A Post-Occupancy Evaluation of LEED-Certified Residential Communities Using Structural Equation Modeling

Authors : Mohsen Goodarzi, George Berghorn

Abstract : Despite the rapid growth in the number of green building and community development projects, the long-term performance of these projects has not yet been sufficiently evaluated from the users' points of view. This is partially due to the lack of post-occupancy evaluation tools available for this type of project. In this study, a post-construction evaluation model is developed to evaluate the relationship between the perceived performance and satisfaction of residents in LEED-certified residential buildings and communities. To develop this evaluation model, a primary five-factor model was developed based on the existing models and residential satisfaction theories. Each factor of the model included several measures that were adopted from LEED certification systems such as LEED-BD+C New Construction, LEED-BD+C Multifamily Midrise, LEED-ND, as well as the UC Berkeley's Center for the Built Environment survey tool. The model included four predictor variables (factors), including perceived building performance (8 measures), perceived infrastructure performance (9 measures), perceived neighborhood design (6 measures), and perceived economic performance (4 measures), and one dependent variable (factor), which was residential satisfaction (6 measures). An online survey was then conducted to collect the data from the residents of LEED-certified residential communities (n=192) and the validity of the model was tested through Confirmatory Factor Analysis (CFA). After modifying the CFA model, 26 measures, out of the initial 33 measures, were retained to enter into a Structural Equation Model (SEM) and to find the relationships between the perceived buildings performance, infrastructure performance, neighborhood design, economic performance and residential Satisfaction. The results of the SEM showed that the perceived building performance was the most influential factor in determining residential satisfaction in LEED-certified communities, followed by the perceived neighborhood design. On the other hand, perceived infrastructure performance and perceived economic performance did not show any significant relationship with residential satisfaction in these communities. This study can benefit green building researchers by providing a model for the evaluation of the long-term performance of these projects. It can also provide opportunities for green building practitioners to determine priorities for future residential development projects.

Keywords : green building, residential satisfaction, perceived performance, confirmatory factor analysis, structural equation modeling

Conference Title : ICHPGB 2022 : International Conference on High Performance Green Buildings
Conference Location : San Francisco, United States
Conference Dates : June 02-03, 2022