

Chapter 7

Enhancing Rural Connectivity Strategies for B5G and 6G Implementation

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ABSTRACT

Realising the potential of B5G as well as 6G technologies makes potential a chance to solve the issues associated with the connectivity of the rural areas. This chapter aims at discussing elaborate plans and approaches to the deployment of B5G and 6G networks to improve on the connectivity of rural areas. We then discuss the technology enablers that rendered these networks fit for rural settings through modern communication technologies such as satellite communications, edge computing, and new spectrum management methods. Thus, by studying the presence of networks in different situations, we discuss the main practices for deploying networks and consider examples of pilot projects. Secondly, the chapter

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also analyses wider socio-economic effects that increased connectivity has on rural societies, including access to education, health care or employment. We also discuss the limitation that may exist in the implementation of the strategy such as infrastructural, regulatory and financial and the ways by which they could be surmounted.

INTRODUCTION

Information and communication technologies (ICT) is known to have developed greatly in the recent past, making drastic changes in almost all sectors in the modern society, but this has not been the case for the rural areas mainly because accessing a reliable and high-speed internet still remains a dream. Hence, the role of rural connectivity cannot be emphasized enough since it aimed at solving the problem of digital divide, stimulating economic growth and enhancing lives of rural inhabitants at the same time (Al-Fuqaha, A., Guizani, M., Mohammadi, M., Aledhari, M., and Ayyash, M., 2015). For people in rural areas, improved network expands the convenient access to services like education, health, and government, tend to deliver which services via the internet. In addition, this facilitates access to the international market for local enterprises, encourages the growth of entrepreneurship and supports advanced technologies in the agriculture and others rural sectors such as smart farming (Das, A. K., Mohan, P. M., Panda, S., and Mishra, A. K., 2021). Lack of connection means that rural areas may fail to invest in and progress in the technologies of the fourth industrial revolution thus worsening the social-economic divide.

This is one of the strongest barriers faced in the provision of connectivity in the rural areas due to sheer unavailability of infrastructure. That is why many rural regions are thinly settled and cover significant territories; for this reason, telecommunications companies cannot afford investments in broad networks (Mary, A., Begum, A. Y., and D. G. V., 2023). The cost of establishing laying of fiber optic cables, constructing cell towers and maintaining such networks in this regions deters accessibility and causes coverage gaps in most remote regions (Nishikawa, D. K., Higuchi, T., and Kojima, Y., 2020). Further, in developed countries infrastructure development in many rural areas can be hampered by an unfavourable topography, invariably leading to enhanced costs due to the need for equipment and techniques required to overcome physical geography barriers.

Therefore, it is clear that rural connectivity is a very significant factor since it has the capability to change the lives of individuals as well as communities due to connection that offers them the means of getting the essential services and other opportunities (Chandra, G., Kumar, R., and Prasad, K. D. V., 2024). This potential can only be realized once these issues relating to infrastructure, finances and regulation are overcome. Several challenges can be attributed to the current state of Rural communities' connectivity; B5G and 6G technologies present cutting-edge solutions to these problems. Using such technologies, policy-makers, technocrats and other stakeholders can then join hands to ensure that rural areas are not left stranded in the information age.

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