Techno-economic analysis Framework for 5G network slicing

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INTRODUCTION

It is anticipated that Fifth Generation (5G) networks will provide cheaper and diverse services, which will support vertical markets, such as agriculture, health care and, as depicted in Figure 1, many others[1]. 5G network architectures will support multi-tenancy, as well as access to both mobile and fixed access networks, where different networking policies will be enforced.
Network slicing is considered as a key enabling technology in 5G networks to accommodate different use cases for the vertical markets, as well as multi-tenancy over a single network infrastructure efficiently. As shown in Figure 2, network slicing allows for a network to be divided in an elastic, scalable and dynamic manner to provide for different services with different qualities of service as required [2]. Although the introduction of 5G networks using network slicing technology brings about greater support and flexibility of new services, it also brings about business and economic challenges that need to be addressed. As the number of technical 5G network architecture designs using different types of network slicing emerges, it is important to perform calculations to identify cost efficiency combinations of technologies and functionalities. This study intends to identify a 5G network slicing framework and determine techno-economics analysis thereof.

OBJECTIVES

This work intends to define the 5G network slicing framework with the aim of understanding available slicing options that can enable cheaper solutions for vertical markets of South Africa.
The main objectives are to:

- Determine a system architecture of network slicing, focusing on its business aspects; and
- Identify options for 5G network slicing.

SIGNIFICANCE OF STUDY

Telecommunication networks are crucial for enabling economic growth and social prosperity as they provide varied services that are relied upon every day. 5G networks are expected to offer different services and enable innovation and quicker service deployments. This study is
expected to determine the relevance of 5G networks for South African markets and determine if the new networks will address the needs of rural areas and small market penetration. Such answers will assist the African government to provide solutions for rural areas. This work is also expected to contribute to South African policy-makers, such as ICASA and telco operators, to provide options available for network slicing.

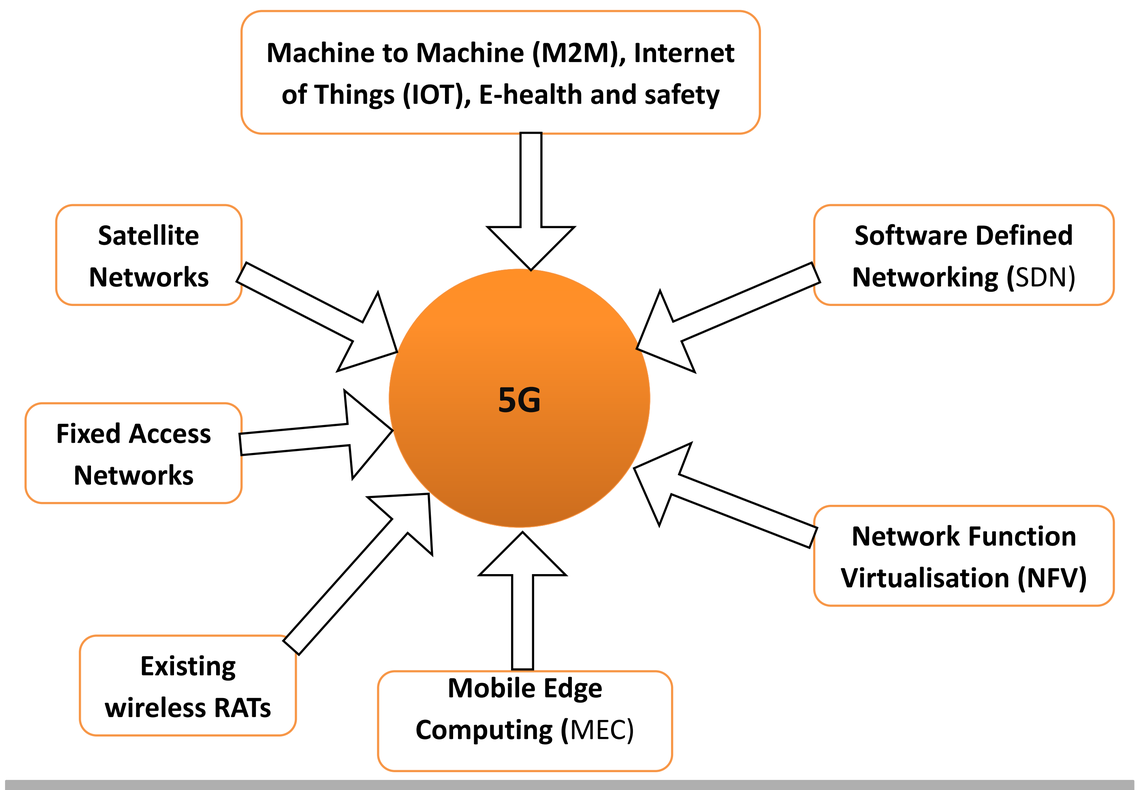

Figure 1: 5G network

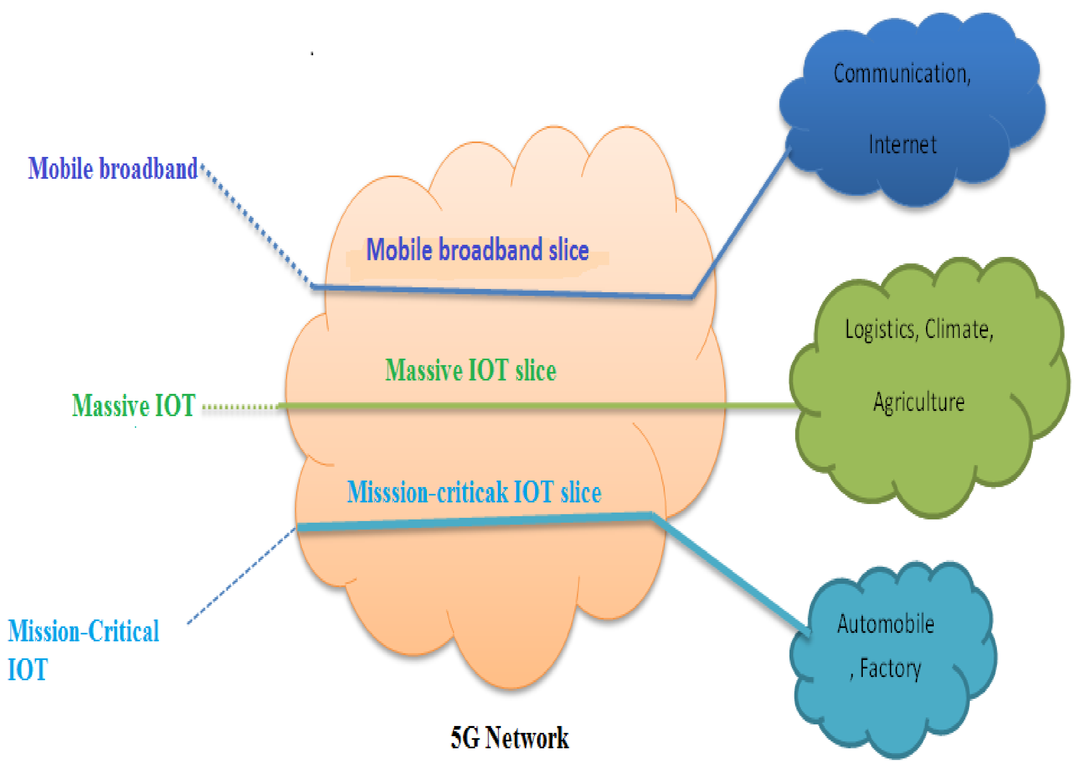

Figure 2: Network slicing

METHODOLOGY

As shown in Figure 3, the techno-economic analysis will include three phases, with the first phase focusing on network slicing market analysis, which will address the slicing options and services. The second phase will focus on economic and technical evaluations. The third phase will address network performance analysis and investment analysis.

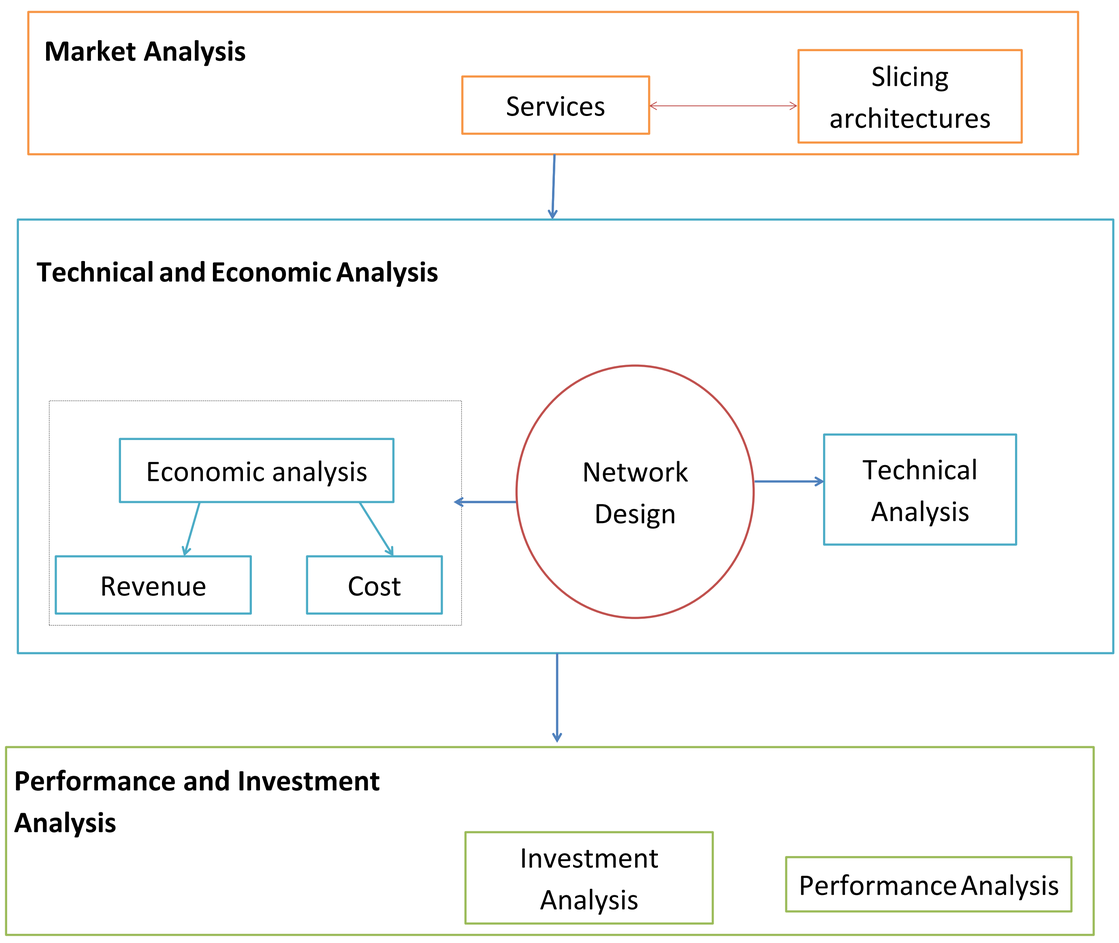

Figure 3: Techno-economic analysis methodology

REFERENCES

[1] Iwamura, M., 2015, May. NGMN view on 5G architecture. In *Vehicular Technology Conference (VTC Spring), 2015 IEEE 81st* (pp. 1-5). IEEE.
[2] Habibi, M.A., Han, B. and Schotten, H.D., 2017. Network Slicing in 5G Mobile Communication Architecture, Profit Modeling, and Challenges. *arXiv preprint arXiv:1707.00852*.