

From Technical Validation to Policy Implementation A Dynamic Spectrum Sharing Framework for 6G Networks in West Africa

Dourahamane IDE BARKIRE, Benjamin KONÉ, Ahmed Dooguy KORA

E-INOV LAB, Ecole Supérieure Multinationale des Télécommunications (ESMT), Dakar, Sénégal

dourahamane.barire.etu@esmt.sn, benjikone@yahoo.fr, ahmed.kora@esmt.sn

Abstract— The transition toward 6G networks in West Africa; specifically, in the emerging Alliance of Sahel States or Alliance des Etats du Sahel (AES), is probably going to be restricted by static approaches to spectrum management which results in significantly reduced efficiency of use of available spectra and significant economic waste. This research develops a comprehensive dynamic spectrum sharing framework that addresses both the technical potential of dynamic spectrum sharing and the need for implementation as it relates to the institutional and economic realities of West Africa. This is accomplished through a three-part framework which includes (1) collaborative spectrum pooling, (2) dynamic spectrum markets, and (3) public service spectrum banking based upon an assessment of existing regional spectrum allocations and identified saturation risks. A phased roadmap of implementation (2025-2030) is provided along with an assessment of the expected technical, economic, and social impacts, such as improved efficiencies in the use of available spectra, increased economic activity, and increased availability of broadband services. Through the combination of technical feasibility with practical policy design, this research identifies a viable path toward reforms in spectrum usage that will promote digital inclusion and the development of a sustainable 6G ecosystem throughout the AES and the broader West African region.

Keyword—6G networks, dynamic spectrum sharing, cognitive radio, West Africa, regulatory framework, spectrum efficiency, telecommunications policy, digital transformation.



Ide Barkire Dourahamane is a PhD student in Telecommunications at the École Supérieure Multinationale des Télécommunications (ESMT), Dakar, Senegal, and Université Cheikh Anta Diop. He earned his master's degree in networks and telecommunications from ESMT in 2011, and he also holds a Diploma in Teleinformatics Engineering from ESMT. His research focuses on dynamic spectrum management. He is currently a department head for digital culture at the University of Dosso, Niger, and has worked in various academic and telecommunications roles, including as a contractual telecom department head at SGEM Telecom. He has also completed several internships in Niger and Senegal, contributing to his expertise in telecom and IT systems.



Benjamin Koné received his PhD in Mathematics and Computer Science with a Telecommunications specialization from Université Cheikh Anta Diop and Ecole Supérieure Multinationale des Télécommunications, Senegal, in 2023. His research focuses on the deployment of software-defined networks (SDN) and network function virtualization (NFV) to improve rural connectivity. He earned a master's degree in Networks and Telecommunications from ESMT Dakar, with practical experience in RF planning, optimization, and quality of service for (2G -6G) / IA networks, intelligent Network and Autonomous System. Since 2024, he has been teaching telecommunications at private universities in Mali. He has contributed to multiple international conferences and has published research on network resource management and orchestration for virtualized networks. Currently, he is a co-founder and associate researcher at Find RD, where he focuses on innovation and rural connectivity solutions.



Ahmed Dooguy Kora is an IEEE Senior Member and a consultant for the International Telecommunication Union (ITU). He received a master's degree in Networks and Telecommunications from the Ecole Supérieure Multinationale des Télécommunications (ESMT) in 2003 and completed his PhD in Telecommunications at the University of Limoges, France, in 2007. He is currently a professor at ESMT, where he serves as the head of teaching, training, and research. His research interests include communication and network system architecture (2G to 6G), free-space optics, fiber optics, quality of service, universal access, artificial intelligence, software-defined networking, Cloud RAN, and cognitive radio.