Tenants’ office leasing motivators toward the tangible and symbolic aspects of office buildings: Between Green and Non-Green Buildings

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Abstract. Increasing interests in the sustainable development of the Australian building sector has resulted in a surge of green buildings across the country. Nonetheless, limited studies have been done to compare green and non-green building tenants’ leasing motivators. To address this gap, this study aims to examine tenants’ leasing motivators toward tangible and symbolic aspects of office buildings. To this, a questionnaire survey was conducted, and the obtained responses were analysed using the Mann-Whitney U test, followed by an examination on their effect sizes. The results show that green buildings tenants put more emphasis on certain tangible aspects of office buildings such as building sustainability ratings, building quality and energy efficiency. Likewise, green building tenants’ higher emphasis on several symbolic aspects of office buildings, including their attractiveness to future employees, was found. The results inform policymakers and building owners that understanding tenants’ leasing motivators and establish targeted strategy is important to provide adequate office spaces.

1. Introduction
It is known that the Australian building sector accounts for over 50% of domestic electricity demand while also contributing to almost half of carbon emissions [1]. To this extent, it is not surprising to see many attempts have been made to develop the sector into a ‘green’ or even further into a ‘sustainable’ sector. According to the Brundtland Report, sustainable development is defined as meeting the demand of the present without compromising the ability to meet future demand [2]. Specifically, its underlying notion can be defined as achieving the balance among environmental, economic and social aspects of sustainability although many real estate studies so far tend to focus on the environmental pillar.

One of the common practices has been adopted by the Australian building sector for the sustainable development of the sector is the usage of the building sustainability certifications. Similar to the US (LEED), UK (BREEAM) and Singapore (Green Mark), a number of building sustainability certifications have been used in Australia for a wide range of buildings from office towers to data centre. For instance, National Australian Built Environment Rating System (NABERS) and Green Star have been widely used in the Australian commercial property sector whereas, Nationwide House Energy Rating Scheme (NATHERS) and Building Sustainability Index (BASIX, across the state of New South Wales) have been used for residential dwellings. Moreover, there are several mandatory regulations (e.g. Commercial Building Disclosure, Energy Efficiency in Government Operations) and voluntary initiatives (e.g. CitySwitch Green Office Program) which are often incorporated with at least one of those building sustainability certifications [3]. For example, the commercial building disclosure program
mandates public disclosure of energy efficiency of offices over 1,000sqm and subject to sales or lease using NABERS [4].

In Australia, office buildings certified as 4 Stars or over by either NABERS or Green Star can be considered as sustainable and thus, referred to ‘green buildings’ [3, 5]. It is reported that the number of green buildings in Australia has been increased steadily and the market is now moving towards the maturity stage [6]. The incremental trend of green buildings across the country may be due to several reasons. Firstly, tangible aspects of office buildings may play a role in tenants’ office leasing decisions. For instance, green buildings are often known as larger, taller and newer than non-green buildings [7] and therefore, may be preferred by tenants. Moreover, as its name suggests, green buildings are generally more environmentally-friendly by consuming less electricity and producing less CO₂ emissions [8-9]. This may be an important motivator for many tenants considering the rising electricity costs as well as the increasing pressure from the public and the government in regard to environmental sustainability [10]. Several studies [11-12] also show that indoor environmental quality (IEQ) of green buildings is often superior to its non-green counterpart and thus, brings out higher satisfaction and productivity level for buildings occupants (e.g. employees) although this is not always consistent [13].

Additionally, it is also suggested that symbolic aspects of office buildings may also lead tenants to choose green buildings over the non-green counterpart [14]. For example, tenants of green buildings can enjoy reputation benefits due to their positive images to the public (for example, as a sustainability leader occupying an environmentally-friendly green office building) [15]. Particularly, this may be an important leasing motivator for large corporates considering their commitment to corporate social responsibility (CSR) [16]. Nonetheless, limited empirical works have been done to compare tenants’ office leasing motivators towards green and non-green buildings in regard to their tangible and symbolic aspects.

2. Research aim and methodology
The aim of this study is to examine tenants’ leasing motivators toward green and non-green buildings. Under this aim, the following objectives are established: (i) compare tenants’ emphasis on the tangible aspects of office buildings; and (ii) compare tenants’ emphasis on the symbolic aspects of office buildings. To achieve the aim and objectives of the study, a questionnaire survey was distributed to key informants (e.g. leasing directors, sustainability managers) of organisations occupying offices in Sydney Central Business District (CBD). Sydney CBD was selected as a geographical scope of this study considering the largest number of NABERS and Green Star certified office buildings among the Australian cities [3]. 7-point Likert-scale questionnaires were used to capture to what extent the survey respondents put emphasis on each measurement item related to the tangible and symbolic aspects of office buildings. These measurement items were designed based on literature review and preliminary interview findings [15] for better reflection of their office leasing motivators. Specifically, 24 measurement items describing the tangible aspects of office buildings (e.g. office size, energy efficiency, proximity to amenities) were included in the survey whereas, 14 measurement items were included to reflect the symbolic aspects (e.g. comfortable office environment, healthy office space). Then, obtained responses to the survey were analysed using the Mann-Whitney U test, followed by a calculation of their effect sizes using equation 1:

\[ r = \frac{Z}{\sqrt{N}} \]  

(1)

where,

\( r \): effect size
\( z \): z-value
\( N \): sample size
3. Tenants’ leasing motivators towards green and non-green office buildings

3.1. Sample profile
Table 1 shows that a total of valid 51 responses are collected from the targeted key informants of relevant organisations. Of the obtained responses, it is found that 25 of them occupy NABERS 4 Stars of above-certified office buildings (and thus, considered as green buildings) whereas, a relatively small number is reported for the equivalent Green Star counterpart (n=14). A mean value for NABERS and Green Star certified office buildings is found as 2.6 Stars and 1.6 Stars, respectively. Overall, 25 of the respondents are identified as a tenant of a green building (i.e. either NABERS or Green Star 4 Stars or above). The annual median rental of the green and non-green office buildings are reported as both A$801-900/sqm which is consistent with the Sydney CBD office market of A$894/sqm [17].

Table 1. Description of respondents’ office buildings

|                              | Frequency | Percentage |
|------------------------------|-----------|------------|
| NABERS 4 Stars or above<sup>a</sup> | 25        | 49.0%      |
| NABERS 3 Stars or below<sup>b</sup> | 26        | 51.0%      |
| Green Star 4 Stars or above<sup>a</sup> | 14        | 27.5%      |
| Green Star 3 Stars or below<sup>b</sup> | 37        | 72.5%      |
| Median rental                | A$801-900/sqm |

<sup>a</sup>Green building

<sup>b</sup>Non-green building

3.2. Tangible aspects of office buildings
Table 2 presents the results of the Mann-Whitney U test. The results show statistically significant differences between green and non-green building tenants’ office leasing motivators towards the tangible aspects of office buildings in 6 measurement items, namely; building sustainability ratings (p=0.000), age (p=0.002), energy efficiency (p=0.004), thermal quality (p=0.005), grade (p=0.023) and amenities (p=0.028). The results indicate that tenants of green buildings put more emphasis on the well-known benefits of green buildings such as better energy efficiency. Moreover, the results agree with the findings of Kim and Lim [7] and Gabe and Rehm [18] that green buildings are relatively superior to non-green buildings in their building quality and thus, preferred by tenants.

Table 2. Results of Mann-Whitney U test for the tangible aspects of NABERS and Green Star certified office buildings

|                                | Mean rank (GB) | Mean rank (Non-GB) | U       | Z       | p-value |
|--------------------------------|----------------|--------------------|---------|---------|---------|
| Building sustainability ratings | 33.46          | 18.83              | 511.500 | 3.630   | 0.000   |
| Building age                   | 32.22          | 20.02              | 480.500 | 3.030   | 0.002   |
| Building energy efficiency     | 31.92          | 20.31              | 473.000 | 2.847   | 0.004   |
| Building thermal quality       | 31.84          | 20.38              | 471.000 | 2.817   | 0.005   |
| Building grade                 | 30.68          | 21.50              | 442.000 | 2.280   | 0.023   |
| Building amenities             | 30.54          | 21.63              | 438.500 | 0.028   | 0.028   |

Calculations of effect sizes using formula (1) further reveal that building sustainability ratings show an effect size of 0.508, followed by age (r=0.424), energy efficiency (r=0.399), thermal quality (r=0.394), grade (r=0.319) and amenities (r=0.004). Following Cohen’s suggestion [19], this reflects that building sustainability ratings show a large effect size whereas, the rest of the measurement items, except for building amenities, has a medium effect size. Therefore, the results indicate that the significant differences between tenants’ leasing motivators towards the tangible aspects of office buildings are most noticeable in the actual building sustainability ratings whereas, the differences are minimal for building amenities.

Meanwhile, no statistically significant differences are found in other measurement items such as proximity to major roads (p=0.914) and clients (p=0.969), acoustics (p=0.204), indoor air quality
(p=0.730), and lease type (p=0.224). This suggests that the superior IEQ of green buildings may not always well-perceived by tenants despite its known benefits. However, it should be noted that the insignificant differences in some of these measurement items may be also attributed to the nature of this study. For instance, relatively narrow geographical boundary of Sydney CBD may limit the role of locational effects which may shape tenants’ leasing motivators otherwise.

When analysing only the NABERS certified office buildings (i.e. NABERS 4 Stars or above versus NABERS 3 Stars or below), the results of the Mann-Whitney U test are consistent with the aforementioned results (see Table 2). In contrast, no statistically significant differences are found in regard to any of the measurement items when analysing only the Green Star certified office buildings. This indicates that there are no differences in tenants’ leasing motivators towards the tangible aspects of Green Star certified office buildings as it is seen from the case of NABERS.

3.3. Symbolic aspects of office buildings

Table 3 presents the results of the Mann-Whitney U test for green and non-green building tenants’ leasing motivators in regard to their symbolic aspects. The results show that 7 out of 14 measurement items are found as significant, namely; office environment to attract future employees (p=0.000) and well-reflects corporate identity (p=0.005), collaborative (p=0.002), environmentally-friendly (p=0.002), employee-friendly (p=0.025), prestigious (p=0.028) and healthy (p=0.044) office environment. Again, the results indicate that tenants’ leasing motivators towards the symbolic aspects of office buildings are not exactly the same when comparing green and non-green buildings.

| Attractive to future employees | Collaborative | Environmentally friendly | Reflect corporate identity | Employee friendly | Prestigious | Healthy |
|-------------------------------|---------------|--------------------------|---------------------------|-------------------|-------------|---------|
| Mean rank (GB) | Mean rank (Non-GB) | U | Z | p-value |
| 35.08 | 17.27 | 552.000 | 4.394 | 0.000 |
| 32.30 | 19.94 | 482.500 | 3.074 | 0.002 |
| 32.28 | 19.96 | 482.000 | 3.057 | 0.002 |
| 31.72 | 20.50 | 468.000 | 2.814 | 0.005 |
| 30.50 | 21.67 | 437.500 | 2.243 | 0.025 |
| 30.48 | 21.69 | 437.500 | 2.191 | 0.028 |
| 30.06 | 22.10 | 426.500 | 2.014 | 0.044 |

Specifically, effect size calculations show that office environment that is attractive to future employees (r=0.615) has a large effect size, followed by an office environment that collaborative (r=0.430), environmentally-friendly (r=0.428), reflects corporate identity (r=0.394), employee-friendly (r=0.314) and prestigious (r=0.307) which all showing medium effect sizes. On the other hand, a healthy office environment shows only a small effect size of 0.282. Collectively, the results indicate that tenants may perceive green buildings as a marketing tool to appeal environmentally conscious current and future employees. On the other hand, green buildings may not always well-perceived as healthy despite the known benefits from the improved IEQ.

The aforementioned results are consistent with the findings of the Mann-Whitney U test using NABERS certified office buildings alone. Specifically, the same measurement items are found as significant at p-values under 0.05 when comparing NABERS certified green and non-green office buildings (see Table 3). However, when analysing Green Star certified office buildings alone, only the measurement item representing an office environment attractive to future employees is found as significant (p=0.034) albeit at a small effect size of 0.298 (Table 4). Again, this may indicate that tenants may perceive Green Star certification as a marketing tool to attract future employees, rather than from the operational efficiency perspective.
5. Conclusions
The number of green buildings in Australia has been increased steadily especially across the country’s metropolitan cities such as Sydney CBD. Nonetheless, tenants’ leasing motivators towards green and non-green buildings are yet relatively unknown. This study explored this gap by comparing their leasing motivators towards the tangible and symbolic aspects of office buildings.

The results indicate that there are some statistically significant differences across several leasing motivators including building sustainability ratings, building age and energy efficiency. Moreover, green building tenants seem to regard their office building as more attractive to future employees. Collectively, the results of this study inform policymakers and building owners that establish a targeted strategy by understanding different tenants’ leasing motivator is important.

Nonetheless, it should be also noted that this study contains several limitations such as the selection of Sydney CBD as the geographical scope, rather than embracing other metropolitan cities such as Melbourne CBD and Brisbane CBD. Moreover, the relatively small number of Green Star certified office buildings may affect the results of the study. Additionally, it is also suggested that tenants’ office leasing behaviours can be complex and multi-dimensional [20-21]. To these extents, it is recommended to perform more in-depth comparative analysis after obtaining additional data.

5. References

[1] Green Building Council Australia 2018 Raising the bottom line: New report finds opportunities in new homes Retrieved on October 8, 2019 from https://new.gbca.org.au/news.gbca-media-releases/raising-the-bottom-line/
[2] United Nations 1987 Our Common Future: Report of the World Commission on Environment and Development (New York: United Nations) pp 1-247
[3] Kim S and Lim B T H 2018 How effective is mandatory building energy disclosure program in Australia? IOP Conf. Ser.: Earth Environ. Sci. 140 12106
[4] Department of the Environment and Energy n.d. What is CBD? Retrieved on September 27, 2019 from http://cbd.gov.au/overview-of-the-program/what-is-cbd
[5] Kim S, Lim B TH and Kim J 2016 The Effect of Building Sustainability Regulation on the Green Office Building Stock in Australia Proceeding of International Conference on Sustainable Built Environment: Actions for the Built Environment of Post-Carbon era Complying with COP21 Sustainable Built Environment 16 Seoul (Seoul: Hanyang University) pp 470–473
[6] Dodge Data & Analytics 2018 World Green Building Trends 2018 (Bedford: Dodge Data & Analytics) pp 1-80
[7] Kim S and Lim B T H 2019 Analysing the characteristics of green and non-green buildings: From the real estate perspective, AIP Conference Proceedings. 2124 20049
[8] Green Building Council of Australia 2013 The Value of Green Star - A Decade of Environmental Benefits (Sydney: Green Building Council Australia) pp 1-51
[9] Wang T, Seo S, Liao P-C and Fang D 2016 GHG emission reduction performance of state-of-the-art green buildings: Review of two case studies Renewable and Sustainable Energy Reviews. 56 484–493
[10] Swoboda K 2013 Energy prices: the story behind rising costs Retrieved on December 3, 2019 from https://www.aph.gov.au/about_parliament/parliamentary_departments/parliamentary_library/pubs/briefingbook44p/energyprices
[11] Kato H, Too L and Rask A 2009 Occupier perceptions of green workplace environment: the Australian experience J. of Corporate Real Estate 11 183–195

Table 4. Results of Mann-Whitney U test for the symbolic aspects of Green Star certified office buildings

| Attractive to future employees | Mean rank (GB) | Mean rank (Non-GB) | U      | Z    | p-value |
|-------------------------------|----------------|--------------------|--------|------|---------|
|                               | 33.00          | 23.35              | 357.000 | 2.125 | 0.034   |
[12] Armitage L, Murugan A and Kato H 2011 Green offices in Australia: a user perception survey, J. of Corporate Real Estate 13 169–80
[13] Thatcher A and Milner K 2016 Is a green building really better for building occupants? A longitudinal evaluation Building and Environment. 108 194–206
[14] Kim S, Lim B TH and Kim J 2017 Green Features, Symbolic Values and Rental Premium: Systematic Review and Meta-analysis Procedia Eng. 180 41–48
[15] Kim S, Lim B TH and Kim J 2019 Tenants’ motivations to lease Green Office Buildings: an exploratory study of Sydney Central Business District Int. J. of Structural and Civil Eng. Res. 8 59–62
[16] Loosemore M and Lim B T H 2016 Linking corporate social responsibility and organizational performance in the construction industry Construction Management and Economics 35 90–105
[17] Cushman and Wakefield 2016 Australia Investment Report: Investment Case for Australia (Sydney: Cushman and Wakefield)
[18] Gabe, J. and Rehm M 2014 Do tenants pay energy efficiency rent premiums? J. of Property Investment & Finance 32 333–351
[19] Cohen J 1988 Statistical power analysis for the behavioral sciences 2nd edn (Hillsdale: L. Erlbaum Associates) pp 1-400
[20] Kim S and Lim B TH 2019 Dimensions of Tenants’ Office Leasing Behaviours: An Introductory Study IOP Conf. Ser.: Mater. Sci. Eng. 601 12022
[21] Kim S and Lim B T H 2019 Do office tenants really pay for the greenness?: Findings from PLS-SEM AIP Conference Proceeding. 2114 20052