

Role of Geospatial Technology in Infrastructure Privatization

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ABSTRACT

Infrastructure utilities are for public use and were always constructed, maintained, and operated by governmental organizations and public companies. Government and public bodies are not known to implement a profit-seeking policy and, with time the level of service deteriorates. The idea of public companies and government management of public facilities lost its preferences and became not safe for a sustainable economy. Privatization came as an advantageous solution to this dilemma, not only it will release the government from maintaining and operating infrastructure utilities, but also it will flood the government with a huge amount of cash.

Privatization is a contemporary economical solution for chronic problems of public companies such as deteriorated levels of services and continuous losses. Geospatial technology plays an important role in the privatization of infrastructure utilities. The aim of this paper is to highlight the importance of GIS (Geographic Information Systems) as an essential tool in evaluating, selling, maintaining, and operating infrastructure utilities.

Keywords: Infrastructure utilities; Privatization; Geospatial technology; Utility maintenance; GIS.

1-Introduction

Infrastructure utilities are expensive pipelines playing the role of arteries of urban cities. They are very expensive to construct and need a lot of time, resources, and energy to be implemented. However, still, its construction requires a lot of maintenance to operate efficiently. In order to clarify the subject, it will be convenient to define Infrastructure utilities as the services provided within urban (or rural) areas such as domestic water networks, sewage networks, and electricity distribution facilities, similar to Telecomm, fiber optics, and many others.

As it is obvious, Infrastructure utilities are for public use and were always constructed, maintained, and operated by governmental organizations and public companies. Government and public bodies are not known to implement a profit-seeking policy, and with time the level of service deteriorates.

The idea of public companies and government management of public facilities lost its preferences and became not safe for a sustainable economy. Privatization came as an advantageous solution to this dilemma, not only it will release the government from maintaining and operating infrastructure utilities, but also it will flood the government with a huge amount of cash. We need to define privatization at this point. Privatization can be defined as the transfer of the ownership of infrastructure utilities from the governmental/public sector into the private sector with the responsibility of maintaining them in a defined status with operation at a satisfactory level of service.

2. Privatization Milestone

Starting from 1980, the United States and Britain brought an economical revolution to face the main challenges such as high inflation, high personal tax rates, the large size of government, and hard regulations of the private sector. They started the privatization of public organizations as a mean to overcome these challenges. Britain privatized major government-owned industries such as British Rail and sold government-owned housing to tenants. United States' strategy was to privatize government functions and allocate contractors to do work that government agencies had formerly done.

3-Advantages & Disadvantages of Privatization

The privatization of infrastructure utilities proved to have many benefits. The enterprise utilities showed better performance under private sector administration in smaller and more efficient teams. As well as in revenue, they showed benefits and stopped losses. Modernization is always associated with privatization. Similarly, competitiveness is boosted in an open market environment. Customer satisfaction and protection are easily and naturally achieved in the private sector. Most important is to feed high cash in the government treasury [1].

However, privatization has its dark side. The most painful is legacy employment. Public enterprises hire more employees than necessary, with lower wages. Many of the employment forces are unqualified and not required. The first step is to kick them off, which has a serious impact on the social level and requires governmental management. The private sector invested huge liquid cash in purchasing public enterprises, therefore they manage it with a single and unique strategy: fast investment return. This will lead to short-term plans and avoid long-term investment. Also, service prices are out of government control and usually increase.

4. How to Privatize

Privatization is a complex process. It has its political, legal, financial, social, and engineering/technological aspects [2]. Although all these aspects are important, however, the most vital question is what is the value of the infrastructure utilities? how much it costs? what is its selling price?

In order to have precise answers to these inquiries an accurate and up-to-date inventory of the infrastructure has to exist, which is the power of geospatial technology. An accurate and precise GIS is a must for successful privatization. Even it is considered to be the first important step towards privatization.

5. Geospatial data source

In managing sophisticated infrastructure utilities by geospatial technology, several data sources are required. The geospatial data have three categories. First, is the public base map such as parcel and cadastral data, highways, and land use/cover. Second, the trajectories of other

utilities at the coarse level. Third, is the utility of fully detailed data. The geospatial data need to be managed through reliable database software with enterprise capabilities.

Satellite images came at top of the list to map the extent of the franchise. They provide an upper updated view of the geographic extent with a variety of free and commercial images available from multiple providers. Advanced geodetic GPS equipment is vital for the precise acquisition of the underneath utilities [3]. Similarly, surveying instruments such as total station, laser alignment, drones, and others.

The legacy geospatial data is an important source for the geodatabase. In many cases, it may exist in hardcopy maps or outdated digital format and require manipulation and development.

The mobile GIS is a contemporary tool for the collection of the attributes of the geospatial features, and their insertion into the centralized geodatabase. The use of mobile GIS will enhance the system performance and allow customers to effectively communicate with the company [4]. The SCADA (Supervisory Control And Data Acquisition) systems are essential components for the maintenance and operation of any infrastructure. The connection between SCADA and GIS enhances the overall performance and regulation of the infrastructure utilities.

Geospatial technology will play a major role in the protection of the environment by applying different techniques to monitor the expected pollution from utilities or other sources. Also, it will ensure safety precautions for maintenance and operation.

6. Geospatial Role in Privatization

The GIS in general provides the following functionalities:

- 1) Storage of infrastructure assets
- 2) Design a platform for infrastructure
- 3) Maintenance and operation interface
- 4) Level of service monitor and assessment

The geospatial system should be at an independent firm other than the private sector that owns the infrastructure and other than the local government monitoring the level of service,

customer satisfaction, and protection. Its independence will lead to transparency in the overall evaluation of the performance of the infrastructure.

The market value for the whole infrastructure can be easily determined from the geodatabase. By making inventory for components of the utilities, and by determining the market price for each of them, a precise and close-to-reality price can be estimated. Nevertheless, the price is a function of date, as prices usually change and need to be computed for the estimated date for ownership transfer. The accuracy of the selling price is a function of the accuracy of the geodatabase. The more accurate geodatabase will lead to precise and realistic selling prices that can be defended and justified.

7. Conclusion

Privatization is a contemporary economical trend in both developed and under-development countries. It provides an easy solution for chronic problems within public companies with fast cash feeding into the country's treasury. Also, it has many negative impacts among them the social effect of decreasing the legacy working force and increase of service prices. Geospatial technology plays an important role in the privatization of infrastructure utilities. Before privatization, GIS computes the estimated cost price for the legacy utilities. After privatization, It has many functions in maintenance and operation in an acceptable level of service and governmental monitoring for the efficiency of the private sector in administrating the infrastructure utilities.

- **Conflict of Interest**

This research is free from any conflict of interest.

8. References

- [1] A. Kousadikar and T. Singh, "ADVANTAGES AND DISADVANTAGES OF PRIVATISATION IN INDIA," *International Journal of Advanced System and Social Engineering Research*, vol. 3, no. 1, pp. 18-22, 2013.
- [2] U. Nations, "Accounting, Valuation and Privatization," United Nations Publications, New York, 1993.

- [3] M. Eleiche and B. Markus, "Standalone Framework for Mobile GIS," *Geomatikai Közlemények*, vol. 12, pp. 377-382, 2009.
- [4] M. Eleiche, "Basics of RTCM 3.1 Transformation Messages Standard for GNSS Positioning Services," *Geomatics series*, no. 1, pp. 41-54, 2009.