

Possibility of open innovation with social media -Case study of the CS topographic map

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Open Innovation (OI) is a new method of innovation that utilizing open resources inside and outside of an organization. In recent years, Open Innovation 2.0, which is led by citizen and technology users, attracts attention mainly in European countries. Social media is considered to play an important role in the OI created by the diverse participant. The purpose of this paper is to report about role of social media in utilization of CS topographical maps and characteristic as OI.

The CS topographical map (CS Map) is a stereographic projection developed by the Nagano Prefecture Forestry Research Center (Fig. 1). It is widely recognized among forestry sector, but were not popular in other fields. In addition, there was software for creating the CS Map using ArcGIS, but the method of making CS Map using other software was not enough.

The first mention about the CS Map on social media was posted to Facebook by "the forest civil engineering memo" about how to make the CS map using QGSI, on November 20, 2016. In December 9th, the implementation of CS Map using leaflet was posted on "FOSS4G Advent Calendar 2016" which had held on Qiita. By this implementation it became possible to browse the CS Map without using GIS. This entry mentioned that the CS map is useful for hobby such as climbing. It can be confirmed that usage of CS Map was expanded. In addition, this CS Map was used in workshop for local resident in Ueda city, Nagano, held on January 21, 2017. Then, "the forest civil engineering memo" released the CS Map of Hokkaido and Kyushu-Okinawa area on 26 Jan. and 15 Feb, respectively. It is created in the tile map format and used in Web map services, such as the MIERUNE Map. In addition, on "FOSS4G Advent Calendar 2016", a new entry about utilization of CM Maps with Deep Learning was posted on December 16, 2016. In this entry, it is described that open methods, such as CS Map is very helpful.

Based on such social media connections, two study sessions about utilization of CS Map were held. The first was held on January 19, 2017, and the participants from various fields exchanged opinions and utilizations about CS Maps. At this meeting, the demand for development of CS Map using open source GIS was high. Thus, on January 30, a meeting about development CS Map with QGIS was held mainly by members of OSGeo.JP. The second result was published using Hackpad. In addition, a plug-in for creating the CS Map with QGIS was developed and published on January 31 at GitHub.

As described above, the CS Map that developed for the the forestry is more easy to use and utilization expanded by contribution of users and engineers in other fields. This can be said a typical example of OI that committed by citizen and user. The reason why the OI was realized in such a short time, is there were three open factors, that is open method, open data and open source software. In addition, the map tile format used as a known method was also important. Social media was used as a medium linking these elements. In this case, not only social media for sharing information like Facebook, but also social media targeted mainly for engineers such as Qiita, Hackpad, Github, have been used to create a new application.

Many researchers and engineers related to geoscience felt that there is a gap between fundamental research and innovation. However, as the case of the CS Map, users' demand and interest are varied, and

there are unexpected applications. It is expected more open data, open methods and open source software to be released and disseminated through social media and contributed to progress of OI.

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