In many developing nations, the locations of public facilities are generally taken locally by government officers or by local elected leaders or by both. In Malaysia, the location of public health care are determined using some guidelines that were developed based on experience or some statistical information. There is still lack of formal analysis being carried out. As a result the decisions can very often be far from optimal. This study attempts to develop some mathematical location-allocation models for the locations of the public health care facilities in Malaysia. Two basic location allocation models with two different objectives are studied: The $p$-median problem and the Maximal Covering Location Problem (MCLP). We designed several solution methods by considering the un-capacitated, capacitated constraints and multiple objectives. The first part of the study focuses on the systems with un-capacitated facilities. The public healthcare facilities in Telok Panglima Garang(TPG), Selangor are taken as a case study to apply the models, and analyze the past and current location decisions.
The models are extended to the capacitated case where a bigger district of Kuala Langat, Selangor is considered. These models which are in form of mixed integer programming models are solved using commercial optimization software CPLEX 10.2. The results from CPLEX are observed to violate some of facilities’ constraint, thus making the solutions infeasible. A heuristic based on Genetic Algorithm (GA) is proposed and some computational analysis is carried out to gauge the performance of the existing facilities. In the third part of the study, a new model that simultaneously considers the $p$-median and the MCLP is proposed. The model is solved using a weighted sum multi objective approach that simultaneously minimizes the average distance traveled ($p$-median) and maximizes the coverage percentage (MCLP). The data set are used to illustrate the effectiveness of the model. The fourth part concentrates on the development of a dynamic location model that incorporates a time factor. A sensitivity analysis which considers the future increase in demand and the need for new health care facilities is also carried out to assist the relevant authority to make proper planning of health care systems in Selangor and in Malaysia in general.

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