

**STUDY OF BUILT ENVIRONMENT FACTORS
INFLUENCING OCCUPANTS' PRODUCTIVITY:
GREEN CERTIFIED OFFICE BUILDINGS IN
SRI LANKA**

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Degree of Master of Philosophy

Department of Building Economics

University of Moratuwa

Sri Lanka

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DECLARATION

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ABSTRACT

Building occupants seek to be comfortable and productive in their workplace. Occupants with local control over their environment generally have an improvement in their work effort and productivity. However, work productivity of occupants may be de-motivated and interrupted due to poor environmental conditions. Thus, the intervention to ensure a healthy working environment should always be the first step towards improving productivity. In the governing concern on improving occupant's working environment, Green Building movement is fast becoming a necessity. Many researchers said that there is a potential link between green building environment and occupants' productivity. However, most of them have focused only on single aspects of the built environment. Further, no evidences were found on to which factors can critically influence occupants' productivity in green built environment. Further, different factors can have different degree of influence on occupants' productivity where it still remains debatable. In this context, this research intends to identify built environment factors critical for occupants' productivity in green buildings and their degree of influence. Therefore, the aim of this research is to investigate the built environment factors critical for green buildings and their degree of influence on occupants' productivity in green certified office buildings in Sri Lanka.

Two research hypotheses were tested by approaching the survey method under the quantitative phenomenon. The questionnaire survey was conducted among randomly selected occupants in green certified office buildings in Sri Lanka. The survey data was analysed by using the Spearman's Correlation and Ordinal Logistic Regression analysis techniques to modeling the relationships of research variables. The SPSS v20 software was used in data analysis. The findings confirm the relationship between built environment and occupants' productivity. According to the results of correlation, five factors such as; system control, open plan office design, air quality, acoustical partitioning and amount of space were selected as critical built environment factors which showed statistically significant monotonic correlation to occupants' productivity. It was further verified thorough ordinal regression analysis. As the test results verify, an improvement of the system controls, air quality, acoustical partitioning and amount of space in green buildings may increase the perceived productivity of occupants whilst open plan office design showed negative association. According to the calculation of exponential values of log-odds in the model, air quality is 5.783 times, system control is 1.822 times, acoustical partitioning is 16.428 times, open plan office design is 0.038 times and amount of space is 63.434 times more likely effect to result in much higher level of occupants' productivity. The research findings were implied as a basis to evaluate the Indoor Environment Quality criteria in national green certification. Accordingly, probable enhancements were proposed to enhance the existing criteria.

Key words: Occupants' Productivity, Built environment factors, Green buildings, Effect

DEDICATION



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*I dedicate this piece of research to all my loved ones
who encouraged me, with emotional and spiritual
effort in this endeavour...*

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LIST OF ABBREVIATIONS

Abbreviation	Description
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
BREEAM	Building Research Establishment Environmental Assessment Method
BUS	Building Use Studies
CASBEE	Comprehensive Assessment System for Building Environmental Efficiency
CBE	Center for the Built Environment
ETS	Environmental Tobacco Smoke
GBCSL	Green Building Council in Sri Lanka
GBI	Green Building Index
HK-BEAM	Hong Kong Building Environmental Assessment Method
HR	Human Resource
HVAC	Heating, Ventilation and Air Conditioning
IAQ	Indoor Air Quality
ICW	Institute for a Competitive Workforce
IDHP	Illinois Department of Public Health
IEQ	Indoor Environment Quality
LEED	Leadership in Energy and Environmental Design
OSHA	Occupational Safety and Health Administration
PLUM	Polytomous Universal model
PO	Proportional Odds
SPSS	Statistical Package for the Social Science
USEPA	United States Environmental Protection Agency
USGBC	United States Green Building Council
VOC	Volatile Organic Compound



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