

**Секция «Модели и методы управления организационными социально-экономическими системами»**

**HIGH TECHNOLOGY USAGE IN BITUMEN MINING A NEW GATEWAY FOR EXPLORATION IN ONDO STATE, NIGERIA**

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*Introduction*

This article discusses the use of high technology in bitumen mining in Ondo state, Nigeria as a gateway for exploration and wealth. With the world needing oil and gas more each day, the need of this resource is on the rise and the application of high technology to bitumen mining can boost the oil producing capacity of Ondo state and Nigeria at large, which in turn boost our economy.

*Nigerian Bitumen Mining Sector*

Nigeria is a country blessed with multiple natural resources such as, gold, iron ore, crude oil, uranium, limestone, bitumen and diamond amongst others. Nigeria has an estimated thirty-eight billion barrels of extra heavy oil and bitumen resources (38,000,000,000) while only Canada and Venezuela top it with Canada having two trillion, four hundred billion barrels (2,400,000,000,000) and Venezuela having two trillion, one hundred billion barrels (2,100,000,000,000) [3]. In Nigeria, major amount of bitumen deposits are found in three states Ondo, Osun and Edo respectively with Ondo state having the most deposits. Unlike how Nigeria has made huge strides in crude oil exploration, bitumen mining in Nigeria still suffers from archaic bitumen mining techniques and epileptic refinery process. In Nigeria small scale surface mining is commonly used and this technique cannot cater for the national need and global need in extension. Due to these issues, only about twenty percent (20%) of about six hundred and sixty-five thousand (665,000) tons demand for bitumen is gotten locally. In 2020, the Federal Ministry of Mines and Steel Development in conjunction with the Ondo state government began to take steps towards the use of high technology in bitumen mining in that state, while south west bitumen exploration limited (SWB) has also began investment in commercial bitumen mining in Nigeria. In Nigeria currently an estimated five thousand (5,000) people are employed in the bitumen industry [1].

*Ondo State and its Bitumen Resources*

Ondo state is a South Western state in Nigeria which shares borders with Ekiti state, Osun state and Edo state. Ondo state is blessed with many natural resources and bitumen is its most abundant resource. Bitumen is found mostly in a local government area in Ondo state called Irele [1], this location has the most bitumen deposits in Africa and the second largest deposit in the world. Recently, technical and economical evaluation of bitumen was conducted and it was discovered that it contains deposit worth between 13 – 16 billion barrels of oil.

Ondo state currently generates about 2 billion naira (approximately 4.5 million dollars) monthly. Agbabo town in Irele local government area is sitting on 42.47 billion tons of bitumen [1].

#### *High Technology Usage in Mining*

In Nigeria, bitumen mining is not a highly developed and relatively untapped industry. The technology and technique used in bitumen extraction is old or archaic. In Nigeria and Ondo state to be precise there are three (3) ways bitumen is extracted [4]. They are:

- Small-scale surface mining
- Large-scale surface mining
- In-situ extraction (not widely used yet)

The use of these old methods is reducing our producing capacity and reducing our competing ability on the global scale.

In-situ extraction is an advanced method of extraction of bitumen and it's a cost-efficient way and very profitable especially when using the steam assisted gravity drainage (SAGD) [4].

The importance of technology in our everyday life activities cannot be over emphasized. The effect of high technology in the sphere of bitumen would lead to a high investment in the bitumen industry. Bitumen would be exploited at full capacity just the same way crude oil is being exploited, if necessary, technology was installed and put in place.

In-situ extraction process and open pit mining being used in Nigeria would lead to more employment, more output of oil and improve the GDP.

High technology in the sphere of bitumen mining would also give way to more labour being employed. Jobs would be created for the teeming population as unemployment would be reduced drastically hereby all sort of crimes and social vices would be reduced in the society. Research shows that full application of high technology in bitumen mining in Ondo state will led to creation of 30,000 jobs [1].

High technology in the sphere of bitumen mining would also lead to more foreign revenues being generated hereby improving the Gross domestic product (GDP) of the country [2].

Nigeria is the only African country that has bitumen in amounts that can be exploited, so bitumen mining in Nigeria can not be compared to any other African country. Canada has one of the largest bitumen deposits in the world and has had many years of experience exploring the bitumen in the best way and most ecologically friendly way, they produce about 1.8 million barrels per day as of May 2022 [3]. That is why Nigeria is compared to Canada because in emulating their use of technology we can increase our producing capacity.

High technology application has yielded great results in the Canadian oil and gas industry and with proper action it can be replicated in Nigeria. There a significant difference in output by the oil and gas sectors of Canada and Nigeria as shown in the figures below.

## NIGERIA'S ECONOMY BY SECTOR

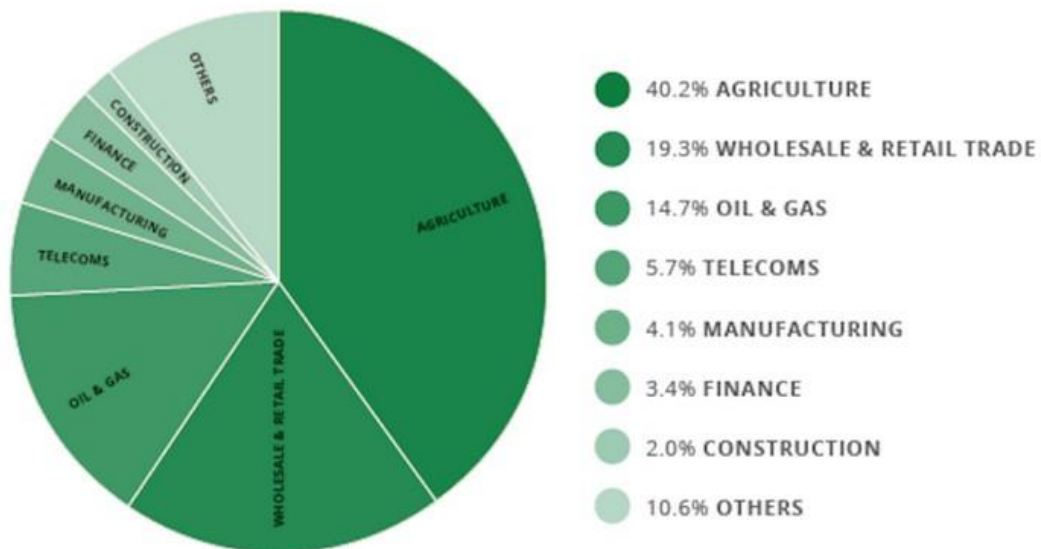


Figure 1 - A pie chart showing the breakdown of each sectors contribution to the Nigerian economy[3].

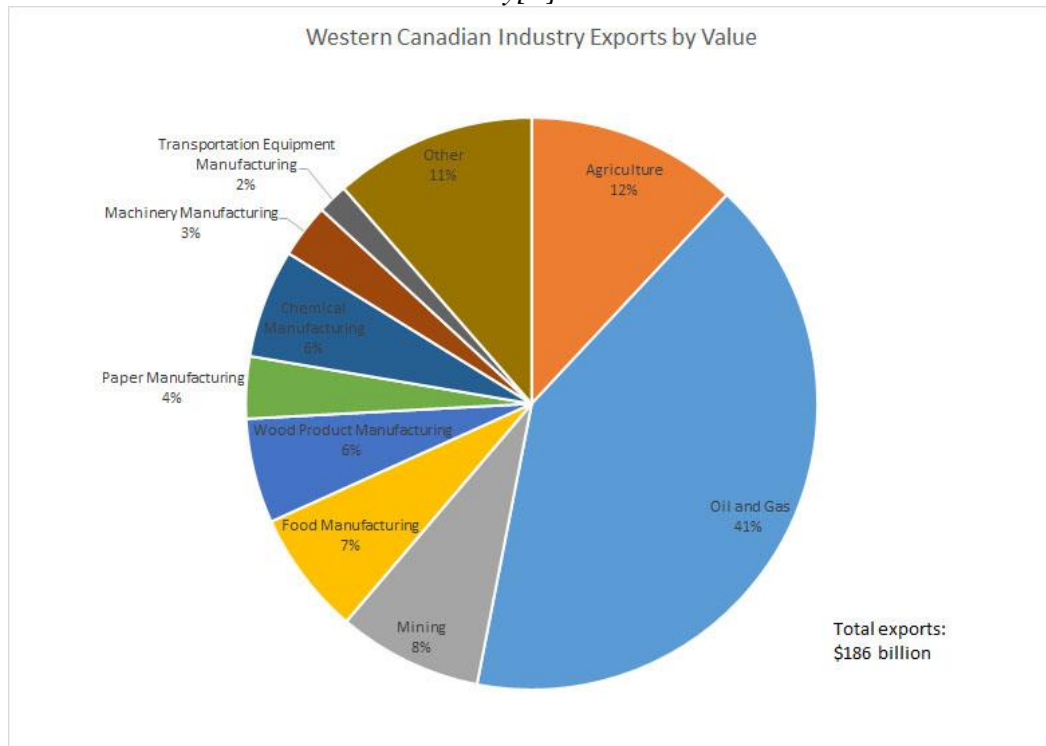


Figure 2 - A pie chart showing the breakdown of each sectors contribution to the Canadian economy [3].

Research shows that application of high technology into bitumen mining in Ondo state will increase the internally generated revenue (IGR) of the state by six (6) to twenty (20) billion naira monthly that's approximately (1 -45) million dollars monthly. This would hugely affect the economy of the state and Nigeria at large [1].

### Conclusion

As an industry which has been in existence for a long time a lot of research has gone into exploration of bitumen in the best way possible and this comes as an added advantage to the industry sector in Ondo state, Nigeria. The implementation

of these new technologies in the mining process of bitumen in Nigeria would open a bigger gateway of income, thereby having a ripple effect on other sectors of the economy.

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## **ECONOMIC PROBLEMS OF PUBLIC TRANSPORT IN MEXICO – A REVIEW**

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*Introduction.* This article discusses current economic problems faced by the public transportation system in Mexico. It is no surprise to anyone that public transportation is undergoing a crisis: unregulated and private operators, an ageing fleet of vehicles, lack of government investment and incentives, high emissions of greenhouse gasses, inadequate infrastructure and long commuting times are some examples of the current challenges encountered in the pursuit of a sustainable and efficient public transport.

### *Current situation of public transport in Mexico*

Public transportation is inseparable from the function and development of nowadays cities, as it has become an important mean of regulating the urban development model, but the lack of investment into the modernization and efficient functioning of urban public transportation has led into an increase in the number of private motor vehicles, with very clear negative results on the economy, society and environment: an increase in accidents, traffic congestion, longer commuting time, an increase in greenhouse gases emissions, lower quality of life, among others. For decades, cities have been planned and developed with the private motor vehicle in mind, diminishing the role of urban public transportation, its related infrastructure and its inherent benefits.