



Improving Building Longevity, Adaptability, and Sustainability: Examination of Multi-Unit Residential Building Regulations in Taiwan

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Abstract

Effectively enhancing buildings' adaptability, extending their service lives, and reducing construction wastes has become a crucial issue in the construction industry. As the transformation of the socio-economic structure and diversification of user demands has grown, occupants in residence may have various needs in different stages, rethinking a sustainable and flexible living space has received substantial focus. "Open building (OB)" is an innovative method to accommodate various changeable occupant spaces, decrease the waste caused by space adjustment and reduce maintenance costs. Although the concept of OB is beneficial for sustainable built environments, the promotion of OB in Taiwan is constrained. One of the obstacles is that the OB approach is partly in conflict with the current building regulations. Without legally developed policies, developers are reluctant to supply OB housing in the market; occupants are unwilling to take the risk of implementing OB approaches in renovation. This study applied a Kano two-dimensional quality model to classify and prioritize OB regulation suggestions proposed by experts in Taiwan. A series of forums and interviews were conducted to develop OB regulations. Barriers and challenges will be discussed for further OB development that can be applied to improve building longevity, adaptability, and sustainability.

Keywords: Adaptive Use; Building Longevity; Open Building; Kano Two-Dimensional Quality Model; Building Regulations.

1. Introduction

The world is facing the significant issue of global climate change, and the Taiwanese government is endeavoring to tackle this challenge head on. The residential sector accounts for 10.9% of Taiwan's energy consumption in 2016 [1]. Lowering household energy consumption to reduce damage to the environment has become an important topic today [2, 3]. Multi-unit residential building (MURB) is the main form of residential housing in metropolitan Taiwan. The recent rise in housing prices has caused public discussions; therefore, the government has declared a public housing policy to address these problems [4]. Changes in the familial structure (including aging population, declining birthrate, and the tendency for late marriage) and environmental sustainability are important factors to consider for today's housing needs [5]. Residents will have different housing requirements according to changes in their family structure, family situation, and various stages in life [6- 8]. Creating a sustainable, flexible, and effective method to satisfy the changing needs of the user and extending the service years of housing has become a continuous focal point in the industry [9-11].

Open building (OB) categorizes the design and construction of buildings in two levels: "Support" and "Infill" [12]. Many studies in the past have indicated that the OB concept is capable of being flexible and adjustable to suit a family's needs. OB can reduce wastes and damages caused by rearrangement of spaces and simultaneously cuts down the cost of

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