Abstract

The facility location problem has been widely researched in the past and is still actively pursued by many researchers due to its multi-disciplinary relevance and implications in framing strategies concerning both public and private enterprises. Most of past and contemporary research has mostly focused on the quantitative aspects of the problem where different objectives like efficiency in the system, equity in the service, impact on the environment etc. have been explored in conjunction with design parameters like number of facilities, their location and allocation to demand points. However, the influence of these objectives and design parameters in making a particular solution an optimal solution remains hidden in the optimization process. In this study we aim to provide a qualitative assessment of some of these objectives for different simulated and real-life demand data-sets and point out the significance of the post-optimality analysis in choosing any preferred solution as opposed to the finding an optimal solution using the existing quantitative models. This work has proposed methodologies to find a good number of facilities that may be preferred based on its trade-off with the amount of efficiency gained per additional facility, and the location of these facilities based on the trade-off obtained between two objectives, efficiency and equity. The equity considered here measures the amount of balance in the distribution of load among different facilities. Additionally, the reliability measure proposed in the literature has been used to measure the robustness of a facility location solution. It is also shown that the most equitable solution will always correspond to the most robust solution.