# Chapter 20
# The Impact of Data Science and Participated Geographic Metadata on Improving Government Service Deliveries:
## Prospects and Obstacles

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## ABSTRACT

*This chapter examined the profound influence of data science and volunteered geographic information (VGI) on the delivery of public services. Volunteered geographic information, being material created by users, has had a substantial impact on making geographic information accessible to everybody, enabling people to actively engage in the creation and management of data. The incorporation of VGI into government operations has introduced novel prospects for enhancing service provision in diverse sectors such as education, health, transportation, and waste management. In addition, data science has enhanced VGI by using sophisticated methodologies like artificial intelligence (AI), internet of things (IoT), big data, and blockchain, thereby transforming the whole framework of government service provision. Nevertheless, in order to effectively use VGI in public sector services, it is essential to tackle significant obstacles such as data accuracy, safeguarding, inclusiveness, technical framework, and specialized expertise.*

## INTRODUCTION

The integration of technology and data-driven methods has significantly revolutionized the provision of public services in recent years. The utilization of Volunteered Geographic Information (VGI) in conjunction with Data Science is a significant advancement in this domain. VGI, short for Volunteered Geographic Information, refers to location-based data that individuals willingly provide on various digital platforms, including social media, mobile applications, and crowdsourcing initiatives (Goodchild, 2007). Data science encompasses the methodologies and techniques used to derive insights and knowledge from vast databases (Brodie, 2019; Provost & Fawcett, 2013).

The use of VGI (Volunteered Geographic Information) and data science in the provision of public services has seen a substantial rise, owing to many factors. Currently, there is a significant increase in the collection and distribution of location-based data due to the widespread use of mobile devices and the availability of the Internet (Huang et al., 2021). In the present day, individuals have the ability to actively participate in the generation of spatial data, providing valuable perspectives on their requirements, choices, and encounters (Goodchild, 2007).Furthermore, conventional methods of gathering data incur significant costs and require a substantial amount of time. On the other hand, VGI offers a timely and cost-efficient alternative that allows public sector enterprises to get dependable information for decision-making processes (Ahmad et al., 2022).

The combination of Volunteered Geographic Information (VGI) with data science enables the effective analysis and interpretation of big datasets, facilitating informed and data-driven policy development (Arnaboldi & Azzone, 2020; Provost & Fawcett, 2013; Wong & C. Hinnant, 2022). Consequently, public service providers have the ability to enhance the distribution of resources, enhance the efficiency of their services, and meet the specific needs of the communities they serve. To evaluate poverty at the village level, one may integrate several data sources such as high-resolution imaging (HRI), point-of-interest (POI), OpenStreetMap (OSM), and digital surface model (DSM) data (Hu et al., 2022). In a similar vein, Ma et al. (2022) put out a method to assess the logic of the geographical distribution of public restrooms in urban functional areas. They achieved this by using POI big data and OSM. KUCUKALI et al., (2022) employed open-source geospatial data, such as OSM, to assess the ease of pedestrian access to crucial public services and facilities. In contrast, Abdulkarim et al., (2014) created a VGI application utilizing Google Street View to encourage individuals to contribute to the categorization of roof materials, thereby supporting energy efficiency initiatives.

The main purpose of this chapter is to analyze the use of donated geographic information and data science in the provision of public services. This study will examine the potential benefits and challenges of incorporating these two components in various aspects of the public domain. In order to accomplish this goal, the chapter is organized in the following manner: Section two offers a comprehensive examination of Volunteered Geographic Information (VGI), with a specific emphasis on its influence on the provision of public services. Section three explores the notion of data science and its potential to improve government services. The text examines the integration of Volunteered Geographic Information (VGI) with data science in four government sectors in section four. Section five is specifically focused on tackling the difficulties that emerge within this particular framework. Ultimately the last part functions as the closing comments of the chapter, along with providing prospective suggestions for more study.

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