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WHEN SPACE MEETS SMART CITIES: NEW INNOVATION PERSPECTIVES

Abstract

The European Commission defines the Smart City as “a place where the traditional networks and services are made more efficient with the use of digital and telecommunication technologies, for the benefit of its inhabitants and businesses”. Smart cities need to fulfil four requirements: responsiveness, intelligence, connectivity and sustainability. In recent years, the Smart City has emerged as a major policy topic in most European countries, and also the space community has been promoting programs and activities to foster the use of satellite applications to increase quality of life in cities. In particular, many space agencies have been stimulating the uptake of satellite-based services for different applications in mobility, urban planning and infrastructure, Internet-of-Things and energy. Therefore, the contribution of space and its related technologies have proved to be fundamental to support the efficient development of Smart Cities. Due to the impacts of space in this field, in this paper, we analysed the state-of-the-art of the space technologies in the development of Smart Cities in terms of scientific publications, patents and semantic analysis. Patent and literature indicators, enhanced with abstract semantic analysis, provided a complete overview of technology trends and readiness levels for applications in Smart Cities, observed from the space domain perspective. By using specific relevant keywords aiming at associating the space sector to terrestrial developments for Smart Cities applications, we analysed patent families and scientific publications in the period 2010-2021, identifying the global trends, the geographic distributions, top players and funding sponsors, etc. As a result, we concluded that both scientific literature and patents have witnessed a significant increase in the period under examination, particularly when taking into consideration Chinese and US companies. The inclusion of machine learning and artificial intelligence algorithms for the analysis of geospatial data is one of the major technological trends for future applications in Smart Cities. In addition, in our research we associated the concept of Semantic Brand with the technological trends. In fact, by using the Semantic Brand Score tool, we measured the brand importance calculated on the abstract text data of scientific publications, useful element to get a relevant contribution to the research on brand equity, and therefore technological importance trend. The analysis is presented as the combination of the three dimensions of prevalence, diversity and connectivity and such indicators are able to provide precious and specific technological trend information.