Online Spatial Data Gathering as a Powerful Arm in Urban Management (Study in Iranian Municipality)*

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Abstract: The old version of the spatial data collection method is not so convenient, is expensive and time-consuming it causing the reluctance of municipalities to conduct space surveys. Online spatial data collection is a solution to improve urban data surveys and facilitate relationships between databases. The SDI system as a host is needed to save and collect spatial data, and an application running on a smartphone can locate and send information tables to SDI. By the way, municipalities can define various audit items and investigate functional by simplicity at a lower cost and faster than before.

1   INTRODUCTION

Urban management has faced many challenges over the past few decades (Freire and Stren, 2013), and Iran's urban management system is now transitioning from traditional to new urban management based on intelligence technologies we can see, municipality cost in software development and system installation is appropriate evidence of this claim.

As we know, information is an asset, and data gathering is a concern in urban management systems (Engin et al, 2020), due to the importance of data, which is required by each organization an annually significant amount a great deal of cost allocated to the data gathering and their maintenance (Batty, 2018). In the use of data, it's undeniable that must be noted to the validity of data, data is the base of planning and decision making in any organization (Bertsimas et al., 2019). So, data collection and database creation is great thing in city management. The locality of information points in the urban's plan, location of the features, location of urban disasters, an urban survey in various topics, all are significant topics and requirements of urban management (Haqi & Dühr, 2022). Although in some cases arriving the electronic system in Iran urban management system facilitate the current affair on the other side, the plenty number of affairs doing by hand like an old manner, this synthesis condition leads to a lack of close

supervision, lack of transparency in management affairs, slowness of the work process and so on, thus not be able to create an optimum accomplishment. In an extensive urban survey like an urban property survey, old kinds of surveys take long about one year or longer, hence, municipalities don't interest in this method. Coupled with the high cost, there is not enough time and technical personnel to control the inspection data. But, the most important issue that occurs during this process is the lack of proper communication between surveying data and municipalities electronic system (Cassandras, 2016), one way is to try to scan the proper dossiers, while the easier way is an online survey with a direct connection between surveying data online dossiers in the database. There are other issues in the handy manner of surveys such as; in the last year's spatial data gathering in the municipality survey by GPS and gathering in local GIS that it doesn't have any connection by the other subsections. The municipality consists of several parts, each of them attempts to survey their data in the way of the owner, there is no integrity in the data gathering. Finally, a Spatial Data Infrastructure (SDI) must be installed at the municipality to create a participating database of spatial data, known as geodatabase.

SDI provides numerous advantages in urban management system (Ghaderi & Sadeghi Arj, 2019). It can create an overall geodatabase in the municipality as a host, and each subsection can

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upload their data and update it simplicity. SDI is not only a powerful database; it is also a participating network that receives and corrects spatial data transmitted by other devices. It can connect to other devices like GPS, Real-Time Kinematic (RTK), etc. Using SDI as a host, the idea of an online survey may become a reality, as described below.

2 METHODOLOGY

As mentioned earlier, to run an online survey network, SDI is required as a host, and SDI creates open access for anyone who wants to use the spatial data SDI is able to receive spatial data from various sources such as local GIS, other databases, external devices, etc. Such as GPS and RTK, or even apps running in smartphones. It is a powerful, newer smartphone with the ability to locate via internal GPS and receive signals via GPRS or Wi-Fi. SDI could define data's forms, these forms are specific in any project or survey, an application manipulated in smartphones could open each form by the name of each project, this app defines the location of each urban features and it is able to precise locations by auxiliary maps which presented in its background. The mobile APP retrieves data online, quickly sends data to SDI, or offline, and sends data when the device is connected to the Internet. On the SDI side, the audit data is received in a box, needs to be approved, and when the operator confirm the data, it is sent to the GIS layer and called features in the SDI layer. The operator checks the data received in SDI for problems, the data may be rejected or returned to the sender. SDI has several tables in its database, each table holds specific data for each section or it is a maintain topic. For example, in a municipality, a table would hold spatial data for transportation organization, or a table would hold land property data. Each form is updated online with their own survey items, and their specific personnel and operators can investigate the same data and confirm its authenticity. Spatial data that receive to SDI not only could influence in a table, but also could change the condition of same feature in other layer or tables, because of the SDI layer or table are related by Main Key. One of the most famous Key in municipalities is Dossier ID Property Number. The SDI structure based on the online survey is shown in the figure below.

3 CONCLUSION

Online data collecting specifically in the field of spatial data can improve city management in several cases. One of the real issues with which cities and its administration are involved every day is city violations. The online survey helps municipalities report city violations, and once that data is turned into SDI and approved quickly, it can lock down electronic records and ban online services to the same home. This limitation cannot be removed until the issue is resolved.
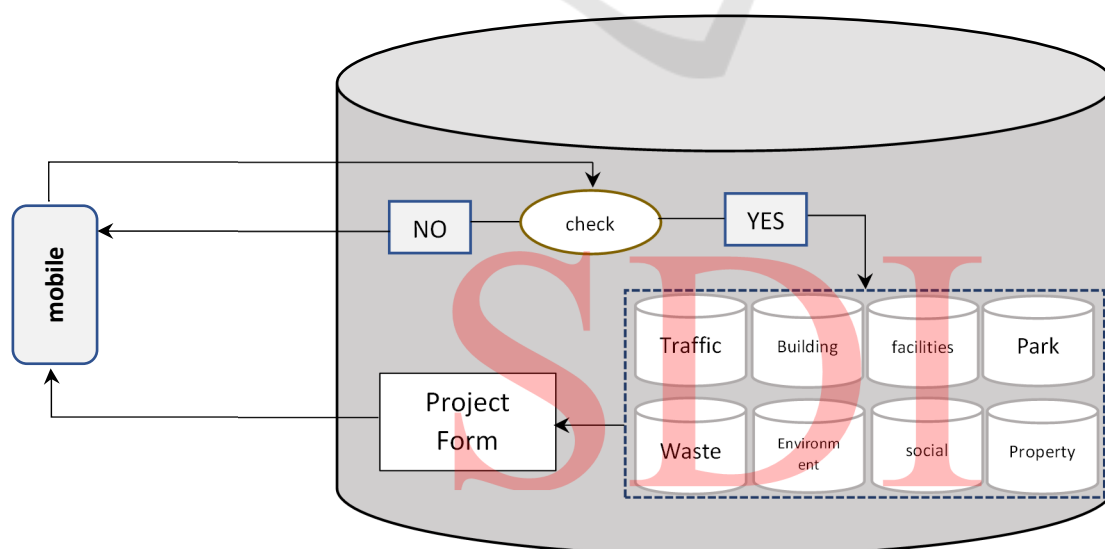

Figure 1: Online survey in SDI.

Another use of spatial online auditing is in large-scale projects such as urban surveys, land surveys, etc. All projects can be implemented in less time and at lower cost compared to the convenient old way. In this way, municipal experts can develop their control over city characteristics and city section, and they can update every part of the city for which they need information. The spatial online survey project completed in the city of Hamadan, Iran as a real project, and several project defines and spatial data are being collected, is an exciting conclusion of the method, which can be seen in the city is enhancing the level of city services in municipality. It stems from the case that city services are monitored by the audit project and any failures services reported online. Under this approach, the municipal database is updated daily and corrected for inefficiencies information doing precisely. All in all spatial online survey is a powerful arm of urban management as benefits mentioned.

Municipality As the SDI manager and GIS expert Sine 2016.

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