In the last decades, we could observe huge growth in the deployment of mobile telecommunication networks. It is caused by an increasing number of mobile devices e.g., smartphones, tablets. Moreover, users in the network demand higher, and higher bitrates. These demands can be fulfilled in the 5G and beyond networks, by utilization of the large antenna arrays, i.e., technology named Massive Multiple-Input Multiple-Output (MMIMO). The MMIMO offers higher bitrates to the users through the improvement of spectral efficiency i.e., the same bandwidth is used but more effectively. In MMIMO Instead of transmitting energy over the whole cell, by proper amplification and phase shifting (i.e., beamforming) of the transmitted signal, energy can be delivered directly to the user equipment (UE). As a result, the quality of signal received by the UE can be improved only by scaling up the number of antennas. However, the MMIMO network users, especially those located at the edges of neighboring cells suffers from unequal bitrates. To overcome this issue a novel network architecture is under consideration, i.e., User-Centric Cell-Free MMIMO (UCCF MMIMO). This concept assumes that there are no strict cell edges, and network configuration is adapting to the needs of a particular user. One of the key management functions in the UCCF MMIMO network is the formulation of the so-called serving clusters. In an extreme case, the user can be simultaneously connected to all of the surrounding antennas, either arranged in arrays and installed on different Base Stations (BSs) or distributed over the network area. However, this would result in a large processing delay. Instead, only a subset of active antennas e.g., providing signals of the best quality can be chosen. Then serving cluster is formulated by the area where UEs' are being connected to the same subset of antennas. Due to the complexity of the real UCCF MMIMO network which consists of many functional blocks, it is not straightforward to obtain its mathematical model. Such a model would be necessary to formulate serving clusters with the use of standard optimization methods. On the other hand, machine learning algorithms can be successfully applied in order to extract hidden data patterns and formulate serving clusters of complex shapes. This procedure will require storage and processing of the location-dependent data. For this purpose network architecture can be extended the dedicated intelligent database of location-dependent data can be used, i.e., Radio Environment Map. The hypothesis of this project is **Machine Learning and Radio Environment Maps can be effectively used to improve the management of the UCCF MMIMO network**. The research project aims at the development of an intelligent algorithm based on REM and machine learning that will improve management of the UCCF MMIMO network, e.g., formulation of the serving clusters. The research project is divided into 4 tasks. Task no. 1 aims at development of the simulation scenarios for UCCF MMIMO network, including modeling of imperfect information about the radio environment, (e.g., localization error), and implementation of the baseline algorithms. The accurate modeling of imperfect information about the radio environment is crucial from the perspective of REM design at next stages of the project. Task no. 2 will result in the proposition of the intelligent algorithm aimed at the management of the UCCF MMIMO network. For this initial proposition, ideal knowledge about the radio environment will be assumed, e.g., channel state information, and perfect location information. The intelligent management algorithm will be designed in a centralized manner. Task no. 3 stands for a combination of outputs from task no. 1 and no. 2, i.e. the management algorithm would be evaluated under imperfect knowledge about the radio environment, including localization error, e.g., related to the dual-frequency GNSS, and erroneous channel state information. After the evaluation algorithm will be improved by taking into the account properties of imperfect information about the radio environment. . Finally in task no. 4 another degree of freedom is expected to appear. The algorithm aimed at the management of the UCCF MMIMO network will be adapted to the decentralized infrastructure. The justification of this network architecture is reduced signaling overhead, and decreased number of data related to the process of learning that must be transmitted. The project results will show that machine learning techniques combined with an intelligent database named REM can be efficiently used to improve the management of the UCCF MMIMO network.