Chapter 13
Smart Activation of Citizens:
Opportunities and Challenges for Scientific Research

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ABSTRACT

This chapter focuses on how, by "activating" the citizen's engagement in the research process, the scientific community has a smart way to benefit from the wisdom of the "crowd". There are countless success stories in which citizens participate, contributing with their knowledge, cognitive capacity, creativity, opinion, and skills. However, for many scientists, the lack of familiarity with the particular nature of citizen participation, which is usually anonymous and volatile, turns into a barrier for its adoption. This chapter presents a problem-based typology for citizen-science projects that aims to help scientists to choose the best strategy for engaging and counting on citizen participation based on the scientific problem at hand; and some examples are included. Moreover, the chapter discusses the main challenges for researchers who intend to start involving the citizens in order to solve their specific scientific needs.

INTRODUCTION

Historically, scientific research has been based on integrity, objectivity, truth-seeking and autonomy. This autonomy has led to the creation of a boundary between academia and society, thus dictating that science should be conducted only by scientists and acknowledged by their peers, for the benefit of society. However, new technologies and the popularity of Internet have led to the establishment of a new collaboration paradigm. The combination of crowdsourcing together with the advancement of mobile technologies opens up huge potential benefits for science, society, and the environment.

One of the greatest challenges of modern science is to transform the former border between academia and society into a place where ideas and interests can encounter and collide. Citizen science transforms this border into a permeable boundary that allows the union and exchange of different knowledge, skills and interests with benefits for all participants: scientists, citizens, and partners.

Although there are numerous citizen science projects in various parts of the world, only few studies have addressed the specific managerial aspects of citizen engagement in scientific domain and the dimensions that should be evaluated before and during its adoption. A better understanding of these aspects and related mechanisms can provide the "perfect experience" for the citizen scientist. To attract and retain citizens willing to collaborate with science, assure the quality of the contributions and the attendance to standards, and support a large number of contributors and contributions, are some of the challenges faced by managers of citizen science projects.

This chapter will present an overview of different opportunities for smart collaboration between citizens and scientists. It presents a problem-based typology in order to explore some representative examples of citizen science projects. Additionally, different types of projects will be grouped according to a pushed or pulled data approach adopted by the scientist. A smart activation decision tree is proposed in order to: help project managers assess which types of problems they need to solve, identify if the particular scientific objective of the project is compatible with the use of citizen science, and select which category of solution is best suited to the problem. An assessment of the main challenges for the design and management of these projects, as well as the challenges related to motivational aspects and quality control, will be presented. We believe this chapter will serve as a guide for scientists to advance towards this new paradigm and achieve the benefits associated with the smart activation of citizens in modern science.

BACKGROUND

In the new age of modern science, which is increasingly global, interconnected, and involves more international collaboration ("The Royal Society", 2011), citizen science has emerged as a form of crowdsourcing in which geographically distributed members of the crowd are invited to collaborate with scientists by applying some human cognitive ability on a large scale. This new paradigm has been studied by many authors, including Haklay (2013, 2014), Wiggins and Crowston (2010, 2012), Dickinson et al. (2010), Nov et al. (2010), Alabri and Hunter (2010), and Bonney et al. (2009) to name just a few. In accordance to this paradigm, members of the general public are promoted to the role of citizen scientists, in the stages of real scientific research and, therefore, collaborating to the creation of scientific knowledge.

New scientific methods are being created with the support of the Internet and mobile technology, thus allowing scientists to expand their network of collaborators beyond the limits of institutions. Ubiquitous and pervasive technology has broken the barriers of time and space, allowing a greater and more diverse number of collaborators to be engaged in scientific activities. The use of crowdsourcing platforms is making possible the participation of large groups to perform tasks that were once confined to small groups of experts. Recent innovations in information, communication, and technology — from smartphone apps to real-time crowdsourcing — are undoubtedly making citizen engagement far easier than ever before in history.

Currently, crowdsourcing is considered to be an umbrella or generic term, since it embraces a variety of approaches that exploit the labor force and cognitive potential of a large and open crowd of people

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