Technology Trends

Crowdsourcing

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Business Brief

Crowdsourcing is an online, distributed problem-solving and sourcing model where individuals or organizations leverage the collective intelligence of online communities to acquire needed services, ideas or content.

The journalist Jeff Howe first coined the term crowdsourcing as a combination of the words *crowd* and *outsourcing* in his 2006 Wired Magazine article "The Rise of Crowdsourcing". Howe describes crowdsourcing as the "the act of a company or institution taking a function once performed by employees, and outsourcing it to an undefined (and generally large) network of people in the form of an open call".

The first recorded occurrence of crowdsourcing was a contest issued by the British Government in 1714 to solve a longitudinal problem in naval navigation. This led to the invention of the marine chronometer by John Harrison, who ended up winning £23,065 (equivalent to £2.61 million in 2015).

Crowdsourcing became a modern approach to problem-solving as a result of increased global connectivity. With the internet, contributors now have the means to participate in projects regardless of their location.

The process has proliferated in businesses and the public sector as it can be applied to any type of task, such as application development, policy formation, translation, photography, user testing, etc. However, crowdsourcing distinguishes itself from other online participation activities because it combines the traditional top-down hierarchical management process, where organizations dictate the work to be done, and the bottom-up user production process where online-communities are the center of control. In the crowdsourcing model, an organization sets the objectives but draws input and insight from the crowd. This involvement in the business management is what makes crowdsourcing different than Open Collaboration or Co-Creation:

- **Open Collaboration:** Is a system of innovation relies on a collaborative community who contribute towards a particular goal. There is generally no organisation overseeing the process, no rewards associated and solutions are free of any licences. Contributors are motivated by the creation of mutually beneficial solutions. Ex. Wikipedia.

- **Co-Creation:** is a commitment between parties to cooperate on a project that has mutual value generation. The relationship suggests that all entities will provide their own resource to create value and will share the intellectual property.

Technical Brief

As per Enrique Estellés-Arolas and Fernando González-Ladrón-de-Guevara paper written in 2012, Crowdsourcing is a type of participative online activity in which an individual, an institution, a non-profit organization, or company proposes to a group of individuals of varying knowledge, heterogeneity, and number, via a flexible open call, the voluntary undertaking of a task. The undertaking of the task, of varying complexity and modularity, and in which the crowd should participate bringing their work, money, knowledge and/or experience, always entails mutual benefit. The user will receive the satisfaction of a given type of need, be it economic, social recognition, self-esteem, or the development of individual skills, while the crowdsourcer will obtain and use to their advantage what the user has brought to the venture, whose form will depend on the type of activity undertaken.

Crowdsourcing is a versatile process involving different groups and components, each of which can be independently customized to suit one's end-goal. As such, a crowdsourcing venture requires a specific goal and particular tasks defined by an organization as part of an open request for anyone to participate and that will be conducted through an online platform or some other IT medium with rewards to be gained by both the crowd and the organization.

Organization: Before starting a crowdsourcing venture, an organization has to clearly define the problem and the solution parameters. They need to be well-framed and specific. Otherwise, an overly broad request will result in a wide range of responses having imprecise degrees of value. Furthermore, the organization will need to determine its level of involvement in the process. Any crowdsourcing initiative is labor intensive for an organization as it requires managing and monitoring the work being done by the online community and communicating clear direction.

Crowd: Crowdsourcing is a way of managing the collective intelligence of online communities. This has several properties that an organization can use to its advantage - whether it's the crowd's ability to create or decide, to work collaboratively or individually, or to use its expertise or its mass. The following are different crowdsourcing approaches based on the type of task and the crowd required to do them.

- **Crowd Contests:** The goal is to identify the best worker for the job after receiving several request proposals. It is very well suited for graphic design, testing software or other creative projects.

- **Macrotask:** The objective is to acquire a specific skill for a job or project by hiring a worker from the crowd. It is suited for general business work, web design and development, writing and editing.

- **Microtasks:** By engaging a crowd as a whole, a complicated task can be broken down into smaller units that each member can easily tackle. It is useful for computationally difficult problems like transcribing, finding information or handling non-textual data.

- **Crowdfunding:** This approach recruits the crowd to donate financially to a cause. Non-profit organizations, artistic endeavors or company equity are examples of crowdfunding.

- **Self-Organised crowds:** Usually done by posting a challenge online, a crowd will self-organize to provide the best answer and, thus receive the rewards. This is best suited for innovation, solving challenges, and finding or processing information.

Incentives: The success of crowdsourcing is influenced by the online communities' level of participation and the quality of their contributions. To sustain user engagement, they need an appropriate incentive mechanism that fulfills their needs. Below are popular reward mechanisms designed to trigger these motives.

- **Reputation system:** This reward system takes the form of aggregating personal ratings where each contributor has a reputation score based on their ability to complete tasks successfully, which is assigned either by the requester or other users.

- **Social mechanism:** In an online community, having a good social image is very important for participants as they want to be perceived as competent and skillful. Platforms that implement social features such as profile pages, messages and user connectivity see a positive correlation with user engagement.

- **Financial/Career Rewards:** Perhaps the most common incentives, monetary compensation triggers extrinsic motives similar to the market. Organizations engaged in crowdsourcing can exchange monetary compensation, physical rewards or career opportunities to incentivize the crowd.

- **Gamification:** There is an increased interest in incentives that takes the form of game design elements in non-game contexts. Such elements include a points system, achievement badges, levels, leaderboards, etc. Thus, gamification appeals to intrinsic motives such as enjoyment and social recognition.

Platform: There is a misunderstanding regarding the definition of crowdsourcing as a tool or a process, partly due to the rise of dedicated third-party platforms. However, there have been a rise, throughout the years, in dedicated platforms offering specific flavors of crowdsourcing. The crowdsourcing process encompasses various types of

platforms such as virtual labour markets, tournament crowdsourcing and open innovation.

Organizations can develop their own IT infrastructure with personalized features tailored to their own needs but that require additional expenses. Lego is an example where the company has created an online community to provide ideas for their products. There are also several dedicated online platforms offering crowdsourcing services such as InnoCentive that engages a problem-solving crowd to answer anyone's challenges in exchange for monetary compensation.

Industry Use

Crowdsourcing is currently being used by the industry as an effective method to acquire any type of resources such as labor, influence, capital, assets or data. At its core, Crowdsourcing is a process that can be applied to many fields.

The following classifications includes task-based grouping of crowdsourcing initiatives used in industry via a variety of platforms and channels:

Crowdcasting: This contest-like crowdsourcing is when an organization proposes to a crowd a problem or a specific task to be done and the first or the best solutions receives the reward. The challenge is often performed individually by experts in their field. For example, Prize4Life is an organisation that was initially created after his founder got diagnosed with ALS. The organization seeks to accelerate research towards a cure by funding prize-based competition. A neurologist called Dr. Seward Ruthkove was awarded a $1M prize by Prize4Life for his development of an approach to more rapidly assess disease progression.

Crowdcollaboration: This is a problem-solving approach where the crowd shares its knowledge and works collaboratively, whereas the crowdsourcer doesn't get too involved. Usually, there is no financial reward. There are two subtypes :

- **Crowdstorming:** This is a massive online brainstorming session, in which different ideas are proposed and the crowd can support them with their comments and votes. A great exemple of Crowdstorming would be LEGO with their Cuusoo platform where an idea must garner 10000 votes by the community before it will be reviewed by the LEGO team.

- **Crowdsupport:** This initiative has customers themselves solve the doubt and problems of other customers without the need of the official customer support. A good example of Crowdsupport would be an online support forum that is maintained by a user community.

Crowdcontent: The crowd shares their labor and knowledge to create or find content of various types. It is not a competition, but everyone works individually and assemble the end results. There are three subtypes.

- **Crowdproduction:** The crowd produces content, either collaboratively such as Wikipedia or individually when translating short pieces of text.

- **Crowdsearching:** The crowd is tasked with searching for content on the internet for specific purposes.

- **Crowdanalysing:** This approach is similar crowdsearching, but, instead of the internet, the crowd analyses multimedia documents such as images or videos.

Crowdfunding: In this initiative, an individual or an organization may obtain financial resources from the crowd to carry out any kind of project such as launching a start-up. The will to participate usually comes from a reward system usually in the form of money, merchandise, shares or products such as Kickstarter. There are other forms of crowdsourcing where the crowd donates money to a charity project expecting no reward in return. A great example of that would be GoFundMe.

Crowdopinion: The goal of this approach is to get topic or product feedback from the users through votes, comments, or even sales of shares. The crowdsourcers obtain information about their potential market acceptance. Some companies are using Crowdopinion to collect feedback on upcoming products before releasing them officially.

Canadian Government Use

The Government of Canada (GC) can better leverage the collective knowledge and experience of their employees by using an online platform to transpose traditional practices such as public feedback, project development, or petitions by using crowdsourcing. Currently, this process is mainly used as a data collection tool such as the non-profit OpenStreetMap Foundation in collaboration with Statistics Canada, where users volunteer geographic information to map the environmental impact of human activities in the National Capital region.

The GC has also expressed interest in artificial intelligence and it could be applied to crowdsourcing for supervised learning. In this approach of machine learning, an AI uses training data to recognize some patterns and its performance can be measured by applying some testing data. Before starting the process, the data needs to be classified and the expected results defined. The Amazon Mechanical Turk utilizes crowdsourcing to assign "microtasks" to humans in order to classify data.

From the GC's perspective, political leaders and public managers need a practical framework to assess the applications of crowdsourcing as a tool for governance. There are four problem-based crowdsourcing approaches in which a government could benefit. This typology helps a practitioner to assess the kind of problem that needs to be solved and to decide which crowdsourcing approach is most useful.

- **Knowledge Discovery and Management:** GC agencies challenged with uncovering existing knowledge may amplify its limited discovery capabilities by tasking an online community to find and assemble specific information. It is ideal when obtaining public information such as reporting road or trail conditions or tracking public transit usage.
- **Distributed Human Intelligence Tasking:** A government having a large amount of information may decompose and distribute it to an online community to process or analyze it. Usually, it is applied when human intelligence is more efficient than computer analysis, such as language translation or transcribing digital scans of handwritten records.

- **Broadcast Search:** This problem-solving approach helps agencies to find a specific and provable solution to a problem. Often in the form of a competition, an organization poses a challenge with detailed parameters to an online community to discover an expert able to address the problem. It is ideal for scientific problems like finding better algorithms or improving formulas.

- **Peer-Vetted Creative Production:** An organisation looking for innovative ideas where it's a matter of taste or market support may involve an online community to propose solutions and empower them to select the best submissions through voting or commenting system. This approach of crowdsourcing is suitable for policy, aesthetics or design problems.

Implications for Shared Services Canada (SSC)

Value Proposition

SSC can leverage the increased prominence of crowdsourcing in various areas of its business model. This method provides an opportunity for businesses who seek an alternative to the established business models. Crowdsourcing can be used to accomplish tasks in multiple area of application such as application development, web development, user testing, translation, transcription, photography, graphic design and writing.

SSC could benefit from crowdsourcing in the following aspects:

- Diversity of Talents: Having access to an online community of talent all around the world eliminates the need to acquire missing proficiencies. Using a crowdsourcing

approach will help an organization find specialists willing to lend their expertise in problem-solving. Also, participation in this initiative can have a positive effect as it increases the business value of potential customers or identifies future employees.

- **Innovating Ideas:** The broad access to a flexible and creative individuals can provide out of the box ideas for a product or service that would not otherwise be available within an organization. Furthermore, crowdsourcing generally has a high success rate and can offer reliable solutions. Due to its competitive nature, any single point of failure will be removed by another qualified individual.

- **Time and Cost Effectiveness:** An organization can minimise expense in terms of money, time and resources by crowdsourcing. This process shifts from a labor-based model to an outcome-based model where results are what drive the production. Also, the rapid-growing environment is well suited for crowdsourcing where there is reduced time to market and faster project delivery.

Challenges

There are several limitations when it comes to crowdsourcing that stem from the process and the crowd. It can be effectively applied for some projects, but may not be applicable for others, especially in SSC's line of work.

- **Unreliability:** When outsourcing to a large crowd of non-professional workers, the results can vary greatly. The quality of the end-result might be questionable. There is that element of unfamiliarity with the crowd. Screening the crowd's qualifications isn't part of the process because it requires too many resources and there is nothing to hold the crowd accountable. Also, direct communication with the crowd might be challenging due to language barriers.

- **Management:** In any crowdsourcing venture, there is a lot of overhead required for an effective crowdsourcing. The online community requires a clear directive in order to produce the right end-product. They need to be given clear parameters and a clear vision of what the end goals are. Furthermore, crowdsourcing is a long term initiative and requires patience and perseverance to pay off. It can become complicated to plan and manage projects with such a large pool of diverse people without the appropriate systems and processes in place.

- **Confidentiality/Privacy:** When using crowdsourcing, collaborators will have a certain level of access to information like software source code, web content or other intellectual property in order to perform their work. This is a cause for concern for organizations wanting to keep proprietary information out of reach of other businesses. Without any written contracts or non-disclosure agreements (NDAs), proprietary information including server IP addresses might not remain confidential

or protected. Rigorous use of guidelines, procedures, and frameworks should be used to help protect the confidentiality and privacy of information.

Considerations

SSC should consider these following risks in order to perform a successful crowdsourcing campaign:

- **Involvement:** Turning over a project to a crowd can be worrisome. It is important to let citizens take an active role in the crowdsourcing process. Managers should share their control by letting the crowd get involved. They should take note of the community's concerns and needs while moving the group towards the common goal. SSC should consider using clear guidelines, procedures, and frameworks when engaging in crowdsourcing activities. For example, a tailored GC crowdsourcing framework would enable senior management to establish clear goals and outcomes before commencing a crowdsourced project. SSC should also look to the work of other GC departments and adopt tools and lessons learned to better inform its own crowdsourcing activities (i.e. the Library and Archives Canada Co-Lab tool, the GCcollab workspace, the cannabis crowdsourcing initiative by Statistics Canada, etc.)

- **Rewards:** Even though crowdsourcing is cheap, it is not free by any means. The more that is asked from people, the higher the reward must be in return. Not only is it important to know the motivations of online communities, but you need to make sure their needs are met. This usually takes the form of public acknowledgement. It makes sense for an ideation challenge to acknowledge the winners and to thank all participants for solving an information management problem. SSC should consider looking for ways to cultivate online communities that can be tapped when needed to solve specific problems and/or provide expert input. For example, these online communities could be internal to the GC (via GCcollab individual public servants, departmental working groups, etc.) or external to the GC (via innovation hubs/labs, private companies specializing in crowdsourcing-based services, the non-profit sector, and other levels of government, etc.). Some degree of community management may be required by SSC.

- **Transparency:** It is important that the online community in a crowdsourcing venture trusts the government agency sponsoring the project. They should feel as though their voices will be heard and their concerns will be met. To open a challenge to an online community requires an organization to expose some proprietary information, inner processes or internal struggles. To leverage crowdsourcing, the organization must be able to treat crowds as meaningful stakeholders. While transparency is a vital component of trust, SSC should also consider the risks/rewards associated with what, where, when, why, and how information is released. SSC may wish to engage with GC open government experts before commencing any crowdsourcing activities.

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