Title:	Maturing of urban sensing for air quality using citizen-sensor-networks with low cost sensors Innovation and collaborative potential in citizen science for air quality
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Keywords:	urban sensing air quality citizen-sensor-networks
Issue Date:	May-2023
Publisher:	IISER Mohali
Abstract:	A large proportion of the population in the European Union is subjected to air pollution concentrations above the WHO guideline values. This has wide-ranging effects on the health and well-being of the people, which, in turn, affects sustainability. Citizen science, which is defined by the direct involvement of citizens in scientific research, has gained attention over the years. The thesis project aims at understanding how citizen science initiatives using low- cost sensors bring about an awareness of air pollution and contribute to moulding a better environment for the people. A qualitative case study research, consisting of document analysis and interview sessions, was conducted, with an emphasis on the aspects of 'empowerment', 'upscaling', 'collaboration', and 'reliability', to understand the real motive behind the formation of such initiatives, the goals they aim to achieve, and the barriers to implementing them. An attempt has been made to comprehend the relationship between the citizens and the government bodies, which gives an understanding of the attitude possessed, as well as the motivation various entities have for tackling the shared concern at hand. Two cases, i) Lentse Luchten, a local-level initiative in the city of Nijmegen Lent, and ii) Hollandse Luchten, a regional-level initiative carried out in the Province of North Holland, were looked into. Data analysis for cross-examining the data of PM 2.5 obtained from low- cost sensors with government official sensors was also taken into consideration to figure out how reliable were the low-cost air quality sensors. The results obtained from the set of analyses show that the initiators and/or mediators are in a constant effort to upscale their project by attracting more citizens to participate. The concept of empowerment is applied directly to the citizens voicing out their concerns and questions, but indirectly to matters related to policy changes and policy-making. The government bodies are in an effort to gain the trust of the citizens that has been lost owing to reasons, for instance, Tata Steel, and thus the aim of collaboration is of importance in these initiatives. Low-cost sensors are, in general, given the notion of being low in quality, and thus compromising on the quality of data provided. The results from interviews and data analysis suggest that the concentrations of PM 2.5 from low-cost citizen sensors may not be accurate when comparing it with the expensive high-quality official sensors, but they are capable of proving an insight into the air quality pattern, thereby increasing awareness and knowledge among the citizens.
Description:	embargo period
URI:	http://hdl.handle.net/123456789/5413
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