing integration of algorithms into daily life,<sup>8</sup> and recent fervor around China's "social credit" (shehui xinyong) system,<sup>9</sup> it is increasingly clear that the field lacks a clear evidentiary basis on the most effective and legitimate uses of AI and CI. Decision-makers across contexts would benefit from more due diligence into the potential benefits, risks, and challenges associated with such approaches, as well as comparative analyses of different models of marrying AI and CI.

**The GovLab**, an action research center within NYU, is well positioned to begin this work. Motivated by our mission to strengthen the ability of institutions and people to solve public problems, we study how organizations can use technology to promote the public good in various settings.

This project tries to identify how a public institution might responsibly experiment with AI and CI to better meet the needs of citizens. It follows an initial examination conducted in the context of the MacArthur Foundation Research Network on Opening Governance, with the input of the Network's members. The GovLab together with Nesta is also conducting a related research project, Designing for Crowd and Institution Collaboration, which will produce case studies on government uses of CI from around the world. Those case studies and associated findings will be published in 2020.

In the pages that follow, we lay out a series of real-world case studies to inform how public institutions might incorporate AI and CI into their daily operations. The GovLab neither represents nor endorses any of the platforms described.

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<sup>5</sup> Merrill, "The Bots Who Edit Wikipedia (And The Humans Who Made Them)."

<sup>6</sup> "Figure Eight Home Page."

<sup>7</sup> "Moral Machine."

<sup>8</sup> See, for example, New York City's recent attempts to study algorithms affecting residents: Freed, "NYC's Algorithm Task Force to Hold First Public Meetings."

<sup>9</sup> Ahmed, "The Messy Truth About Social Credit."

## METHODOLOGY

Part of the difficulty in mapping the terrain lies in determining which of the many AI and CI tools to examine. To select our case studies, we undertook a multi-step process considering the context, approach, and outcomes of AI- and CI-based projects. Guided by our previous work on the topic, The GovLab examined existing online databases and repositories for public-facing projects potentially involving AI and CI components.<sup>10</sup> This initial scan allowed us to understand some of the current practices in the field but focused specifically on those tools that appeared to:

- ▶ Anticipate citizens' needs and expectations through cognitive insights and process automation;
- ▶ Pre-empt problems through improved forecasting and anticipation;
- ▶ Analyze large volumes of citizen data and feedback, such as identifying patterns in complaints;
- ▶ Allow public officials to create highly personalized campaigns and services; or
- ▶ Empower government service representatives to deliver relevant actions.

The results of this search were not meant to be comprehensive or representative. Instead, it aimed to highlight instructive projects lacking detailed analysis.

## CASE STUDIES

These criteria revealed 20 initiatives warranting further study to determine their relevance to the research question driving this report. Upon further analysis, 14 case studies were deemed especially relevant. Others were found to largely or exclusively leverage one innovation or the other (e.g. the Department of Homeland Security's AI-powered EMMA chatbot), and were thus removed from the sample. The GovLab then considered which examples would be most relevant for a policy-making audience, ultimately winnowing with two criteria. First, the researchers focused on cases most relevant for innovating and improving assessments of citizen needs and expectations, an identified area of interest. Second, the researchers focused on projects likely to generate insights with relevance for contexts outside of their initial areas of implementation.

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<sup>10</sup> Verhulst, *supra* note 3.

Subsequently, the research team reduced its list to five core case studies: Assembl; Popvox; Insights; Carrot Rewards; and the Camden Resident Index. Through desk research and interviews, The GovLab explored the context in which the cases came about, the process and conditions under which they developed, the outcomes of the work, and overall methodological implications. These cases can be read individually or as part of a cohesive whole. The nine additional cases (included in the Addendum) were examined in lesser detail but informed the work's overall recommendations.

### **METHODOLOGICAL LIMITATIONS**

The GovLab's research team undertook substantial effort to make its work accurate and useful. In addition to reviewing resources on the open web, soliciting documentation from stakeholders, and conducting interviews with the parties involved in each case study, the researchers sought to verify their analysis with interviewees and other experts prior to publication. Despite several attempts, it was not able to re-engage before publication with two interviewees associated with Case Study #4: Métropole du Grand Paris's Deployment of Assembl.

There is additional potential for gaps owing to the staff's lack of direct first-hand experience in any of the cases described. The GovLab could only access content available on the open web or shared with it by its interviewees. In several cases, The GovLab relied on translated documents.

### **KEY FINDINGS**

After studying and classifying the cases, The GovLab then sought to provide a comparative assessment of these AI and CI tools and a list of conclusions to inform future implementations and help officials make informed decisions within their communities.<sup>11</sup> Though explored in more detail below, these conclusions include:

- ▶ **The Field Remains Nascent:** Across all five case studies, there is significant ambition. While each project has a clear vision for how AI and CI can be used to improve governance, none has had a perfect implementation. Rather, difficulties in attracting an

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<sup>11</sup> The GovLab eliminated one of the initial 14 selected cases, the Hybrid Forecasting Competition, for a lack of available information.



audience to the project and making the insights useful and understandable were common.

- ▶ **Implementing Organizations Need to Put Greater Emphasis on Pre-Launch Activities:** Civic organizations often seem to struggle with launching AI and CI tools. Though it is important to acknowledge that there is no such thing as “perfect preparation” and that no civic tech project exists in a controlled environment, groups can at least minimize the potential for disruption by being systematic and methodological prior to launch.
- ▶ **Cross-Sector Partnerships Can Be Essential to Project Success:** Finally, almost all the examples show the importance of cross-sector relationships. Often, the organizations hosting AI and CI tools do not have all the resources needed to be successful. Though forming relationships can be difficult, involving multiple actors helps fill gaps in resources and expertise, identify possible analytical blind spots, and better reach the intended audience.



## **CASE STUDY 1**

# **THE US DEPARTMENT OF STATE'S USE OF INSIGHTS.US**

*Using Artificial Intelligence and Collective Intelligence to Understand Citizen  
Needs and Expectations*



## EXECUTIVE SUMMARY

- ▶ **Context:** In 2016, the United States Department of State sought to improve its passport application and renewal process in anticipation of an increase in the number of passport application and renewal forms. After consulting with the General Services Administration (GSA) and USA.gov, it engaged with the company Insights.US to better assess public sentiment around these processes.
- ▶ **Development:** Insights.US, with its proprietary software, launched the website [tell-us.usa.gov](https://tell-us.usa.gov). From January to February 2017, individuals provided their thoughts on the passport application and renewal process via an online form (CI). An AI protocol analyzed these comments, identifying comments with textually similar elements (AI). Commenters then verified the AI-generated groupings by picking out similar statements and writing an insight statement summarizing them. After having users conduct this analytic task, the Insights.US team analyzed these groups to arrive at common comments and complaints.
- ▶ **Outcome:** These core themes inspired the US Department of State to improve its passport application process. It committed itself to engaging better with other agencies, exploring 24/7 passport services, and researching a passport renewal alert system. The almost 1,000 comments received through the platform helped public servants demonstrate public needs and expectations and gain internal buy-in for these efforts.
- ▶ **Implications:** This tool stands out for the way in which it sought to connect citizens with public servants, both enabling citizens to ensure their concerns were heard and enabling public servants to have a cohesive image of the kinds of issues citizens were concerned about. A government might seek the same broad partnerships as Insights.US engagement with the US Department of State. It might also try to ensure low barriers to user participation and provide evidence that the concerns raised were heard.

## 1. CONTEXT

In 2016, the US Department of State had a problem. Based on its estimates, more than 20 million Americans would apply for or renew a passport for the following year, the most in its history.<sup>12</sup> At the same time, employees worried the passport application process was difficult, time-consuming, and confusing. Worse, some stakeholders were concerned people had few easy ways to express their complaints to the government. Consequently, government employees had little way of knowing the public's specific grievances and how they could address them.

Seeking to bridge this gap, the Department of State engaged with GSA, the federal agency responsible for the domain USA.gov, to identify ways it could incorporate data-driven systems to improve its feedback systems.<sup>13</sup> GSA, having an interest in finding “new ways to both get and process feedback from the public in order to better address their needs,” agreed to support this effort.<sup>14</sup>

## 2. INSIGHTS

Following desk research, the partners identified Insights.US as a third-party vendor to assist in this task. Insights.US an information, communications, and technology company, specializes in “civic engagement tool[s], powered by algorithms” for cities, governments, and nonprofits.<sup>15</sup> Through its proprietary software, it collects, aggregates and analyzes large amounts of public opinion.

## PROCESS

Built with Insights.US's proprietary platform, the Department of State and GSA launched a webpage hosted on the usa.gov site—*tell-us.usa.gov*—to gather public opinion on the passport

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<sup>12</sup> In 2007, federal law started requiring US citizens to present a US passport or Western Hemisphere Travel Initiative-compliant document to return to the US from Canada, Mexico, the Caribbean, and Bermuda. As adult passports are valid for 10 years, Passport Services anticipated many of the individuals who requested passports in 2006-2007 would seek to renew them in 2017. The specific 20-million estimate was the result of various inputs including the aforementioned context, quarterly surveys, focus groups, economic indicators, and business travel trends. *From:* Siegmund, “Re: Request for Information: Tell-Us.Usa.Gov.”

<sup>13</sup> Kalil and Wilkinson, “Harnessing the Power of Feedback Loops.”

<sup>14</sup> Siegmund, *supra* note 12.

<sup>15</sup> “Insights Civic Engagement Tool.”



application and renewal experiences. The engagement had four parts: Answer Collection; Idea Highlighting; Insight Refining; and Decision-making.



Figure 1: Screenshot of [tell-us.usa.gov](https://tell-us.usa.gov)

**Answer Collection:** The Answer Collection phase began with users responding to a question intended to set the agenda for the conversation. Consulting with Insights.US, the US Department of State asked: “How can we [the US Department of State] improve the [passport] application process to make it simpler and easier?”<sup>16</sup>

After finalizing this question, the parties set about raising public awareness of the site to secure public comment. A pop-up on the US Department of State’s site asked visitors to provide input. The Department also posted links to the page on its Twitter and Facebook accounts as well as its newsletters.<sup>17</sup> The US Postal Service and White House, meanwhile, supported outreach by encouraging participation on their websites.<sup>18</sup> From these announcements, 1,436 people

<sup>16</sup> “Product Tour,” Siegmund, “Tell-Us.USA.Gov | Improve Passport Experience.”

<sup>17</sup> Insights Engagement Manager, GovLab / Insights Conversation.

<sup>18</sup> Kaufmann and Siegmund, “USAGov and U.S. Department of State Partner to Streamline Passport Process.”

registered accounts. Almost one thousand provided answers about how the Department could improve the passport application and renewal experience.<sup>19</sup>

The screenshot shows two side-by-side panels from the Insights.US platform. The left panel, titled 'fkdiver's Answers', displays a user profile for 'fkdiver' (Mr.) and a response to the prompt 'IMPROVE PASSPORT EXPERIENCE'. The response, posted 2 years ago, discusses the user's experience at US Post Office facilities and suggests expanding to alternate locations like libraries or DMVs, as well as linking documents to special clearances and offering a senior citizen discount. The right panel shows a highlighted idea: 'expand to alternate locations such as libraries or DMVs'.

Figure 2: One response to the prompt (left) and the highlighted idea (right). See: “All Insights.”

**Idea Highlighting:** In the Idea Highlighting stage, the platform whittled the answers to their most essential parts. After providing their responses, participants were encouraged to highlight up to 200 characters containing the key points of their answers.<sup>20</sup> For users who declined to highlight their idea after contributing, the platform encouraged other users to highlight what they felt to be the other users’ core ideas.<sup>21</sup>

A text-mining algorithm then scanned the highlighted text for responses containing similar keywords. It then invited each user to indicate whether her response supported those same highlights.<sup>22</sup> These users could suggest insight statements that encompassed all the selected and user-validated content. In discussions with staff, Insights.US staff emphasized it “invested significant resources in recent years to improve the ability of users to draft insights themselves, though [drafting] remains an ongoing challenge.”<sup>23</sup> While suggested insight statements were rarely perfect (indeed, Insights.US staff reviewed each prior to publication), they show AI’s and CI’s role in summarizing inputs in addition to putting them together.

<sup>19</sup> Siegmund, *supra* note 16.

<sup>20</sup> Insights Office, Users Add Their Answers.

<sup>21</sup> Insights Engagement Manager, *supra* note 17.

<sup>22</sup> Insights Office, *supra* note 98.

<sup>23</sup> Siegmund, *supra* note 12.

Users were also sent updates periodically throughout the project so they could come back later and group suggestions that might have occurred after their initial participation.<sup>24</sup>

***Insights Refined:*** Third, the Insights.US team reviewed these AI and CI-derived groupings. These analysts determined what overarching theme united clustered responses. Through this analysis, the team derived nine insights. Most frequently and perhaps most obviously, individuals wanted an online process which “would be much easier and more convenient.”<sup>25</sup> Other insights included a desire for simpler language on forms and web pages, making physical passport application facilities easier to access, and providing on-demand user support through an online web chat or other system. After the Department of State reviewed these insights, they made them available on the tell-us.usa.gov site.<sup>26</sup>

- 1** **ONLINE APPLICATIONS AND RENEWALS:**  
An online process would be much easier and more convenient. People have lots of ideas about this, such as--
- Allowing multiple forms of online payment like credit and debit cards.
  - Getting updates on the status of applications
  - Taking passport photos and getting an immediate accuracy check
  - User accounts that let you save your progress and complete an application over time
  - And many more...



and 287 other members are linked to this insight

EXPAND

- 2** **SAVE TIME BY HAVING OTHER GOVERNMENT AGENCIES CONNECT WITH THE PASSPORT PROCESS:**  
Applicants have already taken the time to provide their personally identifying information and other data with government agencies. Make the agencies share it with the Passport office.



and 38 other members are linked to this insight

EXPAND

***Decision-Making:*** In the final phase, the Department responded to each of the insights with policies and interventions they planned to undertake in response (See “Outcomes and Impact” below). Insights.US posted these responses automatically to the website. It then sent personalized emails containing the government’s responses to users whose comments had been grouped within a particular insight (see Figure 4).<sup>27</sup> Consequently, individuals saw the impact their contribution made, matching their feedback with a specific and tangible response instead of a form letter.

Figure 3: Two of the synthesized insights. See “All Insights.”

<sup>24</sup> Siegmund, *supra* note 16.

<sup>25</sup> “All Insights.”

<sup>26</sup> Insights Office, Insights.us for Cities.

<sup>27</sup> “Product Tour” *supra* note 16.

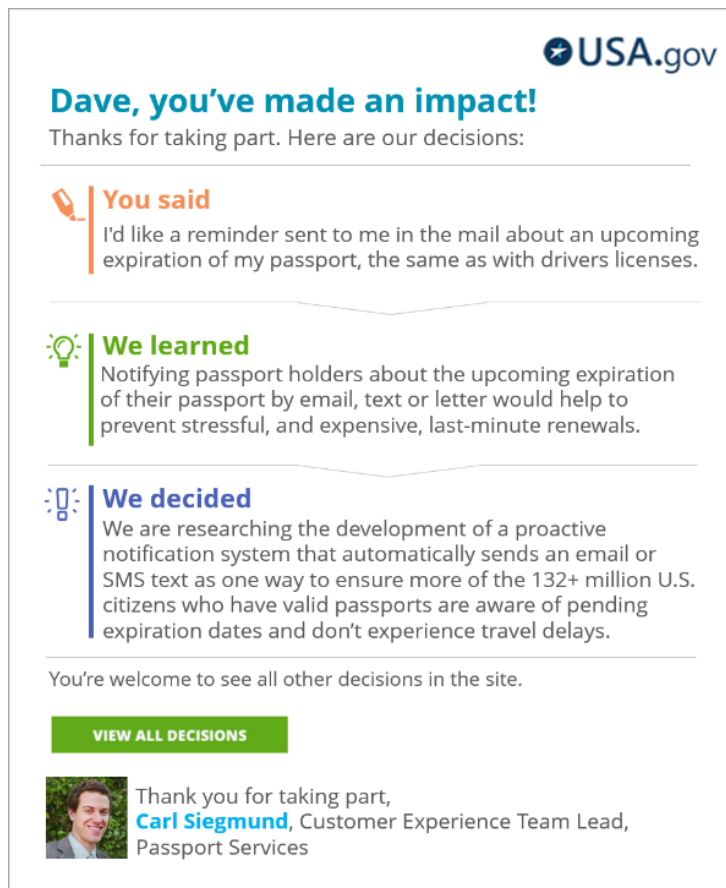


Figure 4: Example of an email sent to users

## DEVELOPMENT

Insights.US's engagement with the US Department of State depended on the company's proprietary civic engagement platform. Launched in 2011 with USD 40,000 in seed money, the Insights.US company and the algorithms undergirding the platform have gradually evolved over time. The platform's most current iteration is based on over 1,000 questions and 130,000 answers and supported by a team of 13 people.<sup>28</sup> Most Insights.US employees have public policy or software development experience. The team recently made Insights.US compliant with the European Union's General Data Protection Regulation (GDPR).<sup>29</sup>

Award amount and other contract information is not available for this specific engagement. However, services for cities and government agencies generally cost between USD 18,000 and USD 36,000.<sup>30</sup> This cost includes support from the Insights.US team in designing the right open-ended question(s) and developing relevant insights from responses to it. This support entails conversations between the client, in this case the US Department of State, and a member of the Insights.US team.<sup>31</sup>

<sup>28</sup> "Insights' Story."

<sup>29</sup> Insights Engagement Manager, *supra* note 17.

<sup>30</sup> "Pricing."

<sup>31</sup> *Ibid.*



The answer solicitation process can last several months. The US Department of State initiative ran from January 2017 to May 2017, with the public solicitation component ending in February.<sup>32</sup> Though Insights.US collected information on how long people spent on the site, the number of active users, and how many tasks they filled, US Department of State set no explicit metrics itself.<sup>33</sup> Nevertheless, the project had a general goal of better understanding what the public's complaints were and receiving enough responses to justify policy and process changes.

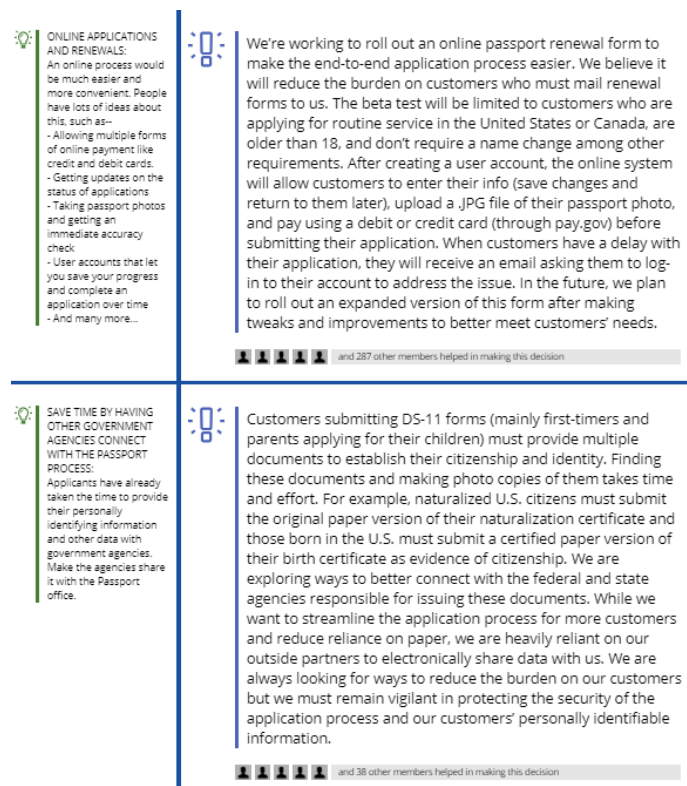


Figure 5: Responses from the State Department

websites.<sup>35</sup> The White House, which had made data-driven solutions a major priority, could later cite the project in its own work.<sup>36</sup>

## CONDITIONS AND CULTURE

Multiple stakeholders made this project possible. The US Department of State only identified Insights.US as a prospective partner after it engaged with the GSA and USA.gov about seeking out new ways to solicit public comment.<sup>34</sup> Once it selected Insights.US, it needed regular conversations with the company's team to settle on an appropriate question, design a usable website, and arrive at relevant analysis. The solicitation only received as much participation as it did thanks to the support of both the US Postal Service and White House who could draw attention to the initiative through their

<sup>32</sup> Siegmund, *supra* note 16.

<sup>33</sup> Insights allows implementing organizations to break down responses by demographic information, such as how the user accessed the site. This component was not incorporated.

<sup>34</sup> Kaufmann and Siegmund, *supra* note 18.

<sup>35</sup> Ibid.

<sup>36</sup> Kalil and Wilkinson, *supra* note 13.

Moreover, the US Department of State team had internal support. Passport Services, the internal body responsible for the passport application and renewal process, demonstrated commitment to improve its services.<sup>37</sup> Though Passport Services could have ignored public comments through the platform, public servants committed themselves to reviewing the insights and identifying if and how they could make reforms in response to them, as evidenced by their responses (see Figure 5).

Insights.US staff itself noted the importance of this support, noting “open-mindedness” and a “willingness to accept a changing way of thinking” are core to successful usage.<sup>38</sup> The platform is built to solicit external input, which means the leaders of the organizations who use Insights.US must be prepared to accept the decisions the platform users make. By accepting that citizens might provide unexpected inputs and being willing to accept those perspectives as part of their normal processes and not as an “afterthought,” groups such as the US Department of State can meet their goals.

### **3. OUTCOMES AND IMPACT**

At the close of the project, the US Department of State team reviewed each of the nine insights and developed responses to each.<sup>39</sup> While employees were already exploring some of the concepts raised, the project did raise new issues for public servants to consider. For instance, the US Department of State team promised to explore sending “renewal reminders to customers and expanding services to allow the public to get passport questions answered on evenings and weekends,” two of the suggestions provided.<sup>40</sup> It also promised to consider developing a virtual assistant fluent in multiple languages, similar to the US Customs and Immigration Services’ Emma.<sup>41</sup>

After reviewing its action plan and speaking with internal stakeholders, the Department committed itself to significant policy changes inspired by the feedback. It began work to expand 24/7 customer support and coordinating with other federal agencies to streamline paperwork,

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<sup>37</sup> Kaufmann and Siegmund, *supra* note 18.

<sup>38</sup> Siegmund, *supra* note 12.

<sup>39</sup> Siegmund, “All Decisions.”

<sup>40</sup> Kaufmann and Siegmund, *supra* note 18.

<sup>41</sup> Siegmund, *supra* note 16.

and promised to begin research on an automated passport renewal notification system. According to its exit survey, Insights.US claims the Department met 82 percent of the recommendations highlighted by the platform with a corresponding change.<sup>42</sup> The Department cited the public engagement made possible by Insights.US as useful in securing internal buy-in for this work.<sup>43</sup>

## 4. LESSONS LEARNED AND METHODOLOGICAL IMPLICATIONS

Insights.US shows how AI and CI can spur ideation and identify ways to improve service delivery. However, its operations depend on a few factors that might not be available to all. For one, not every public initiative will necessarily have the broad base of backers that Insights.US enjoyed, nor will every public engagement have support from groups as large and visible as the White House. Second, not every public engagement can necessarily be simplified to a single open question. Organizations might be required to provide more detailed prompts due to either legal and ethical requirements or because of demands from internal stakeholders. Though groups ought to avoid unnecessary complexity, simplicity might not always be possible. Nevertheless, this example does provide a few methodological insights:

- ▶ **Seek partnerships with a broad array of groups with relevant expertise or constituencies.** By operating with many stakeholders or intermediaries, a platform's sponsor can attract interest and engagement. A sponsor can also secure the technical or policy expertise needed to make the results of the engagement a reality.
- ▶ **Allow low barriers for public participation.** The easier a platform is to access, the more likely a user is to engage with it in a significant way. By reducing the US Department of State's concerns to a single open-ended question that users could respond to as they wished, Insights.US made public engagement simple. Other initiatives might explore similar ways to make public engagement as quick and painless as possible. However, as previously discussed, this simplicity can be a limiting factor. Civic organizations should be aware of which questions are simple enough to be transformed into a well-crafted civic engagement initiative.

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<sup>42</sup> Siegmund, *supra* note 12.

<sup>43</sup> Kaufmann and Siegmund, *supra* note 18.

- ▶ **Provide the public with evidence that their specific concerns have been heard.** Public-facing initiatives often have low perceived efficacy because users do not see the results of their engagement. By providing a mechanism through which users can track progress or see an official response, users can be satisfied with the knowledge that their specific concern was heard.





## CASE STUDY 2

### CAMDEN'S USE OF THE CAMDEN RESIDENT INDEX

*Using AI to Personalize and Scale Public Service Delivery*



## EXECUTIVE SUMMARY

- ▶ **Context:** In 2012, the London Borough of Camden began looking at ways it could improve and maintain public services with fewer resources. Following resident complaints about different parts of the borough government being unaware of public service engagements by other borough components, it began exploring ways to consolidate information across parts of government. The solution was the Camden Resident Index, a tool that consolidates information input from disparate local government datasets using probabilistic matching.
- ▶ **Development:** The Camden Resident Index uses an algorithm (**AI**) to consolidate information input by employees across the disparate parts of the London Borough of Camden (**CI**) into portraits of residents. The Index relies on proprietary software from IBM. The London Borough of Camden supports and maintains it, spending GBP 50,000 yearly to maintain the service, which can be accessed by 350 staff members.
- ▶ **Outcome:** Camden has no set metrics but notes several benefits of the program. The Index helps employees save significant time and effort in their day-to-day jobs by consolidating disparate databases. It has improved the collection of parking fines and helped the borough identify fraud. Additionally, the Index has supported some long-term, strategic planning efforts.
- ▶ **Implications:** The project shows the value of planning and preparation. Similar projects might take steps to ensure they have considered all possible risks and the product is easily understandable to its intended users.

## 1. CONTEXT

Camden is a borough of London home to about 270,000 residents and 29,000 registered businesses. Though a major source of economic activity with a productivity level 47 percent above the national average, it faced major financial constraints as it moved into 2013 due to national austerity measures.<sup>44</sup> Officials anticipated a 63 percent reduction in public services funding by 2020, which would severely undermine local authorities.<sup>45</sup> The London Borough of Camden—the local governing body of the borough responsible for registration services,

housing, parking, recycling, and other public services—expected to be especially affected.

Meanwhile, the national government discontinued ContactPoint, a national child protection database relied upon by Camden for multi-agency work, due to data protection concerns.<sup>46</sup> While borough officials recognized why the database was dissolved, the experience made them aware of how lacking their data coordination was in other areas. Residents complained about “different parts of the council not being aware of previous [public service] engagements.”<sup>47</sup>

In this environment, the London Borough of Camden faced two paths. First, it could take a “salami slicing” approach to its budget. In this approach, the council would operate “as it always had” but at the risk of instigating a vicious cycle where cuts would increase demand for services,



Figure 6: Borough of Camden. See: “Map of Greater London, UK with Districts Shown.”

<sup>44</sup> London Borough of Camden Project Manager, Camden Resident Index - Govlab call; Prothero, “Sub-Regional Productivity.”

<sup>45</sup> Mackintosh and Freeman, “Camden Council’s Medium-Term Financial Strategy 2019/20 – 2021/22 (CS/ 2018/26).”

<sup>46</sup> Nicholls and Sankey, “Was It Right to Scrap the ContactPoint Child Database?”

<sup>47</sup> Dencik et al., “Data Scores as Governance.”

necessitating further cuts as costs ballooned. Second, it could try to overhaul its entire administrative system, simplifying processes to meet budgetary constraints while maintaining most of its services.<sup>48</sup>

## 2. CAMDEN RESIDENT INDEX

The London Borough of Camden took the latter approach. Learning from its previous experiences with ContactPoint, local officials looked at ways to consolidate datasets and better enable multi-agency coordination. Through the usual public procurement process, officials sent a request for proposals. IBM responded to the request by offering use of its proprietary InfoSphere® Master Data Management software to consolidate different data inputs into a “Camden Resident Index.” Camden accepted the proposal after speaking with a neighboring borough, Brent, which had incorporated the same IBM technology into its daily business and could “speak to its benefits.”<sup>49</sup>

Camden hoped IBM could help it meet its goal of saving at least GBP 150 million—half its 2013 budget—by 2018.<sup>50</sup> Upon approving the proposal, IBM made minor revisions to tailor the software to Camden’s specific context, such as updating it to respond to the British address system.<sup>51</sup> Camden, meanwhile worked with the data firm Entity Group Limited (now Viqtor Davis) as an implementing partner “to help design the data model and [matching] algorithm [...] tailored to [Camden’s] specific requirements,” such as ensuring the algorithm wasn’t too aggressive or lax in matching and the model wasn’t too complex.<sup>52</sup>

### **PROCESS**

The Camden Resident Index represents one of the first attempts by a local body to implement a data management system targeted at “allow[ing] the single view of a citizen.”<sup>53</sup> With it, council employees can see a snapshot of how each household interacts with public services. This view allows the Council to “improv[e] and integrat[e] knowledge of the customer to help join up service

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<sup>48</sup> Symons, Wise Council.

<sup>49</sup> London Borough of Camden Project Manager, *supra* note 44.

<sup>50</sup> “London Borough of Camden.”

<sup>51</sup> London Borough of Camden Project Manager, *supra* note 44.

<sup>52</sup> *Ibid.*

<sup>53</sup> Dencik, *supra* note 47.

delivery better and on a bigger scale” and “provide services that are tailored to people’s needs.”<sup>54</sup> It does not grade residents on their interactions with the government, nor does it contain any case information. Rather, the Index forms matches across systems that can be used to better coordinate activities such as residency checks, detecting fraud, and identifying illegal subletting.<sup>55</sup>

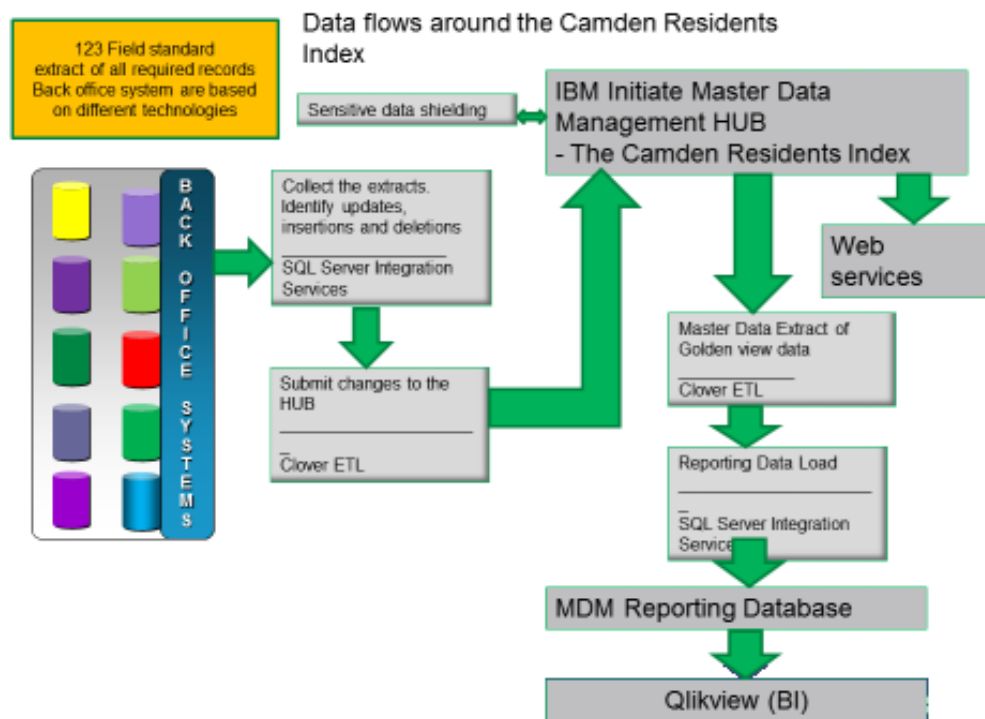


Figure 7: Operations diagram from the Index’s “Data Protection Impact Assessment”

The Index has two core components, one reliant on the collective inputs of council employees (CI) and the other reliant on IBM’s software (AI). The CI component relies on the processes expected of government: providing public services. Public servants across the government approach or are approached by residents on issues like housing, parking, and education. As public servants provide the necessary services to residents—whether that be giving out a library card or enforcing zoning regulations—they input information into databases managed by the council to their best ability and as the situation dictates.

<sup>54</sup> “Data Protection Impact Assessment (DPIA) – Full Assessment.”

<sup>55</sup> Ibid.

The algorithmic component matches these human-derived inputs into a cohesive image. After scanning through each of the borough's 17 largest business systems (containing 123 possible potential fields of information), an algorithm reviews records and tries to determine whether specific entries across systems are likely to describe the same person (e.g. determining whether the "Stuart McDonnell" who receives housing benefits is the same person as the "Steward MacDonald" with a parking permit).<sup>56</sup> This matching is done in probabilistic terms. The closer the entries resemble each other (e.g. having the same or a similar name), the higher the certainty assigned to the portrait. The more discrepancies (e.g. differing addresses or birth dates) there are, the lower the certainty assigned to the portrait. Individual users can then assess the matches and derive meaningful insights from them to support future engagements.

FIELDS	HB	CRM	HSD	ER	ADULTS	GOLDEN
Full Name	Fred Bloggs	Freddie Bloggs	Frederick Blogges	Fred Bloggs	Fried Bloggs	Fred Bloggs
DOB	10-1-1965	01-01-1900	10-1-1965		10-1-1965	10-1-1965
Gender	M	M	M		M	M
Address	10 The Grange Camden NW1 0AA	Flat A 10 The Grange Camden NW1 0AA	10 The Grange Camden NW1 0AA	Flat A 10 The Grange Camden NW1 0AA	10 Grange Camden NW1 0AA	Flat A 10 The Grange Camden NW1 0AA
Home Tel		0231-987-7866	0205-937-996			0205-937-996
Mobile	07988674707	077134563				07988674707
Email		fblogg@v.com	bloggy@bt.com			fblogg@v.com
Income Support	Y					Y
Customer Care Ind					Do not visit address alone	Do not visit address alone

Figure 8: Visualization of the matching process from "Data Scores as Governance"

The algorithm incorporates machine learning elements, allowing it to revise its processes in response to successful matches confirmed by human operators. It is also capable of displaying a "household view" wherein the Council can explore the records of all the people listed at a specific address. This feature gives the London Borough of Camden instant visibility to capture important information about vulnerable groups within the borough.

<sup>56</sup> "Data Protection Impact Assessment (DPIA) – Full Assessment;" Dencik, *supra* note 47.



## DEVELOPMENT

The spine of the Camden Resident Index is IBM's InfoSphere® Master Data Management software, which was initially developed for healthcare providers in the United States.<sup>57</sup> Made available in 2008, the software helps large organizations share data “distributed across multiple front and back-office systems that cannot be shared enterprise-wide.”<sup>58</sup> It receives regular updates and access can be secured through a monthly subscription.<sup>59</sup> The London Borough of Camden reports spending GBP 50,000 per year (USD 65,581) in direct costs to maintain the Index.<sup>60</sup> The cost to launch was about GBP 333,000 (USD 429,677).<sup>61</sup>

There were also indirect costs to incorporate the system into daily operations. The IBM software neither contains nor creates datasets, merely matching fields from the 17 most-used datasets managed by the Council.<sup>62</sup> As such, council officials needed to ensure information input into these datasets was accurate and up to date. Additional training and emphasis went into promoting accuracy of data sources about:

- Customer transactions;
- Housing;
- Council Tax and Benefits;
- Electoral Register;
- Adult and Children's Social Services;
- Schools and Pupil Information;
- Parking Control & Permits, Accessible Transport;
- Young People's Information; and
- Libraries.<sup>63</sup>

These elements were added in small batches to limit the potential for unintended consequences and to allow the algorithm and staff to learn as the project developed.<sup>64</sup> Project managers took

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<sup>57</sup> London Borough of Camden Project Manager, *supra* note 44.

<sup>58</sup> IBM Releases Industry-First Master Data Management Software; IBM InfoSphere Master Data Management Server Now Available.

<sup>59</sup> Kass, “Comparing Master Data Management's Top Five Vendors.”

<sup>60</sup> “Camden Privacy Impact Assessment (PIA) For Resident Index.”

<sup>61</sup> London Borough of Camden Project Manager, “RE: Thank You and Follow-up: Camden Resident Index.”

<sup>62</sup> “Data Protection Impact Assessment (DPIA) – Full Assessment.”

<sup>63</sup> Bryant, “Ref: FOI10251.”

<sup>64</sup> Symons, *supra* note 48.

this approach because they did not know “what [the final product would] look like at the start [...] You need a vision but don't be too rigid.”<sup>65</sup>

In addition, Camden took measures to limit the possibility of data exposure. Though it initially envisioned only 35 staff would have direct access to the Index, logistical realities forced the council to revise that.<sup>66</sup> As of 2018, about 300 staff have access to the Index.<sup>67</sup> The organization instituted system security controls to limit who among these 300 staff members could see the most sensitive datasets, such as those related to borough staff, local celebrities, and juveniles.<sup>68</sup> It also maintains audit trails, circulates acceptable use policies, and conducts regular staff training. Additionally, Camden does not work with third parties or purchase third-party datasets, preventing data transfers off site, and staff members with access are required to sign a confidentiality agreement.<sup>69</sup> Because the United Kingdom is a party to the EU's GDPR, the council must abide by its standards pertaining to data protection.

When first introduced, the council also consulted with a “stakeholder panel” containing members of the public. This consultation was intended to help shape the effort, though the eventual impact is unclear.<sup>70</sup> Officials also used their experience with the Resilient Families Programme, which provided targeted intervention for families with multiple problems, to inform how it audited the Index and tuned the algorithm.<sup>71</sup> Implementation began in December 2012. The Index officially launched in May of the next year.<sup>72</sup>

## **CONDITIONS AND CULTURE**

A few factors enabled Camden's work on its Index. First and foremost, the Index had strong support from the borough's leadership. Throughout the 2010s, Camden's political leaders pioneered the use of various innovative tools and systems. In 2012, officials launched an open

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<sup>65</sup> Ibid.

<sup>66</sup> Ibid.

<sup>67</sup> “Data Protection Impact Assessment (DPIA) – Full Assessment.”

<sup>68</sup> Ibid.

<sup>69</sup> “Data Protection Impact Assessment (DPIA) – Full Assessment”; London Borough of Camden Project Manager, *supra* note 44.

<sup>70</sup> Dencik, *supra* note 47.

<sup>71</sup> Camden Borough Council Project Manager, *supra* note 61.

<sup>72</sup> “London Borough of Camden Project Manager, Camden Resident Index - Govlab call.

digital platform for residents to view tax, housing benefit, repair, and parking permit information.<sup>73</sup> It planned to go paperless by 2014 and to launch an open data portal to improve transparency by 2015.<sup>74</sup> Officials recognized the importance of innovating on current practices, which included being able to use high-quality data.<sup>75</sup> The Index offered a way of meeting goals and responding to its environment.

This support, in turn, allowed Camden to secure the resources necessary for the project. According to senior managers, the total cost to launch the Index (including the hardware, software license, consultancy, commercial management, staff costs, and additional and existing staff resources) was about GBP 333,000 (USD 429,677).<sup>76</sup> GBP 50,000 (USD 64,774) per year is required to maintain it.<sup>77</sup> While a smaller organization might find it difficult to shoulder these costs, Camden had the capacity and commitment to see the project through to launch and to allocate resources year after year.

This commitment can be seen in Camden's attempts to address some of the concerns staff raised regarding data quality. The core value of the Index comes from the borough's ability to combine multiple sources from different business areas within the council into a cohesive portrait. Missing or improperly entered information in one dataset has the potential to compromise its overall utility. Although different teams manage these resources, they are subject to the data quality standards and procedures of the council. As such, "educating people in the business about data collection and how bad data [...] lead[s] to more problems" was a major priority.<sup>78</sup> Officials conduct data quality checks. Data stewards located in different parts of the government investigate and correct discrepancies when they occur.<sup>79</sup>

Staff also raised concerns about the potential for misuse. Recent events concerning China's "social credit" system and Facebook's engagement with Cambridge Analytica have underscored

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<sup>73</sup> Shubash, "Cam Dig Jou V2."

<sup>74</sup> Ibid.

<sup>75</sup> Symons, *supra* note 48.

<sup>76</sup> London Borough of Camden Project Manager, *supra* note 61.

<sup>77</sup> Bryant, *supra* note 63.

<sup>78</sup> Dencik, *supra* note 47.

<sup>79</sup> "Data Protection Impact Assessment (DPIA) – Full Assessment."

the risks highly accurate data systems pose to individuals.<sup>80</sup> Early in the project, public servants were reluctant to share data “either for legal protection reasons or ‘just cultural... and being concerned it would be used in a different way or in a way that is not intended for.’”<sup>81</sup> Others expressed reservations about the matching software, noting how it could arrive at inappropriate conclusions either by joining people together or incorrectly matching them, skewing service delivery.<sup>82</sup> The project’s Data Protection Impact Assessment notes the “increased power imbalance between the data subjects and the data controller.”<sup>83</sup> The most recent edition includes a guide to help users determine whether they meet the conditions under the GDPR to process data lawfully.<sup>84</sup>

These conversations were useful as Camden sought appropriate privacy-respecting procedures. As a solution, the Index compiles key person identifier components such as name, address, date of birth, and a few broad, top level service indicators that are non-transactional and do not involve any case information. For more sensitive, detailed information, Index users can use a system ID number to contact officers in a relevant service area. The officers can then review the request and make a judgement about whether providing additional data is appropriate and necessary.

While Camden did not overcome all reservations, analysts “noted this challenge is less prominent now than it was when the system was first implemented.”<sup>85</sup> Watching how the system operated and seeing the lack of serious failures reassured public servants. Moreover, Index users adopted the mindset that they faced just as much risk by not acting as they did by acting. They could not categorically reject the software for imagined harms. In the words of one former employee, “risk aversion around the sharing is not proportionate [...] A risk-based approach needs to be taken, not a sort of yes/no legalistic approach.”<sup>86</sup>

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<sup>80</sup> Ma, “China Has Started Ranking Citizens with a Creepy ‘social Credit’ System — Here’s What You Can Do Wrong, and the Embarrassing, Demeaning Ways They Can Punish You”; Granville, “Facebook and Cambridge Analytica.”

<sup>81</sup> Dencik, *supra* note 47.

<sup>82</sup> *Ibid.*

<sup>83</sup> “Data Protection Impact Assessment (DPIA) – Full Assessment.”

<sup>84</sup> *Ibid.*

<sup>85</sup> Dencik, *supra* note 47.

<sup>86</sup> *Ibid.*

### 3. OUTCOMES AND IMPACT

The Camden Resident Index had major impact on Camden, becoming instrumental in “enabl[ing] disparate customer records to be cross referenced and joined up accurately across systems,” something the borough could not previously do.<sup>87</sup> This improvement in situational awareness has expedited and expanded previous operations. Inquiries that took an hour before can now be completed in minutes.<sup>88</sup> The borough saves GBP 18,000 each year because it is no longer purchasing third-party data to address departmental silos. 350 people across 35 teams use the index day-to-day, enabling regular improvements to public services.<sup>89</sup> Describing the benefits, one project manager explained:

“I think citizens expect us [...] to operate as one service so you don’t have to tell the same story to different services. Having that capacity, having a housing officer that can see whether there is social service involvement for one of their tenants and then exchanging information that is appropriate, enables a more joined-up service. [...] If a housing officer is going to visit a property, they could then contact a social worker [and get their data] and then deal with their visit in an appropriate manner rather than not knowing.”<sup>90</sup>

These improvements have, in turn, allowed Camden to fulfill its societal goals of improving governance. In 2014, the Index helped streamline the electoral roll, successfully identifying new residents who had not been registered to vote, and saved the borough GBP 28,000.<sup>91</sup> In 2017, the Index allowed the borough to reclaim 14 illegally sublet properties.<sup>92</sup> Many of these processes are automated, reducing the need for in-depth analysis.<sup>93</sup> Borough officials have found it difficult to put a monetary value on many of the more mundane uses, like ensuring appropriate individuals receive services, and abstract benefits.<sup>94</sup> They do, however, emphasize how these

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<sup>87</sup> “Data Protection Impact Assessment (DPIA) – Full Assessment.”

<sup>88</sup> “London Borough of Camden.”

<sup>89</sup> *Ibid.*

<sup>90</sup> London Borough of Camden Project Manager, Camden Resident Index - Govlab call.

<sup>91</sup> Say, “Camden Claims Cash Wins from Residents Index;” London Borough of Camden Project Manager *supra* note 44.

<sup>92</sup> London Borough of Camden Project Manager, *supra* note 44.

<sup>93</sup> Symons, *supra* note 48.

<sup>94</sup> London Borough of Camden Project Manager, *supra* note 44.

abstract benefits have tangible components, like returning 14 illegally sublet properties and improving the renewal process for 25,000 Freedom Passes, a document allowing free or discounted access to public transport for the elderly and those with disability.

While the Index's intended use is in improving individual and household service delivery, workers have also used it for analytics and strategizing. Looking at a population level, the council can test the relationships between different variables on a case-by-case basis, requesting necessary data from business systems and making sure it complies with relevant data governance guidelines. For example, staff can study the relationship between poor school attainment and overcrowded housing, to determine what services to prioritize. To avoid problems around underrepresented groups (data invisibles), Camden does not use the Index for "negative automatic decision-making."<sup>95</sup>

They can also look at anonymized citizens and their interactions to make improvements to services. The government mapped a ten-year period of a social care case to identify where they can make future interventions to improve future care.<sup>96</sup>

#### **4. LESSONS LEARNED AND METHODOLOGICAL IMPLICATIONS**

The Camden Resident Index shows the ability of AI to sort through large amounts of difficult-to-parse data to allow public servants to reach actionable insights. By letting AI match human-input information, analysts no longer need to undertake the time-consuming task of sifting through 16 independent datasets. Similarly, they no longer need to manually detect cases of likely fraud and can instead conduct higher-level analysis while the system pings probable cases.

The Index also shows the importance of assembling resources prior to the launch of the project. Unlike other early examples of AI and CI experiments, Camden officials ensured they had internal buy-in, the finances needed to support the work, and tried to consider and mitigate potential hazards. Though some individuals expressed concerns about data quality or Index misuse, prior

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<sup>95</sup> London Borough of Camden Project Manager, *supra* note 44.

<sup>96</sup> Symons, *supra* note 48.

planning allowed the borough council to identify these issues early and develop privacy, training, and appropriate use policies to counter them.<sup>97</sup>

In short, this example has a few methodological implications for public officials to consider as they try to develop mechanisms for citizen feedback and government services:

- ▶ **Plan.** As previously discussed, Camden engaged in significant planning and preparation for this project. The impetus for the work was budget cuts years in the future. Officials prioritized training of those involved in data collection to ensure the accuracy when it was eventually analyzed. In the same way, officials should try to put an emphasis on pre-launch activities.
- ▶ **Consolidate information into one place to reduce transaction costs.** The core intent of the Index is to allow public servants to view different kinds of information about residents without having to manually sift through various datasets in different formats. By consolidating information into one place and making it easy to understand, officials can increase the likelihood users will glean some useful insight.
- ▶ **Consider how expertise from one sector can inform others.** Similarly, the Index aspires to bring together data collected from different areas—such as library science, health services, and education—into one place. By providing opportunities for information and expertise from one field to support another, officials might maximize the opportunities for success within their government.

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<sup>97</sup> “Data Protection Impact Assessment (DPIA) – Full Assessment.”





**CASE STUDY 3**

**POPVOX**

*Using AI for Constituent Engagement*

## EXECUTIVE SUMMARY

- ▶ **Context:** POPVOX is a US-based crowdlaw platform, a platform that uses new technology to enable the public to participate in the legislative process.<sup>98</sup> Developed amid concerns about a lack of responsiveness in the lawmaking process, the platform aims to make it easier for constituents to contact their lawmakers and for lawmakers to see their constituents' opinions.
- ▶ **Development:** In its earliest days, the POPVOX platform automatically scraped information about federal legislation from Congress.gov. In the days since POPVOX's founding, however, Congress.gov has created a bulk data repository, available in a machine-readable format. POPVOX automatically collects data from this depository (**AI**) and provides a platform for users to log their thoughts (**CI**). In accordance with congressional franking rules, each constituent's views are then sent directly to their legislators and displayed on the platform itself.
- ▶ **Outcome:** The POPVOX platform has users from each US congressional district and engages regularly with lawmakers and their staff. However, the platform does not yet publicly provide metrics against which to grade itself. Upcoming iterations on the platform as well as "LegiDash" and "POPVOX Local" aim to resolve some of these issues by seeking to measure how informed a user is.
- ▶ **Implications:** This project shows the potential and risks of trying to engage with a large audience on a broad issue. Similar projects might start small and scale up to ensure sustainability and representative insights. As POPVOX did, it might also consider what its goals are at the outset and how its position relative to other parties (e.g. constituents and lawmakers) impact its ability to achieve this goal (e.g. risks and responsibilities to partners, limitations on the kinds of metrics it can provide).

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<sup>98</sup> "CrowdLaw-Online Public Participation in Lawmaking."

## 1. CONTEXT

From 2007–2009, Marci Harris was a staffer in the US Congress working on the Affordable Care Act. As the bill moved closer to passage, the congressional office Harris worked with received increasing amounts of mail while her committee faced increasing numbers of position letters from advocacy groups. Harris noticed a few problems. First, offices struggled to process the volume of mail received. Second, offices had difficulty knowing what input was from a real constituent. Third, many real constituents seemed unaware of what Congress was actually working on. For instance, staff “were receiving letters advocating for a public option long after that was off the table when advocacy would have been better directed to issues that were under discussion.”<sup>99</sup>

The result was offices could not easily grasp the full depth of support or opposition for legislation. Meanwhile, the public had no way of knowing what letters their legislators actually reviewed, leading to feelings of low efficacy. The result was high “activist churn,” where people stopped engaging with Congress out of frustration or because of a lack of response.<sup>100</sup>

Together with Rachna Choundhry, a former lobbyist, and Joshua Tauberer, the civic technology activist responsible for the bill tracking website GovTrack, Harris began exploring tech-driven ways to address these problems.<sup>101</sup> The result was POPVOX, a platform designed to consolidate and simplify the constituent engagement process.<sup>102</sup>

## 2. POPVOX

POPVOX’s website describes it as “a neutral, nonpartisan platform for civic engagement and governing” that aims to “empower people and makes government work better for everyone.”<sup>103</sup>

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<sup>99</sup> Harris, “Re: Request for Information: Popvox;” Senior POPVOX Staff Member, “GovLab/ POPVOX Discussion.”

<sup>100</sup> McKinney, “The Future Of Political Engagement Is Here (And It’s Called POPVOX).”

<sup>101</sup> GovTrack.us is a project created by software developer and entrepreneur Joshua Tauberer in 2004. It publishes “the status of federal legislation, information about your representative and senators in Congress including voting records, and original research on legislation and congressional oversight & investigations.” For more information, please see: <https://www.govtrack.us/about>.

<sup>102</sup> McKinney, *supra* note 100.

<sup>103</sup> “About POPVOX.”



## PROCESS

A user's experience on POPVOX begins when they register an account using their real name, address, and contact information. This information determines who the person's legislators are. It is checked against two separate databases to confirm her identity, ensuring legislators only receive messages from their constituents.<sup>104</sup>

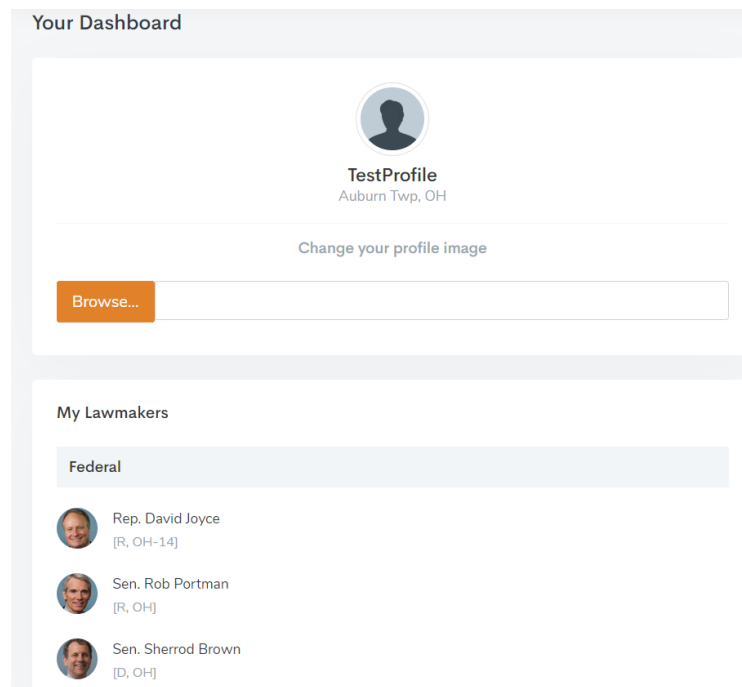


Figure 9: POPVOX's user dashboard

Next, the platform routes the user to the POPVOX dashboard. In the platform's early days, it used an algorithm to automatically scrape data from Congress.gov, Congress's internet-accessible database on legislative information. In the years after POPVOX's founding, however, Congress.gov's managers created a bulk data repository available to the public in a machine-readable format.<sup>105</sup> Taking information from this repository, the platform presents the user with recent actions taken by her congressional representatives on legislation and each piece of legislation introduced before the body itself. Users can then navigate to these individual bills and—under a pseudonym of their choice—log their opinion for or against the bill. These thoughts can be logged either as a simple up-or-down vote or as a longer message explaining the reasoning

<sup>104</sup> Zax, "Fast Talk."

<sup>105</sup> Per interviews, the state version of the platform will rely on the commercial source LegiScan, which provides a standardized format for legislation across all 50 states. Harris, *supra* note 52; US Government Publishing Office, "Bulk Data Repository."

for the vote. Users can also review how other users and advocacy groups reacted to the legislation. The platform does not attempt, in its current form, to represent congressional activity outside the legislative process (see “Lessons Learned” below).

Finally, the platform displays the collection of reactions, showing how residents of each district or state felt about an issue. An algorithmic system collects each reaction and electronically sends them to each corresponding user’s legislator’s office.

This description only describes the version of the platform accessible at the time of writing in June 2019. According to interviews, POPVOX is developing versions of its platform for localities and US states.<sup>106</sup> It also plans to expand its offerings to allow lawmakers to “post a position on a pending bill and/or share an update and that is sent to anyone following them based on the follower’s preference.”<sup>107</sup> This summary does not describe other initiatives spearheaded by POPVOX such as LegisDash, a closed social network for constituents and lawmakers to help congressional offices “more efficiently view, batch, and respond to messages delivered to Congress” supported by the Democracy Fund.<sup>108</sup>

## **DEVELOPMENT**

POPVOX aims to reduce the gap between citizens and their federal legislators. For this goal, it tries to address two central questions. First, is there a way to centralize public advocacy so it is easy for people to influence policymaking? Second, is it possible to declutter public engagement so legislators know how their constituents feel about specific bills beyond vague generalities?<sup>109</sup>

In response to the first of these questions, POPVOX provides an outlet where large groups of people can express their thoughts with few transaction costs. The platform allows people to see almost in real-time what their legislators are doing and to react, whether it be to a highly publicized vote on health care to one related to the minting of commemorative coins. In response to the second, POPVOX’s address validation and message delivery service tries to make it easier for members of Congress to separate meaningful engagements from constituents from mass,

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<sup>106</sup> “Home.”

<sup>107</sup> “New ways to engage with your lawmakers on POPVOX.”

<sup>108</sup> “POPVOX LegiDash Fund.”

<sup>109</sup> Zax, *supra* note 104.

low-content emails. By separating the wheat from the chaff, the argument goes, office staff can better tally the extent of support or opposition for a bill.

In measuring its success in achieving this goal, the company does not seek to quantify success in terms of likes or page views.<sup>110</sup> This decision is informed by input from individuals like sociologist Erhardt Graeff whose research suggests usage metrics are counterproductive, if not outright exploitative, for citizen engagement platforms.<sup>111</sup> Rather, POPVOX engages with lawmakers and their staff to seek feedback. Harris recently testified before the House Select Committee on the Modernization of Congress about improving the constituent engagement process.<sup>112</sup> POPVOX previously worked with the House Democratic Caucus on its intranet system.<sup>113</sup>

Staff have also engaged with academic researchers from across the country to assess the platform's value for improving civic efficacy.<sup>114</sup> A pilot is underway in Sebastopol, California and POPVOX hopes to expand the effort after initial tests. Once they finish this research, staff plan to develop measures inspired by it to assess how much the public learns from POPVOX.

### **CONDITIONS AND CULTURE**

Substantial financial investments from angel investors, such as open-source activist Tim O'Reilly, and support from friends and family of the founders made POPVOX possible. These investments enabled Harris and the other co-founders to hire staff—three full-time employees and one part-time—and secure additional technical resources.<sup>115</sup> POPVOX is further supported by widgets, private investments, and selling use of its proprietary mail delivery system to third-party vendors, the last providing the bulk of funding.<sup>116</sup> Staff hope to develop a further funding stream through

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<sup>110</sup> Senior POPVOX Staff Member, *supra* note 99.

<sup>111</sup> Harris, *supra* note 99; Graeff, "How Silicon Valley Can Support Citizen Empowerment."

<sup>112</sup> Harris, "Improving Constituent Engagement."

<sup>113</sup> Senior POPVOX Staff Member, *supra* note 99; Williamson, "DemCom to Integrate with POPVOX;" Ho, "Start-Ups Aim for a More Democratic Lobbying System"; Goodman, "Crowdfunding Case Study."

<sup>114</sup> These researcher teams include UC Irvine, UC Riverside, UC Berkeley, Stanford University, The Ohio State University, University of New Hampshire, Georgetown University's Beeck Center for Social Impact and Innovation. They are studying pilots for POPVOX's local platform in Sebastopol, California, Inland Empire, California, Irvine, California, Bay Area, California, Chicago, Illinois, Madison County, Tennessee, Philadelphia, Pennsylvania, and Columbus Ohio. See: Senior POPVOX Staff Member, *supra* note 99.

<sup>115</sup> Harris, *supra* note 99.

<sup>116</sup> McKinney, *supra* note 100.

the development of tools for local governments. The Tides Foundation, supported by a grant from the Democracy Fund, fiscally supports POPVOX's nonprofit LegiDash project.<sup>117</sup>

At the same time, POPVOX leadership cites the “lack of stable funding in this space” as a source of strain. The founders did not consider the normal start-up approach of looking for venture capital funding with a goal of exit to be consistent with their mission.<sup>118</sup> Company leadership claim they are “adamant in maintaining trust” and “set[ting] [ethical] lines that should not be crossed” (e.g. using a civic engagement platform to sell user data or featuring one topic over another). These decisions limit the money the company can make and POPVOX's overall rate of expansion.<sup>119</sup> While this approach limited short-term growth, staff claim it was “the right decision and is paying off in the trust [POPVOX] has established over the years.”<sup>120</sup>

**H.R. 1585 Violence Against Women Reauthorization Act of 2019**

US HOUSE OF REPRESENTATIVES

**Status:** Referred to the Committee on the Judiciary, and in addition to the Committees on Energy and Commerce, Financial Services, Ways and Means, Education and Labor, Natural Resources, and Veterans' Affairs, for a period to be subsequently determined by the Speaker

[Read Bill Text on Congress.gov](#)

Violence Against Women Reauthorization Act of 2019

**Sponsors**

**Rep. Karen Bass [D, CA-37]**  
Introduced on Mar 7, 2019

91 co-sponsors

A grid of 91 small circular portraits of the co-sponsors of the bill.

Figure 10: Example of how legislation is displayed to POPVOX users

This approach aligns with other user-focused decisions. Being familiar with the constituent engagement process, Harris and her colleagues understood the importance of designing an

<sup>117</sup> Harris, *supra* note 99.

<sup>118</sup> Harris, *supra* note 99.

<sup>119</sup> Senior POPVOX Staff Member, GovLab/ POPVOX Discussion.

<sup>120</sup> Harris, *supra* note 99.



intuitive platform that could be understood easily.<sup>121</sup> This perspective and a willingness to iterate over time has allowed POPVOX to adjust and reinvent its platform in response to feedback. Adding personal profiles, taking steps to allow better policymaker use of the platform, and launching a local version of the site have all occurred in response to feedback.<sup>122</sup>

As Harris noted in her recent testimony before the House Select Modernization of Congress Committee, the platform has tried to avoid the common pitfalls associated with political content on platforms by not measuring success by clicks:

“What we’ve seen in some of the research is that typically social media platforms are optimized for something other than letting people feel more informed, but to drive a click and get them mad and get them angry. That drives a lot of engagement and gives a lot of eyeballs for ads, but it doesn’t necessarily give [lawmakers] better information to make decisions or leave a constituent feeling good about the interaction.”<sup>123</sup>

### 3. OUTCOMES AND IMPACT

In attempts to improve situational awareness for both sides of the citizen–legislator relationship, POPVOX has ambitious aims. In its ideal form, it aspires both to improve governance and empower citizens. Though it launched almost a decade ago, reactions to bills still occur multiple times a day.<sup>124</sup> Activity on the site tends to spike amid highly publicized votes.<sup>125</sup> Even though the platform itself does not provide any indication that a lawmaker’s office received a comment (which would likely be difficult if not impossible given that the platform’s third-party status), the continued use suggests some citizens see POPVOX as another tool to connect with their lawmakers.

The number of responses to legislation can potentially be one kind of metric. While the design of the platform seems to encourage this assumption with its mapping and tallying, using bill-by-bill response rates presents serious issues (see "Lessons Learned" below).

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<sup>121</sup> Ibid.

<sup>122</sup> “POPVOX.”

<sup>123</sup> Harris, *supra* note 112.

<sup>124</sup> “Federal Overview.”

<sup>125</sup> McKinney, *supra* note 100.

More relevantly, the platform also has advocates on Capitol Hill who see it as a way of collecting and aggregating public opinion. Steny Hoyer, Democratic Majority Leader, used one of POPVOX's widgets to collect the public's sentiment on the 2019 government shutdown and subsequent bills to reopen the government.<sup>126</sup> In addition, the current work on launching state and local components to the site hint at strong interest in POPVOX outside Washington. Its overall benefit, however, is unclear because it is unknown how many and to what extent congressional offices use the information delivered by POPVOX.

Without hard, externally verifiable information on these engagements, however, it is hard to assess POPVOX's overall success in "inform[ing] and empower[ing] people and mak[ing] government work better for everyone."<sup>127</sup> The organization's previously discussed relationship with researchers aims to rectify this fact. Yet, until those involved publish the work, The GovLab cannot make any value assessment.

#### **4. LESSONS LEARNED AND METHODOLOGICAL IMPLICATIONS**

POPVOX shows the importance of having a clear, user-friendly platform. As discussed, Harris and her colleagues put an emphasis on designing an intuitive platform that could be understood easily. For the large part, this fact shows. Registration is straight-forward. The dashboard provides users with a quick overview of recent legislative activity relevant for them. Logging a position for or against a bill is quick and easy.

At the same time, some users might be frustrated by the lack of indication a legislator's office received their comments. Given the impossibility of providing this to constituents (Congress has not elected to make this kind of information available and providing this information would effectively require POPVOX to surveil the actions of offices, breaching its trust with them), the site instead uses a variety of statistics to show how other users have responded to legislation. These statistics are presented visually, attempting to show the responses nationwide and constituency-by-constituency. These visuals, and the map especially, could be interpreted by the user as denoting a nationwide conversation between users or an indication of how people in specific districts or states feel about an issue.

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<sup>126</sup> The Office of Majority Leader Steny Hoyer, "Trump Shutdown Stories."

<sup>127</sup> About POPVOX" *supra* note 103.

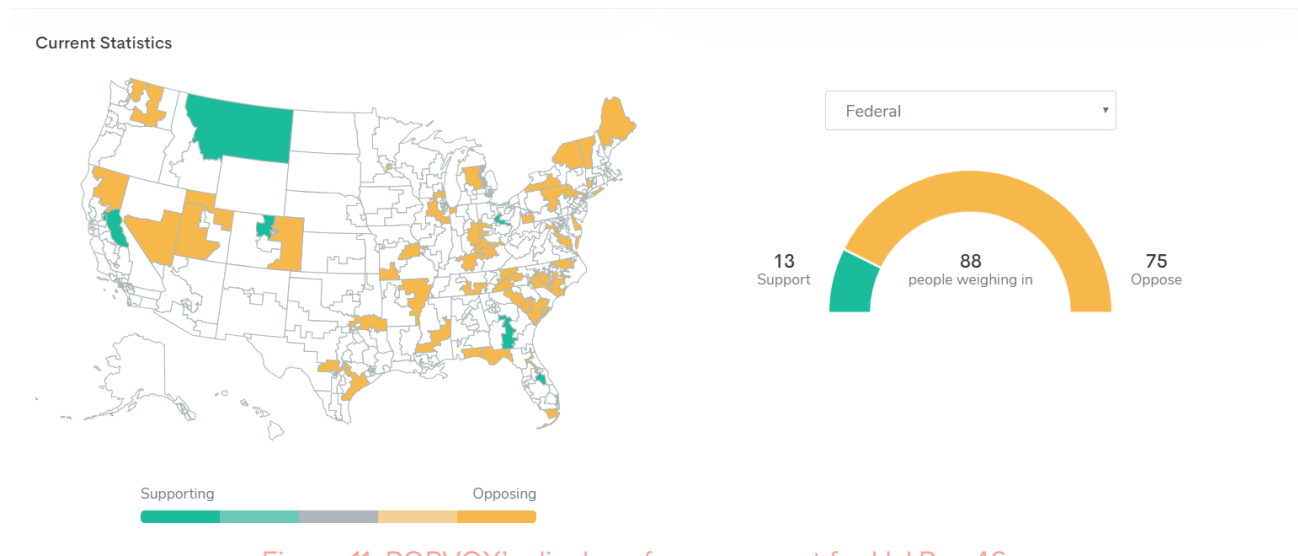


Figure 11: POPVOX's display of user support for H.J.Res 46

Though the platform still receives daily comments, many of these reactions are from a handful of users. Indeed, a recent major piece of legislation in the United States, *H.J.Res. 46 Relating to a national emergency declared by the President on February 15, 2019*, garnered reactions from only 88 users, with many districts and entire states unrepresented.<sup>128</sup> It would be unfair to grade POPVOX by the standards of a poll, survey, or other attempt to measure public opinion when its set goal is to improve the constituent–lawmaker relationship. POPVOX leadership explicitly say the platform is “a self-selected transparent representation of people contacting Congress” and not a poll.<sup>129</sup> At times, however, these displays do seem to invite the comparison.

This issue reflects another problem, albeit one that POPVOX's staff have limited control over: public adoption. Many of the outside-facing elements of the site are only as valuable as the effort of the users, both lawmaker offices and constituents. For a user examining how people have responded to specific bills, many of the responses tend to be low in content, often reacting less to the content of the bill than to the sponsor's political party or media reaction surrounding it.<sup>130</sup> The consolidated area for organizations to provide their views can be useful, but it requires the organizations to actually log on to the platform and indicate their views or for the organization (or

<sup>128</sup> “H.J.Res. 46 Relating to a national emergency declared by the President on February 15, 2019.”

<sup>129</sup> Harris, *supra* note 99.

<sup>130</sup> “H.R. 1585 Violence Against Women Reauthorization Act of 2019.”

a congressional staffer) to forward the organization's position letter to POPVOX.<sup>131</sup> A recently added feature allows elected officials to log or explain their view on a pending bill, but few offices have made use of this feature at the time of this writing.<sup>132</sup> Staff added this feature in response to a request from Congress, and the beta test case will be promoted by a committee to its members to test buy-in.<sup>133</sup> Similar civic tools ought to keep questions about buy-in in mind.

POPVOX's example also invites organizations to consider what their focus should be. In its current form, the platform only captures the progress of legislation, not the whole daily business of Congress. This decision is intentional, as POPVOX the company does not consider a third-party platform necessary to address non-legislative items like congressional casework, flag and tour requests, and scheduling. It also forces users to avoid generalities and focus on the substantive business of the chamber, better informing constituents of what Congress is doing. While users might wish to discuss other issues—sharing their attitudes on hearings, debate confirmations, or requesting their lawmakers introduce bills on as-of-yet untackled issues—staff believe constituents have other avenues to address these topics and they should not be attempting to recreate all the functions of a member office. Moreover, lawmakers can make use of the newly implemented “update feature” to share their views on select issues and provide users with a venue to share their attitudes.<sup>134</sup>

According to interviews, the platform is in an active state of development, iterating in response to feedback from users and congressional staff. One recent addition, granting legislators the ability to indicate and explain their views before they vote, significantly expands the platform's potential reach. Similarly, the local version of the platform (which is still in development) will likely incorporate both AI “scraping” and information directly uploaded by local government officials.<sup>135</sup> As these components have not yet been launched, this report cannot assess their capabilities.

This example has a few methodological implications for public stakeholders to consider should they try to develop mechanisms for citizen feedback and government services:

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<sup>131</sup> Several organizations, such as DemCorp, use POPVOX's position API. From: Harris *supra* note 99.

<sup>132</sup> Senior POPVOX Staff Member, *supra* note 99.

<sup>133</sup> Harris, *supra* note 99.

<sup>134</sup> *Ibid.*

<sup>135</sup> Senior POPVOX Staff Member, *supra* note 99.

- ▶ **Focus small before scaling.** Big public engagement projects require big contributions of resources and user participation whereas smaller projects can rely on smaller investments and a smaller active user base. They can also allow officials to test their work and improve their methods before exposing themselves to large, consequential circumstances.
- ▶ **Offer visible metrics to allow external actors to assess performance.** One way to encourage adoption of a public engagement platform is to quantifiably show it is active and likely to be sustainable over time. A potential user might want to know how many people log in each day, how many responses are logged, and how quickly messages are read and responded to by politicians and others. When these numbers are absent and there is no indication that inputs provided will be seen and responded to, potential users might become discouraged from participating.
- ▶ **Adopt an iterative approach.** Though this case study focuses mainly on POPVOX the platform, POPVOX the company has embraced various changes in response to a changing political context. The titular platform adopted data protection requirements, such as disabling social log in, in response to revelations around social media companies and their handling of private data.<sup>136</sup> Demand on the local level led the company to pursue a local version of its site. A public-facing institution can embrace a similar exploratory approach. A flexible development philosophy can allow an organization to take advantage of circumstances as the political environment changes, more resources become available, and technology improves.

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<sup>136</sup> Harris, *supra* note 99.





#### **CASE STUDY 4**

## **MÉTROPOLÉ DU GRAND PARIS'S DEPLOYMENT OF ASSEMBL**

*Collecting Knowledge to Shape Policy Development*



## EXECUTIVE SUMMARY

- ▶ **Context:** The Métropole du Grand Paris is a French administrative structure created to encourage collaboration between communities in the Paris metropolitan area. One of the tasks assigned to the Métropole as part of its role was to draft a digital development strategy with significant local input. Seeking to reach as many stakeholders as possible and fill a growing desire from local leaders to use digital tools, the Métropole incorporated online discussions through the software platform Assembl.
- ▶ **Development:** Assembl uses a multi-step process to formulate useful group discussions. Part of this process entails collecting large amounts of open-ended comments from stakeholders on a set agenda item (**CI**). After gathering these inputs, an algorithm scans these comments for common elements and groups sets of ideas (**AI**) to allow human operators to better analyze them and convert them into actionable insights that can be discussed in further detail by the selected stakeholders.
- ▶ **Conditions:** Though the Métropole considered the experience to be a useful supplement to in-person workshops, fears about legitimacy limited its overall reach. The Métropole did not think it had the trust needed to directly contact the public. The Métropole ultimately contacted local public servants as a substitute. Many feared that expressing their individual opinions would undermine their role as public servants. A decision not to vet private actors and usability issues further undermined the project's potential.
- ▶ **Output:** The operational value of this effort was in transferring knowledge across sectors and helping develop useful policy while the eventual societal value will be improving decision-making. The Métropole used the insights from the engagement in the creation of its 2019 digital development strategy.
- ▶ **Implications:** This example shows the importance of knowing an organization's limitations beforehand, both in terms of tangible (e.g. staffing, finances) and more abstract (e.g. legitimacy) resources. A similar organization might try to partner with relevant civic organizations to ensure it can engage with the intended beneficiaries.

## 1. CONTEXT

On January 1, 2016, France created the Métropole du Grand Paris.<sup>137</sup> A state institution created to coordinate the 131 communities around the City of Paris, its mission is “to define and implement metropolitan action to improve the quality of life of its residents, reduce inequalities between regions within it [...] and improve attractiveness and competitiveness.”<sup>138</sup> As part of this mission, the Métropole needed to draft a digital development strategy.<sup>139</sup> Statute required the strategy to identify infrastructural needs and what actions the Métropole could take to coordinate the deployment of digital infrastructure.

The Métropole du Grand Paris, a public organization charged with supporting 7.2 million people with only 55 dedicated staff members, debated how to fulfill this obligation. Leaders discussed whether they should “develop a strategy in a dark room” or pursue a more ambitious approach to engagement. After internal discussion, the Métropole settled on a two-part strategy. First, it would conduct workshops and other face-to-face meetings with the communes. Second, staff would “use all the digital tools [available] to reach citizens.”<sup>140</sup>

Subsequently, Métropole published a Request for Proposals and examined bids from third-party civic technology vendors. In assessing the subsequent responses, staff looked for tools that would allow them to operate in “a collaborative way” with stakeholders in a “maximum number of cities.”<sup>141</sup> Based on the strength of their proposal and their previous work supporting large citizen debates in places like Occitanie, the Métropole accepted the bid by bluenove and made use of their proprietary software Assembl.

## 2. THE TOOL

Assembl is a closed-source software tool managed by the Paris- and Montreal-based information and communications technology company bluenove.<sup>142</sup> The company advertises its platform as

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<sup>137</sup> “Page d’accueil.”

<sup>138</sup> “Le Nouveau Grand Paris : Un Projet Par et Pour Les Franciliens.”

<sup>139</sup> Choquin, “Schéma Métropolitain d’Aménagement Numérique – Grand Paris Métropole d’intelligences.”

<sup>140</sup> Ibid.

<sup>141</sup> Ibid.

<sup>142</sup> @bluenove, “Bluenove.”

eliminating “the chaos of working in a large group [while facilitating] the emergence of innovative, new ideas” via collective and artificial intelligence.<sup>143</sup>

## PROCESS

A plug-and-play software, Assembl provides a framework for information gathering and debate. As intended, the platform provides space for hundreds or thousands of people in a company or a constituency to debate and co-create new ideas. The platform routes participants through four phases—discovery, ideation, exploration, and convergence—where they respond to open-ended questions, vote and respond to the answers of other participants. As the project moves forward, AI groups comparable responses to identify priorities and arguments for and against proposals.<sup>144</sup>

Due to extenuating circumstances (see the “Conditions and Culture” below), the Métropole’s implementation deviated from this model. Instead of several hundred users, a few dozen public servants used the platform. Those individuals who logged on to the software were redirected to a page explaining the goals of the initiative and the two-phase structure it would take: “The State of Play,” what users perceived to be priorities based on their experiences and vision, and “Co-Construction of Metropolitan Actions,” what the Métropole could do to address them.

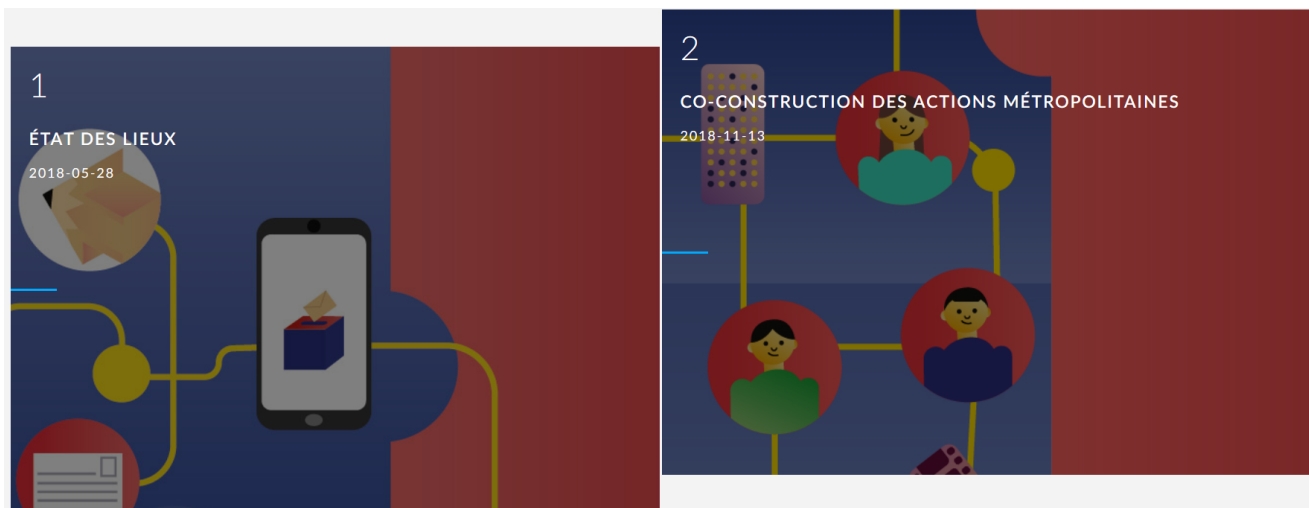


Figure 12: Screenshot of the first two phases of discussion on the platform. See: “Métropole Inclusive.”

<sup>143</sup> “Harnessing the Power of Collective Intelligence: Communities & Technologies.”

<sup>144</sup> bluenove, Assembl Corporate English Version.

Clicking this first phase took users to a page listing themes and sub-themes selected by the Métropole to structure a discussion.

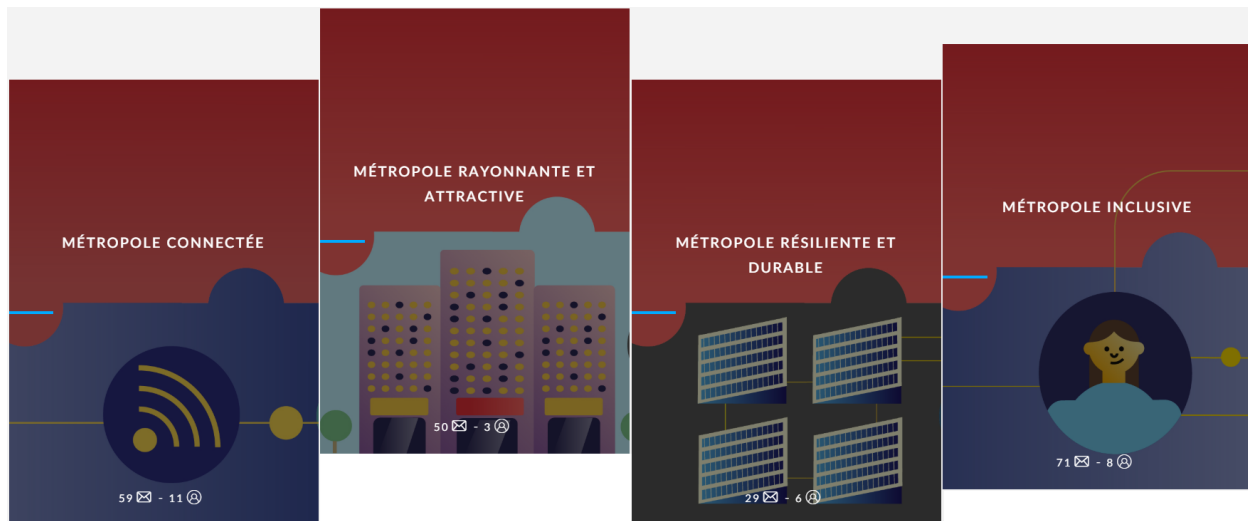


Figure 13: Screenshot of the themes under “Etat des Lieux.” See: “Métropole Inclusive.”

Users could then navigate to a theme to view a synopsis of the issues as defined by Métropole staff. In the theme of “Inclusive Metropolis,” for instance, the platform asked users what initiatives they had undertaken in their communities, what the objectives had been, and whether they encountered obstacles in the process.<sup>145</sup> Other users could react to responses provided by other users. The platform displayed the total positive or negative reactions next to each comment (see Figure 14). Users had from May 29 through July 10, 2018 to participate in the discussion.



Figure 14: Example prompt and response. Note the “reaction” function.

At the end of this period, machine learning algorithms trained to capture textual similarities scanned and grouped responses. After the algorithm formed these groups, the bluenove team (per their contract and usual operating procedure) and Métropole staff synthesized these insights

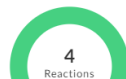
<sup>145</sup> “Métropole Inclusive.”



to support a summarized list of “actions to develop.”<sup>146</sup> This summary also included insights gathered by Métropole from workshops and face-to-face meetings held between March and September 2018. Métropole staff converted this work into a report, *Etat Des Lieux: Contribution technique des collectivités du Grand Paris* (State of the Places: Technical Contribution of the Greater Paris Communities). The report served as the basis of the second phase of discussions.<sup>147</sup>



## Announcement



Dans le fil de discussion ci-dessous vous sont proposées des **actions à développer**. Il s'agit notamment des actions définies lors des ateliers du Schéma Métropolitain d'Aménagement Numérique des 27/09 et 03/10.

Figure 15: Second-phase depiction of total messages, contributions, and participants

Having begun the discussion with public servants, the Métropole then opened the discussion to private actors who expressed an interest in helping draft the digital strategy at France’s annual Viva Technology conference, held prior to the launch of the platform.<sup>148</sup>

In this second phase, public servants and private actors reviewed these insights. Then, in a threaded discussion, they discussed “ideas or projects” they thought should be undertaken by the Métropole to implement them and whom should be involved. The platform aided discussion by providing summaries or syntheses of the key points of the previous debate. The Métropole monitored the discussion with an AI-enabled dashboard that allowed them to monitor the

<sup>146</sup> bluenove, *supra* note 144.

<sup>147</sup> “Métropole Inclusive” *supra* note 145.

<sup>148</sup> Métropole du Grand Paris Project Manager, Métropole d’intelligences/ Assembl Use Case Interview.

elements of the discussion, like number of posts, participation rate, and potentially useful ideas.<sup>149</sup>

Phases	Description	AI Component
<b>Phase 1</b> State of Play	Public servants shared their experience and vision on themes selected by the Métropole.	After the month-long phase, an algorithm scanned the responses for similar language and grouped comments to allow researchers to develop summaries.
<b>Phase 2</b> Co-Construction of Metropolitan Actions	Using insights from the previous phase, public and private actors discussed in a threaded format how to take ideas from the abstract to reality.	The overall discussion is monitored by the Métropole via an AI-enabled dashboard displaying the number of posts, participation rate, and potentially useful ideas. <sup>27</sup>

*Phases in the Initiative*<sup>150</sup>

Though Assembl ordinarily includes a third phase wherein users are presented with two columns “which allow [them] to specify their points of view on a particular idea,” the Métropole opted not to include this component. The Métropole also did not include a formal voting phase for participants to vote for or against specific proposals. Staff only intended the platform to collect ideas and felt deep analysis incorporating these elements would be ineffective in the implementation’s truncated state.<sup>151</sup> In all, Métropole took one month to launch the platform.<sup>152</sup>

## **DEVELOPMENT**

The Métropole’s implementation represents one recent use of Assembl, but the platform launched in 2013. Then developed as part of the CATALYST (Collective Applied Intelligence and

<sup>149</sup> bluenove, *supra* note 144.

<sup>150</sup> Ordinarily, uses of the Assembl platform include two additional stages, a “Pro and Con” discussion in which powerful arguments for and against specific ideas are assembled in different columns and a voting phase in which all views on an issue are tallied. Due to the specific circumstances of the project, the Métropole did not incorporate these elements. See: bluenove, *supra* note 144; Métropole du Grand Paris Project Manager, *supra* note 148.

<sup>151</sup> Ibid; Senior bluenove Staff Member, Métropole d’intelligences/ Assembl Use Case Interview.

<sup>152</sup> Choquin, Marine. “RE: [EXT] Re: Métropole d’intelligences/ Assembl Use Case Interview,” May 2, 2019.

Analytics for Social Innovation Project) consortium, a research body focused on building tools to mobilize collaborative knowledge creation for the public good, Assembl was one of five tools developed to declutter and clarify online discussions for civic groups.<sup>153</sup>

Imagination for People, Assembl's sponsor within the consortium, developed the software alongside five other organizations—Purpose, Euclid Network, Collaborating Centre on Sustainable Consumption and Production, and Wikitalia—and two research partners—the Open University and University of Zurich.<sup>154</sup> The CATALYST Consortium received a EUR 1,658,000 grant from the European Commission's Directorate-General for Communications Networks, Content & Technology to support these parties, of which Imagination for People received EUR 499,526.<sup>155</sup>

The software evolved in response to feedback received from other community stakeholders and through pilot projects with organizations like the OECD's Wikiprogress.<sup>156</sup> In addition, every CATALYST participant, in line with requirements imposed by the European Commission, conducted an ethics review of its proposed work and abided by the Commission's ethical issues checklist. For Assembl, researchers attempted to contact the French data protection authorities but did not receive a response. All CATALYST participants also worked with an external ethics advisor to analyze the work being conducted and develop a checklist of data management procedures to mitigate potential harms.<sup>157</sup>

Following the end of the consortium in September 2015, Assembl continued to be developed by bluenove, an international consulting and technology firm involving many of the same people at Imagination for People.<sup>158</sup> Today, bluenove markets Assembl to corporate managers seeking feedback from their workforce and civic agencies seeking input from the public.<sup>159</sup>

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<sup>153</sup> "Who We Are."

<sup>154</sup> Ibid.

<sup>155</sup> "Collective Applied Intelligence and Analytics for Social Innovation."

<sup>156</sup> "Report on the Test of the Assembl Platform for the Wikiprogress Online Consultation on Youth Well-Being, 30 March to 15 May 2015."

<sup>157</sup> Albiéro, Torrenti, and Groezinger, "Initial Ethics Report."

<sup>158</sup> Escoubes, "Frank Escoubes."

<sup>159</sup> "Assembl."

As previously discussed, the Métropole du Grand Paris used Assembl following a competitive bidding process. Though bluenove adjusted the Assembl platform to fit the Métropole's needs, including the removal of the additional irrelevant stages, Métropole staff claim they did not request any design changes to the software itself. No metrics—either in terms of participation or satisfaction—were put in place by the Métropole. No needs or expectations study was conducted prior to launch.<sup>160</sup>

### **CONDITIONS AND CULTURE**

Assembl is a popular tool for large enterprises, used by over 200 clients including Airbus and Université Paris-Saclay.<sup>161</sup> One of bluenove's most notable recent projects is its work with the company Cognito in mass processing and synthesizing the open-format contributions of the Grand Débat National, an initiative of President Macron's government.<sup>162</sup> Digitized by the National Library of France, these contributions include letters, emails, summaries of local initiative meetings, and other complex messages.<sup>163</sup> While press reporting around these consultations has been broadly positive, Métropole du Grand Paris encountered difficulties in their implementation.

Staff spoke about alignment issues.<sup>164</sup> First, the project had problems relating to participation. As designed, Assembl-enabled discussions should include “at least 100 members to allow for diverse ideation.”<sup>165</sup> While the Métropole hoped to solicit many contributors, it had limited ways to do so. The 55-person staff did not think they could effectively engage with 7.2 million Parisians.<sup>166</sup> What's more, being an unelected body having only come into existence less than two years prior, the organization's leaders did not think they had legitimacy to do that kind of public solicitation.<sup>167</sup> They wanted local public actors to make their own choices and not to try to supplant them.<sup>168</sup> In

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<sup>160</sup> Senior bluenove Staff Member, *supra* note 151.

<sup>161</sup> Laudouar, “Grand Débat : Bluenove mise sur l'intelligence collective.”

<sup>162</sup> Albet, “Le consortium piloté par Roland Berger, associé à Bluenove et Cognito, rend publique son analyse des contributions sous format libre du Grand Débat National.”

<sup>163</sup> *Ibid.*

<sup>164</sup> “Assembl” *supra* note 159.

<sup>165</sup> “Assembl's Methodology.”

<sup>166</sup> “Page d'accueil” and Métropole du Grand Paris Project Manager, *supra* notes 134, 148.

<sup>167</sup> Métropole du Grand Paris Project Manager, *supra* note 148.

<sup>168</sup> *Ibid.*

short, the Métropole was too small, too new, and had too few competencies written explicitly in the law.

These concerns led the organization to scale back its effort and focus on civil servants, a body whom the Métropole clearly had the prerogative to contact. Still, organizers encountered further problems with securing participation. Though built for frank discussions about contentious issues, a representative from Métropole claimed public servants invited to Assembl often hesitated to post, seeking approval from their superiors to ensure their views accurately represented those of the bodies they represented. Though Métropole staff told participants their comments ought to represent their personal opinions, highlighting that they could register under a pseudonym if they preferred, these assurances did little to assuage some users. Staff suggested the initiative did not capture unfiltered input.

As for the private participants invited later in the process, initiative managers found these participants unhelpful. Organizers did little vetting prior to inviting groups onto the platform to maximize participation. Instead, staff invited anyone who approached them at their table at the Viva Technology conference. As a new organization still trying to establish itself, many of the companies invited saw the Métropole as a business opportunity, instead of a public initiative. Staff reported these actors were “not there to debate but were there to sell.”<sup>169</sup>

The last reported problem highlighted by staff was that of design. Assembl has most functionality on a desktop computer, whereas many of the civil servants the Métropole engaged with relied on mobile devices. While a mobile version of the platform did exist, staff claimed its partners had difficulty using the mobile version, which interfered with the ability of participants to participate. As with many of the identified issues in this list, a disconnect with the Métropole’s needs and the requirements it articulated appears to have hampered success.

Despite these problems, staff affiliated with the Métropole did recognize several factors that helped them. First, though participation was limited, those who did contribute provided high-quality, sustained engagement. By working almost exclusively with public servants (many of whom worked in communes with high digital literacy), the Métropole could trust the feedback

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<sup>169</sup> Ibid.

received was genuine and well informed. Moreover, the use of physical workshops parallel to the platform allowed the Métropole to fill gaps in online discussions.

Second, it had support from elected policymakers strongly interested in using civic tech tools. This interest served as a partial impetus for choosing Assembl. It also kept the organization and those participating in the initiative committed to the work throughout. Stakeholders supported the Métropole's attempts to comply with its legal obligations using an innovative tool. The Métropole's steps to ensure it did not replace other public authorities helped it maintain broad support.<sup>170</sup> Staff reported satisfaction among these actors with the way the platform organized online conversations and helped them understand views across the different communes.

### **3. OUTCOMES AND IMPACT**

The Métropole du Grand Paris's use of the Assembl platform had practical limitations owing to alignment and deployment problems. Still, staff considered Assembl useful in understanding the views across their constituency so they could develop a digital development plan. Its operational value was in creating and transferring knowledge across organizations and helping develop useful policy.

Though the primary beneficiaries of this work were the cities and communes, Métropole staff believed the benefits would trickle down to citizens, especially in those cities with limited resources. By gathering these views, the Métropole intends to draft a plan capable of improving local governance and decision-making. The digital development strategy will be published in 2019 (after the drafting of this case study) and help to shape how local governments govern until 2024.<sup>171</sup>

As previously discussed, Métropole set no metrics at the outset to assess its use of Assembl. Still, it did receive feedback from users. Largely, this feedback reflected legitimacy concerns raised earlier in the process (see "Conditions and Culture"). Staff explained that one recurring theme

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<sup>170</sup> Ibid.

<sup>171</sup> Ibid.



was participants noting “it is very complicated to speak when [they] are not elected” because they “do not have the legitimacy to speak.”<sup>172</sup>

## 4. LESSONS LEARNED AND METHODOLOGICAL IMPLICATIONS

The Métropole’s experience speaks to the importance of understanding expectations and limitations from the outset. While staff aspired to engage with various actors, concerns about legitimacy and resources gradually narrowed the project’s focus. Though a useful experience, the platform received responses from only 80 participants instead of the hundreds it was built for.<sup>173</sup>

Still, the episode shows the importance of partnership and engagement. While ultimately not as large in scope as intended, the Métropole’s outreach to public employees did help build trust and secure the high-quality responses needed to develop its digital development policy. The platform itself could not have been built without this broad support. *bluenove* relied on researchers, civic groups, and various public agencies to test *Assembl*. In any context, the tool requires others to provide a community, providing only a means for large groups to develop insights. It does not seek out users but responds to them.

In short, this example has a few methodological implications for public institutions to consider as they try to develop mechanisms for citizen feedback and government services:

- ▶ **Reduce friction wherever possible** to avoid discouraging participation. As noted by staff, technical issues (e.g. mobile device compatibility) can limit participation and eventual insights and ideation. For similar projects, an organization should consider how it can make the experiences of participants as smooth and intuitive as possible.
- ▶ **Seek out partners with the resources to engage with the intended audience.** As discussed, the Métropole’s use of *Assembl* was limited by concerns that it was too small, too new, and had too few competencies to engage directly with the public. Instead, it engaged with public servants in the communities represented within it to ensure it could act as a credible force. A public institution pursuing a similar project might consider whether it can effectively engage

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<sup>172</sup> Ibid.

<sup>173</sup> “Métropole Inclusive” *supra* note 145.

with people directly or whether there are intermediaries that might be better suited for a specific civic engagement project.

- ▶ **Conduct a needs and expectations assessment of the constituency at the start.** While engaging with public servants allowed the Métropole to avoid its own legitimacy concerns, it led to another unexpected problem: Public servants themselves were hesitant to engage because the platform threatened their need to remain neutral actors. A similar project undertaken by a public institution should seriously consider what the target constituency needs **before** launching the project. If the government identifies problems or objections beforehand, it can take steps to address or mitigate that concern. If nothing is done and the government does nothing to understand its target audience, officials risk limiting the overall reach of their work and running afoul of various legal, ethical, or professional obligations.
  
- ▶ **Use ethical councils or external ethics advisors** to ensure the project is taking the appropriate steps to protect the public and mitigate all potential harms. Assembla abided by CATALYST's ethical requirements and accepted CATALYST's hiring of an external consultant to review processes and procedures. To protect its constituents, a public body might incorporate similar checks should it try to develop a similar software or platform.





## **CASE STUDY 5**

### **CARROT INSIGHTS**

*Utilizing AI and Gamification to Promote Public Wellness*



## EXECUTIVE SUMMARY

- ▶ **Context:** In 2015, Andreas Souvaliotis founded Carrot Insights, Inc., the first public engagement platform in Canada to reward users for healthy lifestyle activities.<sup>174</sup> The company first debuted in British Columbia in March 2016, followed by implementations in Newfoundland and Labrador later that year, and in Ontario in February 2017. It unexpectedly shut down on June 21, 2019.
- ▶ **Development:** Carrot nudged the public toward healthy behaviors and supported the Canadian government communicating with its constituents around health issues. After signing up for the smartphone application, Canadians could accumulate loyalty program points for air travel, movies, groceries, gasoline, and other services in exchange for behavioral data and reading about topics related to healthy eating, exercise habits, immunization, alcohol and substance use, and mental health details.
- ▶ **Outcome:** Carrot Insights was one of the most popular wellness apps in Canada. It received funding from departments across the Canadian provincial and federal government. In return, the government obtained reporting and evaluations, insights it used to inform policy, services and direct constituent communication. However, these funds proved to be insufficient and, failing to attract additional private investors, the company declared bankruptcy in June.<sup>175</sup>
- ▶ **Implications:** Carrot's experience shows how even "weak" AI systems can be used to provide a public benefit. It also shows the importance of partnerships in large, multi-domain projects. Without collaboration between government, loyalty partnerships, and Carrot itself, the project could not function. Indeed, a failure to attract additional partners who could provide funding led to its sudden closure.

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<sup>174</sup> PR Newswire, "Canadian Public Engagement Platform Carrot Rewards Ranks Top 20 on the Canadian Business and Maclean's 2018 Startup 50."

<sup>175</sup> Marotta, Stefanie. "Ottawa-Backed Carrot Rewards App Shutting down after Failing to Find a Buyer."

## 1. CONTEXT

The benefits of physical activity are undeniable. Regular movement reduces the risk of heart attack and stroke. It can treat and prevent depression as well as reduce the risk of dementia.<sup>176</sup> Yet, many governments struggle to encourage their citizens to be physically active. One 2009 study found physical inactivity cost Canadian taxpayers CAD 6.8 billion (USD 7.6 billion) per year, 3.7% of all health care costs.<sup>177</sup>

Seeking a cost-effective response, the provincial governments of British Columbia and Newfoundland and Labrador engaged with community and private partners. In partnership with the Public Health Agency of Canada, the BC Healthy Living Alliance, Diabetes Canada, Young Men's Christian Association, the Heart & Stroke Foundation, and other organizations, officials explored how they could incentivize healthier lifestyles.<sup>178</sup>



## 2. CARROT INSIGHTS

These engagements reached their fruition in 2015 with the creation of the start-up Carrot Insight, Inc. Using a smartphone application, Carrot Rewards, the company sought to use “gamification and behavioral insights to better understand the motivations and perspectives of Canadians and encourage them to make better decisions with reward points.”<sup>179</sup>

### PROCESS

Carrot Rewards was a user-friendly tool that took an individualized approach to public health. Downloadable from iTunes and Google Play app stores in English and French, the app began by asking users for their age, gender, postal code, and a card number from a loyalty program of their

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<sup>176</sup> Walton, “6 Science-Backed Ways Exercise Benefits the Body and Brain.”

<sup>177</sup> Janssen, “Health Care Costs of Physical Inactivity in Canadian Adults.”

<sup>178</sup> “What the Heck Are Carrot Rewards?”; Smith Cross, “Ontario Gives \$1.5M to Carrot Rewards App to Help People Make Healthy Choices.”

<sup>179</sup> “Embracing Innovation in Government - Global Trends 2019.”

choice.<sup>180</sup> By registering, users could earn points on loyalty rewards programs that could then be used for goods and services such as movie tickets, gas, groceries, and travel. These points could be used across all Canadian provinces and, in May 2019, the Northwest Territories.<sup>181</sup>



Figure 16: Carrot Rewards advertisement

One method to earn points was through step tracking. Relying on the internal accelerometers on most smartphones and commercial fitness devices, the app tracked how much users walked. In the early phases of the project, the app asked users to behave normally for 14 days to establish a baseline for their physical activity.<sup>182</sup> If users managed at least five valid days of activity, the app calculated their average step count. If they did not manage at least five days of activity, the app assigned a generic step count based on the average number of steps taken daily by a Canadian adult.<sup>183</sup>

The app then added 1,000 steps to the baseline (rounded to the nearest 100 steps) to set a first daily step goal. Meeting this goal each day awarded the user with CAD 0.04 in loyalty points, with rewards increasing to CAD 0.40 for users who reached the goal at least ten times in a 14-day period. The app encouraged users to steadily increase their physical activity by asking them to enroll in a “Step Up Challenge” (which increased their goal by 500 steps each time they persistently achieved their goal) and displayed progress in bar graph format. The app’s later

<sup>180</sup> Mitchell et al., “Uptake of an Incentive-Based MHealth App.”

<sup>181</sup> Shankar, Bradly. “Carrot Rewards Launches in the Northwest Territories with Additional Rewards Option.”

<sup>182</sup> Mitchell et al., “Evaluating the Carrot Rewards App, a Population-Level Incentive-Based Intervention Promoting Step Counts Across Two Canadian Provinces.”

<sup>183</sup> Ibid.



iterations streamlined this process by measuring weekly activity and setting a goal each Sunday for the following week.<sup>184</sup>

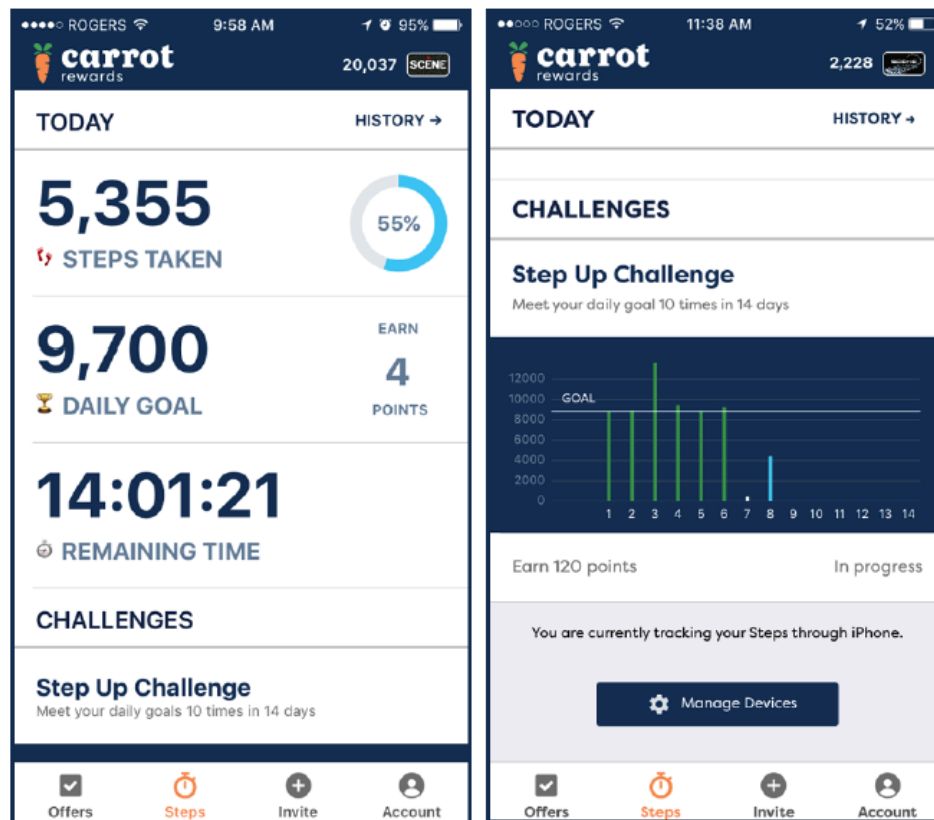


Figure 17: Screenshot of the “Step Up Challenge.” See: “Evaluating the Carrot Rewards App.”

The company also experimented with additional formats and features after this initial launch. Designers incorporated: streaks, wherein users received additional rewards for achieving their step goal on consecutive days; friend leaderboards, wherein users could connect with friends and view their progress in app; and the “Step Together Challenge,” wherein users could challenge a friend to achieve 10 daily step goals in seven days to earn more rewards.<sup>185</sup>

The second way points could be earned was through quizzes. Each week, the app asked users to complete one or two short quizzes focused on public health topics of importance to government officials. These tests asked about “healthy eating, physical activity and sedentary behavior,

<sup>184</sup> “Steps.”

<sup>185</sup> White, Lauren. “Re: Carrot Rewards Case Study,” June 21, 2019.

smoking, low-risk drinking, mental health, and immunization.”<sup>186</sup> Both Carrot and government officials hoped these quizzes would “inform and familiarize users about self-regulatory health skills or ‘stepping stone’ behaviors (i.e., goal setting, tracking, action planning, and barrier identification), skills that have promoted health behaviors in the past.”<sup>187</sup> Carrot designed the quizzes to take less than three minutes to complete.

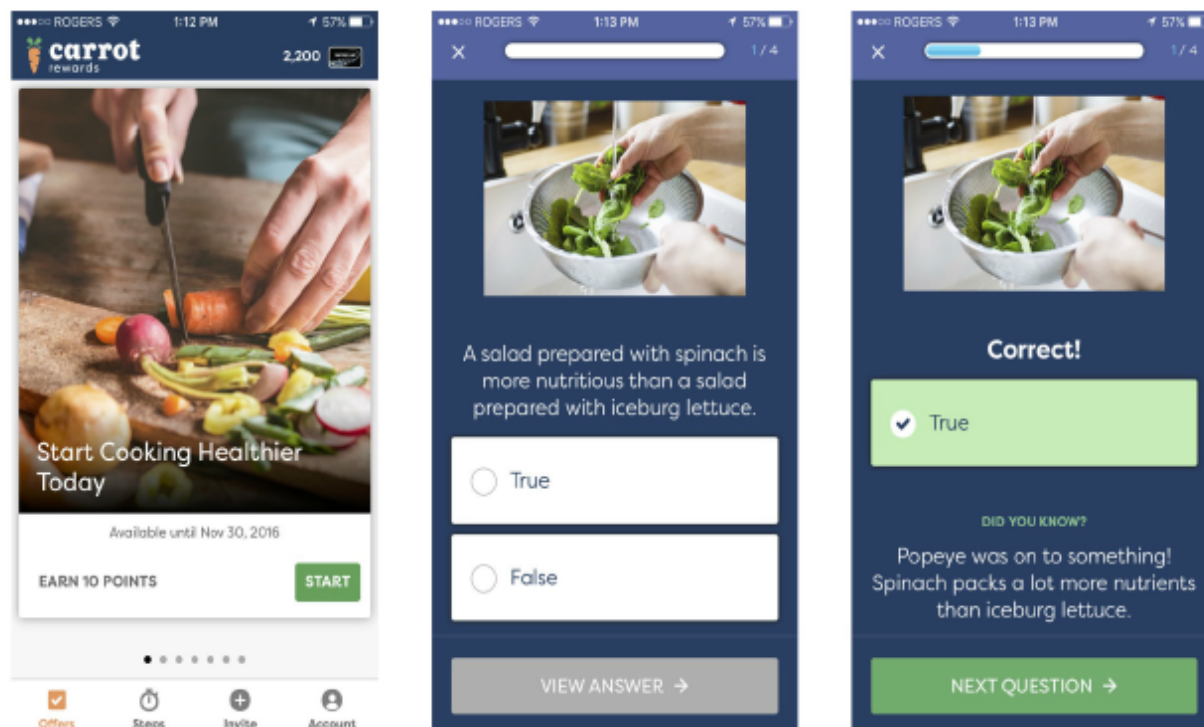


Figure 18: Carrot Rewards health quiz feature. See: “Uptake of an Incentive-Based MHealth App.”

Like the step-monitoring component, users earned “rewards points” for answering questions. The value of these points varied between CAD 0.04 and CAD 1.48 depending on quiz length and timing. Carrot Insights made early quizzes worth more points to encourage participation.

Lastly, users could earn points by inviting their friends to join them. Within the app, users had a unique promotional code they could share with others that redirected to a download link. This component, referred to internally as “Step Together,” allowed users to earn CAD 0.99 for each

<sup>186</sup> Mitchell, *supra* note 180.

<sup>187</sup> *Ibid.*

friend who downloaded the app using the user-specific code.<sup>188</sup> Users could then watch each friend's activity and compete to meet step goals.<sup>189</sup>

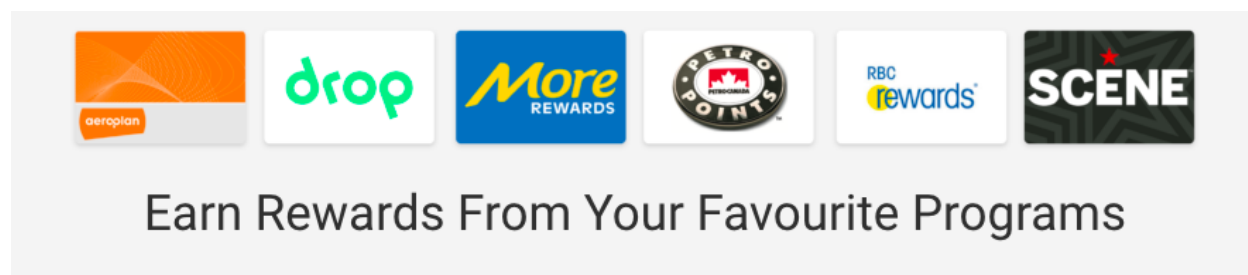


Figure 19: Listing of affiliated rewards programs circa May 2019

### **DEVELOPMENT**

As discussed, various private and public partners supported Carrot Insights. The Public Health Agency of Canada provided funding for the platform's development and to help the start-up secure the rights to loyalty rewards points programs.<sup>190</sup> The company continued to receive significant financial support from Canadian governments through its final years of operation, with Ontario providing CAD 1.5 million and the federal Canadian government providing CAD 5 million in 2017.<sup>191</sup> Though Carrots Insights attempted to reduce this dependence by instituting a "paid user" model and seeking out additional private funding, these funds efforts proved insufficient in making the company sustainable.<sup>192</sup>

Carrot Insights relied on partners to determine what issues the platform should focus on. Though government actors expected the platform to help it "understand the motivations and perspectives of their constituents and nudge them to make better decisions on healthy living and environmental sustainability," pre- and post-analysis tests helped the parties determine what this meant in practice. They also helped answer questions like:

- What kinds of health and wellness activities do Canadians participate in?
- What motivates behavior?

<sup>188</sup> Ibid.

<sup>189</sup> "Step Together."

<sup>190</sup> Senior Carrot Rewards Staff Member, GovLab / Carrot Rewards Discussion.

<sup>191</sup> Cross, *supra* note 178.

<sup>192</sup> Senior Carrot Rewards Staff Member, *supra* note 190.

- How healthy are citizens?
- What can the Canadian government do to help improve their citizens' health and wellness goals and what are the motivations behind these goals?
- Are points/rewards systems/gamification a useful method to incentivize users?
- How can the Canadian government better serve and communicate with its constituents given the failure of traditional outreach tools?

The company collected information on steps taken, to track the app's impact on physical mobility, as well as self-reported health data (e.g. vaccination information) and participation rates to assess its effectiveness in improving public health. Carrot Insights made this data available to research teams for health-related studies.<sup>193</sup>

### **CONDITIONS AND CULTURE**

Carrot Insights staff cited several enabling and limiting factors for their work. First and foremost, staff members considered openness and partnership essential. The company could not have been founded without the Canadian government providing funding, a fact that might have served as a sign of the company's difficulties remaining sustainable. It could not have created incentives for physical activity without support from loyalty partners. It also could not have realized its "gamification" model without academic research showing the model was feasible.<sup>194</sup> The risk inherent in this approach did not become self-evident until the company's unexpected closure.

Staff also said they benefited from Carrot's organizational structure. As a start-up, Carrot claimed to be flexible and more responsive to partner needs. With its small, skilled staff, Carrot Insights argued it could move quickly and incorporate new elements into its platform as needed. During its lifetime, the platform slowly expanded across Canada. Shortly before it declared bankruptcy, senior staff reported they were exploring ways to expand to the United Kingdom and elsewhere.<sup>195</sup>

As for limiting factors, staff cited several challenges. Time constraints in initial development were a limiting factor, as were the resources needed to effectively organize the large number of

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<sup>193</sup> See, for instance: Mitchell, *supra* note 180, 182.

<sup>194</sup> Senior Carrot Rewards Staff Member, *supra* note 190.

<sup>195</sup> *Ibid.*

stakeholders involved in getting the platform off the ground. Staff specifically noted problems coordinating with government due to it, by its very nature, being slow and risk averse.<sup>196</sup>

Determining how to balance rewards points with physical activity was another challenge in the development stages of the platform and required adjustment over time. Creating a rewards structure that incentivizes users to strive for more healthy behaviors can be a challenge— with the potential for easily attainable goals undermining the platform's central purpose and partnerships, as well as overly aspirational goal structures engendering a feeling of unattainability among users, disincentivizing engagement as a result.

A third problem, referenced previously, became evident after the company closed in June: the struggle to remain sustainable as a private business given inherent costs. The company's operation depended on it purchasing and maintaining licensing rights for various loyalty rewards programs. After it failed to secure private funding or additional government support, it could no longer afford these costs. Its funds “eventually ran out and [it] could no longer be in business.”<sup>197</sup> While a large company or a government agency might have been able to operate at a loss for some period, a small start-up like Carrot could not. Its abrupt closure, less than a week after it released an update of the platform and several weeks after talking to this piece's authors about its plans for international expansion, reflect this fact.<sup>198</sup>

### 3. OUTCOMES AND IMPACT

The Carrot Rewards platform was not built with a clear end date. As such, there was no single target outcome beyond improving physical fitness. In trying to meet this goal, though, Carrot pointed to several outcomes. One third-party study of the platform found 52 percent of the users who accumulated fewer steps than the national average accumulated a 16 percent relative increase following persistent use.<sup>199</sup> A separate study found similar effects, attributing the increase in steps to the platform's “micro-incentives” model.<sup>200</sup> Studying the flu vaccine component, a third study found many users (41 percent) clicked on the map to show the nearest

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<sup>196</sup> Ibid.

<sup>197</sup> Souvaliotis, Andreas. “Farewell from Carrot.”

<sup>198</sup> Senior Carrot Insights Staff Member, *supra* note 190.

<sup>199</sup> Mitchell, *supra* note 182.

<sup>200</sup> Ibid.

sponsored pharmacy, suggesting it helped people seek influenza vaccines.<sup>201</sup> These studies suggest Carrot Rewards helped “influence British Columbians [and other Canadians] to make healthier choices.”<sup>202</sup>

These studies point to an operational value. Carrot Insights could analyze the cause and effect of health initiatives.<sup>203</sup> Aggregated information showed provinces how their policies impacted the physical activity and health knowledge of Carrot users. This information directly benefited the Canadian provincial governments who used the data to inform policymaking for their constituents. Users, meanwhile, gained insights into their health habits and received loyalty points for popular services. Other metrics—as they relate to public value—were set by the government bodies working with Carrot. The authors could not confirm what these metrics were.

The platform also benefited loyalty program providers. The loyalty partners who provided the points benefited from access to an increased customer base as well as Carrot Insights’s payments to them for their rights to their programs. Partners also gained promotional value through association with the healthy living and wellness tool.<sup>204</sup> The company’s failure to garner additional private investment could suggest these benefits were negligible, though this takeaway is speculative.

Carrot did share that it solicited public feedback on usability and privacy concerns. On these matters, Carrot insisted the data it provided the government was aggregate and unidentifiable and in accordance with Canada’s national privacy law.<sup>205</sup> To prepare for a launch in the United Kingdom in 2020, the company also began modifying technical configurations to comply with the European Union’s GDPR regulations.<sup>206</sup> The authors of this report cannot verify either of these claims and, in light of the company’s closure, it is unclear whether the platform ever became GDPR compliant.

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<sup>201</sup> Ibid.

<sup>202</sup> “Carrot Rewards Will Reward You for Making Healthier Choices.”

<sup>203</sup> Senior Carrot Insights Staff Member, *supra* note 190.

<sup>204</sup> Ibid.

<sup>205</sup> Ibid.

<sup>206</sup> Ibid.



## 4. LESSONS LEARNED AND METHODOLOGICAL IMPLICATIONS

Carrot is an example of a CI system built on weak AI components. While the platform could fulfill a handful of basic functions (e.g. calculating and “nudging” users to meet step goals and connecting users with rewards points programs), the value for government mainly derived from its collective human components. Only through large numbers of people interacting with the system could health savings or measurement of public health achievements occur. The platform did not deliver services or collect public views on policy. Still, its data could indirectly support these functions.

Carrot is also an example of a program heavily dependent on partnerships. As a company, Carrot Insights depended on governments and private investors to find enough value in it to support it. Only through public and private investment could Carrot purchase the rights to use the assets of loyalty partners. While this model proved to be successful for a time, it fell apart when interest by private investors and the government declined, leaving the company unable to afford use of its partners' loyalty programs. The lack of independent assets made Carrot Insights a volatile organization, unable to sustain itself after financial setbacks.<sup>207</sup> In short, the methodological implications include:

- ▶ **Find ways to encourage participation:** Augmented CI projects can be difficult to launch. In addition to needing to find a large audience to start, a host organization needs ways to sustain public interest long enough to attain usable insights. For Carrot Insights, gamification and a financial reward (loyalty points) was enough to secure prolonged participation. The relatively low barrier to entry for participants further supported the engagement.
- ▶ **Partnerships can assist in project creation:** Carrot Insights likely would not have emerged without robust support from the Canadian government and various loyalty partners. Should a government seek to establish a similar program, officials might try mapping constituencies to see who is interested in collaborating and what that collaboration would entail.
- ▶ **Stable sources of funding might be necessary for long-term success.** While partnership can help organizations to get off the ground or secure new resources, organizations should be

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<sup>207</sup> “Embracing Innovation in Government - Global Trends 2019.”

cognizant of the need to independently secure resources to ensure their long-term viability. Should interest from other parties decline, as it did for Carrot Insights, an organization is at risk of failing.

# COMPARATIVE ASSESSMENT OF ARTIFICIAL AND COLLECTIVE INTELLIGENCE TOOLS

As the previous case studies show, AI and CI can be combined for different purposes. These tools can promote ideation (Insights and Assembl). They can make it easier for citizens to communicate with their representatives (POPVOX). They can even help governments improve how they deliver services and make policies (Carrot Insights and the Camden Resident Index).

The GovLab understands these differences make some tools incomparable or incommensurable. It is difficult, for example, to evaluate and rank Carrot Rewards in comparison with Assembl when the two tools have very different inputs, aims, and methodologies. All the tools discussed have some value to policymakers but may not fulfill a specific policy goal (e.g. better collecting political sentiment). As such, we propose that it is necessary to further categorize AI and CI tools intended to identify citizens' needs. Using the five case studies and briefly examining the other eight tools (discussed in detail the Addendum), we classified the tools according to their primary overall aim: improving cognitive insights; expanding data analysis; crowdlaw; and streamlining service delivery.

## **COGNITIVE INSIGHT TOOLS**

First, AI and CI can be combined to spur brainstorming and the creation of new policies. Tools meant to generate cognitive insights generally incorporate CI through discussion forums and threaded conversations. AI is often used to help analyze these inputs by providing human operators with a sense of common themes and ideas (aggregation) or by showing which ideas are popular (response rating). These tools rely on the “wisdom of the crowd” to generate new, useful information. Tools in this category include ***Assembl***, ***Insights***, and ***Mindool***.

### **DATA ANALYSIS TOOLS**

Second, AI and CI can be combined to make sense of large datasets. In this category, simple inputs provided by a variety of human actors (CI) are combined and aggregated into a single dataset by an algorithm. This dataset can then be analyzed to derive insights that might have been difficult to arrive at manually but were already inherent in the information. Tools in this category include ***Carrot Rewards*** and the ***Camden Resident Index***.

### **CROWDLAW TOOLS**

Third, AI and CI can be used to improve the way citizens engage with their governments. In this approach, large numbers of users visit a platform to log their views on specific government actions or policies with minimal prior prompting. An algorithm, usually incorporating sentiment analysis and machine learning, then collects these sentiments and sends them to the appropriate public authority. These responses can be viewed individually to understand specific concerns or complaints or in aggregate. Discussion and coordination among individual users, if possible, is generally de-emphasized. Tools in this category include ***Better Reykjavik***, ***DEEP-linking Youth***, ***Grade.DC.Gov***, ***Jun Municipal Governance***, ***Pol.is***, ***POPVOX***, and ***Zen City***.

### **STREAMLINED SERVICE DELIVERY**

Finally, AI and CI can be used to scale the capabilities of public authorities. In such systems, AI is used to minimize transaction costs generally associated with interactions with public authorities. Machine learning components allow the AI to learn as it engages with more people to improve response accuracy and timeliness. An indicative example of this category would be the proposed incorporation of IBM's ***Watson*** into NYC311.

# CONCLUSIONS: FINDINGS AND METHODOLOGICAL CONSIDERATIONS

In the previous sections of this document, we laid out five illustrative cases of how AI and CI can complement one another in the public sector. We have also attempted to lay out a taxonomy to help academics and policymakers better understand the ways in which these tools can be used and the value they can generate. Having reviewed all these materials, we have a few main findings.

## KEY FINDINGS

Though this research is by no means comprehensive, it starts an important conversation about the opportunities and risks these tools offer. In closing, we offer a few key takeaways about the state of the field and ways to move it forward:

- ▶ **The Field Remains Nascent.** Across all five case studies, there is significant ambition. Assembl aims to find new ways to collect and spur ideas. POPVOX tries to transform how politicians hear from their constituents. Carrot Rewards aspires to incentivize positive public behavior. While each project has a clear vision for how AI and CI can be used to improve governance, none has had a perfect implementation. Rather, difficulties in attracting an audience to the project and making the insights useful and understandable were common.

Moreover, many actors are still struggling to realize the potential represented by “AI” in the AI/CI dynamic. Both Assembl and Insights depend on AI to analyze a large amount of comments, but this analysis consists largely of text mining and grouping, with human actors then looking over the algorithm’s work to develop relevant insights. POPVOX similarly incorporated AI elements, but only to “scrape” relevant information from official government websites. It now collects data from the Federal Government’s bulk data repository. Using our previously developed model, most of these projects are still Augmented Collective



Intelligence projects, wherein AI enables CI to scale.<sup>208</sup> Very little work has been done on Human-Driven Artificial Intelligence, where CI humanizes AI.

- ▶ **Implementing Organizations Need to Put Greater Emphasis on Pre-Launch Activities:** Civic organizations often seem to struggle with launching AI and CI tools. The Métropole du Grand Paris, for example, had to continually revise its project model in response to concerns about its capabilities and resources.

Organizations varied in how they adapted to difficulties, but the fact that difficulties occurred at all suggests a need for civic groups to prepare before they act and strengthen their methodology (see further below). Metrics were uncommon, often making it difficult to measure progress. Groups rarely had a formal process in which they assessed the needs and expectations of their constituencies. Though it is important to acknowledge that there is no such thing as “perfect preparation” and that no civic tech project exists in a controlled environment, groups can at least minimize the potential for disruption by being systematic prior to launch.

- ▶ **Cross-Sector Partnerships Can Be Essential to Project Success:** Finally, almost all the examples show the importance of cross-sector relationships. Often, the organizations hosting AI and CI tools do not have all the resources needed to be successful. The Métropole du Grand Paris’s concerns about legitimacy led it to approach public servants rather than residents. The Department of State’s need to attract many participants led it to connect with the White House and US Postal Service. POPVOX regularly engages with congressional offices on a formal and informal basis to better craft the platform. Though forming relationships can be difficult, involving multiple actors can fill gaps in resources and expertise, identify possible analytical blind spots, and better reach the intended audience. As such, in their own work, those seeking to leverage a combination of AI and CI could explore similar relationships, especially those that can conform to a data collaborative model.<sup>209</sup>

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<sup>208</sup> Verhulst, *supra* note 3.

<sup>209</sup> “Data Collaboratives Home Page.”

## METHODOLOGICAL CONSIDERATIONS

AI and CI both offer significant new possibilities for governance. As the researchers Weld, Mausam, Lin, and Bragg argue in their analysis of the topic, CI “allows for creative applications that use the wisdom of crowds or around-the-clock availability of people” of varying skills and abilities while “AI algorithms are great at building models, drawing inferences and detecting outliers from the data.”<sup>210</sup> Other researchers provide similar sentiments. Toby Segaran of Metaweb Technologies sees CI as “combin[ing] the knowledge, experience, and insight of thousands of people” to arrive at better, more useful ideas than any individual could provide alone.<sup>211</sup> Ben Lorica and Mike Loukides of O'Reilly Media argue AI and machine learning are useful in processing myriad data streams into useful insights.<sup>212</sup>

Our research echoes these findings. In Paris, AI-supported analytic techniques refined the brainstorming efforts of public employees. In Washington, DC, the US Department of State brought 21st century pattern recognition software to the age-old public solicitation process. Each case demonstrated how combined, the variety, inventiveness, and oversight offered by human operators and the structure provided by artificial operators can supplement the normal processes of institutions and help organizations better identify the needs of their constituents.

Yet, the relative lack of research on the intersection of AI and CI constrains our possibilities. Indeed, the previous case studies show organizations suffering due to a lack of preparation, a failure to develop metrics, or a lack of awareness about the pitfalls of previous attempts to implement augmented CI projects. Until organizations find some way to think through these issues in a systematic fashion, they are likely to repeatedly make the same mistakes.

Though we acknowledge our work here cannot be considered comprehensive, we see an urgent need to begin drawing out some methodological implications to promote the responsible and effective use of AI and CI in the public sector. As such, we offer the following recommendations as a guide for policymakers seeking to launch an augmented CI project.

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<sup>210</sup> Weld, Lin, and Bragg, “Artificial Intelligence and Collective Intelligence.”

<sup>211</sup> Segaran, *Programming Collective Intelligence*.

<sup>212</sup> Loukides and Lorica, “How AI and Machine Learning Are Improving Customer Experience.”

## **1. DEFINE THE UNIT OF ANALYSIS**

The first step in an augmented CI project is to identify the unit of analysis, the group whose needs one wants to understand. Projects can focus on many kinds of groups of people. Some initiatives, such as the Camden Resident Index, are used by internal stakeholders, their employees. Others like POPVOX seek external users, namely US citizens.

This selection depends on the time, resources, and capabilities of the host organization. For POPVOX, the lack of an official deadline and a familiarity with the US constituency services process nationwide meant its founders could target as many people as they wanted. For the Métropole du Grand Paris, public servants recognized they had a deficit of personnel and legitimacy and instead winnowed their unit of analysis from all Parisian citizens to just commune employees within the Paris metropolitan area. Officials focused on stakeholders they felt could represent the public's interests.

Another factor affecting the universe of analysis is the knowledge of the host organization itself. In our previous publication *The People-led Innovation Methodology* we discuss how the distributed expertise of people can identify opportunities for an organization to innovate. Residents, domain experts, businesses, and other actors each might have insight on an issue area. However, knowing which of these groups are most useful requires the methodology user to understand the problems they are working on. The host must understand what they want to accomplish or learn what groups to connect with.<sup>213</sup>

In an augmented CI project, the same principle applies. The host must know how to define the problem area enough to identify the relevant stakeholders within it. Marci Harris, for example, understood the legislative process prior to launching POPVOX.

## **2. DEFINING PATHWAYS TO OUTREACH**

After identifying the unit of analysis, the host organization will need to find some way to contact parties representative of the unit of analysis. Much like the previous step, this process will depend upon time, resources, and capabilities. The US Department of State is a highly visible organization with partners like the White House and the US Postal Service. Given its prominence,

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<sup>213</sup> Young et al., "People-Led Innovation."

it could rely on its existing mailing list and alerts on its partners' websites. The Métropole du Grand Paris, as a new, low-visibility organization, conducted dedicated outreach and attended conferences to invite people to its Assembl platform. Camden, whose primary audience existed within the borough council itself, could rely on normal internal means of communication.

Constituency mapping could be useful in identifying means of outreach. By listing which domain experts, non-governmental experts, community-based organizations, businesses, and other institutions are relevant, a host organization can ensure it contacts everyone it can in an orderly, systematic fashion. *The People-led Innovation Methodology* provides some guidance on mapping and curating the skills, interests, and experiences of stakeholders.<sup>214</sup>

### **3. SOURCING INSIGHTS**

After securing participation from some or all the stakeholders representing the unit of analysis, the host organization can seek their input. As Bigham, Bernstein, and Adar argue in their chapter of *The Handbook of Collective Intelligence*, there are two main ways in which inputs can be collected: Directed Crowdsourcing and Passive Crowdsourcing.<sup>215</sup>

As the name suggests, Directed Crowdsourcing “coordinates workers to pursue a specific goal” involving “a single requester taking a strong hand in designing the process for the rest of the crowd to follow.”<sup>216</sup> For several of the augmented CI cases discussed in this document, this direction takes the form of a specific prompt. For the US Department of State’s use of Insights, the prompt was a short question asking about the passport renewal process. POPVOX seeks reactions to specific bills. The Métropole du Grand Paris wrote short blurbs describing the particular issues it wanted its user base to discuss. As all these examples indicate, directed crowdsourcing works best when the host organization has a bounded agenda topic in mind. The extent to which users collaborate with others can vary.

Should it pursue directed crowdsourcing, a host organization might consider consulting survey publications for guidance on developing well-rounded, unbiased prompts. In their Harvard Business Review article *The Surprising Power of Questions*, for instance, professors Alison Wood

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<sup>214</sup> Ibid.

<sup>215</sup> Bigham, Bernstein, and Adar, “Human-Computer Interaction and Collective Intelligence.”

<sup>216</sup> Ibid.

Brooks and Leslie K. John emphasize how tone and information disclosure impact results.<sup>217</sup> Host organizations might also consider taking lessons from polling firms like Pew Research that have developed best practices guides for designing questionnaires.<sup>218</sup>

Passive crowdsourcing, by contrast, occurs when “the crowd produce[s] useful ‘work product[s]’ simply as part of their regular behavior. That is, the work is a side-effect of what people were doing ordinarily.”<sup>219</sup> This kind of collection works best for process improvements. Camden collected insights as public servants went about their normal work, providing public services as they had always done in the past. For Carrot Insights, insights into physical activity were initially generated by users going about their normal day, with prompts encouraging more motion only occurring later after the system had received a “baseline.”

#### **4. CONDUCT DATA ANALYSIS ACCORDING TO PREVIOUSLY SET PARAMETERS**

Next, the host organization can review the content generated and analyze it usually with support from AI. As these case studies illustrate, the incorporation of AI into the AI/CI dynamic remains limited. Organizations still rely on human reviewers to validate AI insights. AI enables CI to scale rather than CI humanizing AI.<sup>220</sup> But even in this capacity, AI can be useful in automating and improving the process of analyzing inputs.

Regardless, how the algorithmic components operate ought to be determined early on with buy-in across the host organization. To reduce complications, a host organization might draft an analytic methodology (including metrics for success and the framing of the results) at the outset. For several case studies, such as Assembl and Insights, the analysis occurred under the constraints set by the companies’ proprietary processes, processes refined over multiple previous implementations. For the Camden Resident Index, refining the algorithms undergirding the system was an iterative process. Local leaders conducted small pilots and tested the results before trying to use the analysis in the real world. Too few of the examined case studies set out metrics at the outset, making it difficult to assess the overall success of the effort.

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<sup>217</sup> Brooks and John, “The Surprising Power of Questions.”

<sup>218</sup> “Questionnaire Design.”

<sup>219</sup> Bigham, *supra* note 215.

<sup>220</sup> Verhulst, *supra* note 3.



Depending on time and resources, a host organization might also employ external experts to assist in the development of this methodology or the assessment of the work. Before becoming a platform in its own right, bluenove developed Assembl within the confines of the CATALYST research consortium. Here, the software's creators could seek out the perspectives and expertise of their colleagues. These engagements helped identify possible harms prior to full-scale use and take steps to mitigate them.

Taking a page from the CATALYST example, a host organization might find it useful to pursue an "ethical council," wherein a body of outside experts, chosen and governed by a framework set by the host organization, provides advice on uncertain, ethically ambiguous topics.<sup>221</sup> In matters relating to public services, where there are substantial risks to vulnerable populations, additional preparedness is often warranted. Using outsiders to think critically about these risks can stop an organization before it inflicts unintended harms.

## **5. DEVELOP PREMISES FOR FURTHER RESEARCH OR ACTIONABLE INTELLIGENCE**

Finally, a host organization can produce a report summarizing the insights from the analysis. This information can be used to further refine the organization's understanding of their constituency (possibly restarting this process) or it can be used to develop policies, processes, and procedures reflecting the new information.

At this stage, the host organization might find it useful to publish their findings and, privacy protections permitting, data to allow external assessment of the work. By doing so, the host organization can validate its findings, improve the legitimacy of its work, and produce additional insights that might be of public value. For example, at the conclusion of its work, Carrot Insights provided its data to various researchers who used the information to advance research into gamification and public health.<sup>222</sup>

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<sup>221</sup> Verhulst and Young, "Orange Telecom Data for Development Challenge (D4D)."

<sup>222</sup> Mitchell, *supra* note 180, 182.

## ADDENDUM: INFORMATION ON ADDITIONAL TOOLS

This section attempts to provide a high-level overview of the platforms not selected for in-depth analysis. Our initial scan, conducted largely through online databases, revealed many cases that we did not explore further. We did not select tools that appeared irrelevant to the research question upon further investigation (e.g. DEEP-linking Youth), were defunct and lacked information (e.g. Grade.DC.Gov) or had already been reviewed extensively elsewhere (e.g. Better Reykjavik).

While we did not develop in-depth case studies on these tools, we provide a brief introduction to them here. This overview might prove useful for those seeking to understand what other tools and systems are often described to have artificial intelligence and/or collective intelligence components.

### **BETTER REYKJAVIK**

Better Reykjavík is an online social network for the citizens of Reykjavík to present and discuss their ideas on municipal governments. Like DEEP-linking Youth (described below), it relies on the AI-enabled Citizen Dashboard. The top 10–15 priorities identified by the system are processed by the city council and voted on each month.<sup>223</sup>

### **DEEP-LINKING YOUTH**

DEEP-linking Youth tried to explore how “e-participation can foster young people’s empowerment and active participation in democratic life.” DEEP used its Active Citizen Dashboard, an AI-enabled e-platform, to listen to and understand the views of young people on social media to help EU policymakers make informed decisions on issues involving youth.

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<sup>223</sup> “Better Reykjavik.”

**GRADE.DC.GOV**

Grade.DC.gov was a public sentiment analysis initiative undertaken by the municipal government of Washington, DC to understand how residents felt about agencies and public service delivery. In addition to scanning social media sites like Twitter, the platform collected resident opinion through surveys. Through these surveys, residents could provide their thoughts on any of the city's 15 agencies, which were then scanned and rated by a sentiment-analysis engine. These aggregated ratings were then converted to an A-to-F rating scale. The project remains online but appears inactive.<sup>224</sup>

**JUN MUNICIPAL GOVERNANCE**

The town of Jun, Spain relies on Twitter to streamline public service delivery. Beginning in 2011, the town began asking all public officials to register Twitter accounts. It also started encouraging residents to do the same, verifying their accounts at the town hall. By using the platform as its main form of communication, public officials have sped up processes and cut down on costs. The police force has been reduced by three-quarters and the town's budget has been reduced 13 percent.<sup>225</sup>

**MINDOOL**

The Luxembourg-based start-up Mindool offers a collaboration tool that allows individuals to solicit opinions from many people. These inputs are automatically sorted and processed by the tool, allowing the user to quickly sift through them. The International Fluency Association used the tool to communicate with its hundreds of members worldwide. The German media outlet 5vier.de used it to communicate with readers and initiate debates on local topics, while the market research company Quest used it to better coordinate on a project with Luxembourg's Ministry of Economics.<sup>226</sup>

**POL.IS**

Polis is an open-source AI tool that aggregates knowledge from large groups for large-scale deliberation. Through sentiment analysis, the platform segments users into "opinion groups"

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<sup>224</sup> Flook, "District Boosting D.C. Tech Startups;" Evans, "District Agencies Hoping to Make the Grade with Customers."

<sup>225</sup> Powers and Roy, "The Incredible Jun."

<sup>226</sup> Weidig, "Use a Mindool;" Mindool Senior Manager, Request for Information: Mindool.

based on behaviors and reactions that can form a consensus around a given issue. The tool is the basis of vTaiwan, Taiwan's official crowdsourced public consultation platform. Over 200,000 people have participated in vTaiwan and it has hosted discussions around topics like legalizing Uber and Airbnb.<sup>227</sup>

### **USE OF WATSON FOR NYC 311**

NYC311 is working with IBM to apply IBM's Watson computing system to 311 calls. The system intends to provide faster and more refined responses to public queries about city services. As envisioned, it will sort through billions of NYC311 records to identify the fastest and most effective answer to a problem instead of providing just a formula response. It will also learn as it responds to more complaints.<sup>228</sup> This initiative has not yet been implemented as of August 2019.

### **ZEN CITY**

Zen City is a data analytics platform which relies on AI to help city policymakers better understand citizens' needs. The system sifts through social media, 311 calls, and other data sources and analyzes them for topics, trends, and sentiment. It then visualizes the results. The City of Corona, California used Zen City for crisis management.<sup>229</sup>

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<sup>227</sup> "Polis."

<sup>228</sup> Flamm, "IBM's Watson Will Soon Answer Your 311 Calls."

<sup>229</sup> "ZenCity Home Page."

## BIBLIOGRAPHY

- “About POPVOX.” Popvox, 2019. <https://www.popvox.com/about>.
- Ahmed, Shazeda. “The Messy Truth About Social Credit.” Logic Magazine, April 17, 2019. <https://logicmag.io/07-the-messy-truth-about-social-credit/>.
- “AIDR: Artificial Intelligence for Disaster Response.” Accessed May 17, 2019. <http://aidr.qcri.org/>.
- Albet, Julie. “Le consortium piloté par Roland Berger, associé à Bluenove et Cognito, rend publique son analyse des contributions sous format libre du Grand Débat National.” *Bluenove* (blog), April 8, 2019. <https://bluenove.com/blog/le-consortium-pilote-par-roland-berger-associe-a-bluenove-et-cognito-rend-publique-son-analyse-des-contributions-sous-format-libre-du-grand-debat-national/>.
- Albiéro, Stéphanie, Roger Torrenti, and Rosa Groezinger. “Initial Ethics Report.” Catalyst, February 10, 2014. [http://catalyst-fp7.idea.kmi.open.ac.uk/wp-content/uploads/2014/09/CATALYST\\_WP1\\_D1.1-online-version.pdf](http://catalyst-fp7.idea.kmi.open.ac.uk/wp-content/uploads/2014/09/CATALYST_WP1_D1.1-online-version.pdf).
- “All Insights.” Tell-Us.USA.gov, February 12, 2017. <https://usagov.insights.us/improve/insights>.
- “Assembl.” *Bluenove* (blog), 2019. <https://bluenove.com/en/offers/assembl/>.
- “Assembl’s Methodology.” Internet Archive, March 4, 2014. <https://web.archive.org/web/20140304173119/http://assembl.org/learn-more/methodology/>.
- Bersoff, David M., Sarah Adkins, Cody Armstrong, Joshua Wu, Nick Maxwell, Giuseppe Bovenzi, Abbey Fox, and John Zamites. “2019 Edelman Trust Barometer.” Edelman, March 2019. <https://www.edelman.com/trust-barometer>.
- “Better Reykjavik.” *Citizens Foundation* (blog), May 6, 2010. [https://citizens.is/portfolio\\_page/better\\_reykjavik/](https://citizens.is/portfolio_page/better_reykjavik/).
- Bigham, Jeffrey P., Michael S. Bernstein, and Eytan Adar. “Human-Computer Interaction and Collective Intelligence.” *Handbook of Collective Intelligence* 57 (2015).
- “Bill Summary.” City of Aurora, Illinois, January 22, 2019. <https://www.aurora-il.org/Archive/ViewFile/Item/1501>.



- Blackwell, Theo. "Digital Transformation, Technology and Local Public Services: Camden and Beyond." *Medium* (blog), August 29, 2016. <https://medium.com/@camdentheo/digital-transformation-technology-and-local-public-services-camden-and-beyond-c3b0c347a5ca>.
- bluenove. *Assembl Corporate English Version*. Accessed April 30, 2019. [https://www.youtube.com/watch?time\\_continue=58&v=qd-dEph\\_aew](https://www.youtube.com/watch?time_continue=58&v=qd-dEph_aew).
- Brooks, Alison Wood, and Leslie K. John. "The Surprising Power of Questions." *Harvard Business Review*, May 1, 2018. <https://hbr.org/2018/05/the-surprising-power-of-questions>.
- Bryant, Tanya. "Ref: FOI0251." London Borough of Camden, December 12, 2017. What Do They Know? [https://www.whatdotheyknow.com/request/445907/response/1083921/attach/3/FOI%20Response%20FOI0251.pdf?cookie\\_passthrough=1](https://www.whatdotheyknow.com/request/445907/response/1083921/attach/3/FOI%20Response%20FOI0251.pdf?cookie_passthrough=1).
- Camden Borough Council Project Manager. "RE: Thank You and Follow-up: Camden Resident Index," April 25, 2019.
- Camden Borough Council ProjectManager. Camden Resident Index - Govlab call. Skype, April 18, 2019.
- "Camden Privacy Impact Assessment (PIA) For Resident Index." London, United Kingdom: Camden Borough Council, March 20, 2013. What Do They Know? [https://www.whatdotheyknow.com/request/445907/response/1083921/attach/4/CRI%20PIA%202013%20Redacted.pdf?cookie\\_passthrough=1](https://www.whatdotheyknow.com/request/445907/response/1083921/attach/4/CRI%20PIA%202013%20Redacted.pdf?cookie_passthrough=1).
- "Carrot Rewards Will Reward You for Making Healthier Choices." Health Families BC. Accessed May 2, 2019. <https://www.healthyfamiliesbc.ca/carrot-rewards>.
- Choquin, Marine. "RE: [EXT] Re: Métropole d'intelligences/ Assembl Use Case Interview," May 2, 2019.
- . "Schéma Métropolitain d'Aménagement Numérique – Grand Paris Métropole d'intelligences," 2018. <https://www.metropolegrandparis.fr/intelligences/le-sman/>.
- "Collective Applied Intelligence and Analytics for Social Innovation." European Commission CORDIS, September 30, 2015. <https://cordis.europa.eu/project/rcn/111272/factsheet/en>.
- Crisis Computing. "Hurricane Harvey's Catastrophic Destruction and the Role of AI." *Crisis Computing* (blog), September 27, 2017. [https://crisiscomputing.qcri.org/2017/09/27/hurricane\\_harvey\\_and\\_the\\_role\\_ai/](https://crisiscomputing.qcri.org/2017/09/27/hurricane_harvey_and_the_role_ai/).
- . "Hurricane Maria's Destruction Through the Lens of Social Media." *Crisis Computing* (blog), October 13, 2017. <https://crisiscomputing.qcri.org/2017/10/13/hurricane-marias-destruction-through-the-lens-of-social-media/>.

- “CrowdLaw-Online Public Participation in Lawmaking.” CrowdLaw-Online Public Participation in Lawmaking. Accessed October 3, 2019. <https://crowd.law/>.
- “Cultivate Forecasts - Prediction Markets & Crowdsourced Forecasting.” Accessed May 17, 2019. <https://www.hybridforecasting.com/>.
- “Data Collaboratives Home Page.” Data Collaboratives, 2018. <http://datacollaboratives.org/explorer.html>.
- “Data Protection Impact Assessment (DPIA) – Full Assessment.” London, United Kingdom: Camden Borough Council, January 16, 2019. Camden Resident Index.
- Dayton City Commission. “On Wednesday, February 20, 2019, at 6:01 p.m., the Dayton City Commission Met in Regular Session in the Commission Chambers of City Hall.” City of Dayton, Ohio, February 20, 2019. <https://www.daytonohio.gov/AgendaCenter/ViewFile/Minutes/02202019-603>.
- DeJohn, Samuel. “Better Reykjavik.” Crowd.Law, April 2019. <https://congress.crowd.law>.
- . “VTaiwan.” Crowd.Law, April 2019. <https://congress.crowd.law>.
- Dencik, Lina, Arne Hintz, Joanna Redden, and Harry Warne. “Data Scores as Governance: Investigating Uses of Citizen Scoring in Public Services,” December 2018. <https://datajustice.files.wordpress.com/2018/12/data-scores-as-governance-project-report2.pdf>.
- Desmarais, Chris. “New Watson Assistant Updates to Provide GDPR Support.” IBM, May 24, 2018. <https://www.ibm.com/blogs/watson/2018/05/new-watson-assistant-updates-to-provide-gdpr-support/>.
- “Dynamic Yield: Bring True Personalization from Vision to Reality.” Dynamic Yield, 2019. <https://www.dynamicyield.com/>.
- Eggers, William D., David Schatsky, and Peter Viechnicki. “AI-Augmented Government.” Deloitte Insights, April 26, 2017. <https://www2.deloitte.com/insights/us/en/focus/cognitive-technologies/artificial-intelligence-government.html>.
- “Embracing Innovation in Government - Global Trends 2019.” OECD Observatory of Public Sector Innovation, 2019. <https://trends.oecd-opsi.org>.
- “Erasmus+ Programme: Forward-Looking Cooperation Projects’ Call 2015 (N°33/2014) Selection Results - List of Funded Projects.” European Commission, July 15, 2015AD. [https://eacea.ec.europa.eu/sites/eacea-site/files/e\\_strand\\_2-youth-list-of-funded-projects\\_en.pdf](https://eacea.ec.europa.eu/sites/eacea-site/files/e_strand_2-youth-list-of-funded-projects_en.pdf).
- Escoubes, Frank. “Frank Escoubes.” LinkedIn, 2019. <https://www.linkedin.com/in/frankescoubes/?originalSubdomain=fr>.

- European Citizen Action Service. "DEEP-Linking Youth Project." *Welcome to Our Digital Ecosystem for E-Participation Linking Youth* (blog), July 15, 2015. <https://ecas.org/projects/projectspast/deep-linking-youth/>.
- . "E-Participation Guidelines for Decision-Makers: Social Listening Through the Digital Dashboard." European Commission, November 1, 2017. <https://ecas.org/wp-content/uploads/2017/10/Eparticipation-Guidelines.pdf>.
- Evans, Marissa. "District Agencies Hoping to Make the Grade with Customers." *Washington Post*, June 13, 2012. [https://www.washingtonpost.com/local/dc-politics/district-agencies-hoping-to-make-the-grade-with-customers/2012/06/12/gJQA0zUaZV\\_story.html](https://www.washingtonpost.com/local/dc-politics/district-agencies-hoping-to-make-the-grade-with-customers/2012/06/12/gJQA0zUaZV_story.html).
- "Federal Overview: What's Going on In Congress," April 30, 2019. <https://www.popvox.com/us/federal>.
- "Figure Eight Home Page." Figure Eight, 2019. <https://www.figure-eight.com/>.
- Flamm, Matthew. "IBM's Watson Will Soon Answer Your 311 Calls." *Crain's New York Business*, January 12, 2017. <https://www.crainsnewyork.com/article/20170112/TECHNOLOGY/170119941/ibm-s-watson-will-soon-answer-your-311-calls-as-part-of-a-24-million-upgrade-to-the-system>.
- Flook, Bill. "District Boosting D.C. Tech Startups." *Washington Business Journal*. June 29, 2012, sec. Technology. Google Cache. <https://webcache.googleusercontent.com/search?q=cache:0wxUWo8DilAJ:https://www.bizjournals.com/washington/print-edition/2012/06/29/district-boosting-dc-tech-startups.html+&cd=8&hl=en&ct=clnk&gl=us>.
- Freed, Benjamin. "NYC's Algorithm Task Force to Hold First Public Meetings." *StateScoop*, March 29, 2019. <https://statescoop.com/new-york-citys-algorithm-task-force-to-hold-first-public-meetings-nearly-a-year-after-creation/>.
- "General Data Protection Regulation (GDPR) Entered into Force in the EEA." European Free Trade Association, July 19, 2018. <https://www.efta.int/EEA/news/General-Data-Protection-Regulation-GDPR-entered-force-EEA-509576>.
- Goldsmith, Stephen. "Giving Citizens the Tools to Grade Their Governments." *Governing*, January 23, 2013. <https://www.governing.com/blogs/bfc/col-grade-dc-gov-washington-citizen-satisfaction-public-services.html>.
- Goodman, Michelle. "Crowdfunding Case Study: How Appbackr Worked for Popvox." *msnbc.com*, September 16, 2011. [http://www.nbcnews.com/id/44545933/ns/business-small\\_business/t/crowdfunding-case-study-how-appbackr-worked-popvox/](http://www.nbcnews.com/id/44545933/ns/business-small_business/t/crowdfunding-case-study-how-appbackr-worked-popvox/).

- Gorski, Paul, Stacy Lopresti-Goodman, and Dallas Rising. "‘Nobody’s Paying Me to Cry’: The Causes of Activist Burnout in United States Animal Rights Activists." *Social Movement Studies* 18, no. 3 (May 4, 2019): 364–80. <https://doi.org/10.1080/14742837.2018.1561260>.
- Graeff, Erhardt. "How Silicon Valley Can Support Citizen Empowerment." Scholars Strategy Network, March 15, 2019. <https://scholars.org/contribution/how-silicon-valley-can-support-citizen-empowerment>.
- Granville, Kevin. "Facebook and Cambridge Analytica: What You Need to Know as Fallout Widens." *The New York Times*, May 14, 2018, sec. Technology. <https://www.nytimes.com/2018/03/19/technology/facebook-cambridge-analytica-explained.html>.
- Griffith, Janice. "The French Metropole: How It Gained Legal Status as a Metropolis." *Journal of Comparative Urban Law and Policy* 2, no. 1 (2017): 3.
- "Harnessing the Power of Collective Intelligence: Communities & Technologies." Catalyst, 2015. [http://catalyst-fp7.idea.kmi.open.ac.uk/wp-content/uploads/2016/01/Final\\_Report\\_CATALYST.compressed-2.pdf](http://catalyst-fp7.idea.kmi.open.ac.uk/wp-content/uploads/2016/01/Final_Report_CATALYST.compressed-2.pdf).
- Harris, Marci. "Re: Request for Information: Popvox," July 3, 2019.
- Ho, Catherine. "Start-Ups Aim for a More Democratic Lobbying System." Washington Post, November 4, 2012. [https://www.washingtonpost.com/business/capitalbusiness/start-ups-aim-for-a-more-democratic-lobbying-system/2012/11/02/6b5f1b38-22e0-11e2-ac85-e669876c6a24\\_story.html](https://www.washingtonpost.com/business/capitalbusiness/start-ups-aim-for-a-more-democratic-lobbying-system/2012/11/02/6b5f1b38-22e0-11e2-ac85-e669876c6a24_story.html).
- "Home," 2019. <https://www.popvox.com>.
- "H.R. 1585 Violence Against Women Reauthorization Act of 2019." Popvox, April 2019. <https://www.popvox.com/us/federal/bills/116/hr1585>.
- "Insights Civic Engagement Tool." Insights, 2019. <https://www.civicengagement.app/>.
- Insights Engagement Manager. GovLab / Insights Conversation. Zoom, April 8, 2019.
- Insights Office. *Insights.US for Cities*. Accessed May 1, 2019. <https://www.youtube.com/watch?v=S1LTWeswMfk>.
- . *Users Add Their Answers*. Accessed May 1, 2019. <https://www.youtube.com/watch?v=HxJvObWOAv8>.
- "Insights' Story." Accessed May 1, 2019. <https://www.insights.us/en/story>.
- "Intercultural Cities: Good Practice Examples: Better Reykjavík." Council of Europe, 2019. [https://www.coe.int/en/web/interculturalcities/good-practice/-/asset\\_publisher/IA8MBwPd2Unw/content/better-reykjavik](https://www.coe.int/en/web/interculturalcities/good-practice/-/asset_publisher/IA8MBwPd2Unw/content/better-reykjavik).

- Janssen, Ian. "Health Care Costs of Physical Inactivity in Canadian Adults." *Applied Physiology, Nutrition, and Metabolism = Physiologie Appliquée, Nutrition et Métabolisme* 37 (June 6, 2012): 803–6. <https://doi.org/10.1139/h2012-061>.
- Kalil, Thomas, and David Wilkinson. "Harnessing the Power of Feedback Loops." whitehouse.gov, January 3, 2017. <https://obamawhitehouse.archives.gov/blog/2017/01/03/harnessing-power-feedback-loops>.
- Kass, Elliot M. "Comparing Master Data Management's Top Five Vendors." Information Management, December 22, 2017. <https://www.information-management.com/news/comparing-master-data-managements-top-five-vendors>.
- Kaufmann, David, and Carl Siegmund. "USAGov and State Department Partner to Streamline Passport Process." USA.gov, July 24, 2017. <https://blog.usa.gov/usagov-and-state-department-partner-to-streamline-passport-process>.
- Köhl, Anna, Simon Fuger, Moritz Lang, Johann Füller, and Martin Stuchtey. "How Text Mining Algorithms for Crowdsourcing Can Help Us to Identify Today's Pressing Societal Issues." In *Proceedings of the 52nd Hawaii International Conference on System Sciences*, 2019.
- Laudouar, Janique. "Grand Débat: Bluenove Mise Sur l'intelligence Collective." *Medium* (blog), March 27, 2019. <https://medium.com/@janiquelaudouar/grand-d%C3%A9bat-bluenove-mise-sur-lintelligence-collective-cc764b7fff5a>.
- "Le Nouveau Grand Paris: Un Projet Par et Pour Les Franciliens." Ministère de la Cohésion des territoires et des Relations avec les collectivités territoriales, October 24, 2013. <http://www.cohesion-territoires.gouv.fr/Le-Nouveau-Grand-Paris-un-projet>.
- "London Borough of Camden." IBM, December 19, 2018. <https://www.ibm.com/case-studies/london-borough-camden>.
- Loukides, Mike, and Ben Lorica. "How AI and Machine Learning Are Improving Customer Experience." O'Reilly Media, May 14, 2019. <https://www.oreilly.com/ideas/how-ai-and-machine-learning-are-improving-customer-experience>.
- Ma, Alexandra. "China Has Started Ranking Citizens with a Creepy 'social Credit' System — Here's What You Can Do Wrong, and the Embarrassing, Demeaning Ways They Can Punish You." *Business Insider*, October 29, 2018. <https://www.businessinsider.com/china-social-credit-system-punishments-and-rewards-explained-2018-4>.
- Mackintosh, Sanjay, and Kathy Freeman. "Camden Council's Medium Term Financial Strategy 2019/20 – 2021/22 (CS/2018/26)." London, United Kingdom: London Borough of Camden, November 30, 2018. <https://www.camden.gov.uk/documents/20142/5611054/>



[Camden+Councils+Medium+Term+Financial+Strategy+201920+-+202122+CS201826.pdf/8fad3f9f-c945-4406-e5fc-cc40e0dbf6fe.](#)

Nilfanion. *Map of Greater London, UK with Districts Shown*. July 17, 2010. Ordnance Survey OpenData. Most data from Boundary-Line product. Lake data from Meridian 2 product. Inset derived from England location map.svg by Spischot. [https://commons.wikimedia.org/wiki/File:Greater\\_London\\_UK\\_district\\_map\\_\(blank\).svg](https://commons.wikimedia.org/wiki/File:Greater_London_UK_district_map_(blank).svg).

Marotta, Stefanie. "Ottawa-Backed Carrot Rewards App Shutting down after Failing to Find a Buyer." June 19, 2019, sec. Business. <https://www.theglobeandmail.com/business/article-ottawa-backed-carrot-rewards-app-shutting-down-after-failing-to-find-a/>.

McKinney, Sarah. "The Future Of Political Engagement Is Here (And It's Called POPVOX)." Forbes, February 1, 2014. <https://www.forbes.com/sites/sarahmckinney/2014/02/01/the-future-of-political-engagement-is-here-and-its-called-popvox/>.

Merrill, Brad. "The Bots Who Edit Wikipedia (And The Humans Who Made Them)." MakeUseOf, July 20, 2015. <https://www.makeuseof.com/tag/bots-edit-wikipedia-humans-made/>.

Metropole du Grand Paris Project Manager. Métropole d'intelligences/ Assembl Use Case Interview. Zoom, April 3, 2019.

"Métropole Inclusive." Métropole d'intelligences, September 30, 2015. <https://consultation.metropolegrandparis.fr/metropole-intelligences/debate/survey/question/UXVlc3Rpb246MjY=/1>.

Mindool Senior Manager. Request for Information: Mindool. Skype, April 11, 2019.

Mitchell, Marc, Lauren White, Erica Lau, Tricia Leahey, Marc A. Adams, and Guy Faulkner. "Evaluating the Carrot Rewards App, a Population-Level Incentive-Based Intervention Promoting Step Counts Across Two Canadian Provinces: Quasi-Experimental Study." *JMIR MHealth and UHealth* 6, no. 9 (2018): e178. <https://doi.org/10.2196/mhealth.9912>.

Mitchell, Marc, Lauren White, Paul Oh, David Alter, Tricia Leahey, Matthew Kwan, and Guy Faulkner. "Uptake of an Incentive-Based MHealth App: Process Evaluation of the Carrot Rewards App." *JMIR MHealth and UHealth* 5, no. 5 (May 30, 2017): e70. <https://doi.org/10.2196/mhealth.7323>.

"Moral Machine." Moral Machine, 2019. <http://moralmachine.mit.edu>.

Narayanan, Darshana. "Re: Questions Regarding Pol.Is," May 14, 2019.

Nicholls, Penny, and Bella Sankey. "Was It Right to Scrap the ContactPoint Child Database? I Penny Nicholls and Isabella Sankey." *The Guardian*, August 13, 2010, sec. Opinion. <https://>

[www.theguardian.com/commentisfree/libertycentral/2010/aug/13/closure-contactpoint-database-contrasting-views](http://www.theguardian.com/commentisfree/libertycentral/2010/aug/13/closure-contactpoint-database-contrasting-views).

Office of the Director of National Intelligence. "IARPA Launches Hybrid Forecasting Competition to Improve Predictions Through Human-Machine Integration," August 18, 2017. <https://www.dni.gov/index.php/newsroom/press-releases/item/1785-iarpa-launches-hybrid-forecasting-competition-to-improve-predictions-through-human-machine-integration>.

"Page d'accueil." Métropole du Grand Paris, 2019. <https://www.metropolegrandparis.fr/en/node/94>.

Passport Services. "Passport Customer Survey." Travel.State.Gov, 2019. <https://travel.state.gov/content/travel/en/contact-us/passports/customer-survey-npic.html>.

"PaymentRegister-Nov2018." City of San Antonio, November 2018. <https://www.sanantonio.gov/Portals/0/Files/Finance/Checks/PaymentRegister-Nov2018.xlsx>.

"Polis." Pol.is, 2018. <https://pol.is/company>.

"POPVOX." Crunchbase, 2019. <https://www.crunchbase.com/organization/popvox>.

"POPVOX LegiDash Fund." Democracy Fund, 2018. <https://www.democracyfund.org/portfolio/entry/popvox-legidash-fund>.

Powers, William, and Deb Roy. "The Incredible Jun: A Town That Runs on Social Media." HuffPost, 13:03 400AD. [https://www.huffpost.com/entry/jun-twitter-social-media\\_b\\_7102780](https://www.huffpost.com/entry/jun-twitter-social-media_b_7102780).

PR Newswire. "Canadian Public Engagement Platform Carrot Rewards Ranks Top 20 on the Canadian Business and Maclean's 2018 Startup 50." markets.businessinsider.com, September 13, 2018. <https://markets.businessinsider.com/news/stocks/canadian-public-engagement-platform-carrot-rewards-ranks-top-20-on-the-canadian-business-and-macleans-2018-startup-50-1027532545>.

"Pricing." Insights, 2019. <https://www.civicengagement.app/pricing>.

"Product Tour: Civic Engagement Easy Made," 2019. <https://www.civicengagement.app/product-tour>.

Prothero, Richard. "Sub-Regional Productivity." Office for National Statistics, March 8, 2016. <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/subregionalproductivity/march2016>.

"Questionnaire Design." *Pew Research Center Methods* (blog), 2019. <https://www.pewresearch.org/methods/u-s-survey-research/questionnaire-design/>.

- “Report on the Test of the Assembl Platform for the Wikiprogress Online Consultation on Youth Well-Being, 30 March to 15 May 2015.” Wikiprogress, July 30, 2015. [http://catalyst-fp7.idea.kmi.open.ac.uk/wp-content/uploads/2015/08/Test\\_Report\\_OECD\\_Assembl.pdf](http://catalyst-fp7.idea.kmi.open.ac.uk/wp-content/uploads/2015/08/Test_Report_OECD_Assembl.pdf).
- Roy, Deb, and William Powers. “The Incredible Jun: A Town That Runs on Social Media.” *Medium* (blog), April 16, 2015. <https://medium.com/@socialmachines/the-incredible-jun-a-town-that-runs-on-social-media-49d3d0d4590>.
- Say, Mark. “Camden Claims Cash Wins from Residents Index.” UKAuthority, March 7, 2015. <https://www.ukauthority.com/articles/camden-claims-cash-wins-from-residents-index/>.
- Scott, Mark. “The Spanish Town That Runs on Twitter.” *The New York Times*. December 21, 2017, sec. Technology. <https://www.nytimes.com/2016/06/09/technology/the-spanish-town-that-runs-on-twitter.html>.
- Segaran, Toby. *Programming Collective Intelligence: Building Smart Web 2.0 Applications*. 1st edition. Beijing; Sebastapol CA: O'Reilly Media, 2007. <http://axon.cs.byu.edu/~martinez/classes/778/Papers/GP.pdf>.
- Senior Carrot Insights Staff Member. GovLab / Carrot Rewards Discussion. Zoom, March 27, 2019.
- Senior Popvox Staff Member. GovLab/ Popvox Discussion. Zoom, April 2, 2019.
- Shankar, Bradly. “Carrot Rewards Launches in the Northwest Territories with Additional Rewards Option.” MobileSyrup, May 29, 2019. <https://mobilesyrup.com/2019/05/29/carrot-rewards-northwest-territories-expansion/>.
- Shubash, Paul. “Cam Dig Jou V2.” Prezi, London, United Kingdom, October 26, 2016. <https://prezi.com/cfya2pcdkwvy/cam-dig-jou-v2/>.
- Siegmund, Carl. “All Decisions.” Tell-Us.USA.gov, May 17, 2017. <https://usagov.insights.us/improve/decisions>.
- . “Re: Request for Information: Tell-Us.Usa.Gov,” April 9, 2019.
- . “Tell-Us.USA.Gov | Improve Passport Experience.” Tell-Us.USA.gov, May 2017. <https://usagov.insights.us/improve>.
- Smith Cross, Jessica. “Ontario Gives \$1.5M to Carrot Rewards App to Help People Make Healthy Choices.” *The Star*, July 6, 2017. <https://www.thestar.com/news/canada/2017/07/06/ontario-gives-15m-to-carrot-rewards-app-to-help-people-make-healthy-choices.html>.
- Souvaliotis, Andreas. “Farewell from Carrot.” Carrot Rewards, June 19, 2019. <http://www.carrotapp.com/>.
- “Step Together.” *Carrot Rewards* (blog), 2018. <https://www.carrotapp.com/earn-together/>.
- “Steps.” *Carrot Rewards* (blog), 2018. <https://www.carrotapp.com/walk-and-earn/>.

Symons, Tom. *Wise Council: Insights from the Cutting Edge of Data-Driven Local Government*.

London, United Kingdom: Nesta, November. [https://media.nesta.org.uk/documents/wise\\_council.pdf](https://media.nesta.org.uk/documents/wise_council.pdf).

The Office of Majority Leader Steny Hoyer. "Trump Shutdown Stories." Trump Shutdown Stories,

Feb 19. <https://trumpshutdownstories.us/>.

Tuttle, Martin. "Consideration of Measure E Allocations for Reducing the Community Impacts of Homelessness (\$442,540); Repairing City Streets (\$250,000); Procuring A Software License to Facilitate Improved Qualitative Analysis of the Community Impacts of Measure and Other Projects (\$12,000); And Implementing Bicycle and Trail Improvements (\$140,000)." City of West Sacramento, October 4, 2017. <https://blob.cityofwestsacramento.org/civica/filebank/blobdload.asp?BlobID=15687>.

UN General Assembly. "Universal Declaration of Human Rights," December 10, 1948. [http://www.verklaringwarenatuur.org/Downloads\\_files/Universal%20Declaration%20of%20Human%20Rights.pdf](http://www.verklaringwarenatuur.org/Downloads_files/Universal%20Declaration%20of%20Human%20Rights.pdf).

U.S. Government Publishing Office. "Bulk Data Repository." GovInfo. Accessed July 9, 2019.

<https://www.govinfo.gov/bulkdata>.

"Use Cases." *ZenCity* (blog), 2018. <https://zencity.io/use-cases/>.

Verhulst, Stefaan G. "Where and When AI and CI Meet: Exploring the Intersection of Artificial and Collective Intelligence towards the Goal of Innovating How We Govern." *AI & SOCIETY* 33, no. 2 (May 1, 2018): 293–97. <https://doi.org/10.1007/s00146-018-0830-z>.

Verhulst, Stefaan, and Andrew Young. "Orange Telecom Data for Development Challenge (D4D)." Data Collaboratives, 2018. <http://datacollaboratives.org/cases/orange-telecom-data-for-development-challenge-d4d.html>.

Walton, Alice G. "6 Science-Backed Ways Exercise Benefits the Body and Brain." *Forbes*, May 23, 2017. <https://www.forbes.com/sites/alicegwalton/2017/05/23/6-ways-exercise-benefits-the-body-and-brain/#4fc04a532503>.

"Watson Data Responsibility Perspective." Watson Data Responsibility Perspective, October 15, 2017. <https://www.ibm.com/watson/data-privacy/>.

"Watson Language Translator." IBM, November 28, 2016. <https://www.ibm.com/watson/services/language-translator/>.

Weidig, Tom. "Case Studies." Mindool, 2019. <https://mindool.com/case-studies>.

———. "Use a Mindool." Mindool, 2019. <https://mindool.com/welcome>.

Weld, Daniel S., Christopher H. Lin, and Jonathan Bragg. "Artificial Intelligence and Collective Intelligence." *Handbook of Collective Intelligence*, 2015, 89–114.

"What Is Grade.DC.Gov?" Grade.DC.Gov, September 2018. <https://grade.dc.gov/>.

"What the Heck Are Carrot Rewards?" Refresh Financial, March 13, 2017. <https://refreshfinancial.ca/blog/money-saving-ideas/carrot-rewards-earn-favourite-loyalty-points-getting-healthy/>.

What. Where. When. PredPol Home Page. "Predict Prevent Crime," 2018. <https://www.predpol.com/>.

White, Lauren. "Re: Carrot Rewards Case Study," June 21, 2019.

Whitley, Edgar. "Can Data Sharing Improve Public Services? Lessons for Parliament." *Impact of Social Sciences* (blog), November 30, 2016. <https://blogs.lse.ac.uk/impactofsocialsciences/2016/11/30/can-data-sharing-improve-public-services-lessons-for-parliament/>.

"Who We Are." *Catalyst-FP7* (blog), 2015. <http://catalyst-fp7.idea.kmi.open.ac.uk/us/who-we-are/>.

Williamson, Tom. "DemCom to Integrate with Popvox." Jackson River, July 19, 2012. <https://www.jacksonriver.com/news/demcom-integrate-popvox>.

Wilson, Melissa A. City Commission Meeting Agenda - November 14, 2018 (2018). [https://www.daytonohio.gov/AgendaCenter/ViewFile/Agenda/\\_11142018-584](https://www.daytonohio.gov/AgendaCenter/ViewFile/Agenda/_11142018-584).

Young, Andrew, Jeffrey Brown, Hannah Pierce, and Stefaan Verhulst. "People-Led Innovation: Toward a Methodology for Solving Urban Problems in the 21st Century." SSRN Scholarly Paper. Rochester, NY: Social Science Research Network, January 1, 2018. <https://papers.ssrn.com/abstract=3141381>.

Zax, David. "Fast Talk: How PopVox Gets Congress to Listen." Fast Company, February 17, 2012. <https://www.fastcompany.com/1816285/fast-talk-how-popvox-gets-congress-listen>.

"ZenCity Home Page." ZenCity, 2018. <https://zencity.io/>.