Introduction:

In recent years, urban centers worldwide have experienced rapid transformations, necessitating the reassessment of administrative boundaries and structures to accommodate changing demographics and urban dynamics. The city of Lisbon is no exception, and in response to these challenges, the Portuguese government implemented administrative reforms in July 2012. The Parliament approved a proposal, including Chapter Two regarding the reconfiguration of Lisbon's parish map, which stipulated that the reconfiguration was based on the principles of territorial organization rationalization and adjustment, with the purpose of creating larger and more balanced parishes. The original 53 parishes were merged, modified, or maintained, and these changes took effect in January 2013. The implementation of Lisbon's administrative reform was a complex and challenging process, but it resulted in a more modern and efficient administrative structure for the city. Notably, the most modern and trendsetting parish, Parque das Nações, was born from this reform.

During the same period, the Portuguese National Institute of Statistics (INE) conducted the 2011 Portuguese National Census from March 21 to May 2011. Census enumerators collected data from households and individuals across the country. The INE was responsible for organizing and implementing the census, ensuring the accuracy of data collection and analysis. The comprehensive results and data from the census were gradually released starting on July 29, 2011. According to the census, Lisbon's population in 2011 was 547,733, a decrease from 564,477 in 2001, with a population density of approximately 6,378 people per square kilometer. Lisbon's population was aging, with a higher proportion of elderly people and a median age of around 42.2 years. Compared to other regions in Portugal, Lisbon had smaller average household sizes, with 2.4 people per household. Lisbon had a relatively high number of vacant housing units, accounting for about 12.2% of the total housing stock. The educational level of Lisbon's population was higher than that of other regions in Portugal, with a higher proportion of individuals completing higher education. The unemployment rate was higher than the national average, but the city also had a higher proportion of individuals engaged in professional, scientific, and technical activities. Lisbon had a diverse population, with a considerable proportion of foreign-born residents. The city attracted immigrants from various countries, particularly from African Portuguese-speaking countries, Brazil, and other European nations.

This study aims to propose a redistricting plan for the Lisbon administrative area based on a data-driven approach, utilizing the 2011 census data to inform the decision-making process. The objective of this research is to provide a comprehensive and well-informed redistricting proposal that takes into account the current and future needs of Lisbon's diverse population. By analyzing key demographic variables, such as population density, age distribution, education, employment, housing, and migration patterns, we seek to identify trends, disparities, and opportunities that can inform the redistricting process. In doing so, we aim to ensure that the proposed administrative boundaries are equitable, functional, and reflective of the city's changing demographics.

The study will commence with a meticulous examination of Lisbon's current administrative structure, followed by an analysis of the 2011 census data to underscore the patterns and trends that will inform the proposed redistricting plan. Subsequently, we will utilize advanced methods such as spatial cluster analysis from data science disciplines, regionalization studies, and other relevant tools to pinpoint Lisbon's specific challenges and opportunities at the granular level of the smallest geographical units. This will allow us to outline the goals and objectives of the redistricting process more effectively. Based on these findings, a comprehensive redistricting plan will be developed, with recommendations for redefining administrative boundaries, reallocating resources, and implementing new policies and plans to address the identified needs.

Once the initial redistricting plan is formulated using the 2011 census data, the latest 2021 census data will be employed to validate the results. By comparing the proposed plan with the most recent demographic data, we can ensure that the redistricting plan remains relevant and responsive to Lisbon's evolving needs. This validation process will allow us to refine the proposed plan, make adjustments where necessary, and ultimately create a more robust and effective administrative framework for the city.

In conclusion, the proposed redistricting plan for Lisbon's administrative area, based on a census data-driven approach, seeks to improve the city's governance and adapt it to the shifting needs of its population. By incorporating both the 2011 and 2021 census data and focusing on key demographic variables, we aim to develop a comprehensive, evidence-based proposal that addresses the challenges and opportunities faced by each administrative area. Ultimately, this research aims to contribute to the creation of a more equitable, functional, and responsive administrative framework that can better serve the diverse needs of Lisbon's residents, both now and in the future.