# Summary

## "Producing a Geodatabase for evaluating and developing the land transport network in Suez Governorate by using geographic information systems and remote sensing"

Suez governorate is characterized by an important strategic location in the northwest of Suez Gulf, as it is bordered from the north by Ismailia Governorate and from the east by North Sinai and South Sinai Governorates, in addition to Suez Gulf. Suez is also boarded from the south by the Governorate of South Sinai and Red Sea Governorate. From the west, Cairo Governorate, and Giza Governorate board it. In addition, it is also located in a distinct geographical location at the southern entrance of the Suez Canal. The study area lies between 28° 57´ 58´ N and 30° 16´ 13´ N and between 31° 53´ 08´ E, 32° 51´ 25´E. It covers an area of 9447.4 km$^2$, as it is served by roads with a total length of 1687 km, and it had three railways with a total length of 172 km.

The study of land transport in Suez Governorate is very important due to several factors such as population growth, with an increase of 42.2% during the period from 2006 to 2017, as its inhabited area increased by 458.2% during the period from 1996 to 2019. This show the important is the planning of land transport in the governorate to address the arising problems from its population and urban growth through the production of a Geodatabase for the study area that includes various factors affecting road transport and the problems it faces.

This study discussed the geographical characteristics related to the extension of land transport networks and their efficiency using a Geodatabase for the study area through the study of geological characteristics, topography, climatic factors and clarification of their impact on land transport in the region. This study show the human factors affecting the road transport network such as the characteristics of the population, and landuse in the study area.

This study revealed that the total length of the roads reached 1271.7 km in 2019, with each of Faisal and El Arbaeen neighborhoods accounting for more than half of the total roads in the neighborhoods by 55.6%, while the total length of the roads that represent the entrances to Suez Governorate reached 415 kilometer, the most important of which is the Suez-Cairo road, which has a length of 57 km within the borders of the governorate. The governorate includes three railways, the most important of which is the Suez-Ain Shams line, with a length of 74 km within the governorate's borders in 2019.

This study used the statistical analysis to study the road transport network in Suez Governorate due to its importance in giving a

visualization of the level of development of the region, as it showed high Detour index on some roads such as the new El Galala Road with an index of 167.3% due to the very rough surface; meanwhile, the index of the Suez-Adabia-Sokhna line has reached 139,5% as it is related to industrial areas and quarries in the study area. In addition, the low road density and railways are shown in relation to the area, low direct communication rates between the transportation nodes due to relative spacing, the large extended areas, limited occupied area, which due to the topography of the study area.

The study used the techniques of geographic information systems and remote sensing in analyzing the efficiency of the road network in the study area through designing a digital database for the road network in the study area that includes transport lines, and conducting network analysis on them. Network Analysis includes the best route analysis for the Suez train station, the Service area analysis, and finding facility areas for a specific service such as health services.

The study was devoted to highlighting the role of Geodatabase in monitoring some problems facing land transport and studying how to deal with these problems, especially those related to natural factors, such as the risks of Flash flood on roads and railways, especially Suez - Zafarana Road and Suez- Ain Shams railway, as well as the dangers of rock falls, and salt weathering, and The dangers of sand movement on roads, such as Al-Qantara-Shark road, in addition to problems related to road characteristics such as lack of rain drainage networks, followed by the problem of the high number of bumps and excavations, such as Suez-Ismailia road. The roads of the study area suffer from unplanned random Car Parks, causing traffic congestion. This study also discussed the movement problems, the most important of which were traffic accidents, whose number reached 289.7 during the period 2015 to 2008.

Which also this study showed that land transport has an important role in the economic development of the governorate, especially tourism and industrial development, where transport contributes to the growth of such economic activities as tourism and mining activity. This impact has been presented using some analysis tools such as Proximity Analysis and Location-allocation Analysis for business, which indicates the need to take care of Geodatabases for the development of economic activities, as well as for the development of road transport network and the processing problems to improve its efficiency.