

The Relationship of Green Office Buildings to Occupant Productivity and Organisational Performance

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Problem

Green building advocates claim that improved indoor environmental quality (IEQ) in the form of green building features and initiatives (GBFIs) result in enhanced individual productivity, which can be transferred into relatively superior organisational performance.

...not according to the academic literature...

...also known as...

Holy Grail (in Green Building Research)

Green Building Advocates
Green Building Researchers



Green Buildings = Increased Productivity = Enhanced Organisational Performance



Research Question

What theoretical and empirical pathways link GBFIs to individual productivity and organisational performance within an office building?

Green Building Rating Tools

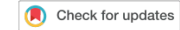
CATEGORY	BREEAM	LEED	CASBEE	Green Star SA (GSSA)
Electricity/Energy	16%	32%	25%	25%
Water	7%	9%	30%	12%
Building Materials	15%	13%	10%	14%
TOTAL	38%	54%	65%	51%
Health and Wellbeing/IEQ	14%	14%	10%	20%

Nurick and Thatcher (2021a:19)

Theoretical Paper No. 1:

Over-arching literature review on previous studies in different contexts, resulting in an emergent theoretical model.

Nurick, S. and Thatcher, A. (2021) The Relationship of Green Office Buildings to Occupant Productivity and Organizational Performance: A Literature Review. *Journal of Real Estate Literature*, 29(1), 18-42.



The Relationship of Green Office Buildings to Occupant Productivity and Organizational Performance: A Literature Review

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ABSTRACT

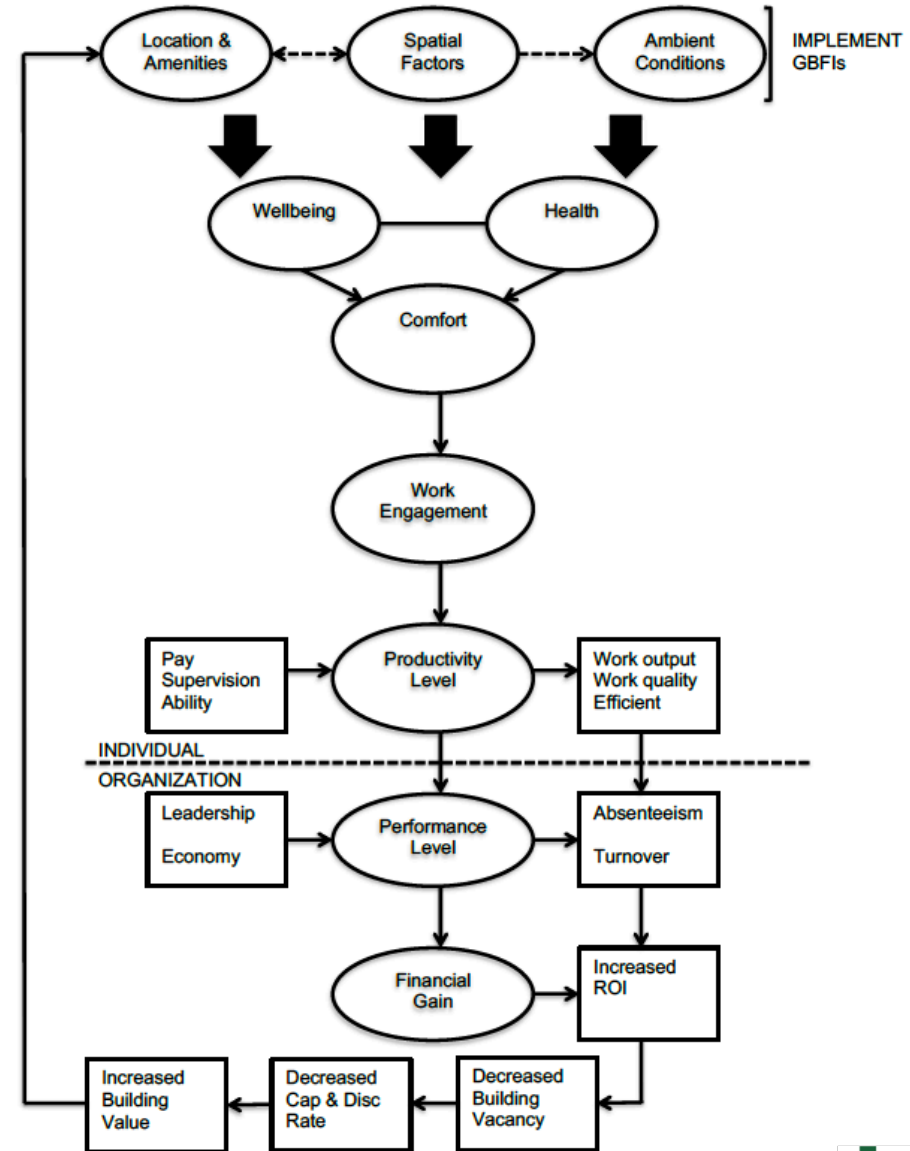
The purpose of this paper is to identify and critically evaluate previous research that examines the link between green office buildings and the productivity of commercial building occupants. The over-arching approach is to highlight and critique the key findings from a variety of researchers that attempt to find links specifically between indoor environmental quality (IEQ) and individual productivity. This is done to develop a theoretical model that links green building features and initiatives (GBFIs) in office buildings to individual productivity and organizational performance. This paper first provides a background of the emergence of green buildings, specifically with regards to utility costs, which led to changes in design and hence to the indoor environment. The core focus of this study is to provide a literature review of the research that attempts to link GBFIs to productivity. Various studies focus on a single or multiple components of GBFIs within different settings, such as controlled laboratory settings, field studies, or longitudinal studies. Other studies choose to focus on occupant health, comfort, and organizational outcomes in relation to GBFIs. The present study attempts to consolidate this area of research by presenting the studies and their findings thus far to develop a new theoretical model. The proposed model links GBFIs to increased individual productivity and organizational performance which results in increased building value, thus justifying the initial capital expenditure for the implementation of GBFIs.

KEYWORDS

Green buildings; green building features and initiatives (GBFIs); wellbeing; productivity; performance

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Emergent Theoretical Model



Nurick and Thatcher (2021a:29)

Theoretical Paper No. 2:

A scoping literature review focusing on the predominant data gathering methods in this field of research.

PRISMA – Preferred Reporting Items for Systematic Review and Meta-Analysis used as the framework for this paper.

Most common approaches were the use of either cross-sectional or longitudinal studies in developed real estate markets.

Previous researchers used quantitative (regression analysis) and/or qualitative (interviews) research approaches.

Nurick, S. and Thatcher, A. (2021) Enhanced Indoor Environmental Quality and the link to individual productivity and organisational performance: A scoping review. *Journal of African Real Estate Research*, 6(2), 84-116.



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Enhanced Indoor Environmental Quality and the Link to Individual Productivity and Organisational Performance: A Scoping Review

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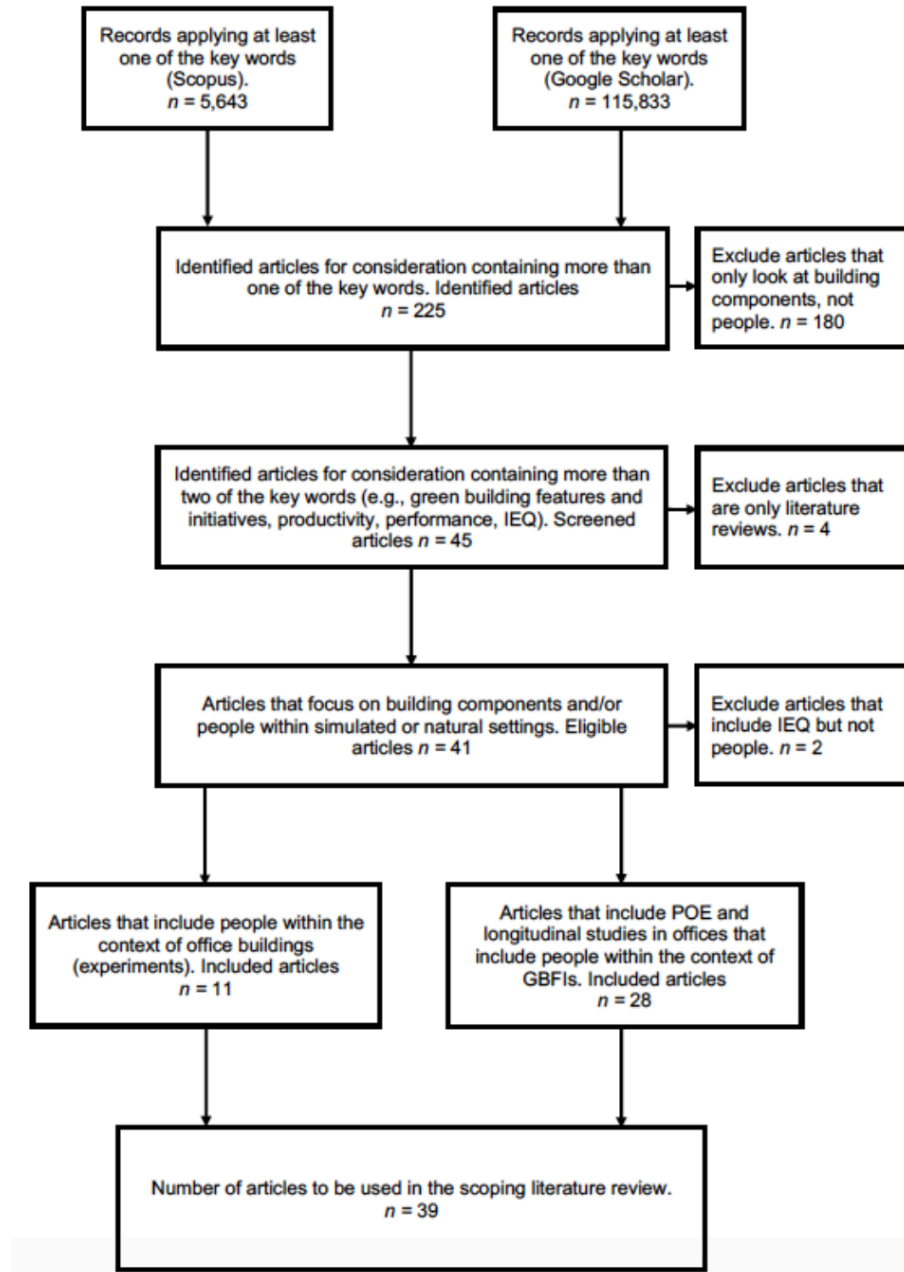
Abstract

This paper provides a scoping literature review of research methods that seek to measure individual productivity and organisational performance in office buildings containing enhanced green building features and initiatives that focus on Indoor Environmental Quality (IEQ).

The paper follows the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) framework and includes thirty-nine academic papers for the period 2000 to 2020. Different research instruments are discussed, including post-occupancy evaluations (POE), longitudinal surveys, and interviews. Furthermore, a narrative focuses on specific measures, including location, amenities, comfort, engagement, individual productivity, and organisational performance. This provides insight into common research approaches and highlights where lesser used research approaches could be applied in the field of green building features and initiatives (GBFIs), including the assessment of individual productivity and organisational performance. Key findings highlight that individual productivity was measured via self-assessment in previous research. At the same time, there has been no research that has successfully measured organisational performance within the context of GBFIs. Gaps have been identified in the literature concerning the relationship between knowledge-based building occupants and measuring/monetising the implementation of GBFIs. Implications of this research indicate that there are common approaches that highlight both strengths and, more importantly, weaknesses concerning linking GBFIs to individual productivity and organisational performance. Addressing weaknesses that predominantly encompass measuring organisational performance creates the opportunity for future research in this field.



PRISMA Flow Diagram



Nurick and Thatcher (2021b:89)

Empirical Paper No. 1:

Testing the organisational component of the emergent theoretical model by analysing returns of financial services companies (FSCs) in green certified and conventional (non-green) office buildings in South Africa.

FSCs 1-10 across 19 green buildings.
FSCs 11-20 across 13 conventional buildings.

All the FSCs included in the study had to provide three funds:

1. Income fund (low risk)
2. Balanced fund (moderate risk)
3. SA equity fund (high risk)

Nurick, S. (2022) Mind over Mortar: Examining IEQ Scores and Financial Services Companies Performance. *Journal of Sustainable Real Estate*, 14(1), 42-56.

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Mind over Mortar: Examining IEQ Scores and Financial Services Companies Performance

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ABSTRACT

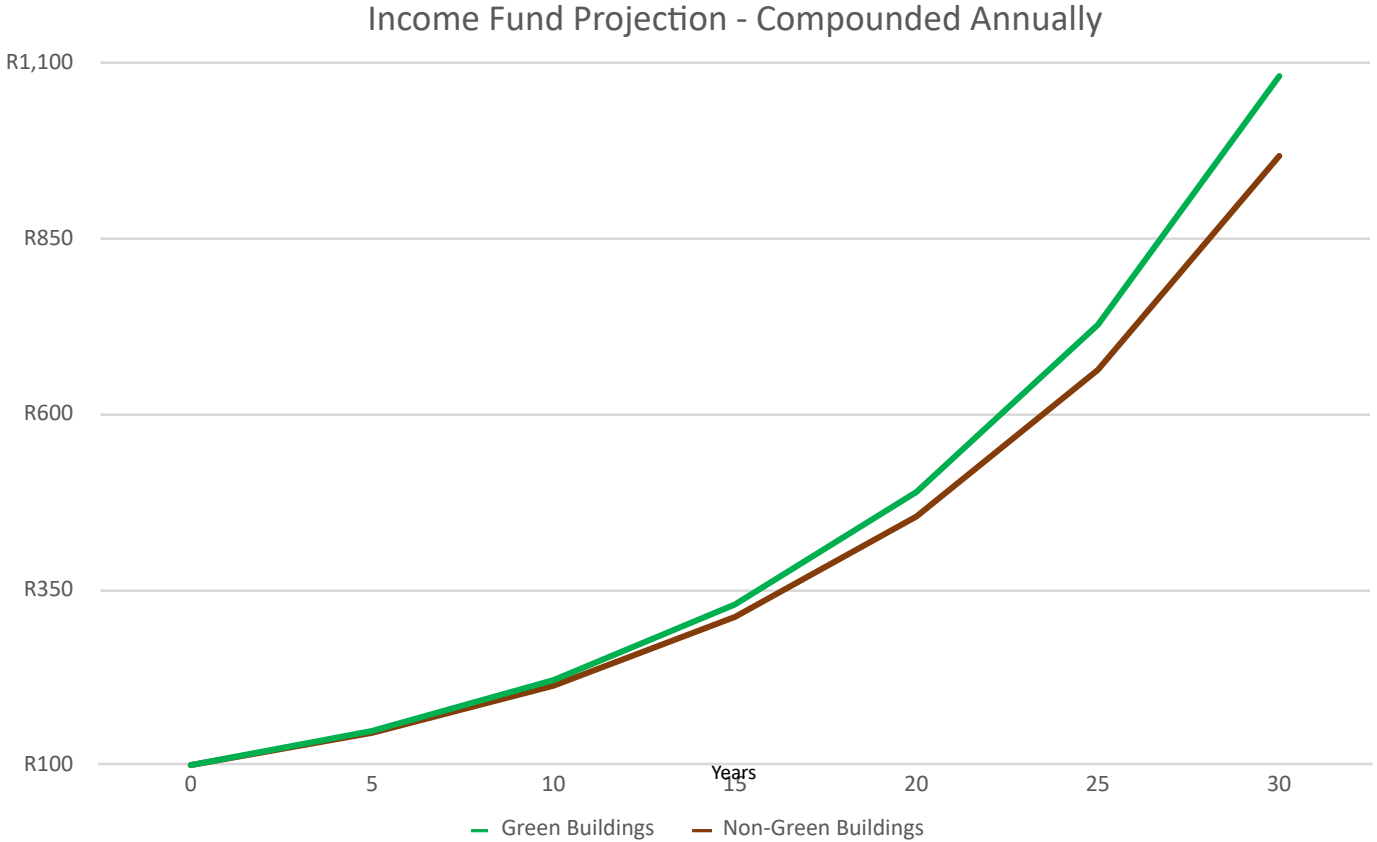
This paper investigates green buildings and organizational performance, using financial services companies (FSCs) located in green and non-green buildings. Returns of low, moderate, and high-risk investment products were used to underpin organizational performance. FSCs based in green buildings on average outperformed their competitors in non-green buildings. One statistically significant relationship (high-risk fund) was found when assessing returns and IEQ. Average green return ratios (AGRRi) determined the discount/premium of the incremental return per IEQ point of a FSC based in green building(s). However, there were individual FSCs located in non-green buildings that outperformed some of the FSCs based in green buildings.

KEYWORDS

Average green return ratio (AGRRi); financial services companies (FSCs); indoor environmental quality (IEQ); performance



Income Fund

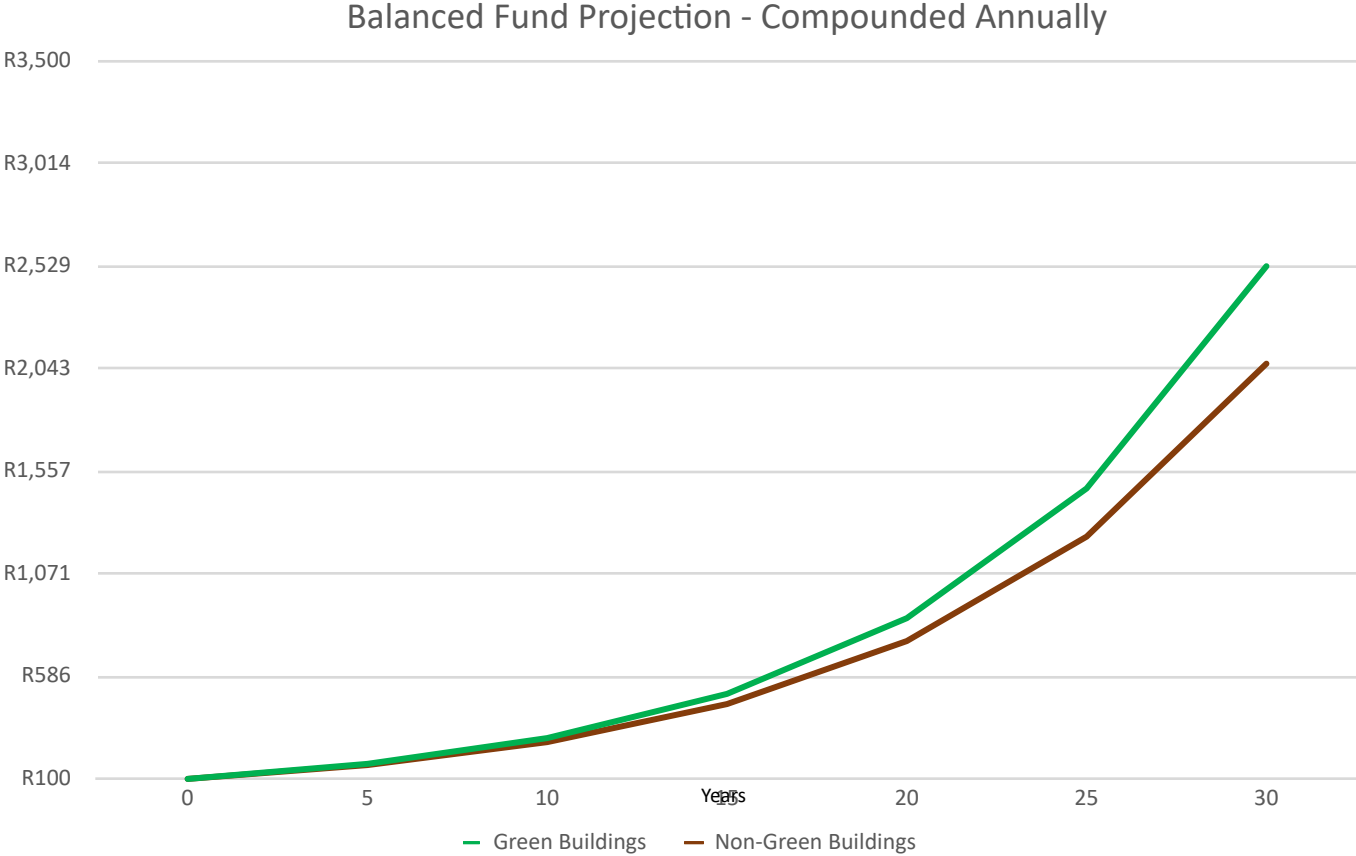


$\triangle = 11.7\%$

Nurick (2022:48)



Balanced Fund

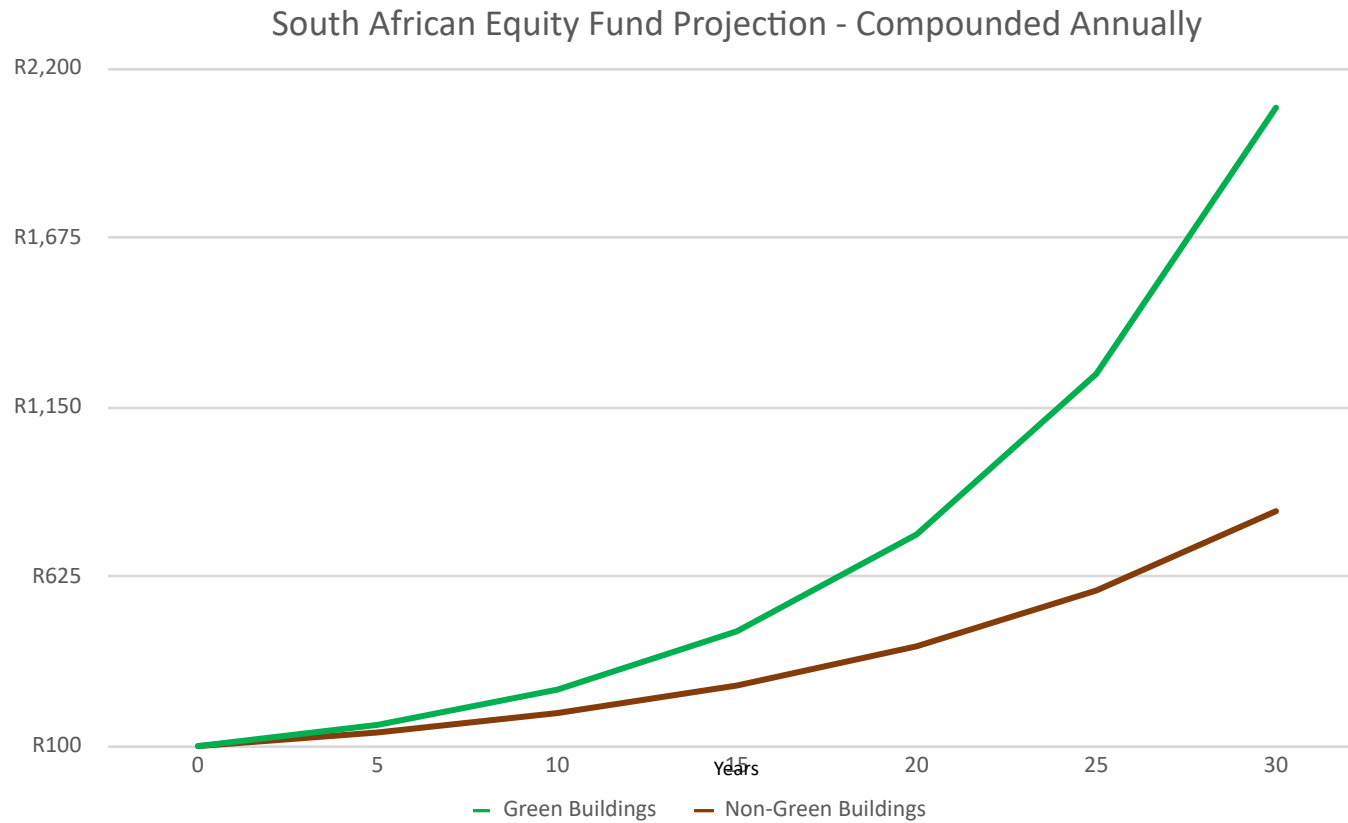


△ = 22.3%

Nurick (2022:49)



SA Equity Fund

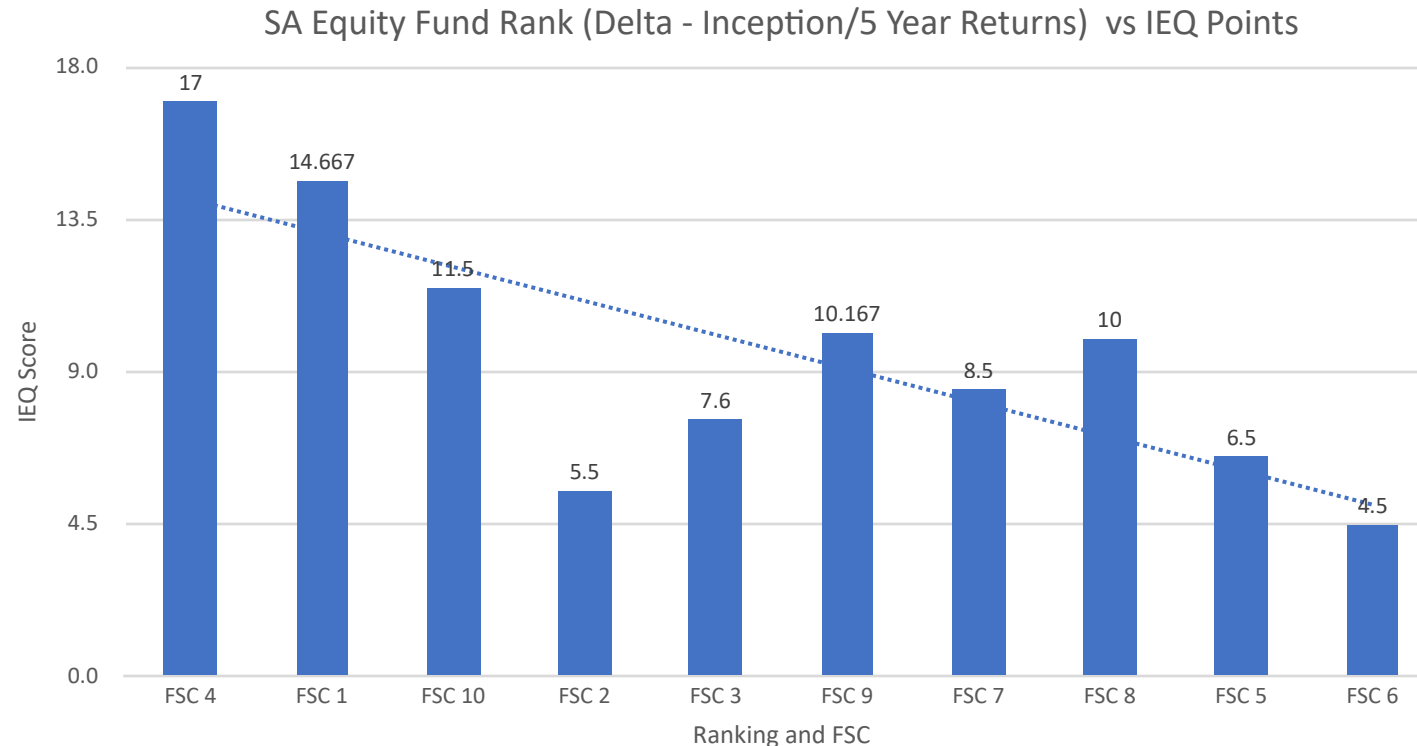


△ = 151%

Nurick (2022:50)

IEQ Scores Compared to Returns

(with ranking)

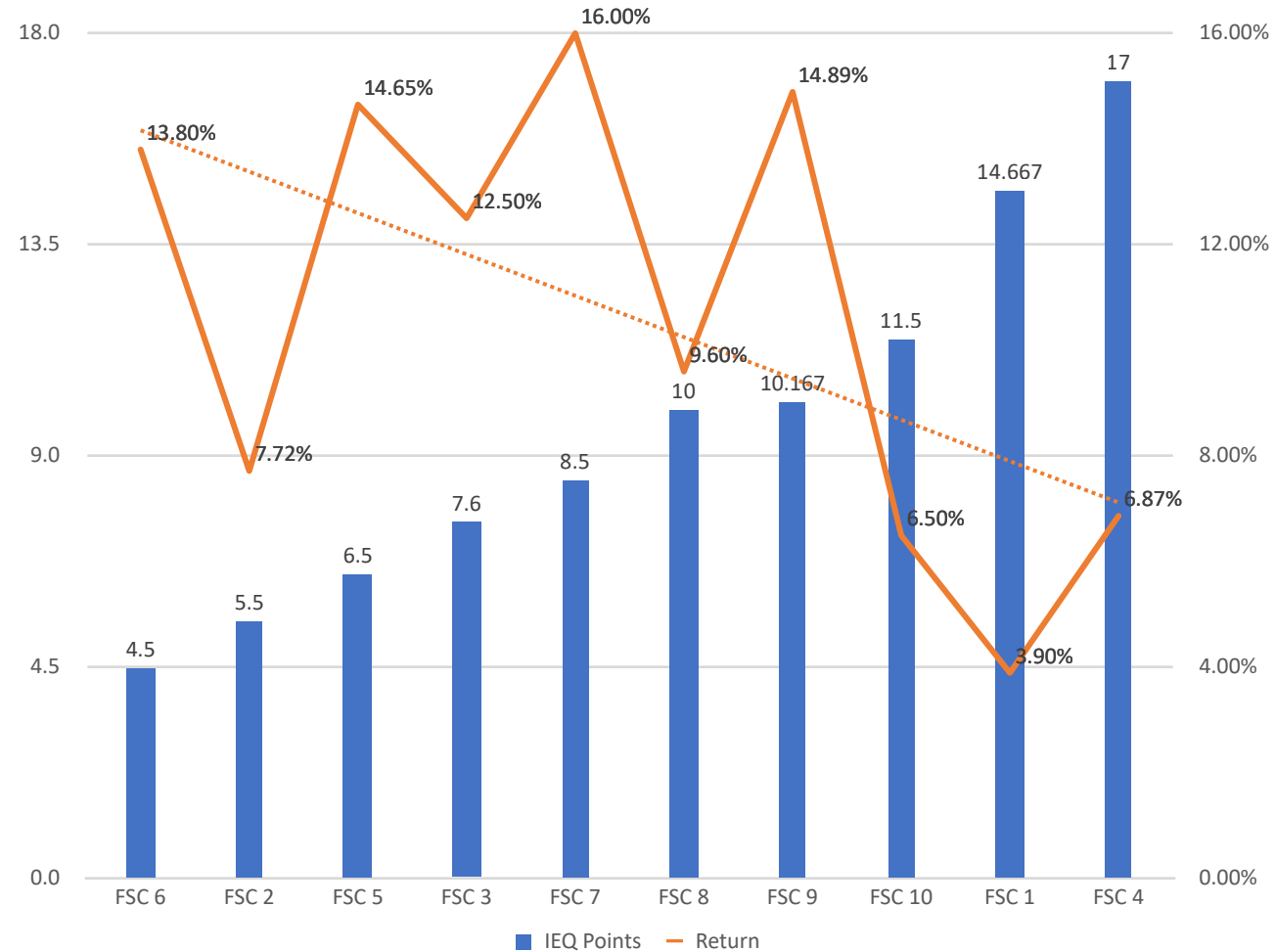


Pearson's Correlation: $r=-0.76$ ($p<0.01$)

Nurick (2022:50)

South African Equity Fund Return vs IEQ Score

(without ranking)



IEQ Sweet Spot: 7.5 -10 points

Nurick (2022:51)

Average Green Return Ratio (incremental) AGRR(i)

- Provide insight into the incremental increase in return for each FSC 1-10 (green) against the average return of FSCs 11–20 (non-green) for each of the three investment funds. IEQ scores were used to normalise incremental calculations.
- Eight of the FSCs located in green buildings indicated a marginally positive AGRRi, while the remaining two FSCs had slightly negative AGRRi's.
- The AGRRi's for each FSC 1–10 were mostly positive, thus providing further support to the hypothesis that individual FSCs located in green buildings outperformed a group of FSCs located in non-green buildings.
- The AGRRi incorporated IEQ scores are adjusted for the three investment funds held by each FSC.

The way forward...for another publication

- Analysis of qualitative research that focuses on individual productivity.
- Semi-structured interviews of $n=15$ respondents across two FSCs located in a four and a six star rated green building, respectively.
- Data saturation was achieved relatively quickly, via the acquisition of thick descriptions (Drew, 2022).
- Nvivo used to conduct thematic analysis against the individual component of the theoretical model developed by Nurick and Thatcher (2021a).

Revised emergent theoretical model:

1. Wellbeing, spatial factors and health not linked to ambient conditions.

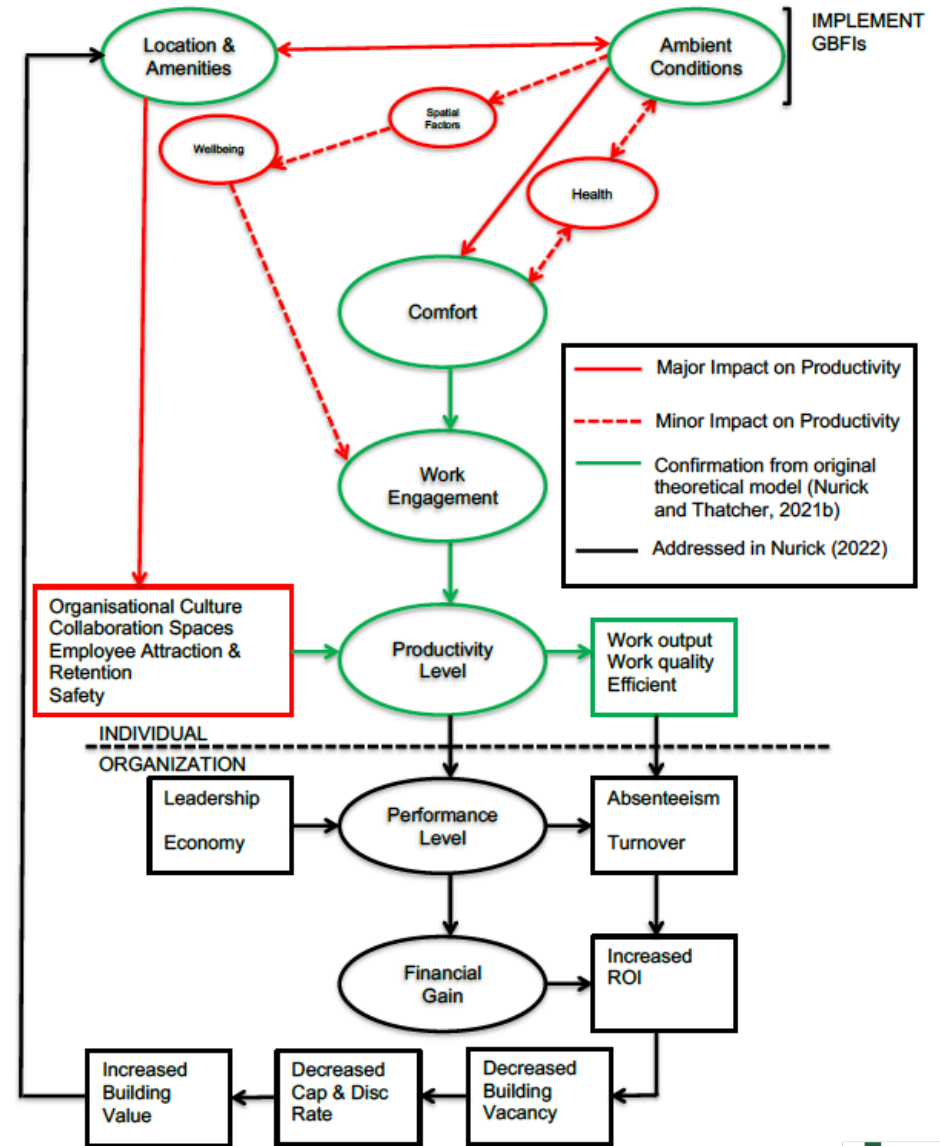
2. Ambient conditions is directly linked to comfort.

3. Location & Amenities directly contribute to:

Organisational culture
Collaboration spaces

Employee **attraction** & retention

Safety



Concluding Thoughts

Further research is required in this field to fully justify (or not) claims by green building advocates that there is a strong relationship between enhanced IEQ and improved individual productivity and organisational performance.

Perhaps expand the research to other industries and/or property sectors.

Thank you

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Paper under review:

Examining the Impact of Indoor Environmental Quality on Individual Productivity of Knowledge Workers in Green Certified Buildings

