

# Office Investment Decision-making and Building Performance

by

Mao-Lin Chiu

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Department of Architecture  
Carnegie Mellon University  
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## Abstract

Poor building performance substantially contributes to building related illnesses, spatial inefficiency, and increased operational and energy expenses. Buildings and facilities are important corporate assets. A fundamental problem in office investment is to improve building performance economically, in both the short-term and the long-term. This study uses a case study approach to analyze the impact of office investment decision-making processes and design decisions on building performance.

The objective of the study is to investigate cost effective methods to improve building performance. The focus is the existing corporate facility investment process and its implications for design decisions that influence building performance. An analytic framework was developed to systematically analyze the interactions between office investment decision-making and building performance.

Three major tasks of this work are to: I. develop an analytic framework by taking five steps: 1.) identifying the design decisions critical for better building performance, 2.) identifying key performance issues in present and future office design to achieve better performing offices, 3.) exploring the interactions between key performance issues and design decisions, 4.) justifying these key performance issues by quantitative and qualitative criteria, and 5.) providing implications for design decisions to improve the quality of office environment; II. conduct four building case studies to examine the existing corporate decision-making process, and illustrate how building performance relates to corporate facility decision-making, and construct decision flows through influence diagrams for visualization of interactions among design decisions; and III. perform economic analysis for justifying better building performance by a demonstration case, and cost-benefit analyses.

The major findings from case studies indicated: 1.) developers make design decisions based on inadequate information, and do not sufficiently understand the impact of the early decisions on the final building performance; 2.) developers or designers learn insufficiently about building performance from their previous projects; 3.) the feedback from team decision-making is inadequate to ensure systems integration and better building performance; and 4.) office tenants are inadequately informed about what alternatives they should have, and therefore make the best of what they can have. However, tenants' expectation of building performance have increased in today's overbuilt office market, and recognize the impact of poor building performance. Existing buildings are no longer good enough for future increasing demands of flexibility, suitability and occupancy comfort.

Furthermore, economic analyses in this thesis demonstrated that better building performance can be achieved economically. At least eight criteria should be considered, namely, the initial cost, operation and maintenance costs, energy and resource conservation, office productivity, retention and attraction of knowledge workers, accommodation of changing uses and technologies, and health and safety in the office environment. The cost impact of design alternatives indicated that decision-makers should focus on the early decision-making process, define the system concepts, and select system alternatives, and make efforts on system integration.

The major findings of the study are: A better performing building must have a more explicit delivery process. Design decisions must consider building systems integration. Team decision-making requires occupant participation. Most importantly, corporate owners and tenants have to make a commitment to a more productive, healthy and safe office environment.