Tenants' leasing motivators and decisions about the greenness of office buildings and their rental

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TENANTS' LEASING MOTIVATORS AND DECISIONS ABOUT THE GREENNESS OF OFFICE BUILDINGS AND THEIR RENTAL

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Increasing concerns about environmental sustainability in the real estate sector have resulted in a growing number of office buildings being certified by green building certifications to reflect their levels of greenness. In Australia, the number of National Australian Built Environment Rating System (NABERS) and Green Star certified office buildings in major Central Business Districts has been increased rapidly over the last 20 years. Studies in this field show that office buildings with higher levels of greenness can fetch higher rental, and the tangible aspects of office buildings often play a role. Nonetheless, the impacts of tenants' leasing behaviours on rental, especially in regard to office buildings' symbolic aspects, has not been fully explored.

As such, this research aims to investigate the determinants of rental of the Australian office buildings. Under this aim, the four objectives are to (i) develop and test a conceptual framework of tenants' office leasing behaviours; (ii) examine the key leasing motivators driving tenants' decisions about the greenness of their office buildings; (iii) examine the collective effects of tangible and symbolic aspects of office buildings on rental; and (iv) explore the moderating effects of market and regulatory forces on the relationships between tenants' key leasing motivators and decisions about the greenness of their office buildings.

To achieve the research aim, a conceptual framework is developed by integrating the three behavioural theories of (i) symbolic self-completion theory; (ii) expectancy-value theory; and (iii) push-pull theory. In this study, it is postulated that tenants' leasing motivators are multi-dimensional and that they could affect the tenants' decisions about the greenness of their office buildings; then, in turn, collectively determine the rental. Moreover, the relationship between tenants' leasing motivators and their decisions about the greenness of office buildings could be moderated by market and regulatory forces.

This research adopts a survey research design and was built on a post-positivist research paradigm. Preliminary interviews were conducted with nine key informants of relevant organisations to identify potential determinants of tenants' leasing decisions. These findings were used to inform the development of the structured survey questionnaire. Overall, an online survey of 51 Sydney CBD office tenants was undertaken and the data were analysed using both the first- and second-generation multivariate methods, including Exploratory Factor Analysis (EFA) and Partial Least Square – Structural Equation Modelling (PLS-SEM) techniques.

The results of the EFA reveal that tenants' leasing motivators are multi-dimensional, comprising of eleven constructs related to their organisational identity, expectations and both tangible and symbolic aspects of office buildings. The results of PLS-SEM further show that organisations that possess a sustainability-focused identity tend to put more emphasis on building quality than building sustainability. Building quality is found to be a determinant of office rental; whereas, building sustainability contributes to the creation of symbolic meanings of office buildings for organisations and employees. Additionally, the results demonstrate that the level of greenness represented by NABERS and Green Star ratings is of interest to organisations with people-focused identity, while the ratings did not significantly affect rental. Finally, no significant moderating effects of market and regulatory forces were detected on the relationship between tenants' leasing motivators and their decisions about the greenness of office buildings.

It is concluded that the identified relationships between tenants' leasing behaviours and rental provides good insights about the impact of tenants' leasing motivators. As such, it is recommended that landlords understand tenants' office leasing behaviours and, thereafter, establish a targeted strategy for attracting appropriate tenants. Tenants are also recommended to make strategic office leasing decisions, so they can provide their employees with psychological ownership of their workplace

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ABSTRACT

Tenants' leasing motivators and decisions about the greenness of office buildings and their rental

Increasing concerns about environmental sustainability in the real estate sector have resulted in a growing number of office buildings being certified by green building certifications to reflect their levels of greenness. In Australia, the number of National Australian Built Environment Rating System (NABERS) and Green Star certified office buildings in major Central Business Districts has been increased rapidly over the last 20 years. Studies in this field show that office buildings with higher levels of greenness can fetch higher rental, and the tangible aspects of office buildings often play a role. Nonetheless, the impacts of tenants' leasing behaviours on rental, especially in regard to office buildings' symbolic aspects, has not been fully explored.

As such, this research aims to investigate the determinants of rental of the Australian office buildings. Under this aim, the four objectives are to (i) develop and test a conceptual framework of tenants' office leasing behaviours; (ii) examine the key leasing motivators driving tenants' decisions about the greenness of their office buildings; (iii) examine the collective effects of tangible and symbolic aspects of office buildings on rental; and (iv) explore the moderating effects of market and regulatory forces on the relationships between tenants' key leasing motivators and their decisions about the greenness of their office buildings.

To achieve the research aim, a conceptual framework is developed by integrating the three behavioural theories of (i) symbolic self-completion theory; (ii) expectancy-value theory; and (iii) push-pull theory. In this study, it is postulated that tenants' leasing motivators are multi-dimensional and that they could affect the tenants' decisions about the greenness of their office buildings; then, in turn, collectively determine the rental. Moreover, the relationship between tenants' leasing motivators and their decisions about the greenness of office buildings could be moderated by market and regulatory forces.

This research adopts a survey research design and was built on a post-positivist research paradigm. Preliminary interviews were conducted with nine key informants of relevant organisations to identify potential determinants of tenants' leasing decisions. These findings were used to inform the development of the structured survey questionnaire. Overall, an online survey of 51 Sydney CBD office tenants was undertaken and the data were analysed using both the first- and second-generation multivariate methods, including Exploratory Factor Analysis (EFA) and Partial Least Square – Structural Equation Modelling (PLS-SEM) techniques.

The results of the EFA reveal that tenants' leasing motivators are multi-dimensional, comprising of eleven constructs related to their organisational identity, expectations and both tangible and symbolic aspects of office buildings. The results of PLS-SEM further show that organisations that possess a sustainability-focused identity tend to put more emphasis on building quality than building sustainability. Building quality is found to be a determinant of office rental; whereas, building sustainability contributes to the creation of symbolic values of office buildings for organisations and employees. Additionally, the results demonstrate that the level of greenness represented by NABERS and Green Star ratings is of interest to organisations with people-focused identity, while the ratings did not significantly affect rental. Finally, no significant moderating effects of market and regulatory forces were detected on the relationship between tenants' leasing motivators and their decisions about the greenness of office buildings.

It is concluded that the identified relationships between tenants' leasing behaviours and rental provides good insights about the impact of tenants' leasing motivators. As such, it is recommended that landlords understand tenants' office leasing behaviours and, thereafter, establish a targeted strategy for attracting appropriate tenants. Tenants are also recommended to make strategic office leasing decisions, so they can provide their employees with psychological ownership of their workplace.

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Chapter 1. INTRODUCTION

1.1 Background

Australian real estate sector is the world's largest single contributor of greenhouse gases (GHG) and is responsible for approximately one-third of domestic water consumption and 40% of waste generation (GBCA, 2015). As such, considerable efforts have been made to transform it into an 'environmentally-sustainable' sector. This is evident by increasing numbers of office buildings being certified by the 'green building certifications', having achieved higher levels of greenness. Most notably, the Australian real estate sector is actively adopting the National Australian Built Environment Rating System (NABERS) and Green Star certifications to represent the level of greenness of certified office buildings.

There is a general consensus among researchers that understanding tenants' demand is important, as it drives the greenness of office buildings (Myers *et al.*, 2015; Chau *et al.*, 2010). The growing demand by tenants' for greenness of office buildings has resulted in a convergence of studies, over the past decades, that document values of greenness, such as less energy, water and electricity consumptions (GBCA, 2013; Thomas, 2010). However, Newell *et al.*'s (2011) analysis of NABERS and Green Star certified office buildings shows that tenants are often required to pay higher rental for leasing spaces within office buildings if that building has a higher level of greenness. Hitherto, a number of studies document a range of determinants for rental and rental premiums (Eichholtz *et al.*, 2013; Chegut *et al.*, 2011; Fuerst and McAllister, 2009b), and note that the tangible aspects of office buildings, such as superior building quality (with, for example, more storeys, larger spaces and better amenities), and better locations are the key determinants for rental, hence a 'green premium'.

1.2 Research problem

Several studies (Khanna *et al.*, 2013; Dovey, 1992; Etzioni, 1991) suggest that office buildings should be seen from the two aspects of 'tangible' and 'symbolic'. The former refers to the perception that office buildings are tangible objects characterised by their locational, physical or functional features; the latter refers to intangible aspects that hold a 'special meaning' that is closely related to the identity of relevant individuals (e.g. employees) and groups (e.g. organisations). Ledgerwood *et al.* (2007) add that the values of buildings could be affected by their symbolic aspects, apart from the tangible aspects

of office buildings, which are often characterised by several factors such as building quality and location.

In line with the above, it appears that the greenness of office buildings adds value to their employees by providing a better workplace environment (Armitage *et al.*, 2011; Thomas, 2010), which in turn, creates symbolic values for them. Moreover, it is suggested that the greenness of office buildings could be the symbolic representation of tenants' organisational identity and, therefore, may affect their leasing decisions (Kim *et al.*, 2017b). This concurs with Levy and Peterson (2013) and Eichholtz *et al.* (2009) who note that tenants' leasing decisions could be driven by several motivators, including the level of greenness, organisations' commitment to corporate social responsibility (CSR), locations and market and regulatory forces. These studies thus imply that tenants' leasing motivators towards the tangible and symbolic aspects of office buildings could collectively affect their decisions about the greenness of office buildings, and in turn, impact on rental.

Although many studies recognise the two aspects of office buildings, it appears little empirical work has been done to investigate their meanings in relation to office rental. Specifically, determinants of office rental are mostly explained by the tangible aspects of office buildings; whereas, little is known about the possible impact of the symbolic aspects of office rental. Therefore, this research postulates that the greenness of office buildings will provide tenants with identity advantages, raising the research question of:

What are the tangible and symbolic aspects of office buildings that

can collectively influence their rental?

1.3   Knowledge gap

Hitherto, only a small number of studies have empirically investigated the relationships between the greenness of office buildings and rental in the context of Australia's real estate sector. Newell *et al.* (2011) and Gabe and Rehm (2014) are the two of the relevant studies that focus on the relationships between the greenness of office buildings and rental, although their findings contradict each other's. Gabe and Rehm' (2014) findings disagree with those of Newell *et al.*'s (2011) that there are significant positive relationships between NABERS and Green Star certifications and rental. However, they share the view that the tangible aspects of office buildings could significantly affect office rental.

This aligns with several other studies conducted outside of Australia (Eichholtz *et al.*, 2013; Reichardt *et al.*, 2012) which found a significant positive relationship between the greenness of office buildings and rental, while confirming the role of the tangible aspects of office buildings as a determinant of rental. Despite all these efforts, these studies did not consider interrelationships among tenants' office leasing motivators (e.g. their identity and expectations), the tangible and symbolic aspects of office buildings (i.e. 'meanings' of the place), and their leasing decisions about the greenness of office buildings. This then points to a gap in the literature, and suggests a question: if and to what extent is office rental determined by tenants' leasing behaviours?

Further, the review of the literature reveals that various market and regulatory forces can affect tenants' leasing decisions about the greenness of office buildings (Olubunmi *et al.*, 2016; Shazmin *et al.*, 2016); however, little or no study has empirically examined the moderating effect on the relationships between tenants' leasing motivators and leasing decisions, especially in the Australian context. This leaves another gap in the understanding of if, and to what extent, government regulations (e.g. mandatory energy disclosure programs) and external stakeholders' pressures play a role in affecting tenants' office leasing behaviours to the greenness level of office buildings.

1.4 Research aim and objectives

Based on the knowledge gaps identified above, the aim of this research is to investigate the determinants of rental of the Australian office buildings. To address this aim, the four specific objectives are set out below to:

1. develop and test a conceptual framework of tenants' office leasing behaviours;
2. examine the key leasing motivators driving tenants' decisions about the greenness of their office buildings;
3. examine the collective effects of tangible and symbolic aspects of office buildings on rental; and
4. explore the moderating effects of market and regulatory forces on the relationships between tenants' key leasing motivators and their decisions about the greenness of their office buildings

1.5   Definition of terms

Table 1.1 summarises the definitions of major terms used in this research.

Table 1.1 Definition of the major terms used in this research

Term	Definition
Greenness (X5)	The term 'greenness' refers to the environmental performance of office buildings, characterised by the ratings of green building certifications. For example, higher ratings mean a higher level of greenness of office buildings
Green building	Green building refers to an office building which is certified by one or more green building certifications and achieved above the average in their ratings (e.g. 4 Stars or above in NABERS or Green Star) and thus, show a higher level of greenness
Tenants	Tenants refer to corporates, government agencies or other forms of organisations who pay rental to lease either an entire or some portion of an office building
Occupants	Occupants refer to groups or individuals who occupy and use either an entire or some portion of an office building either as a landlord, tenant or employees
Tangible aspects of office buildings (X1)	Tangible aspects refer to the physical, locational and functional aspects of office buildings.
Symbolic aspects of office buildings (X2)	Symbolic aspects refer to the intangible aspects of office buildings which are closely related to the identity of the organisation and their employees. This is also referred as a term 'symbolic values' (or meanings).
Measurement items	Measurement items describe the underlying meaning of its respective 'construct' or 'factor'. For consistency, this research uses the term 'measurement items' instead of 'variables' unless describing findings of other studies
Determinants	Determinants refer to measurement items (or variables) found as significantly affecting their respective construct (or factor). For example, determinants of office rental and tenants' office leasing decisions may include building quality and locations

1.6   Research hypotheses

Twenty-four hypotheses and sub-hypotheses are established in this study, by which to test if the relationships among tenants' office leasing motivators (X1-X4), their leasing decisions about the greenness of office buildings (X5) and rental (Y) and the relationships between these constructs could be moderated by the market and regulatory forces (Z) (see Section 3.6):

> **Hypothesis 1-1 (H1-1)**: *Tenants' identity (X4) has a significant positive impact on the sustainability performance of office buildings (X1$_{BLDS}$)*

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Hypothesis 1-2 (H1-2): *Tenants' identity (X4) has a significant positive impact on lease contract features (X1$_{LEAS}$)*

Hypothesis 1-3 (H1-3): *Tenants' identity (X4) has a significant positive impact on office building quality (X1$_{BLDQ}$)*

Hypothesis 1-4 (H1-4): *Tenants' identity (X4) has a significant positive impact on proximity (X1$_{PROX}$)*

Hypothesis 2a-1 (H2a-1): *Tangible aspects of office buildings (X1) have a significant positive impact on employees related symbolic aspects of office buildings (X2$_{EMPL}$)*

Hypothesis 2a-2 (H2a-2): *Tangible aspects of office buildings (X1) have a significant positive impact on organisation related symbolic aspects of office buildings (X2$_{ORGS}$)*

Hypothesis 2b-1 (H2b-1): *Tangible aspects of office buildings (X1) have a significant positive impact on their expectation to become a socially conscious organisation (X3$_{SOCO}$)*

Hypothesis 2b-2 (H2b-2): *Tangible aspects of office buildings (X1) have a significant positive impact on their expectation to become a sustainable organisation (X3$_{SUSO}$)*

Hypothesis 2c-1 (H2c-1): *Tenants' identity (X4) has a significant positive impact on employees related symbolic aspects of office buildings (X2$_{EMPL}$)*

Hypothesis 2c-2 (H2c-2): *Tenants' identity (X4) has a significant positive impact on organisation related symbolic aspects of office buildings (X2$_{ORGS}$)*

Hypothesis 2d-1 (H2d-1): *Tenants' identity (X4) has a significant positive impact on their expectation to become a socially conscious organisation (X3$_{SOCO}$)*

Hypothesis 2d-2 (H2d-2): *Tenants' identity (X4) has a significant positive impact on their expectation to become a sustainable organisation (X3$_{SUSO}$)*

Hypothesis 3a (H3a): *Tangible aspects of office buildings (X1) have a significant positive impact on tenants' leasing decisions about the greenness of office buildings (X5)*

Hypothesis 3b (H3b): *Symbolic aspects of office buildings (X2) have a significant positive impact on tenants' leasing decisions about the greenness of their office buildings (X5)*

Hypothesis 3c (H3c): *Tenants' expectations (X3) have a significant positive impact on their leasing decisions about the greenness of their office buildings (X5)*

Hypothesis 3d (H3d): *Tenants' identity (X4) has a significant positive impact on their decisions about the greenness of their office buildings (X5)*

Hypothesis 4a (H4a): *Tangible aspects of office buildings (X1) have a significant positive impact on rental (Y)*

Hypothesis 4b (H4b): *Symbolic aspects of office buildings (X2) have a significant positive impact on rental (Y)*

Hypothesis 4c (H4c): *Tenants' expectations (X3) have a significant positive impact on rental (Y)*

Hypothesis 4d (H4d): *Tenants' leasing decisions about the greenness of office buildings (X5) have a significant positive impact on rental (Y)*

Hypothesis 5a (H5a): *Market and regulatory forces (Z) moderate the relationships between tenants' emphasis on tangible aspects of office buildings (X1) and their leasing decisions about the greenness of office buildings (X5)*

Hypothesis 5b (H5b): *Market and regulatory forces (Z) moderate the relationships between tenants' emphasis on symbolic aspects of office buildings (X2) and their leasing decisions about the greenness of office buildings (X5)*

Hypothesis 5c (H5c): *Market and regulatory forces (Z) moderate the relationships between tenants' expectations (X3) and their leasing decisions about the greenness of office buildings (X5)*

Hypothesis 5d (H5d): *Market and regulatory forces (Z) moderate the relationships between tenants' identity (X4) and their leasing decisions about the greenness of office buildings (X5)*

1.7   Research scope

From the real estate perspective, the value of office buildings is generally represented by either rental or sales prices, or both. Of these, this research focuses on the rental of office buildings given the nature of the Australian office market as a 'tenants' market', as suggested by Newell *et al.* (2011) and CPS Property (2016). In line with this, the targeted samples are tenants who leased their offices in Sydney central business districts (CBD).

Next, studies (Monfared and Sharples, 2011; Burnett, 2005) measure the level of greenness of office buildings in several ways, such as: (i) CO_2 emissions and electricity consumptions; (ii) indoor environmental quality (IEQ); and (iii) green building

certifications. Of these, the majority of real estate studies investigating the relationships between the level of greenness of office buildings and their rental adopt green building certifications to distinguish one office building from another. As such, this research uses NABERS and Green Star certifications ratings, as these are commonly adopted and well-recognised in Australia's real estate sector (see Kim and Lim, 2018b; Kim *et al.*, 2015b).

Wheaton *et al.* (1997) suggest that employment trends and rates are the most important factor for determining the demand for leased office buildings in selected sectors. Therefore, tenants from the top three sectors of the Sydney Central Business Districts (CBD) office market are selected for this research. Sydney CBD is chosen as a geographical scope as this region has the largest number of both NABERS and Green Star certified office buildings within its local governing area (LGA) (Kim and Lim, 2018b). In summary, the focus of this research is office tenants in the: (i) Finance and insurance services sector; (ii) Professional, scientific, and technical services sector; and (iii) Rental, hiring and real estate services (see Section 4.6.1 for further discussions about the scoping of this research).

1.8 Research method

To fulfil the research objectives stated in Section 1.4, this research adopts the survey research design for its advantages in understanding tenants' office leasing behaviours, based on self-reported opinions from the research participants (Flynn, 1990). To this, a three-phase research process is employed, namely: (i) exploratory; (ii) questionnaire development; and (iii) data collection and analysis phases, involving both quantitative and qualitative forms of data collection and analyses.

The adoption of the three-phase research process allows examination of the relationships between tenants' leasing behaviours and rental, while maximising the reliability and validity of research findings. Details of the research methods are provided in Chapter 4.

The obtained survey data is analysed using several data analysis methods, including the second-generation multivariate method of Partial Least Square – Structural Equation Modelling (PLS-SEM) method. PLS-SEM is selected as a main method of analysis for this research, given its advantages over the traditionally adopted first-generation multivariate method of regression analysis and appropriateness to the context of this research (this is discussed further in Chapter 5).

1.9 Research significance

The significance of this research is categorised as having theoretical, methodological and practical significance, and each is discussed following.

1.9.1 Theoretical significance

First, this research contributes to the application of behavioural theories in the domain of real estate. Traditionally, real estate studies have built on the underlying assumption of neo-classical economics and, thus, focused mainly on the tangible aspects of office buildings to explain the determinants of rental. As such, the symbolic aspects of office buildings and their relationship with rental have not been considered and explored. In contrast, this research may broaden ways to explain real estate market behaviour, beyond the traditional neo-classical economics, by capturing the collective effect of tangible and symbolic aspects of office buildings on rental.

Second, this research integrates three behavioural theories in developing the conceptual framework to explain the relationships between tenants' leasing behaviours and rental (see Section 3.3): (i) symbolic self-completion theory; (ii) expectancy-value theory; and (iii) push-pull theory. Although the application of these theories in the real estate context is not entirely new, it appears that little or no study has attempted to integrate these theories to explain tenants' office leasing behaviours. Most of the previous studies only explore these theories without explaining interrelationships among tenants' identity, expectations, their emphasis on the tangible and symbolic aspects of office buildings, and leasing decisions. Therefore, and in contrast, the research findings can inform the applicability of these behavioural theories in the real estate contexts to collectively explain tenants' office leasing behaviours.

Third, this research potentially contributes to theories related to environmental psychology. Based on the identified relationships among tenants' office leasing motivators, it will be seen if and to what extent office tenants are affected by related concepts, such as the sense of place and place attachment aroused by the greenness of office buildings. This will provide insights into environmental psychology beyond the focus of previous studies on the relationship between the workspace environment and occupants' health, satisfaction and productivity level.

1.9.2 Methodological significance

The methodological significance of this research is related to the adoption of Partial Least Square - Structural Equation Modelling (PLS-SEM) as the main method of analysis.

Hitherto, it is common to see studies adopt the multiple regression-based hedonic pricing model (HPM) to explain the determinants of office rental including their greenness. This is mainly as each office building is barely the same, making it almost impossible to control all the varying characteristics, even when applying the most comprehensive sets of variables (Fuerst and McAllister, 2011b).

Nevertheless, Yoshida and Sugiura (2010) ascertain that the research methodologies adopted in previous studies are not satisfactory. This is partially due to the inherent limited capability of the widely-used first-generation multivariate method of regression analysis. In contrast, the second-generation multivariate method of PLS-SEM allows investigation on the complex interrelationship among underlying constructs and their measurement items (Hair *et al.*, 2017b). As such, adopting the PLS-SEM method in this research allows the researcher to determine if and to what extent tenants' leasing motivators, their decisions about the greenness of office buildings and rental are related to each other, while achieving higher reliability and validity of research findings (see Section 6.4). In fact, PLS-SEM is still a relatively new method in real estate research, and thus its implementation here can also demonstrate its applicability in future real estate research.

1.9.3 Practical significance

The practical significance of this research is related to the quantification of tenants' leasing motivators. Understanding the key leasing motivators of office tenants and their impact on the tenants' leasing decisions and rental can enable the development of better-targeted strategies for landlords who need to understand the importance of the determinants of rental. For example, the results of this research may inform which aspects of office buildings are being considered to be more important for organisations with a different strategic focus and thus, help them in their investment decision making.

Moreover, the research findings may also inform government agencies about the effect of market conditions and regulatory implementations on tenants' leasing decisions about the greenness of office buildings. This allows government agencies to understand if their regulatory goals have been achieved or not and, as a result, adaptive actions can be undertaken to foster the greenness of the Australian real estate sector.

1.10 Thesis structure

The remaining chapters of this thesis are structured as follows:

Chapter 2 contains a literature review on studies discussing the relationship between sustainable development, the greenness of office buildings, green building and green building certifications. This is followed by discussions about values of greenness and their impact on rental, and thereafter, an identification of the knowledge gap.

Chapter 3 presents the theoretical framework of this research. The underpinning behavioural theories of this research are discussed, followed by their integration, in order to develop a conceptual framework. Operationalisation of relevant measurement items is also discussed. These lead to the presentation of the research hypotheses, which are devised to test relationships among tenants' motivators, their leasing decisions about the greenness of office buildings and rental.

Chapter 4 describes the research design and methods. Therefore, this chapter commences with discussions about research philosophy, followed by justifications for selecting a survey research design and three phases of the research process of (i) exploratory; (ii) questionnaire development; and (iii) data collection and analysis. Discussions about data sampling methods and their justifications are also provided.

Chapter 5 presents details about the methods of data analysis. This involves the justification for selecting the second-generation multivariate method of Partial Lease Square – Structural Equation Modelling (PLS-SEM) as a primary method of this research to test the research hypotheses.

Chapter 6 discusses the measurement models of this research. Results of classical and contemporary construct validation approaches are presented, followed by discussions about the identified multi-dimensional constructs explaining tenants' leasing behaviours towards their leasing decisions.

Chapter 7 explores the structural model, showing the relationships among tenants' leasing motivators and their decisions about the greenness of office buildings and rental. As such, this chapter presents evaluations on the hypothesised paths specified in the PLS path model. This chapter also investigates the results of four sets of moderating analysis to determine the effect of market and regulatory forces on tenants' leasing decisions.

Chapter 8 discusses the validation of the research findings. In doing this, expert opinions about the major research findings and their suggestions about the developed PLS path model are presented.

Finally, Chapter 9 presents a summary and conclusions of this research. Theoretical contributions of this research and practical implications of the research findings are also discussed. Limitations of this research and the directions for future research are also provided.

Chapter 2. LITERATURE REVIEW

2.1 Introduction

This chapter presents the results of the literature review, commencing with discussions about sustainable development and its relationship with green building, greenness of office buildings and the Australian green building certifications (Section 2.2). Then, Section 2.3 presents the greenness of office buildings and its value from the perspective of office building occupants consisting of organisation and employees. Section 2.4 discusses the price of the greenness of office buildings with particular attention given to rental and its determinants. Finally, the research gaps in the existing studies are presented in Section 2.5.

2.2 Sustainable development of the real estate sector

2.2.1 Sustainable development

According to the International Institute of Sustainable Development (2012), the concept of sustainable development first appeared in 1962, with the realisation an interconnection among environmental, economic and social well-being was needed. This early, but important, idea evolved rapidly over the successive decades.

The Brundtland Report *Our Common Future* (1987) states:

> *What is needed now is a new era of economic growth - growth that is forceful and at the same time socially and environmentally sustainable* (United Nations, p. 7).

The three aspects of environmental, social and economic sustainability are described as the 'triple bottom line' of sustainable development. It is increasingly important for individuals or organisations to be conscious of their actions and that they do not compromise the ability of future generation to meet their own needs (United Nations, 1987), to achieve the triple bottom line.

Table 2.1 Timeline of sustainable development (adopted and summarised from the International Institute of Sustainable Development (2012))

Year	Events	Remarks
1962	Publication of 'Silent Spring'	The interconnections among the environment, the economy and social well-being are introduced
1971	Establishment of the International Institute of Environment and Development (IIED)	Addressed needs for making economic progression while protecting biological and ecological resources, as well as the social system
1980	The release of 'World Conservation Strategy'	The term 'Sustainable Development' first appears. It suggests that the underlying problems of developments must be overcome
1987	Publication of 'Our Common Future'	Establishes the notions of sustainable development, which results in the popularisation of the term
1990	The launch of 'BREEAM'	The world's first green building certification is introduced in the UK
1998	The launch of 'NABERS'	The Australian government introduced their version of a green building certification
2000	The launch of 'LEED'	The US version of the certification for building sustainability is launched
2003	The launch of 'Green Star'	The Australian Green Star certification is launched by Green Building Council of Australia (GBCA)
2005	Empowerment of 'Kyoto Protocol'	Legally binding protocol for greenhouse gases (GHG) reduction initiated
2014	European Council Summit in Brussels	European Union (EU) leaders reach an agreement to reduce greenhouse gas emissions by 40% by 2030, compared with 1990 levels

Table 2.1 summarises the implementation of the concepts of sustainable development since the 1960s. Of relevance, the concepts of sustainable development that have been used as a basis for developing various certifications to measure the environmental impact of buildings to during design, construction and occupation stages (hereafter, green building certifications). In 1990, Building Research Establishment Environmental Assessment Method (BREEAM) was launched in the UK, followed by several different certifications, such as Leadership in Energy and Environmental Design (LEED) (US), National Australian Built Environment Rating System (NABERS) and Green Star (Australia).

BREEAM, LEED, Green Mark and Green Star are some of the internationally well-recognised certifications for office buildings; the majority of them incorporate ratings or grading systems. For example, Green Star and NABERS (both Australia) use Star ratings up to 6 Stars; LEED (US) uses a grading system of Platinum, Gold, Silver and Certified. Some of these certifications (e.g. BREEAM and LEED) also assign different weights to

reflect location specific needs such as water scarcity and pollutant levels (Kim *et al.*, 2015b).

The developments of these certifications have resulted in a diffusion of environmentally-sustainable buildings across various regions and countries (Reed *et al.*, 2011). In Australia particularly, the number of NABERS and Green Star certified office buildings has swelled, especially across the major central business districts (CBD) (Kim and Lim, 2018b). For example, Green Star certified office buildings in Australia increased by more than 100% from 2004 to mid-2015 (GBCA, n.d.), while NABERS certified office buildings more than tripled between 2010 and 2014 (Office of Environment and Heritage, n.d.). Kim and Lim's (2018b) comparative analysis of NABERS and Green Star certified office buildings shows the increase in certified office buildings is most evident in Sydney CBD, as their numbers surpass the comparable office buildings in rest of the Australian CBDs.

According to a study conducted by Dodge Data & Analytics (2016), Australia is generally considered to be a relatively mature market, compared with the world average in terms of incorporating certifications into the real estate sector. The study reports that NABERS and Green Star are already being used rigorously (see Section 2.2.4 for discussions about NABERS and Green Star). Kim *et al.* (2016b) also agree that the Australian office market is currently moving towards a stage of maturity, given the negative incremental trend of NABERS certified office buildings under the Commercial Building Disclosure program across the top three CBDs of Sydney CBD, Melbourne CBD and Brisbane CBD during 2011-2015 (Figure 2.1). This is further supported by the positive growth trend of NABERS 5 Stars or above certified office buildings across these three CBDs, whereas 4 and 4.5 Stars certified buildings are the opposite (Figure 2.2).
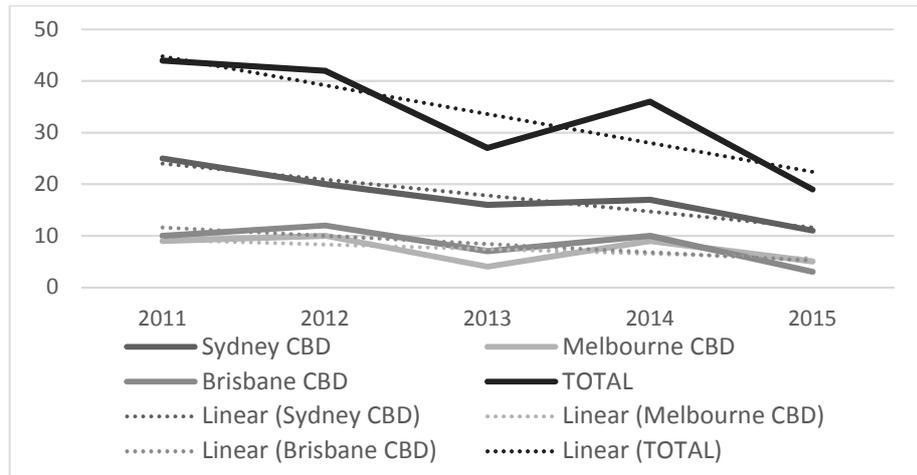
Figure 2.1 Increment trend of certified office buildings by the Australian CBDs
(adopted from Kim et al. (2016b))
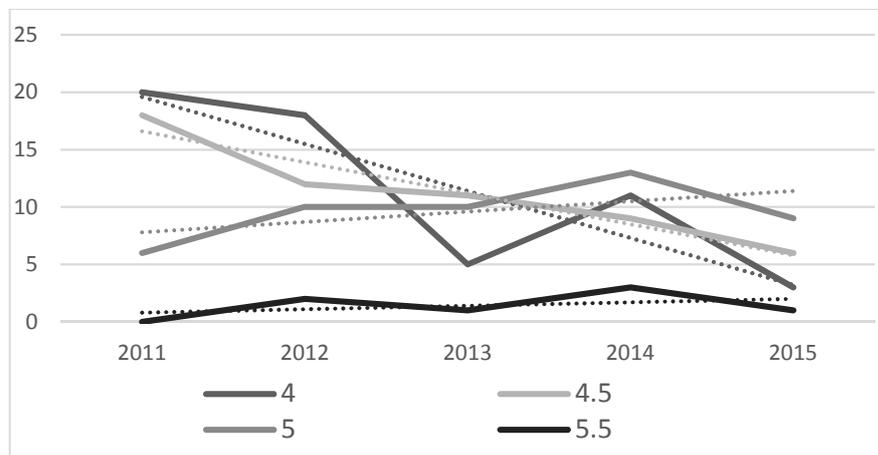
Figure 2.2 Incremental trend of certified office buildings by a number of stars
(adopted from Kim et al. (2016b))

2.2.2   Concept of green building

In response to the increasing interest in the environmental sustainability aspect of buildings, the concept of 'green building' is now widespread across the real estate sector, which accounts for the biggest contributor of world's greenhouse gas (GHG) emissions (Eichholtz *et al.*, 2013; Wu and Low, 2010). According to Darko and Chan (2016), the concept of green building has gained rapid popularity since 2000, as only one related publication was found in the 1990s; however, sixty publications were found during the period of 2000 to 2015.

Despite the increasing popularity of the concept 'green building' in the last two decades, there is no single, consensual definition of the term, as reflected by several definitions in Table 2.2. Previous studies use, for example, the concept of 'green building' as a synonym

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(often without any real attempt at definition (Sayce *et al.*, 2010)) of: 'sustainable building' (Haapio and Viitaniemi, 2008); 'energy-efficient building' (Department of Business and Innovation, n.d.); 'zero energy building' (Ban *et al.*, 2011); 'net-zero energy building' (Wang *et al.*, 2016); 'environmentally (or eco-) friendly building' (US EPA, n.d.); 'high performance building' (US EPA, n.d.); buildings with green design (Wiley *et al.*, 2010); and buildings built with Environmentally (or Ecologically) Sustainable Design (ESD) (Leaman *et al.*, 2007).

Table 2.2 Some definitions of Green Building

Definition	Reference
Green building "takes an intelligent approach to energy", "safeguards our water resources", "minimise waste and maximise reuse", "promote health and well-being", "keeps our landscape green", "creates resilient and flexible structures", "connects us", and "consider all stages of a building's life-cycle"	WGBC (n.d.)
The practice of creating structure and using a process that environmentally responsible and resource efficient throughout a building's lifecycle. The practice of increasing efficiency… and protecting and restoring human health and the environment, throughout the building life-cycle	US EPA (n.d.)
Planning, design, construction, and operations of buildings with several central, foremost considerations: energy use, water use, indoor environmental quality, material section and the building's effects on its site	Kriss and Jacob (2014)
Green building incorporates design, construction and operational practices that significantly reduce or eliminate its negative impact on the environment and its occupants. Building green is an opportunity to use resources efficiently … Green building can also significantly reduce construction and performance costs	WGBC (n.d.)
Green building (also known as green construction or sustainable building) refers to a physical structure that uses a design and planning process that is environmentally responsible and resource-efficient	WWF Australia (n.d.)
Healthy facilities designed and built in a resource efficient manner, using ecologically based principles	Kibert (2012, p. 8)
Buildings with superior environmental performance	Yoshida and Sugiura (2010)
A construction project that is either certified under any recognised global green rating system or built to qualify for certification	Mcgraw Hill Construction and United Technologies (2013, p. 5)

The lack of a clear definition of the concept of green building is a challenge to its promotion and implementation (Zuo and Zhao, 2014). As such, Kim and Lim (2018a) believe that buildings that achieve above average performance are defined as 'green buildings'. Adopting their definition, this research uses the term 'green building' to

indicate buildings that show higher levels of greenness, as represented by relevant green building certifications. As such, detailed discussions about the term 'greenness' follow.

2.2.3   Greenness of office buildings

Hitherto, various studies document the implementation and operationalisation of the term 'greenness' in different contexts. Of these, Yoshida and Sugiura (2010) use the term 'greenness' by incorporating the level of Tokyo Green Labeling System for Condominiums (TGLSC) in their study on the impact of the 'greenness' on condominium prices. This aligns with Eichholtz *et al.* (2012) who investigate the impact of the 'greenness' on the performance of office, industrial, retail and residential real estate investment trusts (REITs) using the ratings of US LEED and Energy Star certifications. Further, Monfared and Sharples (2011) and Burnett (2007) also operationalise the term 'greenness' in their study of various certifications in respective regions.

The rating criteria and their weightings adopted by some of the internationally recognised green building certifications for office buildings further reveal definitions of the term 'greenness'. It is clear in Table 2.3 that three internationally recognised green building certifications used across multiple nations (e.g. LEED for US and Canada, Green Star for Australia and New Zealand) emphasise the environmental sustainability of office buildings, as it is reflected by more than 50% of the total credits given to energy, water, materials usage and emissions for all three certifications (marked as asterisks[*]). Of these, substantial emphasis is on electricity usage as it is recorded as the top weighting for all three certifications ranging from 19% to 30% of the overall available credits. This is similar to NABERS having designated certifications measuring the performance of energy and water efficiency of several different types of buildings – i.e. NABERS Energy and Water tools for offices, shopping centres and hotels (see Section 2.2.4). For building tenants, this implies that green building certifications can help them to search for, buy and/or lease more environmentally sustainable office buildings characterised by, for example, better energy efficiency (Department of the Environment and Energy, n.d.b).

Table 2.3 Weightings of three different green building certifications

Green Star – Design & As Built		BREEAM EU – New Builds		LEED v4 – Building Design & Construction	
Category	*%*	*Category*	*%*	*Category*	*%*
Energy*	20%	Energy*	19%	Energy & Atmosphere*	30%
Indoor Environmental quality (IEQ)	15%	Health & Well-being	15%	Indoor Environmental quality (IEQ)	14.5%
Materials*	13%	Materials*	12.5%	Location & Transport	14.5%
Management	13%	Management	12%	Materials & Resources*	12%
Water*	11%	Pollution*	10%	Water Efficiency*	10%
Innovation	9%	Land Use & Ecology*	10%	Sustainable Sites*	9%
Transport	9%	Waste*	7.5%	Innovation	5%
Land Use & Ecology*	5%	Transport	8%	Regional Priority	4%
Emissions*	5%	Water*	6%	Integrated Process	1%
Total:	**100%**	**Total:**	**100%**	**Total:**	**100%**

As per the above discussion, this research defines and operationalises the term 'greenness' as describing the environmental performance of office buildings measured by the ratings (or grades) of the relevant green building certifications. Accordingly, discussions about the Australian green building certifications follow.

2.2.4 Green building certifications in Australia

Table 2.4 shows the overview of the two nationally-used Australian green building certifications for office buildings, Green Star and NABERS. As with many other certifications, these two provide information about the greenness of office buildings with a special focus on the building's environmental performance (Wilkinson, 2018). According to the rating descriptions, only 4 Stars or above can be defined as 'above the average' in both certifications and, therefore, reflect the status as 'green building'. This tends to support Zalejska-Jonsson (2013) that the main underlying principle of green building certification is to ensure that buildings' environmental impacts must be assessed according to specific standards for them to be labelled 'green'.

Table 2.4 Rating descriptions for Australian Green Star and NABERS[1] (adopted from Kim et al. (2016b))

	Green Star	**NABERS**
Ratings	*Description*	*Description*
6 Stars	World Leadership	Market leading performance
5 Stars	Australian Excellence	Excellent performance
4 Stars	Best Practice	Good performance
3 Stars		Average performance
2 Stars	Not awarded	Below average performance
1 Star		Poor performance
0 Stars	Not Applicable	Very poor performance

[1] *For NABERS Energy and Water tools for offices, shopping centres and hotels*

Green Star was launched by Green Building Council of Australia (GBCA) in 2003. Initially, Green Star focussed on building design. However, it later widened its scope to embrace a broader range of building lifecycle, from the planning stages to operations and maintenance stages. As shown in Table 2.3, the rating measures the level of the greenness of office buildings based on several criteria, including energy usage, IEQ and material usage. Based on assessments on these criteria, a star rating is given to certified office buildings from 4 Stars ('best practice') to 6 Stars ('world leadership') by 1-Star increments.

NABERS was initiated by the Australian government in 1998 and measures the level of greenness of office buildings based on their on-going operating efficiency (CitySwitch, n.d.). Similar to Green Star, this is measured based on a range of criteria (e.g. building energy and water efficiency, waste production and IEQ). Also, a star rating ranging from 0 Star ('very poor performance') to 6 Stars ('market-leading performance') is used, albeit with 0.5-Star increments.

Often, green building certifications are incorporated with various building sustainability regulations (Reed *et al.*, 2011). In Australia, NABERS is often used to measure the environmental impacts of buildings in compliance with various government regulations and programs. Table 2.5 shows some of these regulations applicable to office buildings in Australia, including Efficiency in Government Operations (EEGO) policy, National Green Leasing Policy (NGLP) and Commercial Building Disclosure program.

Table 2.5 Description of the Australian mandatory building sustainability regulations for office buildings (adopted from Kim and Lim (2018c))

	Energy Efficiency in Government Operations	National Green Leasing Policy	Commercial Building Disclosure
Effective from	2006	2010	2010
Major approach	Setting up minimum requirements	Setting up minimum requirements	Public disclosure
Major scope	Government operations (incl. substantially budget-funded agencies)	Government operations, Private sector operations	(Mainly) Private sector operations
Related program/policy	Green Lease Schedule (GLS)	Green Lease Schedule (GLS)	Building Energy Efficiency Certificate (BEEC)
Requirements & goals	The inclusion of GLS in new buildings, or new lease over two years, or major refurbishment over 2,000sqm where the government is the tenant Achievement of 4.5 Stars or above in NABERS	The inclusion of GLS in the new lease or lease renewal of offices over 2,000sqm with the lease term over two years, and where the government is the tenant Achievement of 4.5 Stars or above in NABERS	Acquisition and disclosure of BEEC containing NABERS ratings for sales or lease of offices over 2,000sqm (1,000sqm from June 2016)

EEGO was first announced in 2006 and required an annual report of energy efficiency until 2011-12 (Australian Greenhouse Office, 2007). As the name of the policy suggests, EEGO targets government occupied office buildings and requires them to commit the use of Green Lease Schedule (GLS) (Kim and Lim, 2018c). 'Green Lease' is described as behavioural and financial obligations for environmental sustainability written into lease contract (Hinnells *et al.*, 2008). Specifically, EEGO requires the inclusion of the GLS every time a new lease contract for office buildings is signed, unless exempted by the policy (e.g. new lease less than two years or under 2,000sqm). The GLS contains targeted NABERS ratings of 4.5 Stars or above; therefore better energy efficiency of government occupied office buildings can be achieved (Kim and Lim, 2018c).

NGLP is the first nationally consistent policy by the Australian federal, state and territory governments. The program aims at the greenness of their office buildings by reducing the environmental impact of buildings through improved operational efficiency (Department of the Environment and Energy, n.d.a). Similar to EEGO, NGLP requires the use of GLS,

although its scope is not limited only to government tenants, as it also encompasses private tenants across the country (Kim and Lim, 2018c).

Commercial Building Disclosure program requires: (i) most sellers and landlords of office buildings of 1,000 square metres (sqm) or more (prior to 2017, the requirement was 2,000 sqm or more) and (ii) most tenants who are sub-leasing portion of their tenancy with a net lettable area (NLA) of 1,000 sqm or more to obtain Building Energy Efficiency Certificate (BEEC), which includes NABERS ratings (Department of the Environment and Energy, n.d.b). This is done to enhance the energy efficiency of large-size office buildings while ensuring that potential buyers and tenants are informed of the greenness level of office buildings offered for sale or lease (Department of Industry, Innovation and Science). Considering its applicability to most office buildings over 1,000 sqm in Australia, the program is considered the most comprehensive building sustainability regulation, which aims at achieving higher levels of greenness for office buildings in Australia (Kim and Lim, 2018c).

In addition to the above-mentioned regulations, there is also the CitySwitch Green Office program, which encourages voluntary involvement for higher levels of greenness for office buildings. Although this initiative is not formally incorporated with any government regulations, the initiative has been established and supported by several major city councils in Australia, such as City of Sydney and City of Melbourne (CitySwitch, n.d., 2019). The initiative encourages a commitment to achieving and maintaining a higher level of greenness for office buildings (e.g. 5 Stars or above in NABERS) located in the participating council areas by the provision of incentives and benefits to its members, such as a reduction of NABERS renewal rating assessment fees (CitySwitch, n.d.).

2.3 Greenness of office buildings and its value

2.3.1 Organisations' perspective

Numerous studies document the values of the greenness for office buildings from the organisations' perspective. Suh *et al.* (2014) found reduced environmental impacts of office buildings certified by three green building certifications of up to 25%. This aligns with Kats (2003), who reports a higher level of greenness of office buildings could lead to improved energy efficiency, and therefore reduced operating costs. Newsham *et al.* (2009) and Qiu and Kahn (2019) also found a substantial energy savings of LEED and

Energy Star certified office buildings in the US up to 39% and 8%, respectively; however, the correlation between the level of greenness and the amount of energy savings is weak. Meanwhile, Scofield (2009) argues that it is difficult to confirm if LEED certifications lead to a reduction in energy consumptions. Subsequently, Scofield's (2013) analysis shows there is no difference between LEED and non-LEED certified office buildings in New York in their GHG emissions and electricity usage.

In Australia, GBCA (2013) reports that Green Star certified buildings could bring about a corresponding reduction in GHG emissions, electricity and water usage by 62% by 66%, and by 51% compared with non-certified buildings. Similarly, Thomas's (2010) study of a 5 Stars NABERS certified office building in Sydney further confirms 50% less GHG emissions, compared with the Australian industry average (represented by 2.5 Stars). On the other hand, Wang *et al.*'s (2016) comparative analysis of a 6 Stars (Green Star) in Melbourne and a 3 Stars rated (GB50387-2006) office building in Shenzen, China show that higher levels of greenness of office buildings may not always bring reduced GHG emissions. Most recently, Kim and Lim (2018c) suggest that both NABERS and Green Star have their advantages in dealing with contemporary environmental issues in Australia, such as GHG emissions and energy consumption. Their findings reveal that the value of greenness for office buildings can vary, by not only the level of greenness but also by the nature of certifications.

Dixon *et al.* (2009) suggest that the greenness of office buildings also adds values to organisations by matching their demand. In terms of organisations, several studies (Yadav *et al.*, 2016; Leonidou *et al.*, 2015; Wiley *et al.*, 2010; Eichholtz *et al.*, 2010a) note they can be benefitted by 'intangible' benefits of the greenness, such as improved marketing benefits to environmentally-conscious clients, as can be exemplified by the 'halo effect'. Moreover, it is suggested that the level of greenness of office buildings provides information on their environmental performance which generally cannot be measured by tenants and landlords (Fuerst, 2009). As such, organisations can make strategic leasing decisions based on the level of greenness of office buildings. Additionally, Levy and Peterson's (2013) study of organisations' leasing decisions shows that their decisions are collectively affected by multiple motivators, including reflection of their organisational identity through the symbolic values of the greenness, which in turn, collectively add value to their organisations.

Overall, the findings of related studies consistently highlight the value of greenness from the organisations' perspective. In particular, the possibly superior environmental performance of green buildings (e.g. reduced electricity consumptions and GHG emissions) are well-aligned with the definition of the 'greenness', implying reduced negative environmental impact (Burnett, 2007). Eventually, this allows various stakeholders, including organisations (i.e. tenants in this research), to differentiate certain buildings from others, based on their environmental performance (Blackman and Rivera, 2010). As such, the value of the greenness for employees of organisations is discussed following.

2.3.2 Employees' perspective

Besides the value of greenness from the organisations' perspective, studies also show that the greenness of office buildings also adds values to their employees. This is because of Indoor Environmental Quality (IEQ) of office buildings may impact on employees' psychological and physical well-being. According to World Green Building Council (WGBC, 2014), IEQ is related to the 'environment' which could be characterised as indoor air quality (IAQ), thermal, lighting and acoustics quality and interior layout. This, therefore, also relates to the intangible aspects of office buildings as it affects how employees perceive about the environment of their workplace (Devine and Kok, 2015; Korkmaz, 2007).

Singh *et al.* (2010) found that, while working in an office environment with superior IEQ, employees tend to be more productive and more satisfied. Abbaszadeh *et al.*'s (2006) analysis of occupants' satisfaction with IEQ in green buildings also shows that employees are generally more satisfied with the thermal and IAQ of their 'green workplace' although the contradictory result is reported for lighting and acoustic quality. The findings are further supported by Hwang and Kim (2011), who investigated the effects of IEQ of a green building on occupants' psychological and physical well-being and found a significant role of daylighting on employees' psychological well-being and productivity. However, their study also found the poor quality of indoor lighting and visual environment despite the highest level of greenness achieved by the office building accredited by the Korean Green Building Council (KGBC). More recently, Thatcher and Milner (2016, 2014) found that employees' productivity level and physical well-being are very likely to improve with higher levels of greenness of an office building. However, their results reveal no significant improvement in psychological well-being.

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Similarly, in Australia, Thomas (2010) projects the values of green buildings towards contributing to employees' psychological well-being towards their workplace. Kato *et al.*'s (2009) study of Green Star and NABERS certified office buildings had shown that employees working at green buildings tend to have a greater sense of satisfaction and attachment towards their workplace. However, they found that there was a negligible association between employees' health and productivity, and thus implying deficiency of value of 'green workplace' not meeting the expectations of employees. Another study (Armitage *et al.*, 2011) on Green Star certified office buildings also reveals a higher level of satisfaction towards the green workplace among employees at management level but relatively lower satisfaction level among other employees. This, therefore, implies that there may be a discrepancy in the value of the greenness among employees based on their position and roles in their organisation.

From the review above, it appears that there is a general consensus that the greenness for office buildings may add value to employees as a 'green workplace'. More often than not, higher levels of greenness of office buildings come with a price for organisations who want to purchase or lease office spaces in green buildings. As such, the next section discusses the prices of the greenness of office buildings.

2.4   Greenness of office buildings and its price

2.4.1   Impact of the greenness on office rental

The greenness of office buildings could also the interests of organisations (e.g. corporates) not only because of the aforementioned values (e.g. lower electricity consumptions, improved employees' well-being) but also because it determines the price for purchasing an office building and leasing office spaces. Hitherto, considerable amount research has documented the relationship between the greenness level and sales prices and rental of office buildings being certified by green building certifications (e.g. LEED, BREEAM, Green Star and NABERS) in the creation of sales and rental premium.

Table 2.6 summarises a list of relevant studies and those variables adopted. At present, it appears that most studies presented in Table 2.6 have focused on both sales and rental premium of green and non-office buildings, and found the significant and positive impact of the greenness of office buildings on them. However, the review below will mainly focus on the rental as it is known that the office market in Australia is mainly driven by tenants who tend to lease office spaces (CPS Property, 2016; Newell *et al.*, 2011).

Nelson (2007) is one of the early studies that addressed the relationship between the greenness level and rental of office buildings in the US. The study found that the average rental for LEED-certified Class A buildings is \$39 per ft^2 whilst non-certified Class A office buildings commanded only \$29 per ft^2. Despite this, it appears that little is known about what the key determinants towards driving the rental premium.

Subsequently, a considerable amount of studies have considered other variables representing the greenness level of office buildings and investigated their impact on rental. Among those studies, many have adopted the multiple regression-based hedonic pricing models (HPM) to identify determinants of the rental based on the neo-classical economics paradigm (see Section 3.2.1) while controlling variables possibly impacting on the relationship between the greenness of office buildings and rental. These 'control variables' (CV) are controlled in these studies due to their expected substantial effects as a determinant of rental (or sales prices).

As shown in Table 2.6, the positive relationship between the greenness level and rental of office buildings are established after controlling effects of control variables in studies conducted in the US (Robinson and Sanderford, 2016; Eichholtz *et al.*, 2013; Wiley *et al.*, 2010; Pivo and Fisher, 2010); UK (Chegut *et al.*, 2014; Chegut *et al.*, 2011; Fuerst and McAllister, 2011c); the Netherlands (Kok and Jennen, 2012); and Australia (Newell *et al.*, 2011). For instance, Fuerst's (2009) analysis of LEED and Energy Star certified Class A office buildings in the US, during 2005-2010, had shown there is a positive relationship between the greenness of office buildings and higher rental, along with lower vacancy rates and longer occupancy periods. This positive relationship is also showcased in other studies. Eichholtz *et al.* (2013, 2010a) show that the level of greenness represented by LEED and Energy Star (US) has a positive significant impact on rental. Similarly, Wiley *et al.* (2010) suggest that LEED and Energy Star certified office buildings tend to command higher rental over non-certified buildings and thus, shows the significant relationship between the level of greenness and rental. Their findings tend to agree with the findings of Fuerst and McAllister (2011b), Das *et al.* (2011) and Robinson and Sanderford (2016) which all pointing that the greenness of office buildings can bring out a rental in the US context. Chegut *et al.*'s (2011) study on BREEAM certified office buildings in the UK also supports the positive significant relationships between greenness level of office buildings and rental by showing higher rental of certified office buildings up to 21%. The results of these studies are further fortified by Mudgal *et al.* (2013) which

confirms the existence of the positive and significant relationship in at least eight cities and regions across European countries. On the other hand, Fuerst and McAllister's (2011c) study on the UK office market found that there is no evidence to support the relationships between the greenness of office buildings and rental.

In Australia, Newell *et al.*'s (2011) analysis of NABERS and Green Star certified office buildings in Sydney CBD office market had shown higher rental for NABERS 4 Stars or above certified buildings up to 3% and therefore, indicates the positive significant relationships between the greenness of office buildings. This trend is somehow contradictory to Gabe and Rehm's (2014) findings that building quality and location are the key significant driver of rental of office buildings but not NABERS certification.

From the review, it appears that the majority of studies agree there is a positive significant relationship between greenness of office buildings, characterised by ratings (or grades) of respective green building certifications, and rental. However, there are some studies, including an Australian study (Gabe and Rehm, 2014) claiming that the relationship between these two is rather 'elusive'. As such, further investigation is required to identify determinant of office rental other than the level of greenness.

Table 2.6 Studies about the relationship between the greenness of office building and its value for tenants (e.g. rental)

Reference	*Sample profiles*	*Major analytical methods*	*Variables*	*Major findings*	*Notes*
Robinson and Sanderford (2016)	Country-wise, US	Regression analysis, Propensity Score Matching (PSM) technique, Non-parametric tests	• IV: Office buildings with Energy Star and/or LEED certifications • CV: Building quality, Location, Lease contract features, Building greenness • DV: Rental and sales prices	1. A significant relationship between the greenness of office buildings and rental and sales prices is found 2. An association between the greenness of office buildings and building quality is noted	
Gabe and Rehm (2014)	Sydney, Australia	Regression analysis	• IV: Office buildings with NABERS certifications • CV: Building quality, Lease term, Location • DV: Rental prices	No significant positive relationship between the greenness of office buildings and rental is found	Possible impacts of social responsibility signals and other qualitative benefits on rental are highlighted
Chegut *et al.* (2014)	London. UK	Regression analysis, PSM, Non-parametric tests	• IV: Office buildings with BREEAM certification • CV: Building quality, Lease contract features, Market competition, Investor type, Location, Market supply • DV: Rental and sales prices	1. A significant relationship between the greenness of office buildings and rental and sales prices is found 2. Positive determinants for rental include a number of storeys, less building age, building quality, lease term and rent-free period 3. The 'gentrification' effect is found	A 500m radius is used to determine nearby office buildings with green building certifications at a time of the transaction
Eichholtz *et al.* (2013)	Country-wise, US	Regression analysis, PSM	• IV: Office buildings with Energy Star and/or LEED certifications in 2007 and 2009	1. A significant relationship between the greenness of office buildings and rental and sales prices is found	1. Time-varying rental of office buildings is noted 2. A one-quarter mile (approx. 400m) is

					used as a benchmark when identifying nearby office buildings with green building certifications 3. It is noted that tenants prefer incurring utility costs separately when leasing their office buildings
			• CV: Economic characteristics, Building quality, Location, Lease contract features, Building greenness • DV: Rental (contract rent, effective rents) and sales prices	2. The economic downturn does not significantly impact on tenants' demand towards the greenness – this is similar to their previous study (Eichholtz *et al.*, 2010b) although inconsistent with Reichardt *et al.* (2012) 3. Positive rental and determinants include building size, quality, age, height, green building ratings, dual certification, and site energy usage and costs	
Kok and Jennen (2012)	Country-wise, Netherlands	Regression analysis, Walk Score algorithm	• IV: Office buildings with EU energy performance certificate (EPC) level between A-C & D-G • CV: Location, Building quality, Contract feature, Building greenness, Time of a transaction, Brokerage • DV: Rental price, Rental growth	1. A significant relationship between the greenness of office buildings and rental and sales prices is found 2. An association between the greenness of office buildings and building quality is noted 3. Identified rental determinants include distance to the train station, 'walkability' of offices (location of offices relative to nearby amenities) and building energy efficiency	1. Location effects (density) is controlled using zip-codes 2. The region-specific 'Amsterdam effects' is noted to address its distinctive locational characteristics
Reichardt *et al.* (2012)	Ten largest metropolitan areas, US	Regression analysis	• IV: Energy Star and/or LEED certified office buildings • CV: Building quality, Market condition, Location, Temporal data	1. A significant positive relationship between the greenness of office buildings and rental is found	1. An association between the greenness of office buildings and building quality is noted

			• DV: Rental price (Gross), Occupancy rates	2. Positive rental determinants include building renovation, the time elapsed since certification (only for Energy Star buildings) and occupancy rates (for Energy Star buildings) 3. Negative rental determinants include vintage of the certification and economic downturns	2. This study highlights the intangible aspects of the greenness such as reputation increase for tenants which may contribute to rental
Das *et al.* (2011)	San Francesco o, Washingt on DC, U.S	Regression analysis	• IV: LEED-certified office buildings • CV: Building quality, Temporal data, Market condition, Location, • DV: Rental price (gross, quarterly)	1. Significant relationships between the greenness of office buildings and rental and sales prices are found while showing counter-cyclical trends (i.e. positive and significant in down-markets, but reduced significantly in up-markets) 2. Positive rental determinants include leasing activity and vacant area	
Chegut *et al.* (2011)	London, UK	Regression analysis, Non-parametric comparisons, PSM, Kernel density estimators	• IV: BREEAM certified office buildings • CV: Building quality, Lease contract features, Green building supply, Investor type, Location • DV: Rental price, Sales price	1. A significant positive relationship between the greenness of office buildings and rental is found 2. Positive rental determinants include buildings' green characteristics and rent free-periods	1. An association between the greenness of office buildings and building quality is noted 2. A 500m radius is used to determine the market competition

				3. Negative rental determinants include third-party control for building quality, lease contract features and competition in a micro-location	within a micro-location
Fuerst and McAllister (2011a)	Country-wise, US	Regression analysis	• IV: Energy Star and/or LEED certified office buildings • CV: Building quality, Building sustainability, Location, Market condition, Tenancy type, Lease contract features • DV: Rental price, Sales price, the Occupancy rate	1. A significant positive relationship between the greenness of office buildings and rental is found 2. An association between the greenness of office buildings and building quality is noted 3. Positive rental determinants include recent renovation, the presence of a fitness centre, proximity to a train station and banking facilities, number of storeys and dual certification	An 800m radius is used to control proximity to nearby amenities and other services
Fuerst and McAllister (2011b)	Country-wise, US	Regression analysis	• IV: Office buildings with LEED and/or Energy Star certifications • CV: Building quality, Building greenness, Location, Lease contract features, Market condition • DV: Rental price, Sales price	1. A significant positive relationship between the greenness of office buildings and rental is found 2. Positive rental determinants include building height 3. Negative rental determinants include size, age and triple net lease 4. The higher rental is not always correlated with the higher level of LEED ratings	Longitude and latitude are adopted to capture any large-scale spatial distribution of certified office buildings across the country

Fuerst and McAllister (2011c)	Country-wise, UK	Regression analysis	• IV: Commercial buildings (incl. retail, office and industrial) with EPC (i.e. BREEAM) • CV: Building quality, Lease contract features, Building greenness, Market condition, Location • DV: Rental price, Sales price, Yield	1. No significant positive relationship between the greenness of office buildings and rental is found 2. Statistically significant differences are only found in property yield	
Newell *et al.* (2011)	Sydney & Canberra, Australia	Regression analysis, Correlation analysis	• IV: Office buildings with NABERS and/or Green Star • CV: Building quality, Location • DV: Rental price (gross), Sales price, Outgoing, Yield, Occupancy rate, Incentives	1. A significant positive relationship between the greenness of office buildings and rental is found 2. In Sydney CBD office market, the significant positive relationship is evident only for 5 Stars NABERS buildings	The number of controlled variables adopted in this study is relatively small
Pivo and Fisher (2010)	Country-wise, US	Regression analysis	• IV: Offices with RPI (Responsible Property Investment) features • CV: Building quality, Cost of government services (i.e. tax rates), Market condition, Regional economy, Location • DV: Rental price, Sales price, Occupancy rate, Net operating income, Cap rate, Capital return, Total return, Total expenses	A significant positive relationship between the greenness of office buildings and rental is found	A ½ mile (approx. 800m) radius is used to determine the 'transit-oriented' properties
Wiley *et al.* (2010)	Country-wise, US	Regression analysis	• IV: Energy efficient design on a commercial building (Class A office building) with Energy Star and/or LEED label • CV: Building quality, Lease contract features, Occupancy, Temporal data	A significant positive relationship between the greenness of office buildings and rental is found	

			• DV: Rental price, Sales price, Occupancy rate		
Eichholtz *et al.* (2010a)	Country-wise, US	Regression analysis, PSM	• IV: Office buildings with Energy Star and/or LEED certification • CV: Building quality, Regional economy, Lease contract features, Location, Thermal and energy efficiency • DV: Rental price, Sales price	1. A significant positive relationship between the greenness of office buildings and rental is found 2. The significant relationships between the greenness of office buildings and rental are more evident in smaller markets and regions in more peripheral parts of large metropolitan areas 3. Energy efficiency is found as a positive determinant of rental whilst the role of the intangible aspects of office buildings is also noted	1. Corporate Social Responsibility (CSR) is noted as a part of sustainability efforts. This is later supported by Loosemore and Lim (2016) and Rizer (2013) 2. A ¼ mile radius (approx. 400m) is used to control locational effects
Eichholtz *et al.* (2010b)	Country-wise, US	Regression analysis, PSM	• IV: Office buildings with Energy Star and/or LEED certification • CV: Building quality, Location, Building greenness, Lease contract features, Temporal data, Market condition, Regional economy • DV: Rental price, Sales price	1. A significant positive relationship between the greenness of office buildings and rental is found 2. Positive rental determinants include certification score 3. The economic downturn does not significantly impact on green office building supply	This study considers logarithmic changes in rental throughout the different timeframe
Dermisi (2009)	Country-wise, US	Regression analysis, Spatial Weight Matrix	• IV: Office buildings with Energy Star and/or LEED certification	A significant positive relationship between the greenness of office buildings and rental is found	

		(using Euclidean distance)	• CV: Building quality, Location, Building tenancy and ownership, Building greenness, Spatial data • DV: Assess value (AV), Market Value (MV)		
Miller *et al.* (2008)	U.S (LA, NYC, Washington DC, San Francisco)	Regression analysis, t-statistics	• IV: Office buildings with Energy Star and LEED certifications • CV: Building quality, Location, Temporal data • DV: Sales price	A significant positive relationship between the greenness of office buildings and rental is found	
Nelson (2007)	U.S	Basic comparison	• IV: Office buildings with LEED and/or Energy Star certifications • CV: Building class • DV: Rental price, Sales price, Occupancy rate, Vacancy period	A significant positive relationship between the greenness of office buildings and rental is found	

2.4.2   Variables related to office rental

As summarised in Table 2.6 (and briefly noted in Section 2.4.1), the majority of the previous studies (Robinson and Sanderford, 2016; Chegut *et al.*, 2011; Pivo and Fisher, 2010) acknowledge the significant and positive relationships between the level of the greenness and rental, after controlling several control variables (CV), using hedonic pricing model (HPM) and other supplementary methods such as Propensity Score Matching (PSM) techniques.

According to Spector and Brannick (2011), control variables are defined as variables that are assumed to produce distortions in relationships being tested. As such, control variables in this research indicate their significant effects on rental. For example, it is known that office locations determine rental, and therefore, can be treated as a control variable to clearly distinguish the impact of the greenness of office buildings on rental. In an attempt to control differences in office building characteristics which are often barely the same, many authors adopt the control variable in their studies. Figure 2.3 shows the frequency count of those control variable identified in relevant studies including those presented in Table 2.6.
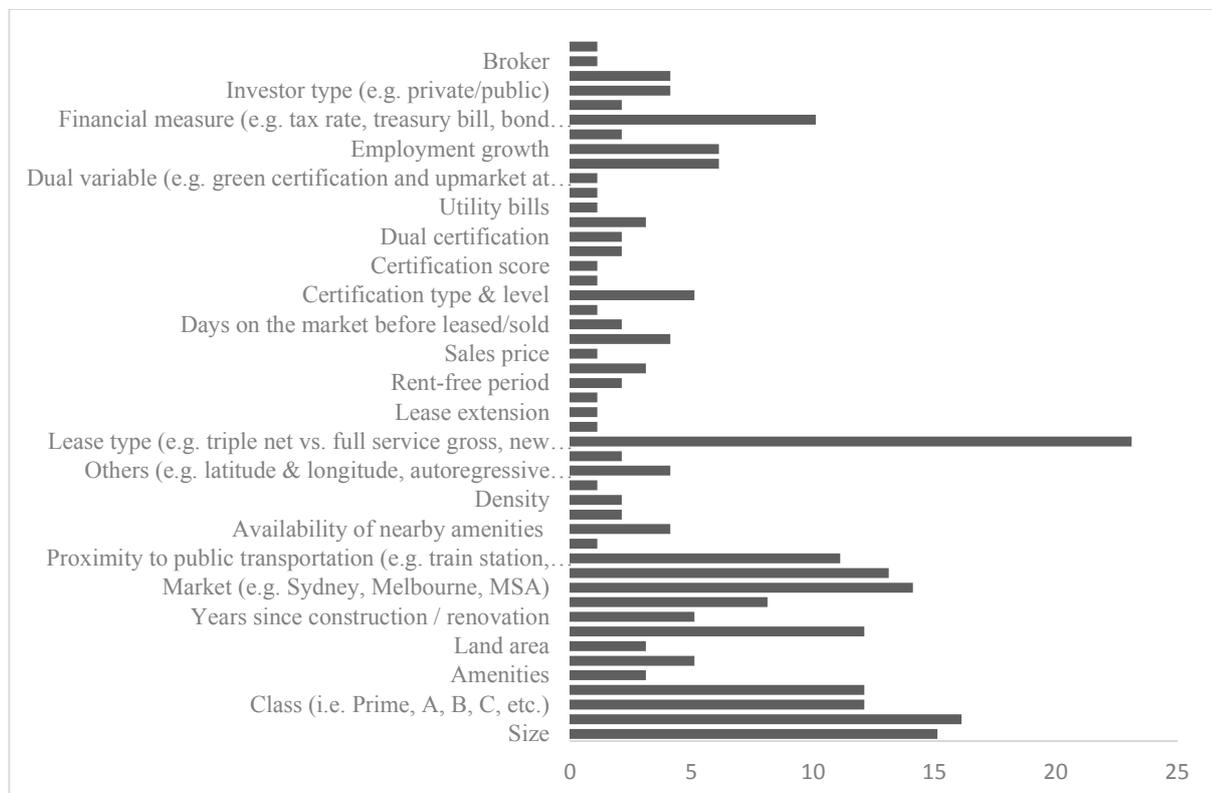
Figure 2.3 Control variables in previous studies about the relationship between the greenness of office buildings and rental

Most notably, a significant number of studies controlled the effects of lease contract features while giving high emphasis to lease contract types. For example, Wiley *et al.* (2010) used 10 different lease types for precise control of their impacts on rental of LEED and Energy Star certified office buildings. This is highly connected with the electricity consumption as its charges (which can be reflected in rental) can be significantly differed by the lease types (Kahn *et al.*, 2013). As such, it appears reasonable to control lease contract features in their impact on office rental.

Next, Figure 2.3 shows that studies (e.g. Robinson and Sanderford, 2016; Chegut *et al.*, 2014; Fuerst and McAllister, 2009a) adopt building size, height and age as the control variable. According to Ho *et al.* (2005), Powe *et al.* (1995) and Glascock *et al.* (1990), higher quality office buildings often command higher rental over lower quality but otherwise similar buildings (e.g. Premium and B grade office buildings in adjacent locations). Kim and Lim (2018a), Reichardt (2016) and Fuerst and McAllister (2011a) point to the positive correlation between the greenness level of office buildings and building quality. For example, NABERS 5 or 6 Stars certified Stars office buildings are more likely to have larger NLA and provide better amenities for their occupants, compared with NABERS 2 or 3 Stars counterpart. For ease of analysis, studies often treated many of location-specific variables as dummy variables. For instance, Eichholtz *et al.* (2010b) and Dermisi (2009) coded building classes (i.e. Class A, Class B) as dummy variables when exploring their impact on the relationship between the greenness of office buildings and rental.

Figure 2.3 also shows that building location in terms of proximity to public transportation is one of the commonly used control variables in previous studies. For example, Gabe and Rehm (2014), Chegut *et al.* (2014) and Kok and Jennen (2012) adopt access to the train station to control the locational effects; Kok and Jennen (2012) use proximity to highways as a mean of the location-related variable. In fact, controlling the locational effect is essential in many real estate studies considering their significant contribution to rental (see Kok and Jennen, 2012). For instance, Braun and Bienert (2015) found that office buildings with a higher level of greenness, are typically located in prime locations occupied by tenants from finance, insurance and real estate (FIRE) sectors. Further, Kok and Jennen (2012) ascertain that location is the most important determinant of rental. In other studies, Kok and Kahn (2012), Chegut *et al.*

(2011) and Fuerst (2009) have used a postcode, radius, and latitude and longitude for (i) precise control of the locational effects; and (ii) sampling purposes.

Additionally, Figure 2.3 further reveals that market condition is treated as another commonly used control variable. For example, Das *et al.* (2011) highlight the moderating effect of the US real estate market condition on the overall relationship between the greenness level and rental of office buildings and point to the difference in the rental of buildings with different energy efficiency ratings. Meanwhile, Chegut *et al.* (2011) show that the relationship between BREEAM certification and the rental is diminished when there is a supply of similar buildings within a micro-location. This finding is later confirmed by Chegut *et al.* (2014) who noticed the 'gentrification' effects of green buildings (i.e. buildings with higher levels of greenness. See Section 2.2.2); the study also found that the expanding supply of green buildings increased the overall rental in the respective market, whereas later entrants of the market did not have the same amount of premium as the earlier adopters. This is consistent with Dermisi (2014) that green buildings tend to be more closely located to each other than other buildings thus, indicating possible proximity pressure.

From the review, it is concluded that studies have commonly used four control variables: (i) lease contract features; (ii) building quality; (iii) location; and (iv) market conditions. The frequent appearance of these control variables in previous studies implies the potentially significant impacts of these variables in this research context. Moreover, it identified knowledge gaps in previous studies.

2.5 Gaps in knowledge of the relationship between the greenness of office buildings and rental

2.5.1 Limited studies conducted in the Australian real estate context

The review of the literature reveals that only a limited number of studies conducted in the Australian context, particularly in regard to the relationships between the greenness of office buildings and rental. It appears that only Gabe and Rehm (2014) and Newell *et al.* (2011) empirically examine the relationships between the greenness office buildings and rental compared with the relatively large number of studies conducted in the US and European contexts. Moreover, it seems that the findings of these two studies are contradictory to each other even though both studies share some common characteristics such as the selection of

Sydney CBD as a geographical scope usage of NABERS to determine the level of greenness of office buildings.

The limited number of studies conducted in Australia and the inconsistency in the results of Gabe and Rehm's (2014) and Newell *et al.*'s (2011) studies make it difficult to discern if there is a significant positive relationship between the greenness of the Australian office buildings and their rental. Moreover, it limits whether there are any Australian specific rental determinants that must be adopted to as a determinant of rental (e.g. as it was acknowledged as the 'Amsterdam-effect' in Kok and Jennen's (2012) study focusing on the Netherland real estate market). This thus shows the limited studies about the greenness of office buildings and rental in the Australian context.

2.5.2 Limited investigation on the intangible aspects of office buildings on rental

Further, it appears that little or no empirical study investigates the impact of the intangible aspects of office buildings on rental. According to Reichardt *et al.* (2012), tenants of office buildings may benefit from the intangible aspects of the greenness although its impact on rental may be hard to quantify. This tends to add weight to Eichholtz *et al.*'s (2010a) conclusions that not only energy efficiency but some other intangible aspects may play a critical role in driving the rental for different levels of greenness for office buildings. Indeed, Ledgerwood *et al.* (2007) and Wiley *et al.* (2010) also suggest that consideration of not only the tangible, but also the intangible aspects of buildings would be a better indication of prices.

Nonetheless, previous studies investigating the relationship between the greenness of office buildings and rental pay particular attention to the role of the tangible aspects of office buildings. Specifically, as shown in Section 2.4.2, variables adopted by these studies are mostly limited to those related to lease contract features, building quality, location and market conditions. As a result, little is known about if and to what extent office rental can be collectively affected by both tangible and intangible aspects of office buildings. This thus unearths a gap in understanding rental determinants related to the intangible aspects of office buildings.

2.5.3 Lack of investigations on the impact of tenants' leasing behaviours on rental

The review of literature also reveals there is a lack of considerations of the relationships between tenants' leasing behaviours and rental. In particular, there are limited studies on tenants' leasing behaviours shaped by their organisational identity and expectations, and their decisions about the level of greenness of office buildings which may, in turn, affect rental. As discussed

in Section 2.4, determinants of office rental are mostly understood as the result of the tangible aspects of office buildings (including lease contract features, building quality, location, market conditions). Nonetheless, studies on the greenness of office buildings and occupants (see Section 2.3) shows that the effects of tenants' leasing behaviours may be also considered when studying determinants about office rental. For instance, Jang *et al.* (2018), Levy and Peterson (2013) and Van de Wetering and Wyatt (2011) suggest that some tenants, such as large-sized organisations or those promoting eco-friendliness as their core value, are likely to consider the level of greenness of their office buildings importantly as this can effectively reflect their organisational identity. Similarly, it can be also assumed that organisations with people-focused corporate culture are likely to put emphasise high levels of greenness of office buildings, in considering of their benefits to the employees (e.g. better psychological well-being), which may, in turn, make them pay a higher rental (as discussed in Section 2.3.2).

Nonetheless, it appears that the relationships between tenants' leasing behaviours and rental is rather unclear. This may be also partly attributed to the limited considerations given to the intangible aspects of office buildings as only the 'quantifiable' tangible aspects of office buildings are considered in previous studies (as highlighted in Section 2.4.2). As such, another gap in knowledge is a lack of investigation on the impact of tenants' leasing motivators and decisions about the greenness of office buildings on rental.

2.5.4 Limited empirical investigations on the effects of the market and regulatory forces on tenants' leasing decisions

Next, it appears that limited attention has given to examining the moderating effects of various market forces on tenants' leasing decisions. Although the review of the literature shows the possibly significant impact on market conditions on rental (as highlighted in Section 2.4.2), its impact on tenants' leasing decisions about the greenness of office buildings is fully explored. According to Levy and Peterson (2013), tenants' office leasing decisions can be driven by not only locational or building-specific factors, but also by other factors such as availability of suitable stocks in the market, pressures from the overseas-based headquarters and possibly mandatory regulations imposed by the government. Chegut *et al.* (2014) also note that the greenness of office buildings in the UK can be driven by tenants' demand as well as the regulatory environment. Australia may not an exception to this as most office buildings over 1,000sqm are subject to the mandatory disclosure of their greenness level (see Section 2.2.4).

In fact, a survey findings of Dodge Data & Analytics' report (2016) reveals the increasing importance of regulations as a driver for decisions towards the greenness of office buildings.

Despite the importance of market and regulatory forces towards the greenness of office buildings, it appears that limited empirical investigation has been done to understand their effects on tenants' leasing decisions. This, therefore, suggests another gap in understanding the effects of the currently existing market forces and implemented government regulations on tenants' leasing decisions.

2.6   Summary

This chapter discusses the concepts of sustainable development and green building, and how they are related to the level of greenness for office buildings. In Australia, NABERS and Green Star are two major green building certifications showing the level of greenness of office buildings. Of these, NABERS is often incorporated with the government's building sustainability regulations such as the commercial building disclosure program.

In general, the review of the literature shows that the greenness of office buildings can provide values to occupants such as better IEQ for employees and marketing benefits to organisations. It is also found there is a cost involved for the higher levels of greenness. Specifically, the significant and positive relationships between the greenness of office buildings and rental are mostly determined by lease contract features, building quality, location and market conditions.

The review of the literature reveals several gaps in knowledge such as limited availability of Australian studies and limited considerations on the intangible aspects of office buildings as determinants of office rental. Moreover, the possible impacts of tenants' office leasing behaviours on rental and a role of the market and regulatory forces remain unknown. As such, it is deemed these limitations are overcome by implementing alternative approaches. In line with this, Chapter 3 discusses relevant theories to develop a conceptual framework for this research to fill these gaps.

Chapter 3. THEORETICAL BACKGROUND

3.1 Introduction

To fulfil the first research objective, this chapter presents the theoretical background of this research. Section 3.2 begins with discussions of the traditionally adopted neo-classical economics paradigm and its limitations, and followed by the behavioural approaches underpinning this research. Section 3.3 is a discussion of the three behavioural theories explaining tenants' leasing behaviours, namely: (i) symbolic self-completion theory; (ii) expectancy-value theory; and (iii) push-pull theory. Then, a discussion about how these theories are integrated to investigate the relationships among different tenants' leasing motivators and their decisions about the greenness level of office buildings and rental are presented in Section 3.4. Section 3.5 presents the development of a conceptual framework. Operationalisation of measurement items are discussed in Section 3.6 and hypotheses of this research are provided in Section 3.7.

3.2 Conceptual approaches in real estate

3.2.1 Neo-classical economics approach

Traditionally, the majority of real estate studies are conducted on the basis of the neo-classical economics paradigm. Generally, this assumes that decision makers are perfectly rational and have full access to all required information and, thus, make rational decisions with an expectation of utility maximisation (Agboola, 2015; Salzman and Zwinkels, 2013; Leishman and Watkins, 2004).

Within the neo-classical economics paradigm, the real estate market outcomes (including rental) are typically understood as the result of the self-regulated system, which is affected by supply and demand or the 'invisible hand' (Mooya, 2016; Agboola, 2015). From the office market perspective, this means that the rental of offices is typically determined by a list of variables (or measurement items) related to the tangible aspects of office buildings, such as lease contract features, building quality, location and market forces (see Section 2.4.2). Therefore, tenants make the most rational leasing decisions based on an evaluation of various tangible aspects of office buildings, so they can maximise office utility within a given budget.

Hodgson describes the benefits of the neo-classical economics paradigm:

this utility maximising version of the rational choice theory has the character of a universal explanation that can be made to 'fit' any set of the event (2012, p. 94).

This is well-reflected by its adoption into several well-known real estate theories and concepts, such as Markowitz's Modern Portfolio Theory (MPT), Capital Asset Pricing Model (CAPM), Arbitrage Pricing Theory (APT) and Efficient Market Hypothesis (EMH) (Waweru *et al.*, 2014). The wide application of the paradigm is no exception to studies about office markets, including those investigating the relationship between the greenness level of office buildings and rental (see Section 2.4.1).

Nonetheless, over the years, the neo-classical economics paradigm has been criticised by real estate researchers, from both methodological and theoretical perspectives (Levy and Peterson, 2013; Dixon *et al.*, 2009; Greenhalgh, 2008; Mcmaster and Watkins, 1999). Among them, Agboola (2015) and Rappaport (1996) criticise the neo-classical economics paradigm for its heavy reliance on unrealistic assumptions, such as perfect rationality, which leads to an erroneous conception of the real estate market. This aligns with Clark and Dannis's (1992) assertion that the real estate market would never act according to the underlying assumptions of the neo-classical economics, and that its application in real estate studies should be reconsidered.

Black *et al.* (2003) add that the neo-classical economics paradigm (within existing real estate studies) has limitations in explaining the influences of individual decision makers, as emotions, irrational sentiments and cognitive limitations play a critical role in real estate decision making. For instance, Wiley (2012) found that institutional investors in the real estate market often overvalue the worth of office buildings and thus, are more likely to spend more than their non-institutional counterparts. Indeed, Hodgson (2012) even claims that the rational choice theory underpinning the neo-classical economics paradigm is a 'slippery concept'.

The above limitations associated with the neo-classical economics paradigm eventually led to many real estate studies considering buildings as a tangible (or physical) asset (Salzman and Zwinkels, 2013) that only focus on the effect of building quality (e.g. size of net lettable area (NLA), building age or number of storeys) and location (e.g. proximity to nearest train stations) and other 'quantifiable' characteristics of office rental (see Section 2.4.2). The usage of these variables enabled researchers to easily identify rental determinants in relation to the level of the

greenness of office buildings using the multiple regression-based hedonic pricing model (HPM). More often than not, the impacts of symbolic aspects of office buildings, on tenants' leasing decisions and rental are neglected (Kim *et al.*, 2017a; 2017b).

3.2.2 Behavioural approach

In response to the limitations of the neo-classical economics approach, Qian *et al.* (2013) and Black *et al.* (2003) suggest that the real estate market could be better explained by understanding the behaviours of market participants, such as tenants. This view is further supported by Salzman and Zwinkels (2013), Black *et al.* (2003) and a study conducted by Center for the Built Environment (2010) at the University of California, Berkeley, which concludes that real estate is a hybrid area consisting of tangibles and intangibles. As a result, an understanding of the role of market participants' behaviours is essential.

In this research, the behavioural approach is adopted over the neo-classical economics approach. This is because tenants' leasing motivators relate to their identity, expectations and their relations to the tangible and symbolic aspects of office buildings, may affect tenants' office leasing decisions and in turn, the resultant could collectively influence the rental of office buildings (Kim *et al.*, 2017b). Specifically, tenants' office leasing decisions about the greenness level of their office buildings are understood to be a result of the collective influence of various leasing motivators which are closely related with, not only the tangible (or physical), but also psychological ownership of the building. Discussions about tenants' psychological ownership of office buildings, which is related to office buildings' symbolic aspects, are presented following.

3.2.2.1 *Psychological ownership of office buildings*

Several studies (Ledgerwood *et al.*, 2007; Eisenhauer *et al.*, 2000) note there are special emotional attachments for some places (or buildings in this research) derived from social and cultural context beyond their use value (or physical/functional value). This aligns with Olubunmi (2016) that it is a psychological process to decide the level of greenness for buildings. Specifically, the psychological ownership of office buildings is closely related to several concepts of environmental psychology, such as a 'sense of place' and 'place attachment'. These concepts have gained interest among researchers in real estate studies, along with changes in the contemporary workplace environment (Too and Harvey, 2012; Vischer, 2008).

Cross (2011) highlights it is difficult to define the concept of 'sense of place' with a single phrase, as its definition is varying by different discipline. This is shared by Hashemnezhad *et al.* who describe the concept as *"a comprehensive concept which in it men feels places, percept them and attached meaning to them"* (2013, p. 1). This indicates that a 'sense of place' is not only a particular emotional feeling attached to a place, but also an 'emotional connection' between people and place, which can be affected by people's experience, motivation, background, as well as physical and symbolic meanings of a place (Hashemnezhad *et al.*, 2013; Ledgerwood *et al.*, 2007; Stedman, 2003). This is supported by Shamai (1991) and Jorgensen and Stedman (2001) who see the place (or office buildings in this research context) according to the views, attitudes, beliefs and expectations of individuals' and/or groups'. These collectively help to define the concept of the 'sense of place' in this research as to how office buildings are psychologically perceived by office building occupants (e.g. organisations, employees).

The concept of 'place attachment' is a stronger form of a 'sense of place' as it emphasises the role of the 'identity' of people and places. Shamai defines 'place attachment' as a "centre of personal and collective experience and that 'identity' combines with the meaning of the place and its symbols to create a 'personality' of the place" (1991, p. 350). This definition is adopted and extended by researchers (Lewicka, 2008; Giuliani, 2003; Pretty *et al.*, 2003; Stedman, 2003) to claiming that 'place attachment' is a 'psychological bond' and 'behavioural commitment' between people and places, which is shaped by the tangible and symbolic aspects of places. In particular, places are emphasised through their uniqueness (i.e. symbolic values derived from its identity) when there is psychological ownership of a place (Shamai, 1991). As such, it is essential to understand what determines the psychological ownership of a place by recognising the relationships among tenants' identity, expectations as well as both the tangible and symbolic aspects of office buildings.

Hitherto, the importance of psychological ownership of buildings is often highlighted as a part of organisations' workplace strategies. Workplace strategy is closely linked to the organisational identity, and therefore, adds value to employees by positive feelings (e.g. 'sense of place' and 'place attachment') and other intangible benefits (Khanna *et al.*, 2013). This may be especially true for office buildings certified by green building certifications (e.g. NABERS and Green Star) to represent their levels of greenness. For example, Kato *et al.* (2009) suggest

the greenness of office buildings is more psychologically-oriented than physical in the context of the Australian office buildings.

Techau *et al.* (2016) and Kim *et al.* (2016a) also agree that higher indoor environmental quality (IEQ) of office buildings may lead to favourable attitudes of employees towards their workplaces; hence, contribute to the creation of the 'sense of place' and 'place attachment'. These claims are further supported by research conducted by the Institute of Sustainable Development and Architecture (2010), that found employees' appreciation of their Green Star certified office buildings may eventually contribute to their psychological ownership of the 'green' workplace. Overall, these studies support the findings of Capolongo and Settimo (2017), Monfared and Sharples (2011) and Haghighat and Donnini (1999), who show that the psychological effects of workplace environment on occupants (e.g. employees) including changes in their overall satisfaction level towards their office environment.

3.2.2.2 *Symbolic aspects of office buildings*
Zhou and Hui (2003) and Cheng *et al.* (2003) suggests that certain objects or places are more or less esteemed than others, due to some attached values. In other words, individuals and groups have their own 'meanings' (or 'values') about a particular place because of their symbolic aspects have a close relationship with their unique self-defined identity (e.g. organisational identity). Relph describes it as "the identity of a place [that] varies with the individual, group, or consensus image of that place" (2016, p. 56).

To reflect the symbolic aspects of a place specific to certain individuals or groups, the term 'symbolic value' is often used. For example, Burton (2004) and Wicklund and Gollwitzer (1981) define 'symbolic value' as the 'indicator of self-definition'. This is reflected by several studies (Ledgerwood *et al.*, 2007; Gieryn, 2000; Etzioni, 1991) that empirically tested the role of symbolic values of buildings as a mean of group's self-defined identity. Of these studies, Ledgerwood *et al.* (2007) found that buildings are perceived as a symbolic representation of the group's identity and they are often driven by the group's social, cultural and other factors. This agrees with Dovey (1992) who suggest that symbolic aspects of office buildings must be seen from own's unique identity, as well as social contexts as it shows the relationship between 'who we are' and 'where we are'.

Duncan (1973) also highlights the symbolic aspects of a place which is different for individuals' values, socioeconomic status and culture. In line with this, Dovey (1992) suggests that the 'aura'

and 'image' of certain building features (e.g. foyers, tall storeys) and locations (e.g. 'Wall-street' in the US) provide unique experiences, 'sense of place' and 'symbolic values'. Khanna *et al.* (2013) also discuss symbolic values of office buildings in their study on 'branding by real estate'. Their findings show that it is not only building features and location, but also the symbolic values of the workplace 'environment', that can determine the 'meanings' of office buildings. This is justifiable, as a better workplace environment can provide a 'sense of place' and 'place attachment' for employees.

In line with the above, Sirgy *et al.* (2005) suggest that real estate decisions could be determined by not only the tangible aspects of buildings, but also their symbolic aspects. NABERS and/or Green Star certified office buildings may not an exception to this, as tenants may emphasise the greenness of office buildings, rather than other than environmental reasons (Wiley *et al.*, 2010). For example, some tenants may perceive leasing a NABERS 6 Stars certified buildings as a way to represent their organisational identity as an environmentally-friendly organisation.

This is supported by the recent findings of Kim *et al.* (2019) that the portrayal of unique organisational values (e.g. environmental protection) through the green image of their office buildings is one of the major leasing motivators among green building tenants in Sydney CBD trying to differentiate themselves from their competitors. Besides, the symbolic aspects of office buildings may help organisations portray their organisational identity to external stakeholders, including the general public and potential employees. In fact, traditional petroleum companies, such as Royal Dutch Shell, have already successfully incorporated greenness into their corporate offices, which allows them to portray their corporate image and manage brand transformation (API, 2012). Similarly, the head office of the Elsevier publishing company is designed to reflect its organisational identity, through their unique open book-like design (Kooijman, 2000).

Meanwhile, symbolic aspects of buildings can be presented in various forms including prices (e.g. rental). Velthuis states that:

> *... price setting is not just an economic but also a signifying act ... prices are expressive of the identity of producers, consumers, and distributors. They serve as status symbols of these actors, and prices enable these actors to enact their role in the market ... we have to take cognitive and symbolic meanings of prices into account* (2003, p. 182, 191, 208).

The Velthuis's (2003) and Ledgerwood *et al.*'s (2007) studies point to the need to examine the collective effects of the tangible and symbolic aspects of office buildings on rental, and operationalisation of relevant measurement items. More details about the operationalisation of measurement items are discussed in Section 3.6.

Therefore, in this research, an examination of the possible relationships between tenants' office leasing behaviours and rental must include the following:

1. Tenants' leasing motivators towards the tangible aspects of office buildings characterised by rental determinants (e.g. building quality, location);
2. Tenants' leasing motivators towards the symbolic aspects of office buildings characterised by their symbolic values;
3. Tenants' identity characterised by their organisational values;
4. Tenants' expectations for their leasing decisions; and
5. Tenants' expectations for leasing decisions about the level of the greenness of office buildings.

The above five is supported by Kim *et al.* (2017b), Levy and Peterson (2013), Gallimore *et al.* (2000) and Greenhalgh (2008), in that: (i) added meaning to a building influences tenants' leasing decisions; and (ii) tenants' leasing decisions are dependent on their unique organisational identity and expectations. A conceptual framework has been developed for this research, based on these two and the integration of three theories, discussed following.

3.3 Theories underpinning the conceptual framework

3.3.1 Symbolic self-completion theory

The symbolic self-completion theory is that individuals with high identity goals (e.g. as a 'sustainability leader' or as a 'fast-follower') use various symbols to substantiate their self-definition or 'identity' (Ledgerwood *et al.*, 2007; Wicklund and Gollwitzer, 1981). The symbolic self-completion theory is a commitment to self-defining goals, symbols of completeness and social reality (Gollwitzer *et al.*, 1982). In other words, the theory suggests that the acquisition of various symbols, which have a consensual meaning to be socially recognised (Hönisch and Strack, 2012), can contribute to the portrayal of identity. Upon recognition, they become a social fact and serve as a self-defining symbol (Wicklund and Gollwitzer, 1981) and provide psychological benefits (Reinecke and Oliver, 2017). According

to Wicklund and Gollwitzer (1981), these self-defining symbols are used to proclaim identity, even when it is perceived negatively by others.

Although the application of the theory may seem to be limited to the individual level, values are occasionally shared among peers and may form the basis of the group's professional, political, or cultural identity (Verplanken and Holland, 2002). For instance, Khanna *et al.* (2013) suggest the values of organisations reflect their self-claimed group identity. Ledgerwood *et al.* (2007) also agree that values placed on material symbols (e.g. buildings) substantiate the 'group identity' (e.g. corporate or school) to which individuals belong, in that: "[p]roperty derives values from its capacity to serve as an efficient means to support in the pursuit of group identity goals" (p. 1). This view is shared by Jordan *et al.* (2011) who suggest that the applicability of the theory highlights the role of individuals' personal, as well as being a group identity to motivate to acquire identity-related symbols.

Hitherto, the theory has been adopted and explored in various behavioural studies, including: (i) studies on consumer behaviours (Noble and Walker, 1997; Dittmar *et al.*, 1996; Schouten, 1991); (ii) physical or psychological ownership of materials (Carr and Vignoles, 2011; Ledgerwood *et al.*, 2007); and (iii) usage of symbolic metaphors (Harmon-Jones *et al.*, 2009). These studies highlight the impact of the symbolic aspect of materials (including buildings) on individuals' and groups' behaviours (e.g. purchase decisions) in several different contexts. Some studies (Longoni *et al.*, 2014; Hu *et al.*, 2014) have also used the theory in the sustainability context. For example, Longoni *et al.* (2014) use the theory to determine if and to what extent consumers' purchase decisions about green products contribute to the creation of a state of completeness for them to become a green consumer. They note that the purchase decisions of green products are considered a part of consumers' efforts to portray their self-defined identity as an environmentally-conscious individual or group. Similarly, Ledgerwood and Liviatan (2010; 2007) suggest there is a relationship between group identity and symbolic aspects of a building. They found that the symbolic aspects of a building lead certain groups (that share the same identity) to have the psychological ownership of the building; thus, making them value these buildings higher than others (see also Section 3.2.2.2).

In this research, the symbolic self-completion theory is adopted to highlight the role of tenants' leasing decisions driven by their organisational identity and symbolic aspects of office buildings. Following the proposition of the theory, tenants' self-defining identity can be

operationalised by their organisational values (Khanna *et al.*, 2013); whereas, tenants' leasing decisions about the level of the greenness can be regarded as the self-definitional symbol. For example, organisations self-defining themselves as being sustainability-focused may put emphasis on the higher level of the greenness of office buildings (e.g. NABERS 6 Stars) to substantiate their organisational identity. This agrees with a recent study by Darko *et al.* (2017) that shows both individual level drivers (e.g. self-identity) and organisational level drivers (e.g. corporate image and social responsibility) may influence decisions about the greenness of office buildings.

3.3.2 Expectancy-value theory

The expectancy-value theory was established by Atkinson (1964; 1957) to highlight the role of perceived expectations and values on motivations using various psychological, cultural and social determinants (Wigfield and Eccles, 2000; McInerney and van Etten, 2004; Wigfield, 1994). Specifically, the theory demonstrates how identity shapes values, goals and subsequent behaviours, such as motivation or decisions (Magidson *et al.*, 2014; van den Broeck *et al.*, 2010). In the expectancy-value theory, 'values' are described as the subjective idea about desirable ways of behaving or desirable end states (Verplanken and Holland, 2002). Therefore, values are important ingredients of self-definition, and thus contribute to a 'sense of identity' as a motivational construct (Hönisch and Strack, 2012). On the other hand, expectations are related to the beliefs about the end state (or consequence), which can be either positive or negative, based on their behaviours (Feather, 1992).

Hitherto, the theory has been used in a wide range of contexts including: (i) studies on students' learning behaviours (Flake *et al.*, 2015; Fan, 2011); (ii) job seeking behaviours (Lynd-Stevenson, 1999; Feather, 1992); (iii) consumer behaviours (Xie *et al.*, 2008; Belch and Belch, 1987; Cohen *et al.*, 1972); and (iv) business-related behaviours (Wiklund *et al.*, 2003; Kopelman, 1976). Of these, Westaby (2002) and Kopelman (1976) use the theory in the context of organisational behaviour and showcase its applicability to an organisational level.

Meanwhile, it is noted that the behaviour of individuals and groups often requires a trade-off between competing values (Alcock and Sadava, 2014; Schwartz, 1996). This is because it is often not a single value, but prioritised multiple values, lead to a certain behaviour (Schwartz, 1996). This is no exception to the office tenants as their behaviours in the market (e.g. office leasing decisions) are frequently affected by a combination of several different leasing

motivators. These motivators can range from values placed on prime locations to having a higher level of greenness (see Section 2.3.1). Levy and Peterson (2013) and Dixon *et al.* (2009) also point out that sets of values that share a core of meaning across individuals, groups and cultures are the valid measure of specific motivation goals. This implies the subjective nature of values that may be closely related to the unique identity of tenants.

In this research, the expectancy-value theory is used to highlight various tenants' leasing motivators related to symbolic values of office buildings and expectations about the consequence of their leasing decisions. This relationship is widely accepted by researchers (Westaby, 2002; Shah and Higgins, 1997; Locke *et al.*, 1986) who highlight the collective influence of values and expectations on organisational decision-making. Although the theory is used in a range of different contexts, little has been done to incorporate the theory in the context of real estate decision-making.

3.3.3   Push-pull theory

The push-pull theory explains the drivers of behaviours by highlighting the two driving forces – 'push forces' and 'pull forces' (Li and Bray, 2007). In the push-pull theory, push forces generally refer to socio-economic pressures from the external environment; pull forces are described as driving forces or offerings to draw individuals or groups to behave in certain ways (Lo and Lee, 2011; Pesonen, 2011; Kirkwood, 2009; Li and Bray, 2007). In some studies, the push and pull forces have also been described as market and regulatory forces (sometimes also referred to as 'carrots and sticks') (Taylor, 2008; Andreoni *et al.*, 2003; Wilson, 1996).

Hitherto, the theory has been adopted by a wide range of studies across different areas, such as: (i) education-related studies (Lam *et al.*, 2011; Li and Bray, 2007; Mazzarol and Soutar, 2002); (ii) business-related studies (Singla *et al.*, 2018; Kirkwood, 2009; Unni and Harmon, 2007); (iii) migration and travel-related studies (Piras, 2017; Prieto Rosas and López Gay, 2015; Doerschler, 2006; Meyer, 1999); (iv) real estate studies (Adnan and Daud, 2010; Appel‐Meulenbroek, 2008; Adeyeye *et al.*, 2007). It is notable the majority of these studies have consistently adopted the theory to determine if and to what extent various push or pull forces lead to individual and organisational decision making.

Despite its wide adoption, it appears there is no well-accepted measurement of push and pull forces. This is not surprising given researchers could define and operationalise their own

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measurements differently to fulfil their requirements. Nonetheless, it is found that some of the commonly adopted measurements include (i) government regulations (Arfaoui, 2018; Kim *et al.*, 2015a; Seebaluck *et al.*, 2015; Zmud, 1984); and (ii) market situations (Horbach *et al.*, 2012; Brem and Voigt, 2009; Daniels and Bobe, 1992). In particular, several studies (Ibrahim *et al.*, 2017; Mohamad *et al.*, 2011) suggest that government regulations and market situations could play a 'moderating role' in certain relationships.

In this research, the push-pull theory is used to test the moderating effect of various market and regulatory forces on the relationship between leasing motivators and tenants' leasing decisions about the greenness of office buildings. This is done as there are no market and regulatory forces that directly lead to tenants' leasing decisions about the greenness of office buildings in the context of Australia's real estate market. The Energy Efficiency in Government Operations (EEGO) policy is one closest to considering the mandatory nature of the policy (see Section 2.2.4); however, as it only targets government tenants, the scope of the policy is limited to a small number of tenants.

Similarly, the commercial building disclosure program mandates the public disclosure of NABERS ratings of the majority of office buildings in the rental and sales markets. Nevertheless, because its mandatory nature is only applicable to building owners, it is not likely directly to impact on tenants' leasing decisions. As such, it appears reasonable to adopt the theory and its measurement as the moderator of the relationships between tenants' leasing motivators and leasing decisions. The moderating role of the market and regulatory forces are shown in Figure 3.1.
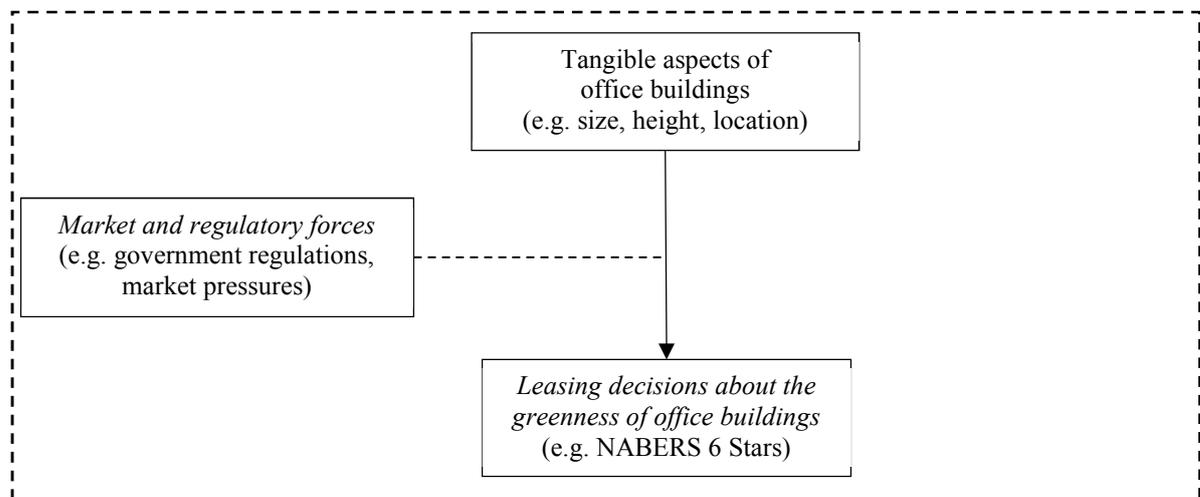
Figure 3.1 Hypothetical example of the moderating impacts on a relationship between tenants' leasing motivator and decisions

3.4   Integration of the three theories

This section provides discussions on and justifications of the integration of the three theories (i.e. symbolic self-completion theory, expectancy-value theory and push-pull theory) in developing the conceptual framework of this research. All these theories are adopted, as a set, to explain the determinants of office rental; integrating them helps to inform the conceptual framework towards exploring the relationship between tenants' leasing behaviours on rental, by recognising: (i) tenants' leasing motivators related to the tangible (X1) and symbolic (X2) aspects of office building; (ii) tenants' expectations (X3); (iii) tenants' organisational identity (X4), and (iv) tenants' leasing decisions about the greenness of office buildings (X5). This aligns with the arguments raised in Section 3.2.2 that it is increasingly important for real estate research to understand the behaviours of its participants (e.g. tenants).

From the context of the symbolic self-completion theory, tenants' office leasing decisions can be explained as a result of their endeavour to portray their organisational identity through the greenness of their office buildings. In particular, tenants may perceive the higher the level of the greenness of their office buildings as a symbolic representation of their identity. For example, some organisations, especially those that promote organisational values related to environmental protection, may put a large emphasis on the NABERS and/or Green Star ratings (X5) as this could help to reflect their organisational identity (X4) as a sustainability-focused organisation. This is further supported by Ledgerwood *et al.* (2007), Vansteenkiste *et al.* (2005)

and Verplanken and Holland (2002) who suggest that values, which can be shared with others, may function as important motivators leading to decision making.

The expectancy-value theory implies that tenants' subjective values and expectations about their behaviour may lead to their office leasing decisions. For instance, tenants' leasing decisions about the level of the greenness of office buildings (X5) may be determined by their expectation (X3) that their leasing decisions can lead to adequate benefits (e.g. the reflection of their organisational identity), as well as symbolic values of office buildings (X2) placed by them. To this extent, subjective values and expectations towards the greenness of office buildings must be also considered as important motivators driving tenants' leasing decisions. Indeed, this is also aligned with the claim that consideration of both tangible (X1) and symbolic (X2) aspects of office buildings provide a better indication of their rental (see Section 3.2.2.2).

It is also known that tenants' leasing decisions can be affected by the push and pull forces (Z). For example, tenants' leasing decisions may be affected by market and regulatory forces, such as tight local office market situations at the time of leasing. As a result, the relationships between tenants' office leasing motivators and their decisions about the greenness of office building can be either enhanced or reduced (or 'moderated') by them.

In this research, it is believed that office rental can be partially explained from tenants' office leasing behaviours (X1-X5). Therefore, a conceptual framework of this research has been developed based on the three behavioural theories that collectively help explaining the relationships among tenants' office leasing motivators (X1-X4), their decisions about the greenness of office buildings (X5) and rental (Y) as well as the moderating impact of the market and regulatory forces (Z). Relationships between them which poses the hypotheses of this research could be further explained by the arrows shown in Figure 3.2.

3.5 Conceptual framework of the research

Figure 3.2 shows the conceptual framework and the hypothesised relationships among constructs describing tenants' office leasing motivators (X1-X4), their decisions about the greenness of office buildings (X5) and rental (Y). Specifically, the framework is to examine if and to what extent tenants' emphasis on the tangible and symbolic aspects of office buildings is related to their decisions about the greenness of office building and rental. Details about the operationalisation of each construct and hypothesised relationship are discussed in Sections 3.6.
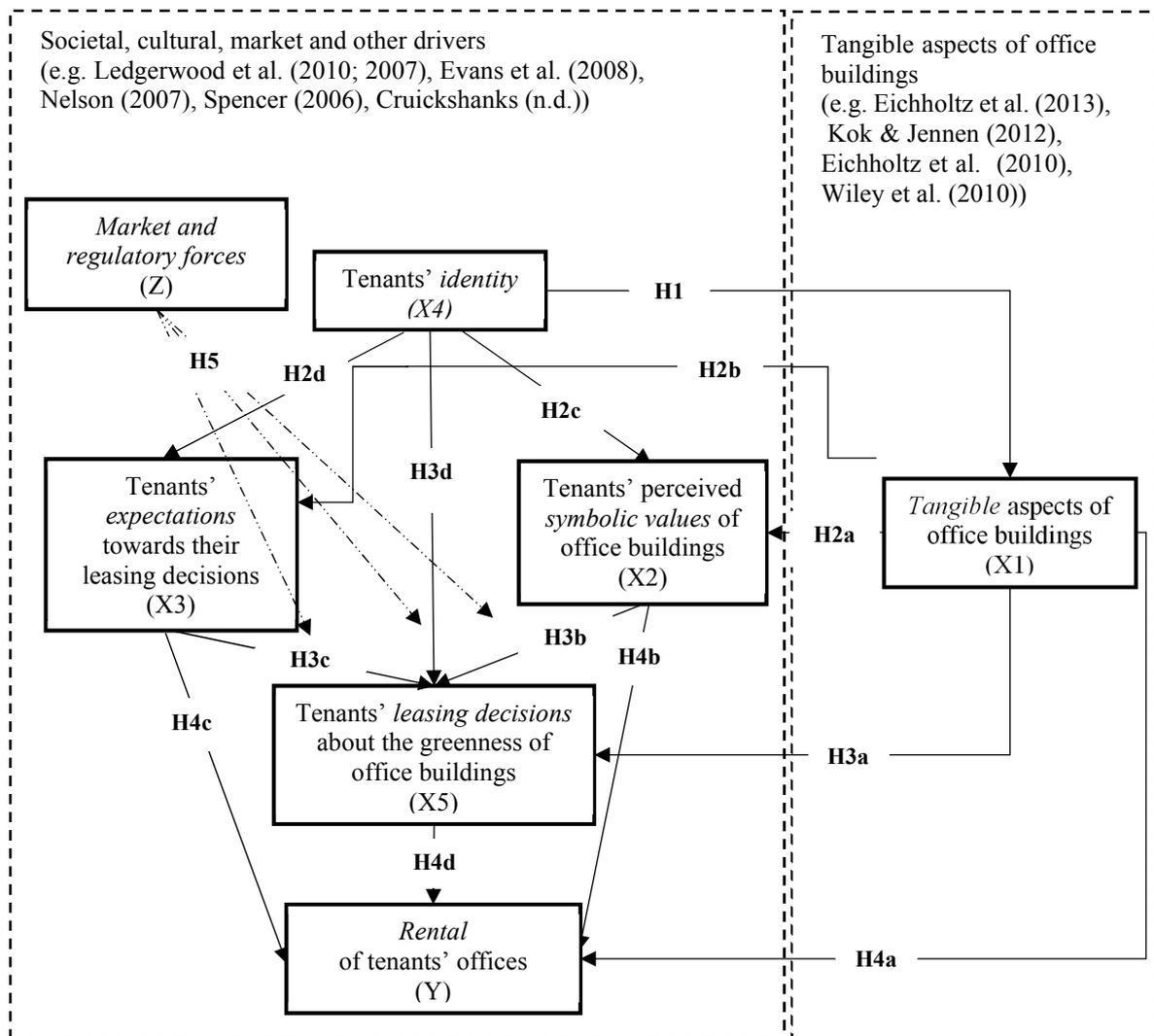
Figure 3.2 Conceptual framework of the research

3.6   Operationalisation of measurement items

Measurement items related to each construct of the aforementioned conceptual framework have been operationalised using several different methods. For the tangible aspects of office buildings (X1), this research operationalises measurement items based on the result of literature review (see Chapter 2), the systematic review, and meta-analysis about the determinants of rental such as office space size, age and proximity (see Section 4.4.1.1). A similar approach is adopted for measurement items to assess the greenness of office buildings (X5). This research uses NABERS and Green Star certifications given their popularity in the Australian real estate sector (see Section 2.2.1). This is also aligned with the 'meaning' of the greenness of office buildings as a representation of tenants' identity (discussed in Sections 3.3.1 and 3.3.2).

However, operationalisation of measurement items for the symbolic aspects of office buildings (X2), tenants' expectations (X3) and organisational identity (X4) requires different approach considering the subjective nature of these constructs. As such, measurement items related to these constructs are operationalised mainly through preliminary interviews with tenants (see Section 4.4.1). For instance, as described by Hönisch and Strack (2012), Ledgerwood *et al.* (2007) and Wicklund and Gollwitzer (1981), this research operationalises measurement items for the symbolic aspects of office buildings (X2), based on symbolic values of office buildings described by tenants while a similar approach is adopted for tenants' expectations (X3). For tenants' identity (X4), adopting Khanna *et al.*'s (2013) suggestions that values reflect identity, this research operationalises relevant measurement items from tenants' organisational values (e.g. environmental protection).

It is noted that the amount of rental, the dependent construct (Y) of this research, is operationalised by the amount of 'flat rental', based on the gross lease. The well-known definition of gross rental equals base rental amount plus operating expenses (e.g. insurance or maintained costs). This allows tenants to pay the fixed-amount of the rental as 'inclusive of all', rather than paying the extra amount of fees required for the operation of their office in addition to the base rental. However, in Sydney, the energy costs are always paid by tenants, even those in gross leases (Gabe and Rehm, 2014). Therefore, a working definition of rental adopted in this research is a sum of base rental and electricity costs paid by tenants (as a form of 'modified gross lease'), but excluding any other outgoings paid by landlords (e.g. repair costs).

Lastly, market and regulatory forces (Z) on tenants' leasing decisions are also operationalised through preliminary interviews. As with many other tenants' leasing motivators, such as the symbolic aspects of office buildings (X2), market and regulatory situations are highly subjectively connected with where office buildings are located. Therefore, it is more reasonable to operationalise relevant measurement items based on preliminary interviews, rather than adopt them from the literature review (unless they are universally applicable). Details about the results of the interview are provided in Section 4.4.1.2.

3.7 Hypotheses of the research

Based on the conceptual framework (Figure 3.2), the following hypotheses are established to achieve the research aim and objectives. These hypotheses are to examine the relationships among tenants' office leasing motivators (X1-X4), their leasing decisions about the greenness

of office buildings (X5) and rental (Y) and if these relationships could be moderated by the market and regulatory forces (Z). Detailed discussions about each hypothesis and justifications are presented following.

3.7.1 The tangible aspects of office buildings (X1) and tenants' organisational identity (X4)

This section discusses if and to what extent the tangible aspects of office buildings (X1) could be affected by tenants' organisational identity (X4). As discussed in Section 3.2.2.2, it is common for many organisations to use their buildings to symbolise their identity. This aligns with the symbolic self-completion theory (see Section 3.3.1), suggesting there is a connection between self-defined identity and physical ownership of office buildings. The direct relationship between tenants' identity and the tangible aspects of office buildings is also highlighted by Levy and Peterson (2013), Khanna *et al.* (2013), Kooijman (2000) and Dovey (1992). These studies suggest that many organisations often have preferences for certain materials, technologies, finishes and colours for their buildings related to their organisational identity. Davis (1984) also notes that organisations communicate their identity using various tangible aspects of their office buildings, such as furnishings and floorings. In relation to this, it is hypothesised that:

> **Hypothesis 1 (H1)**: *Tenants' identity (X4) has a significant positive impact on their emphasis on the tangible aspects of their office buildings (X1)*

3.7.2 Symbolic aspects of office buildings (X2) and tenants' expectations (X3)

This section discusses if and to what extent the symbolic aspects of office buildings (X2) and tenants' expectations (X3) could be affected by the tangible aspect of office buildings (X1) and tenants' organisational identity (X4).

3.7.2.1 Tangible aspect of office buildings (X1)

Several studies (Kim *et al.*, 2019; Ledgerwood and Liviatan, 2010; 2007) state that buildings create certain images, mood, feelings and aura due to their physical characteristics and environments. This view is shared by Davis (1984), who notes that a building's tangible aspects (characterised by office design, types of furnishings and carpeting) could individually or collectively create symbolic values associated with that building. The overall picture that emerges from these studies is that the tangible aspects of office buildings may contribute to the creation of symbolic meanings of office buildings and possibly shape tenants' expectations which are subjective in nature. For example, it is known that office buildings with higher levels

of greenness are often perceived as comfortable, due to their innovative design and superior building quality (AlSanad, 2015; Li *et al.*, 2014; Kats, 2003). Likewise, Kim *et al.* (2019) found that tenants of green buildings in Sydney CBD often perceive their office buildings as not only environmentally-friendly, but also more comfortable and satisfactory. As such, it can be assumed that the comfortable workplace environment of green buildings, which may be achieved by the use of certain materials and finishings, positively contribute to improved psychological well-being and thus, their symbolic values. Considering the findings of these studies, it is hypothesised that:

> **Hypothesis 2a (H2a)**: *Tangible aspects of office buildings (X1) have a significant positive impact on the symbolic aspects of office buildings (X2)*
>
> **Hypothesis 2b (H2b)**: *Tangible aspects of office buildings (X1) have a significant positive impact on the tenants' expectation (X3)*

3.7.2.2 Tenants' organisational identity (X4)

The symbolic-self completion theory implies that tenants' organisational identity is also related to their emphasis on the psychological ownership of office buildings. Specifically, the theory suggests that tenants' organisational identity should be closer to the symbolic aspects of office buildings perceived by them. This is supported by Deborah and O'Keefe Bazzoni (2009) and Ledgerwood and Liviatan (2010; 2007), who note that organisations' self-completion contributes to their identity; this can be reflected by various forms, including perceived symbolic values of buildings. This tends to add weight to Dovey's (1992) conclusion that corporate towers are often perceived as a 'symbolic representation' of organisational identity. Dovey's (1992) also notes that symbolic values of office buildings can be determined by their views and tallness, and they often reflect the unique identity of organisations who occupy office spaces in the building.

The symbolic aspects of office buildings (as discussed above) also align with the implications of the expectancy-value theory. The theory suggests that both subjective expectations and values play a role in individuals' and groups' decisions (see Section 3.3.2). For instance, studies (Cohn, 2014; Reissner, 2010; Scott and Lane, 2000; Balmer and Gray, 2000) document the close relationship between expectations and identity. One of the prime examples is the Corporate Social Responsibility (CSR) of an organisation. CSR reflects the organisation's unique identity; office buildings can be used to meet their expectations to meet CSR

requirements (Argenti, 2013; Deborah and O'Keefe Bazzoni, 2009). Based on these discussions, it is hypothesised in this research that:

> **Hypothesis 2b (H2c):** *Tenants' organisational identity (X4) has a significant positive impact on their perceived symbolic values of office buildings (X2)*
>
> **Hypothesis 2c (H2d):** *Tenants' organisational identity (X4) has a significant positive impact on their expectations (X3)*

3.7.3 Tenants' leasing decisions about the greenness of office buildings (X5)

This section discusses if and to what extent tenants' leasing decisions about the greenness of office buildings (X5) could be collectively affected by the tangible (X1) and symbolic (X2) aspects of office buildings, as well as tenants' expectation (X3) and organisational identity (X4).

3.7.3.1 Tangible aspect of office buildings (X1)

Tenants' leasing decisions about the greenness of office buildings are noted in Dixon *et al.* (2014; 2009), Levy and Peterson (2013) and Van de Wetering and Wyatt (2011). These studies suggest that tenants' demand for the greenness of office building is mostly driven by the tangible aspect of office buildings, such as building quality and location (see Section 2.4.2). For example, Dixon *et al.* (2009) found that organisations perceive building locations to be more important than the level of the greenness of office buildings.

The importance of the tangible aspects of office buildings on tenants' leasing decisions is also highlighted by Gabe and Rehm (2014), who found that tenants in Australia's central Sydney office market are paying a rental premium for superior building quality and location, rather than for energy efficiency. This implies that tenants may put a higher emphasis on the tangible aspects of office buildings when they make office leasing decisions. Overall, the prevalent evidence demonstrates the role of the tangible aspects of office buildings on tenants' leasing decisions. This thus informs the development of the following hypothesis in this research:

> **Hypothesis 3a (H3a)**: *Tangible aspects of office buildings (X1) have a positive significant impact on tenants' leasing decisions about the greenness of office buildings (X5)*

3.7.3.2 Symbolic values of office buildings (X2) and tenants' expectations (X3)

The expectancy-value theory implies that tenants' leasing decisions about the greenness of their office buildings could be affected by their symbolic aspects, as well as expectations held by

tenants. In line with this, Dovey (1992) and Krumm (2001) highlight increasing interest in the role of office buildings as a symbolic representation of tenants' identity (see Section 3.2.2.2). In addition, Zieba *et al.* (2013) add that tenants' office leasing decisions are often aligned with their expectations. This is further supported by Kim *et al.* (2019) who note that tenants' leasing decisions about the greenness of office buildings in Sydney CBD are at least partly determined by their expectations for compensating the higher rental from some benefits of their greenness, such as energy savings. Similarly, Boyle and McGuirk (2012) address several tenants' expectations of the greenness of their office buildings, including meeting their CSR obligations, and being seen as an environmentally conscious organisation by customers and employees. As such, it is hypothesised in this study that:

> **Hypothesis 3b (H3b)**: *Symbolic aspects of office buildings (X2) have a positive significant impact on tenants' leasing decisions about the greenness of their office buildings (X5)*
>
> **Hypothesis 3c (H3c)**: *Tenants' expectations (X3) have a positive significant impact on their leasing decisions about the greenness of their office buildings (X5)*

3.7.3.3   Tenants' organisational identity (X4)

As discussed in Section 3.7.2.2, the symbolic self-completion theory implies that tenants' leasing decisions about the greenness of office buildings could be affected by their organisational identity. The positive significant impact of tenants' identity on their leasing decisions is also highlighted by several studies. For example, Kim *et al.* (2019) found that the portrayal of organisational identity is one of the major motivations for tenants to lease office buildings with higher levels of the greenness, despite their higher rental. This aligns with Boyle and McGuirk (2012) who found that promoting corporate branding is a powerful motivator for tenants to aim at higher levels of greenness for their office buildings. These findings are also aligned with those of Olubunmi (2016) and Hoffman and Henn (2008), whereby, social and psychological reasons are important motivators towards the greenness of office buildings. Accordingly, this research hypotheses that:

> **Hypothesis 3d (H3d)**: *Tenants' organisational identity (X4) has a significant positive impact on their decisions about the greenness of their office buildings (X5)*

3.7.4 Rental (Y)

This section discusses if and to what extent office rental (Y) can be affected by the tangible (X1) and symbolic (X2) aspects of office buildings, and tenants' expectation (X3) and their leasing decisions about the greenness of office buildings (X5).

3.7.4.1 Tangible aspects of office buildings (X1)

The tangible aspects of office buildings have been considered the typical rental determinants in numerous real estate studies. Specifically, it is found that the rental of office buildings can be often determined by lease contract features, building quality, location and market forces (see Section 2.4.2). For example, Ozus (2009) identify several office rental determinants related to the tangible aspects of office buildings, such as numbers of storeys, access to amenities and proximity to nearby banks. Additionally, Farooq *et al.* (2010) found that office rental can be determined by its locations, in terms of proximity to central business districts (CBD) and public transport. The findings of these studies tend to agree with Kim *et al.*'s (2017a) study on green buildings, which shows the significant role of building age, numbers of storeys, green building certifications and renovation status on rental premium. Indeed, it is common to see newly built Premium- or A- grade office buildings in the CBD area command substantially higher rental than C-grade office buildings at fringe locations. As such, the following hypothesis is established:

> **Hypothesis 4a (H4a)**: *Tangible aspects of office buildings (X1) have a significant positive impact on rental (Y)*

3.7.4.2 Symbolic aspect of office buildings (X2)

In contrast to the tangible aspects of office buildings, intangible aspects of office buildings and their impact on rental have not been explored much to date. Nevertheless, several studies highlight the role of symbolic aspects of office buildings towards driving tenants' leasing decisions (see Section 2.3.1) suggesting this may be positively and significantly related to office rental. This is supported by the findings of Ledgerwood and Liviatan (2010; 2007) implies that rental of office buildings may be better indicated by considering not only their tangible, but also their symbolic, aspects. This is consistent with how tenants perceive the greenness of office buildings, not only as a mean of better environmental performance, but also as a symbolic representation of their organisational identity, and thus possibly affect on rental (see Section 2.3.1). As such, it is hypothesised that:

Hypothesis 4b (H4b): *Symbolic aspects of office buildings (X2) have a significant positive impact on rental (Y)*

3.7.4.3 Tenants' expectations (X3)

Hitherto, Conlisk (1996), Plott and Sunder (1982) and Elton *et al.* (1981) discuss the relationship between expectations and prices. In the real estate context, Quan and Titman (1999) claim that real estate prices could be affected by changes in expectations. This is further supported by Zieba *et al.* (2013) and Malpezzi and Wachter (2005) highlight the importance of organisations' expectations as a determinant of prices of their buildings. The impact of expectations on rental may be especially true when considering the real estate market participants' behaviours are often not perfectly rational (see Section 3.2.1). For instance, numerous studies (Yiu *et al.*, 2013; Fernández-Kranz and Hon, 2006; Pontual *et al.*, 2014; Zhou and Sornette, 2006) suggest that expectations for price appreciation are the key driver for demand, which could bring about price bubbles. As such, it is hypothesised in this research that:

Hypothesis 4c (H4c): *Tenants' expectations (X3) have a significant positive impact on rentals (Y)*

3.7.4.4 Tenants' leasing decisions about the greenness of office buildings (X5)

Hitherto, a considerable number of studies (Chegut *et al.*, 2014; Eichholtz *et al.*, 2010a; Ries *et al.*, 2006) suggest that higher level of greenness for office buildings often leads to higher rental (see Section 2.4.1). In fact, Kim *et al.* (2017a) found that one of the most significant determinants for office rental is the greenness of office buildings which is often represented by green building certifications. This aligns with Newell *et al.* (2011), in that office buildings with higher NABERS and Green Star ratings (e.g. 4-6 Stars) in Australia deliver rental premium over office buildings with lower ratings (e.g. 1-3 Stars). However, it should be also noted that Gabe and Rehm (2014) disagree with the contention there is a relationship between the greenness level of office buildings and rental. In view of these, it is hypothesised that:

Hypothesis 4d (H4d): *Tenants' leasing decisions about the greenness of office buildings (X5) have a significant positive impact on rental (Y)*

3.7.5 Market and regulatory forces (Z)

Under the premises of the push-pull theory, tenants' leasing decisions about the greenness of their office buildings could be affected by the push ('sticks') and pull ('carrots') forces. A

considerable number of studies (Remøy and Van der Voordt, 2014; Adnan and Daud, 2010; Holmes and Hudson, 2003; Daniels and Bobe, 1992) discuss the effect of the 'carrots and sticks' on tenants' behaviours in various contexts. For example, Daniels and Bobe (1992) define push and pull forces as the market situation such as availability of suitable stocks. Holmes and Hudson (2003) exemplify regulatory pressures as the push force, while the 'badge' of the green building certification is the pull force.

Despite the variety of measurement reflecting push and pull forces, these studies generally agree that tenants' decisions about the level of greenness for office buildings could be affected by market and regulatory situations. In most instances, tenants' leasing decisions do not solely depend on the push and pull forces defined in this research (see Section 3.3.3). Rather, these market and regulatory forces may moderate the relationships between tenants' leasing motivators and their decisions about the greenness of office buildings. Accordingly, it is hypothesised that:

> **Hypothesis 5a (H5a):** *Market and regulatory forces (Z) moderate the relationships between tenants' emphasis on tangible aspects of office buildings (X1) and their leasing decisions about the greenness of office buildings (X5)*
>
> **Hypothesis 5b (H5b):** *Market and regulatory forces (Z) moderate the relationships between tenants' emphasis on symbolic aspects of office buildings (X2) and their leasing decisions about the greenness of office buildings (X5)*
>
> **Hypothesis 5c (H5c):** *Market and regulatory forces (Z) moderate the relationships between tenants' expectations (X3) and their leasing decisions about the greenness of office buildings (X5)*
>
> **Hypothesis 5d (H5d):** *Market and regulatory forces (Z) moderate the relationships between tenants' identity (X4) and their leasing decisions about the greenness of office buildings (X5)*

3.8 Summary

This chapter presents the theoretical background of this research. Due to the limitations associated with the neo-classical economics paradigm, this research adopts the behavioural approach to identify determinants of tenants' leasing behaviours and rental. Several related concepts, such as tenants' psychological ownership of their office buildings and its relationship with the tangible and symbolic aspects of office buildings, are discussed. The development of

the conceptual framework of the research is based on three behavioural theories, namely: (i) symbolic self-completion theory; (ii) expectancy-value theory; and (iii) push-pull theory.

The above theories are integrated to explain the relationships between constructs of the tangible (X1) and symbolic (X2) aspects of office buildings, tenants' expectations (X3), identity (X4), and their leasing decisions about the greenness of office buildings (X5) and rental (Y). Moreover, the framework explores whether or not tenants' leasing decisions could be moderated by various market and regulatory forces (Z).

The justification for operationalising measurement items related to each construct is also discussed. In this research, literature review, systematic review and meta-analysis and preliminary interviews are employed, given the subjective nature of many of these constructs. Based on the established conceptual framework, hypotheses of this research are developed to test the relationships between tenants' office leasing behaviours (X1-X5) and rental (Y), as well as the moderating effects of market and regulatory forces (Z). Chapter 4 discusses research design and methods to empirically test these hypothesised relationships.

Chapter 4. RESEARCH DESIGN AND METHODS

4.1 Introduction

Chapter 4 presents an overview of the research design and data collection methods, starting with discussions about research philosophy, the basis of the overall research design (Section 4.2). Section 4.3 discusses the survey research design, followed by detailed discussions of three phases of this research in Section 4.4. This leads to the justification for the adopted research methods (Section 4.5) and the sampling methods (Section 4.6), appropriate for this research context.

4.2 Research philosophy

Research philosophy is an essential part of any research as it relates to the central question of 'why research?' (Holden and Lynch, 2004). Specifically, it justifies the rationale for the research methodology, including research design, research methods and sampling methods. The choice of research methodology is influenced by the theoretical stances adopted by researchers that are closely related to their ontological and epistemological perspectives (Gray, 2009). In particular, Grix (2002) and Jun and Moon (2017) suggest that 'question-led' research, selects the most appropriate research design and methods based on ontology and epistemology, should be adopted; rather, than the 'method-led' research (which is *vice versa*).

According to Crotty (1998), epistemology is the starting point of this research as it is the basis of its theoretical stance. Epistemology provides a philosophical background for determining what types of knowledge are suitable for the research context (Gray, 2009); therefore, it reflects the researcher's 'view of reality' (Furlong and Marsh, 2002). To this extent, epistemological assumptions of this research are related to various approaches to reach the answer developed from relevant theoretical stances.

There are several theoretical stances research can adopt to investigate 'the reality' (e.g. positivism, post-positivism, realism and interpretivism). This research adopts post-positivism, as it allows an 'objective view of reality' through both quantitative and qualitative approaches (Ryan, 2006; Furlong and Marsh, 2002). In particular, the use of an integrated approach (i.e. 'triangulation' of quantitative and qualitative methods), employed by post-positivism, research minimises the risk of excessive usage of quantitative data and methods and biased interpretation of the result (Kivunja and Kuyini, 2017; Adam, 2014; Fielding, 2012).

For instance, quantitative approaches, such as surveys and Structural Equation Modelling (SEM), can be used to test adopted theories and establish hypotheses. Meanwhile, qualitative methods, such as interviews, can be used to substantiate the results obtained by quantitative analysis and to validate research findings. Adopting post-positivism, this research is based on the hypothetico-deductive reasoning, which makes this research 'question-led' research. Detailed research design and methods for studying the 'reality' (i.e. the relationship between tenants' leasing behaviours, including their decisions about the greenness of office buildings, and rental) are discussed in Section 4.3 to 4.6.

4.3   Survey research design

This research employs a survey research design instead of others, such as case-study and experiment, and its advantages (specific to the nature of this research) are:

1. The majority of previous studies adopt the conventional hedonic pricing model (HPM) to investigate the relationship between the greenness of office buildings and their rental (see Section 2.4.1). Alternatively, this research adopts the behavioural approach to consider the 'human factors' not considered in previous studies. Specifically, this research explores the relationship between tenants' leasing behaviours and rental. To this extent, the adoption of survey research design in this research allows an investigation of the possible sources of the rental, by understanding various tenants' leasing motivators and their decisions about the greenness of office buildings.

2. This aim of this research (see Section 1.4) is to investigate organisational behaviours towards their office buildings. To this extent, adopting a survey research design is reasonable as it is proven as an efficient design for the acquisition of factual, self-reported expert opinions from the research participants (Flynn, 1990). Moreover, it raises the reliability of obtained data by using various statistical techniques (see Section 5.3).

3. The nature of this research requires investigation of a large number of office buildings and tenants occupying these buildings; the adoption of a survey research design is more appropriate compared with using case studies or experiments, particularly considering it is more economical and time-saving.

4.4 Implementation of three phases of the research process

In this research, a three-phase research process is adopted, namely: (i) exploratory phase; (ii) questionnaire development phase; and (iii) data collection and analysis phase (Figure 4.1). Three-phase research is adopted to maximise the reliability and validity of research findings. Details about each research phase are presented in Sections 4.4.1.
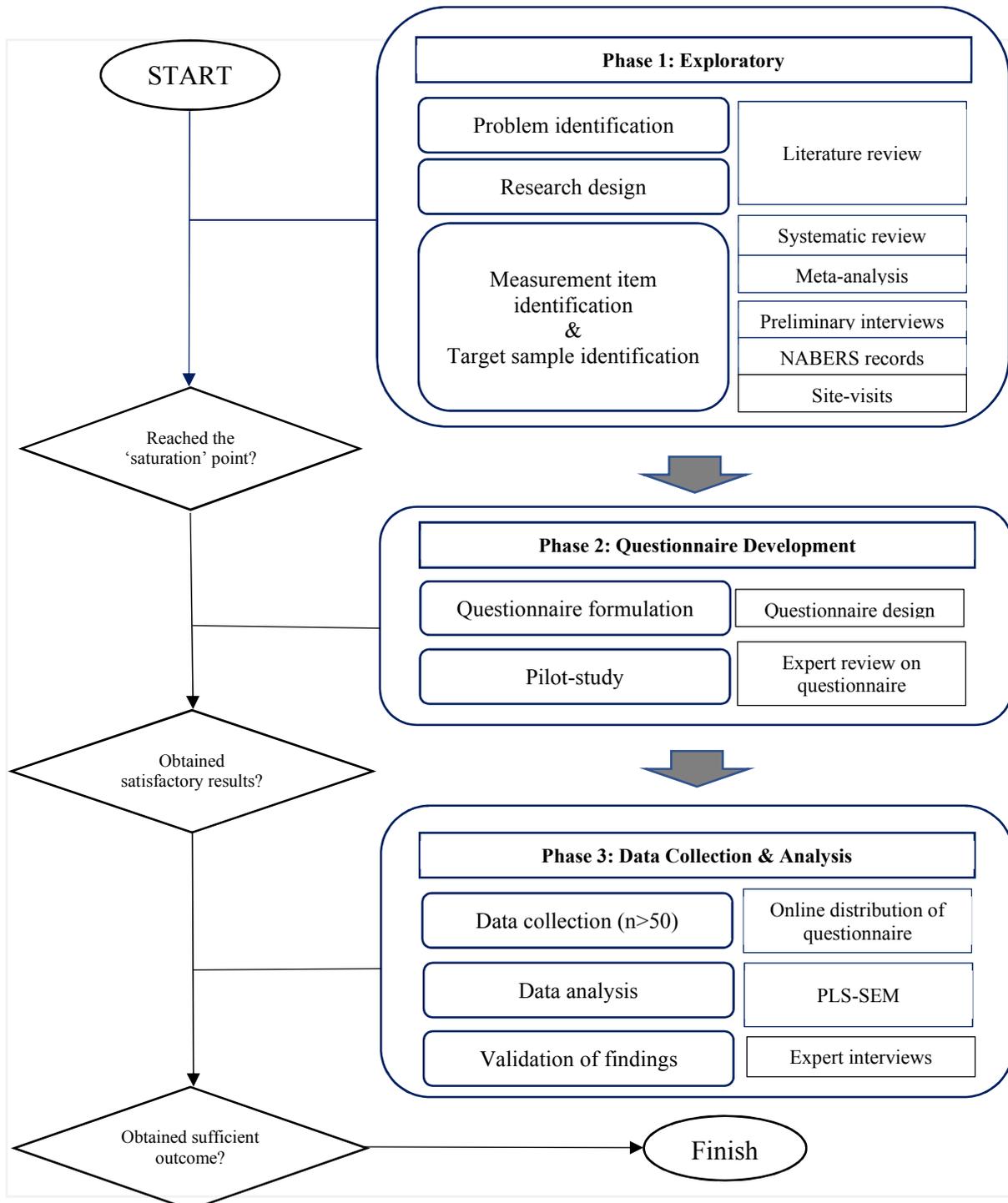
Figure 4.1 The three phases of the research process

4.4.1 Exploratory phase

To achieve the aim and objectives of the research, this research commenced with the exploratory phase, which identifies: (i) tenants' motivators driving their leasing decisions about the greenness of office buildings; and (ii) possible determinants of office rental, from both conventional real estate and the adopted behavioural perspective. Therefore, the main purpose of the exploratory phase is to identify and contextualise relevant measurement items for the subsequent development of the structured survey questionnaire by reviewing variables adopted by relevant studies. This is an essential part of this research, considering the limited availability of studies in relation to tenants' leasing behaviours, which defines this as exploratory research.

In addition to the review of literature that helps to identify the gaps in knowledge (see Section 2.5), the exploratory phase consists of: (i) systematic literature review and meta-analysis; and (ii) preliminary interviews. Brief findings from the exploratory phase are presented in subsequent sections.

4.4.1.1 Findings from the systematic literature review and meta-analysis

A systematic review of studies published after the 2000s shows that the analysis of the relationships between the greenness of office building and rental was mostly done using the regression-based HPM. An adoption of HPM allows these studies to adopt several variables ranging from the location (e.g. proximity to the nearby train station) to building quality (e.g. NLA, height) and from lease contract features (e.g. lease form) to energy efficiency (e.g. green building certification ratings).

The result of a meta-analysis reveals the impacts of the above-mentioned variable; most notably, the 'labelling effect' of green building rating certifications, which indicates a positive relationship between the greenness of office buildings and rental. Moreover, building quality (e.g. building age, height, renovation), access to train stations and lease contract features are also found to be significant determinants of office rental (Kim *et al.*, 2017a). The results confirm that the conventional rental determinants of location and building quality have a strong influence on office rental.

Nevertheless, it also shows the adopted variables are mostly similar to the conventional variables of office rental (see Section 2.5.2). In particular, as only the variables showing the tangible aspect of office buildings were adopted, the intangible (or symbolic) aspects of office buildings and their impact on rental is not explained. Accordingly, this necessitates the adoption

of alternative ways to identify possible determinants of tenants' leasing behaviours and rental. Therefore, preliminary interviews were conducted to identify required additional variables (or measurement items) more appropriate for use in this research context.

4.4.1.2 Findings from the preliminary interview

Table 4.1 summarises the background information of the nine interviewees who participated in the exploratory stage of this research. For this, an interview guide comprising 11 questions were developed (see Appendix A) and they were reviewed and approved by the UNSW Human Research Ethics Advisory Panel (approval number: HC17017). The questions were designed to obtain interviewees' responses about their organisation's office leasing motivators, expectations and organisational identity. Responses on each interview question were voice-recorded and transcribed following an agreement by all interviewees. Where necessary, their responses were analysed using a content analysis tool KH-Coder for content analysis.

Table 4.1 List of the organisations interviewed for the preliminary study

Interviewee	Sector	Specialities	Nationality	The primary purpose of the office
Interviewee A	Finance and Insurance	Banking	Australian	State HQ
Interviewee B		Insurance	Foreign	State HQ
Interviewee C		Finance (Non-profit)	Foreign	Single/Representative office
Interviewee D	Rental, Hiring and Real Estate	Commercial real estate	Foreign	National HQ
Interviewee E		Commercial real estate	Foreign	National HQ
Interviewee F		Commercial real estate	Foreign	National HQ
Interviewee G	Professional, Scientific & Technical	Advisory	Foreign	National HQ
Interviewee H		Advisory	Foreign	State HQ
Interviewee I		Architecture design	Foreign	Single/Representative office

The preliminary interview results indicate diversity in tenants' office leasing motivators. Of these, office location is the paramount motivator influencing all interviewees' office leasing decisions. The meaning of location is generally perceived as proximity to public transport and amenities (e.g. cafés) which are directly related to the provision of benefits to their employees. Other motivators highlighted by interviewees are costs, size of the floorplate, building quality, building sustainability features, government regulations and availability of suitable stocks (Kim *et al.*, 2019). In general, the identified tenants' leasing motivators are similar to the office rental determinants, which are closely related to the tangible aspects of office buildings (see Section 2.4.2).

In addition to the above, the interviews also identify some intrinsic leasing motivators. Most notably, eight out of nine interviewees agreed that they want to portray their organisational identity through the 'greenness' of their office buildings. This is aligned with their organisational values, such as 'leadership' and 'innovation'. For instance, Interviewee D pointe notes:

> *Sustainability is seen to be something that leaders do, and I think we see ourselves as a leader and an innovator, not just a follower.*

Interviewee D's response above is reinforced by Interviewee I, who emphasises the role of organisational identity in their leasing decisions about greenness, by stating

> *… in terms of branding (of the organisation), if you want to portray the image, sustainability commitment, that (the greenness of the building) speaks itself…*

Therefore, tenants' leasing motivator related to the portrayal of their organisational identity is highly connected with the symbolic aspect of office buildings such as the positive image of the greenness which may appeal to certain types of organisations or groups of stakeholders, such as employees and shareholders.

Further, it is also noted that tenants have several different expectations for their office leasing decision, particularly in regard to the greenness of their office buildings. Their expectations of leasing decisions about the greenness of office buildings include becoming a market leasing organisation, fast-follower organisation, socially responsible organisation and environmentally friendly organisation. In general, many of these expectations are closely aligned with the value of the greenness from the building occupants' perspectives (see Section 2.3).

In this research, the 'data saturation point' was achieved after the ninth interview, as little or no additional findings were unearthed. In general, interviewees consistently pointed out that their leasing decisions were not affected by a single motivator but both tangible and symbolic aspects of office buildings. Overall, findings of the preliminary interviews helped inform the questionnaire development phase (see Section 4.4.2) by contextualising and incorporating measurement items reflecting tenants' office leasing behaviours.

4.4.2   Questionnaire development phase

4.4.2.1   Questionnaire formulation

The questionnaire development phase involves collating the results obtained from the systematic literature review, meta-analysis and preliminary interviews. In particular, this phase aims at the development of measurement items of the questionnaire survey having consistency and coherency and adequately that represent the constructs under investigation (Hinkin, 1998).

In this research, a structured questionnaire comprising six sections was developed with the use of open-ended and closed-ended questions (see Section 4.4.2.1.1). Each section was designed to elicit tenants' responses about their organisation's leasing behaviours based on the established conceptual framework of the research (see Section 3.3). The developed structured questionnaire was reviewed and approved by the UNSW Human Research Ethics Advisory Panel (HC17017) before the industry wide survey.

The questionnaire consists of the following sections:

1. The basic profile of the survey respondents (e.g. their positions, years of experience) and their office/office building (e.g. Rental (Y), NABERS & Green Star ratings (X5)). Several 'screening questions' (see Section 4.5.3) were also included in this section;

2. Tenants' leasing motivators related to the tangible aspect of an office building (e.g. proximity to nearby amenities, office floor level) (X1);

3. Tenants' leasing motivators related to the symbolic aspect of an office building (e.g. comfortable office environment, a safe office environment) (X2);

4. Tenants' expectations at a time of leasing (e.g. to become a market leading organisation, to become a people-first organisation) (X3);

5. Tenants' organisational values (e.g. leadership, innovation) (X4); and

6. Push-pull forces moderating tenants' leasing decisions about the greenness of office building (e.g. relationships with the landlord, government support and incentives) (Z)

4.4.2.1.1   Questionnaire design

The questionnaire comprises several types of questions. Below is the description of each type of questions:

1. Dichotomous/polytomous questions, in which survey respondents were asked to choose only a single answer from given answers. Examples of this type of question include the questions on tenancy status (i.e. leased *versus* owned) and geographical coverage of tenants' businesses (i.e.local, national, regional or international).

2. Multiple-choice questions: Survey respondents were allowed to choose more than one answer from given answers. An example of this type of question includes the questions on tenants' areas of business (i.e. banking, real estate, legal, accounting legal, engineering, and so on).

3. Likert-scale questions: Survey respondents were asked to rate the degree of their opinions using the scales. In this research, 7-point Likert-scales were used to measure tenants' office leasing behaviour, as this scale is proven to be the compatible measure for a wide range of analysis, including confirmatory factor analysis (CFA) and SEM (Dawes, 2008). Examples of this type of questions include the questions on tenants' leasing motivators (e.g. proximity to the nearby amenities 1: very insignificant – 7: very significant) and organisational values (e.g. leadership 1: strongly disagree – 7: strongly agree).

4. Open-ended questions: Survey respondents were allowed to freely provide their opinions to the given question. Examples of this include questions on the participant's position in his/her organisation, and years of experience.

5. Semi open-ended questions: Survey respondents were allowed to freely provide their opinions, but within the set condition. An example of this type of question is the level of the greenness of tenants' office building (e.g. minimum 0 Stars to maximum 6 Stars in NABERS and/or Green Star).

4.4.2.1.2 Use of multiple measurement items

In this research, almost all specified constructs consist of multiple measurement items (or indicators) to effectively reflect constructs which cannot be directly measured or observed. This is because multiple measurement items often provide several advantages over single measurement items such as higher reliability and predictive validity (Diamantopoulos *et al.*, 2012; Bergkvist and Rossiter, 2007; Churchill, 1979). For example, multi-measurement items are often preferable to SEM method as the method requires estimation of the reliable variance (Wanous *et al.*, 1997). To this extent, it is more reasonable to adopt the multiple measurement items for this research as it can capture tenants' leasing behaviours, while not compromising

the reliability or validity of the findings. Following Marsh *et al.* (1998) and Sinkula *et al.* (1997), all constructs consisting of multiple measurement items, except for the greenness of office buildings (X5), adopted at least three measurement items. The construct showing the greenness of office buildings that used only two measurement items, considering it is measured by NABERS and Green Star ratings.

The single measurement item was adopted only for the dependent construct of this research (Y), (i.e. rental prices for a square metre). Studies suggest that the adoption of the single-measurement item should be considered carefully, as it could provide several practical benefits such as simplification of the survey, while reducing the reliability or validity of the findings when compared with the use of multiple measurement items (Hair *et al.*, 2017b; Kamakura, 2015; Bergkvist, 2015). The adoption of a single measurement item for the dependent construct of this research is justified considering the exploratory research nature of the research, and the fact that it is the single and the only item that accurately represents the amount of rental paid by tenants (Hair *et al.*, 2017b; Rossiter, 2002; Diamantopoulos *et al.*, 2012).

4.4.2.2 Pilot study

Adopting suggestions by several studies (Hinkin, 1998; Harrison and McLaughlin, 1991), the questionnaire was sent to the nine interviewees of the preliminary interviews for a pilot study, to check the layout and the language used in the questionnaire was comprehensive but easy to understand and to raise their reliability. Eventually, five interviewees agreed to review the questionnaire and share their feedback.

Further, to increase its content validity and clarity, the questionnaire was sent to two academics experienced in this discipline to review. After careful consideration of the feedback given (including the refinement of some wording), necessary amendments were made before the launch of the industry-wide questionnaire survey. The refined survey questionnaire was first imported to the cloud-based online survey tool, Qualtrics (provided by the University of New South Wales). The final version of the questionnaire is provided in Appendix B.

4.4.3 Data collection and analysis phase

The data collection and analysis phase involves the analysis of hypothesised relationships among tenants' key motivators, their leasing decisions about the greenness of office buildings, and office rental (as presented in Section 3.7). Generally, the aims of this phase are to: (i) collect sample data required for statistical analysis through appropriate procedures; (ii) analyse

obtained data using appropriate statistical methods; and (iii) validate research findings. The detailed data collection process is discussed following.

4.4.3.1 Data collection process

The data collection process was commenced in late 2017, with approval from the UNSW Human Research Ethics Advisory Panel. This research adopts Qualtrics, an online survey tool, for data collection. The developed survey questionnaire was implanted to the Qualtrics system, which generates a URL for distribution. The survey was distributed through two channels. First, email invitations were directly sent to the potential survey respondents, using the obtained contact details. The invitation emails contained the purpose of the research and procedures of the questionnaire survey. Moreover, information for survey respondents, such as contact details of the research investigator and human research ethics approval number, was included to vouch for its reliability.

Second, the URL was shared through the CitySwitch Green Office Program LinkedIn group and their newsletter emails to boost the data collection process. CitySwitch Green Office Program was selected considering it is the initiative to encourage a higher level of greenness of office buildings in major Australian city councils including the City of Sydney (see Section 2.2.4). Moreover, it enhances the trustfulness of this research especially to the participants of the questionnaire survey. It should be noted that the membership of the LinkedIn group and the newsletter subscriptions are strictly limited to the targeted survey respondents, as described in Section 4.6.2. In addition, a statement was included to explicitly show that the survey was targeted at Sydney CBD office tenants. To improve the response rate, several reminder emails through Qualtrics were sent. Eventually, a total of 51 responses was obtained, thus representing 3.9% of response rate. The obtained responses were analysed using Partial Least Square – Structural Equation Modelling (PLS-SEM) method, as discussed in Chapter 5.

4.4.3.2 Validation process

Upon completion of the analysis, the findings of the research were validated through expert interviews. As with the preliminary interviews, e-mail invitations were sent to potential interviewees. Their participation in the preliminary interviews and the questionnaire survey were double-checked prior to the interview, as they must be excluded if they participated in either of them. The semi-structured interview guide (Appendix C) was shared with the selected

interviewees in advance, and their responses were voice-recorded (with their agreement). Results of the validation process are discussed in Chapter 8.

4.5 Research methods

In terms of research methods, this research employs: (i) historical archive analysis; (ii) interviews; and (iii) online questionnaire survey. This combination of data collection methods ensures this research has 'triangulation' of the research methods. This allows this research to overcome the inherent limitations of each method and have a stronger research design. The justification for each method is discussed below:

4.5.1 Historical archive analysis

Historical archive analysis is used to analyse various types of literature and can be used in conjunction with other methods, including a questionnaire survey (Pasco, 2004; Flynn, 1990). To analyse literature relevant to this research, a systematic literature review and meta-analysis were conducted.

Manchikanti *et al.* describe systematic literature review as, "the application of scientific strategies that limit bias by the systematic assembly, critical appraisal, and synthesis of all relevant studies on a specific topic" (2009, p. 35). Therefore, a systematic literature review is aligned with the evidence-based paradigm, which seeks to answer research questions through objective evaluation and synthesis of relevant empirical studies (Brereton *et al.*, 2007; Jones, 1996). In this research, the purpose of conducting systematic literature review and meta-analysis is two-fold: (i) to critically review analytical methods adopted by relevant past studies; and (ii) to identify rental determinants of office buildings in relation to the greenness of office buildings (Kim *et al.*, 2017a). Below are the procedures adopted in this study:

1. Critically review past studies about the relationships between the greenness of office buildings and their rental, with emphasis given to their analytical methods, adopted variables and results; and
2. Conduct meta-analysis using a statistical package (i.e. SPSS)

Eventually, the results of systematic literature review and meta-analysis led to the identification of the measurement items of the questionnaire survey. This allows operationalisation of the constructs of tenants' leasing behaviours as discussed in Section 3.6.

4.5.2   Interviews

In this research, semi-structured face-to-face interviews were adopted for exploratory (see Section 4.4.1.2) and validation (see Chapter 8) purposes. The semi-structured face-to-face interview approach was adopted as it provides several advantages over structured or unstructured interviews. For instance, obtaining expert opinions in a direct and flexible setting is possible. Further, it allows instant clarification of any ambiguous responses and prompts follow-up questions, when necessary.

As discussed in Section 4.4.1, the preliminary interview is especially essential in this research, considering the limited availability of the related studies relating to the collective effect of the tangible and symbolic aspects of office buildings on rental. Specifically, it allows this research to:

1. identify additional measurement items of the questionnaire survey, especially in relation to the non-tangible aspects of office buildings in Sydney CBD (e.g. their symbolic values, tenants' organisational identity and expectation); and
2. clarify terminologies used in the questionnaire survey.

Similarly, the validation interview is important in this research for the following reasons:

1. It provides an indication that whether the research findings 'make sense';
2. It reveals the contribution of the research, especially in its practical applications;
3. It helps to identify limitations of the research and areas to improve; and
4. It helps to determine future research directions.

4.5.3   Online questionnaire survey

The online questionnaire survey was selected as a primary method of data collection for the following four reasons:

1. An online questionnaire survey is more time- and cost-effective data collection method as a mean of obtaining self-reported expert opinions, compared with other options such as paper-based questionnaire survey and face-to-face interviews (Heiervang and Goodman, 2011; Wright, 2005). This is especially important because the targeted research participants (the key office leasing decision makers of different organisations) are usually the employees at the senior management level (e.g. CEO, Director) which raises the difficulty in obtaining a sufficient number of responses within the limited time

and budget unless an online questionnaire survey is adopted. This aligns with the fact that online questionnaire surveys are often considered more efficient data collection methods than traditional methods (e.g. by mail) in studies on organisational behaviour (Baruch and Holtom, 2008).

2. Data obtained from the online questionnaire survey can be used to effectively and empirically test hypotheses required to achieve the aim of the research (Flynn, 1990). This could be done using summated scales (e.g. Likert-scale), that measure either a favourable or unfavourable attitude towards the given statement (Kothari, 2018). Moreover, the collated survey data also can be used for future research, given its exploratory nature.

3. It is possible to include a set of mandatory questions that do not allow survey respondents to proceed unless responses to respective questions are provided. This minimises the chance of missing data. Mandatory questions used in this research include questions about survey respondents' position in their organisation (e.g. CEO), their organisation's main business areas (e.g. real estate), tenancy status (i.e. leased compared with owned), amount of rental, the level of the greenness of their office building (e.g. NABERS ratings) and their leasing motivators.

4. Fourth, despite the various advantages of adopting an online questionnaire survey in this research, it is also acknowledged that it has several limitations, such as finding an adequate sample size for the required statistical tests (Bartlett *et al.*, 2001). Further, it should be noted that the Likert-scale adopted in an online questionnaire survey may limit what survey respondents want to say by forcing them to choose their opinion based on a numerical scale. This may result in the risk of obtained responses being potentially biased or inaccurate (Kothari, 2018; Jones *et al.*, 2013). For instance, social responsibility bias has been a long issue in any research involves psychometric measures (Rosenman *et al.*, 2011), and due to the nature of the online questionnaire survey, there is also a risk that the survey may be completed by an ineligible person (e.g. a receptionist or a member of the marketing department, not the office leasing director).

Nevertheless, many of these limitations can be overcome by implementing various remedial strategies. These strategies include, but are not limited to, adoption of the second-generation multivariate methods, the inclusion of open-ended questions and screening questions, and a review on responses patterns. For example, the second-generation multivariate method of PLS-

SEM accepts quantitative analysis on obtained survey data, using a relatively small number of sample size (see Chapter 5). Moreover, the inclusion of open-ended questions allows survey respondents to state their opinions to support their responses. Likewise, screening questions (e.g. a participant's position in his/her organisation) allows verification of the trustfulness of the obtained sample data. Finally, a review of patterns of obtained responses allows the identification of any suspicious responses such as 'straight linings' (Hair *et al.*, 2017b). These allow the removal of any irrelevant and inappropriate responses, which could produce uninterpretable or biased results. Considering the availability of various remedies and its appropriateness in this research context, it is justifiable to adopt the online questionnaire survey as a data collection method of this research.

4.6   Sampling methods

4.6.1   Stratified sampling method

This research adopts a stratified sampling method over the other methods (such as convenience sampling method or simple random sampling method) as it allows identification of the list of tenants occupying office buildings based on strata. This helps to understand the leasing behaviours of tenants driving the demand towards the greenness of office buildings. Moreover, its nature, as a probability sampling method, permits the generalisation of research findings (Sarstedt *et al.*, 2017).

Specifically, this research identifies over 100 office buildings in Sydney CBD, occupied by more than 1,300 tenants. Sydney CBD is selected as the geographical scope of this research considering the largest number of NABERS certified office buildings in Sydney CBD compared with other suburbs in Australia (Kim *et al.*, 2019). This scoping technique is also adopted by several previous studies (Fuerst, 2009; Chegut *et al.*, 2011; Kok and Kahn, 2012) whereby Postcode 2000 is used to define the boundary of Sydney CBD. The boundary of Sydney CBD used in this research is identical with the boundary defined by the Property Council of Australia (PCA) boundary maps and CityScope dataset. NABERS registry is used due to its reliability and comprehensiveness; its information is generated and updated regularly by the Australian government agency of the Office of Environment and Heritage (OEH). This registry also contains a wide range of information required for this research, including the location of each building and the level of the greenness as represented by NABERS ratings.

Based on the investigation on NABERS registry and subsequent site-visits of Sydney CBD-located office buildings, this research determined the top three sectors of the identified tenants using the Australian and New Zealand Industrial Classification (ANZSIC). Results of the classification process reveal that the Sydney CBD-located green buildings are occupied by tenants from (i) Finance and insurance services sector (28.9%), (ii) Professional, scientific, and technical services sector (27.3%), and (iii) Rental, hiring and real estate services (10.0%) (Kim *et al.*, 2019). These top three sectors account for over 65.6% of the entire tenant population, which therefore, provides representability.

4.6.2 Judgemental sampling method

In identifying prospective interviewees and survey respondents (i.e. key informants), a judgemental sampling method is used. Judgemental sampling, also known as a purposive method, is one of the non-probability sampling methods. As the name suggests, it allows identification of the appropriate sample population (e.g. interviewees) based on the researcher's experience and judgement. As noted by Briggs *et al.* (2012), the selection of the judgemental sampling is justifiable, considering the interviews and surveys must target the 'representative' key-personnel of the targeted organisations. To achieve the purpose of the preliminary interview and online questionnaire survey, email invitations were sent to potential interviewees who have either/or: (i) been involved in their organisation's leasing decisions; (ii) significant knowledge of their organisation's leasing decisions. According to the criteria, nine interviewees (Table 4.1) and participants of the online questionnaire survey, consisting of mid- to senior-level employees (such as CEO, Director, Sustainability and Leasing Manager) were identified. The identified key informants for the interviews and online questionnaire survey are further verified based on the given information (such as their current position, years of experience and previous experience in leasing green building) prior to analysis to ensure their reliability (see Section 6.2).

It should be noted that the targeted interviewees for validation of research findings are a different cohort from those of preliminary interviews and online questionnaire surveys. Specifically, all interviewees for validation must either have an in-depth knowledge of the Sydney CBD office market and its tenants' leasing behaviours (e.g. as a research director) or have intensive experience in office tenancy representation (e.g. as a leasing director). This is to ensure interviewees have correct and full knowledge of various tenants' office leasing

behaviours required to verify the findings of this research. Therefore, the targeted interviewees for validating the research findings are those who:

1. Are experienced with tenants' leasing behaviours and motivations about the greenness of office buildings; or
2. Have involved in the leasing decision-making process of tenants' current office.

4.7 Summary

This chapter discusses the research design and data collection method derived from the post-positivism research paradigm and hypothe-deductive approach. Their emphasis of the objective view of reality and logical reasonings led to the adoption of the survey research design and development of the three phases of the research, consisting of (i) exploratory phase, (ii) questionnaire development phase and (iii) data collection & analysis phase.

In the exploratory phase, a systematic literature review and meta-analysis were conducted, followed nine preliminary expert interviews. Through these, potential measurement items of the research were successfully identified. In the questionnaire development phase, the questionnaire survey was designed to effectively and efficiently obtain responses from the targeted survey respondents. The developed questionnaire survey was also sent to the five interviewees and two experienced academics for an expert review to raise its reliability and applicability. In the final phase of the research, data collection for the questionnaire survey was made based on the stratified sampling process. A total of 51 responses was obtained through the online distribution of the questionnaire survey. The obtained responses were analysed using PLS-SEM to analyse the relationships between tenants' office leasing behaviours and rental. The results of the analysis were reviewed by another three industry experts from the real estate sector to ensure their validity and applicability in practice. The next chapter discusses details of the methods of analysis.

Chapter 5. METHODS OF ANALYSIS

5.1. Introduction

This chapter presents the analytical methods used to achieve the aim and objectives of the research. Section 5.2 commences with a discussion about the Partial Least Square - Structural Equation Modelling (PLS-SEM) and justifications on its selection as a primary method of analysis. Then, discussions on the required process to use PLS-SEM for this research are presented in Section 5.3. This section consists of a specification of the structural and measurement models, preparation of sample data, evaluation of the measurement and structural models, as well as discussions about moderator analysis.

5.2. Background of data analysis methods

Several statistical methods can be adopted in analysing survey data. These methods are broadly classified into first-generation multivariate analysis methods and second-generation multivariate analysis methods. Accordingly, subsequent sections provide discussions about each method followed by justifications for using the second-generation multivariate analysis method of PLS-SEM technique for this research as a method of analysis.

5.2.1. First-generation multivariate analysis methods

Table 5.1 shows examples of first-generation multivariate methods that are often adopted in behavioural and social science research. These include Analysis of Variance (ANOVA), principal component analysis, exploratory factor analysis and multiple regression analysis (Gerow *et al.*, 2010). This research adopts exploratory factor analysis (EFA), one of the most commonly adopted methods to determine to construct validity, prior to using the second-generation multivariate of PLS-SEM. The aim of using EFA in this research is two-fold: (i) to remove any irrelevant or inconsistent measurement items; and (ii) to extract any constructs embedded within the measurement items.

As its name suggests, EFA is mainly exploratory, meaning that it is most appropriate in exploring a dataset, rather than testing hypotheses or theories (Costello and Osborne, 2005). Therefore, as noted by several studies (Henson and Roberts, 2016; Fabrigar *et al.*, 1999), EFA is particularly useful in this research, as there is limited availability of prior theories and empirical studies on the relationship between the greenness of office buildings and rental, especially in the Australian context (see Section 2.5). To conduct EFA, it is recommended to have a sample size of over 50 (Winter *et al.*, 2009).

Table 5.1 Classification of multivariate methods (adopted from Hair *et al.* (2017b))

Generation	Exploratory Research	Confirmatory Research
First-generation multivariate methods	▪ Cluster analysis ▪ Exploratory factor analysis (EFA) ▪ Multidimensional scaling	▪ Analysis of variance (ANOVA) ▪ Logistic regression ▪ Multiple regression
Second-generation multivariate methods	Partial Least Squares - Structural Equation Modelling (PLS-SEM)	▪ Confirmatory factor analysis (CFA) ▪ Covariance-based Structural Equation Modelling (CB-SEM)

5.2.2. Second-generation multivariate methods

SEM is selected as a main method of analysis for this research. SEM is a set of second-generation multivariate methods (e.g. paths analysis, confirmatory factor analysis and structural analysis) that allows the examination of a set of relationships (or paths) between one or multiple independent (or predictor) constructs (or factors), either continuous or discrete, and one or more dependent (or predicted) constructs (Hair *et al.*, 2017b; Ullman and Bentler, 2004). Hitherto, a large number of studies in the field of behavioural and social sciences have adopted SEM to analyse organisational behaviour and group decision making (Xu *et al.*, 2016; Alper *et al.*, 1998; Wally and Baum, 1994).

In this research, SEM has several advantages over the first-generation multivariate methods. In this case, the use of SEM offers a more comprehensive evaluation of the reliability and validity of data; therefore, it gives confidence to the overall trustworthiness of research findings (Boucard *et al.*, 2007). Following is a further justification for selecting SEM over the first-generation multivariate analysis methods.

First, SEM offers an analysis of the complex reciprocal relationships associated with one's decision-making process. For instance, SEM allows investigation of the interrelationship among various constructs representing tenants' leasing behaviours based on the hypothesised paths (or relationships) specified by the conceptual framework of the research (see Section 3.5). This is an important advantage, considering the first-generation multivariate methods (including the widely adopted regression analysis) have limitations, such as a lack of consideration of complex multi-dimensional relationships among the variables and its high sensitivity to sample size (Jeon, 2015; Lowry and Gaskin, 2014; Schneider *et al.*, 2010).

Further, SEM allows empirical testing of theoretical prepositions using non-experimental data (e.g. survey data) (Salkind, 2010). For instance, it is possible to test whether the adopted symbolic self-completion theory well-explains tenants' office leasing behaviours. This is further supported by Chin (1998a, 1998b) who notes that SEM provides higher flexibility, allowing researchers to understand the interplay between theory and data. In addition, SEM recognises and accounts for error in each measurement items of the survey questionnaire (Astrachan *et al.*, 2014). Moreover, SEM can be used in conjunction with some first-generation multivariate methods. For example, EFA can be undertaken to examine the pattern of the measurement items and identify respective constructs embedded within them, before modelling on the relationship among these constructs using SEM (see Section 6.3.2).

SEM also allows the adoption of a bootstrapping method (i.e. a re-sampling technique of obtained data). This method is particularly useful when the number of sample data is relatively small and there is a concern about the distribution of sample data (Hair *et al.*, 2017b; Mooney and Duval, 1993). For example, the bootstrapping method allows an increase in the number of sample data from 50 to 5,000 (or even 10,000) and, thus, results in more reliable results in CFA and path analysis.

The relationships between constructs can also be graphically illustrated using path models (Hair *et al.*, 2017b). As a result, it is possible to easily demonstrate the research findings of relationships among tenants' leasing motivators, leasing decisions about the greenness of office buildings and rental. Generally, there are two SEM approaches: (i) Partial Lease Square SEM (PLS-SEM) and (ii) Covariance-Based SEM (CB-SEM). Table 5.2 summarises the characteristics and requirements of these two approaches.

First, PLS-SEM is generally used for theory building, whereas CB-SEM is more appropriate for theory confirmation (Hair *et al.*, 2017a; 2017b; 2011; Lowry and Gaskin, 2014; Astrachan *et al.*, 2014). Moreover, CB-SEM and PLS-SEM have different sample size requirements; whereby the former requires a substantially larger sample size than the latter (Astrachan *et al.*, 2014). PLS-SEM (because of its nature as a 'partial least square') can maintain a high statistical power even with relatively low sample sizes (Lu *et al.*, 2011; Astrachan *et al.*, 2014; Hair *et al.*, 2014). For example, Hair *et al.* (2017b) suggest that PLS-SEM establishes predictive validity even when the sample size is relatively small (e.g. 50); whereas Aimran *et al.* (2017) found that CB-SEM performs better with larger sample sizes of at least 100. In addition, the distribution

of sample data must be normally distributed for CB-SEM, whereas PLS-SEM is a distribution-free approach (Hair *et al.*, 2014; 2017a; Astrachan *et al.*, 2014). Nevertheless, it is noted that the PLS-SEM is not superior to CB-SEM, or *vice versa*, and that their selection is mainly made based on the nature of research, research objectives and other criteria. Therefore, the justification for selecting PLS-SEM over CB-SEM in this research is provided in Section 5.2.3.

Table 5.2 Comparative characteristics of PLS-SEM and CB-SEM

	PLS-SEM (composite based)	CB-SEM (factor based)	References
Primary purpose	Exploratory study, Theory building	Confirmatory study, Theory confirmation	Hair *et al.* (2017a; 2017b; 2011) Astrachan *et al.* (2014) Lowry and Gaskin (2014)
Sample size	Can be applied with a small number of samples, although 50 or generally is preferable	5-10 observations per indicator or more than 100	Astrachan *et al.* (2014) Hair *et al.* (2017a; 2014) Lu *et al.* (2011) Diamantopoulos *et al.* (2012) Henseler *et al.* (2014)
Complexity of model	Can handle complex models	Substantially larger sample number is required for more complex models	Henseler *et al.* (2014) Lowry and Gaskin (2014) Ringle *et al.* (in-press)
Distribution of data	Either normally or non-normally distributed	Must be normally distributed	Astrachan *et al.* (2014) Hair *et al.* (2017a; 2014)

5.2.3. Justification for using PLS-SEM
In this research, PLS-SEM is determined to be a more appropriate method over CB-SEM, due to the following three reasons.

1. *The primary purpose of the research:* This research is aimed at identifying the sources of rental from the tenants' behavioural perspective (see Section 1.4). As the nature of this research is exploratory, not the confirmation of theories, PLS-SEM fits better than CB-SEM in this case. This is supported by Richter *et al.* (2016) and Hair *et al.* (2011) who state that the primary selection criteria must be the research purpose, whereas other criteria such as sample size and distribution of data must be considered secondary. Moreover, Lim and Ling (2011) and Henseler *et al.* (2014) suggest that PLS-SEM is suitable for organisational, behavioural and other studies, which involve statistical modelling of econometric and psychometric perspectives.

2. *The sample size of the research:* The primary method of data collection of this research is an industry-wide questionnaire survey, targeting those key leasing decision makers (i.e. a key informant) of the organisations such as CEO, leasing directors and sustainability directors (see Section 4.6.2). It is thus expected that a relatively low number of responses will be obtained from the survey, making PLS-SEM more suitable than CB-SEM.

3. *The complexity of the model:* The proposed conceptual framework of this research comprises of six constructs and twelve paths (excluding the moderator construct and its paths) and the number can be remarkably increased, depending on the result of EFA. This makes the proposed model very complex, while the adoption of CB-SEM is not likely to manage its complexity and generate statistically valid findings. Therefore, PLS-SEM is deemed more appropriate.

PLS-SEM also has some disadvantages, such as the possible existence of collinearity issue and inability to apply the goodness-of-fit index (GoF) to evaluate its model (Goodhue *et al.*, 2015; Wong, 2013; Henseler and Sarstedt, 2013). However, Hair *et al.* (2017b) claim these disadvantages can be overcome. For example, the existence of the collinearity of the model can be assessed by measuring the variance of inflation factor (VIF) (Section 5.3.5.1). Similarly, the structural model can be evaluated based on alternative criteria, such as the significance of path coefficient (Section 5.3.5.2) and the level of coefficient of determinants (Section 5.3.5.3) and effect sizes (Section 5.3.5.4). Collectively, it is more reasonable to adopt PLS-SEM over CB-SEM as a primary method of analysis for this research.

5.3. PLS-SEM process

An application of PLS-SEM in this research involves several steps, as shown in Figure 5.1. Adopting Hair *et al.,* (2017b), at first, the sample data preparation process was undertaken (Section 5.3.1), and thereafter the structural (Section 5.3.2) and measurement models (Section 5.3.3) are specified. This is followed by evaluation of the measurement model (Section 5.3.4) which involves: (i) exploratory factor analysis (EFA); and (ii) confirmatory factor analysis (CFA) to ensure reliability and validity of data (Section 5.3.4). Upon establishing the reliability and validity of data, evaluation of the structural model was undertaken. Finally, the moderator analysis was undertaken. Further details about these steps are discussed below.

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│          Sample data preperation         │
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┌─────────────────────────────────────────┐
│       Structural model specification     │
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┌─────────────────────────────────────────┐
│      Measurement model specification     │
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┌─────────────────────────────────────────┐
│        Measurement model evaluation      │
└─────────────────────────────────────────┘
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┌─────────────────────────────────────────┐
│        Structural model evaluation       │
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┌─────────────────────────────────────────┐
│             Moderator analysis           │
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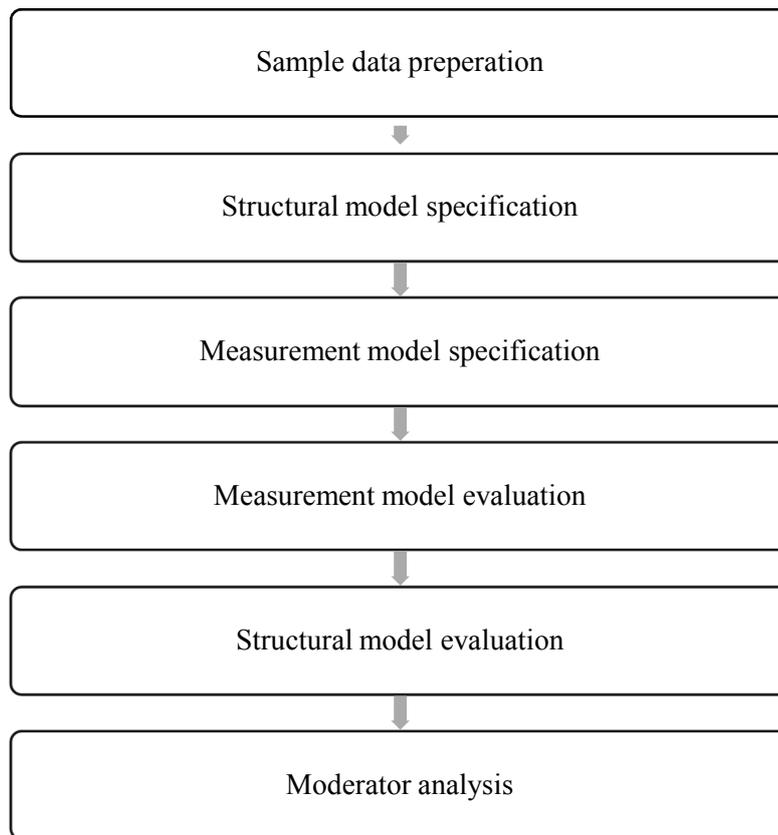
Figure 5.1 A systematic procedure for applying PLS-SEM adopted for this research

5.3.1. Sample data preparation

The first stage of the PLS-SEM process is sample data preparation and examination, which involves examining and establishing the reliability and validity of measurement items and constructs. In this research, several attempts were made to prepare data for the subsequent stages of the PLS-SEM process, using IBM SPSS Statistics. These attempts include an inspection of missing data, outliers, suspicious patterns, and common method variance (CMV).

5.3.1.1. Missing data

The issue of missing data can potentially cause a reduction of sample size and thus induce a bias when analysing the obtained responses (Hair *et al.*, 2010). As a rule of thumb, if the amount of missing data is over 15%, it is generally considered an issue and respective responses need to be removed (Hair *et al.*, 2017b). If the amount of missing data is less than 15% of the recommended threshold, it is required to examine the characteristics of missing data. This includes a diagnosis of the randomness of the missing data, which can be classified as either Missing at Completely Random (MCAR) or Missing at Random (MAR) (Hair *et al.*, 2010;

Masconi *et al.*, 2015). This guides the adoption of appropriate remedies, such as mean value replacement, case-wise deletion and pair-wise deletion.

In this research, missing data is not a major issue as that most responses collected were complete, with all closed-ended questions having been answered duly, while several mandatory questions were included when necessary (Section 4.5.3). Thus, no remedial action was taken prior to subsequent analysis.

5.3.1.2. Outliers

An outlier is an extreme response given to a particular question or entire questions (Hair *et al.*, 2017b). The presence of outliers can potentially contaminate the data collected and thus impact on the results of the analysis. In this research, no statistically misleading outliers were detected, except for responses about the organisation's annual turnover, after an assessment of box-and-whisker plots of the obtained data. Hair *et al.* r say that determination on outliers and their subsequent removal should be made based on practical sense. Adopting their suggestion, the outlier related to organisation's annual turnover was considered as acceptable, given this information was only used as a supplementary purpose to understand a general profile of the survey respondents' organisations.

5.3.1.3. Suspicious patterns

Next, suspicious patterns of the obtained responses were examined. Suspicious response patterns include straight lining, diagonal lining, and alternating extreme pole responses (Hair *et al.*, 2017b). In this research, as suggested by Hair *et al.* (2017b), the potential existence of suspicious response patterns was examined using visual inspection of the data, including responses given to respective open-ended questions. Eventually, three responses were removed.

5.3.1.4. Normality of data

The normality test offers an overview of the distribution of the sample data. As discussed in Section 5.2.3, unlike CB-SEM, PLS-SEM does not require data to be normally distributed. However, as shown by Hair *et al.* (2017b), it is recommended to not have extremely non-normally distributed data, as it inflates errors from the bootstrapping procedures. Although several approaches can be adapted to determine the degree of normality, skewness and kurtosis are typically used. Curran (2001) suggests skewness value between -2 and +2, and kurtosis value between -7 and 7 can be considered as normal, whilst skewness value of +3 (or -3) and kurtosis value of 21 (or -21) indicates the extreme level of non-normality. Meanwhile, other

studies (Muthén and Kaplan, 1985; Ho and Yu, 2015) suggest a more stringent guideline of between -1 and +1 (or -3 and +3 in case of the 'excess kurtosis').

In this research, it is found that 15 out of 82 measurement items (equivalent to approximately 18%) have skewness level out of the more stringent recommendation of -1 to +1 range. Of these, only two of them has skewness over 2 (or less than -2), while none of them shows above the thresholds for an extreme value of 3 (or -3). Specifically, 'customer satisfaction' (OV13) has a skewness level of -2.747, followed by 'teamwork' (OV4, -2.018) and 'efficiency' (OV9, -1.664). Similarly, it is found that 'customer satisfaction' (OV13) has the highest level of kurtosis (11.819), followed by 'teamwork' (OV4, 6.140) and 'efficiency' (OV9, 5.431). Overall, the result indicates the existence of non-normal data; however, following the guideline specified in Curran (2001), it can be still considered as acceptable and thus have been retained for subsequent stages of the analysis as none of the items showing the extreme level of the non-normal distribution of data.

5.3.1.5. *Common method variance (CMV)*

Podsakoff *et al.* (2003, p. 879) define common method variance (CMV) as the "variance that is attributable to the measurement method rather than to the constructs the measures represent". CMV is a concern particularly for behavioural research that relies on self-report questionnaires. This is because CMV can cause a false consistency due to the measurement error, rather than due to the actual phenomenon of data; thereby affect the validity of results obtained (Chang *et al.*, 2010; Malhotra *et al.*, 2006). As such, an examination of CMV is essential here as this research employs a self-reported questionnaire survey as the primary data collection tool.

In this research, an assessment of CMV was undertaken using Harman's (1967) single factor test. The test results show that the adopted 82 measurement items explain 26.16% of the variance, with no single construct account for over 6.97% of the variance in the sample data. This indicates that CMV is not a major issue in this research as that the total variance of a single construct is less than 50% of the suggested threshold (Eichhorn, 2014; Podsakoff *et al.*, 2003).

5.3.2. Structural model specification

The next step is specifying a structural model, which forms the inner part of the PLS-SEM model. When specifying the structural model, two principal issues must be considered: (i) the sequence of the constructs; and (ii) the relationship (or 'casual links', if supported by the structural theory) between them. These are important fundamentals as they reflect the

hypothesised relationships between each construct, which are established based on the relevant theories (Hair *et al.*, 2017b). The sequence and relationship between each construct can be determined ideally based on existing theories and logic but also possibly based on researchers' practical experience and judgement when there is an inconsistency or uncertainty among studies (Hair *et al.*, 2017b). For example, traditional real estate studies often use building size, height and age to characterise building quality in their attempt to examine the relationship between the tangible aspect of office buildings and rental (see Section 2.4.2). In this context, these rental determinants act as the predictor construct; whereas rental becomes the predicted construct (Figure 5.2).
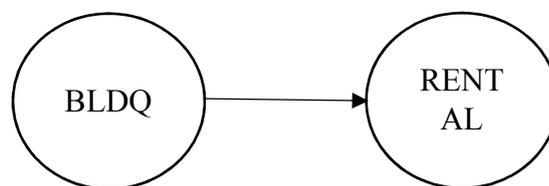
Figure 5.2 Relationship between predictor and predicted constructs

In this research, the structural model specification was devised according to the conceptual framework of this research, which was designed based on a combination of the three underlying behavioural theories: (i) expectancy-value theory, (ii) symbolic self-completion theory and (iii) push-pull theory (see Section 3.3). The specified structural model shows sequence and relationships (i.e. paths) from predictor constructs to predicted constructs, and thus reflecting the hypotheses of this research (see Section 3.7).

5.3.3. Measurement model specification

Measurement model specification is important as the measurement items adopted in the survey questionnaire must properly reflect each related construct. In this research, all the measurement models are specified in a reflective model. Figure 5.3 is an example of the reflective measurement model between a predictor construct of building quality, one of the constructs showing the tangible aspect of office buildings, represented by its measurement items of size, grade and amenities.
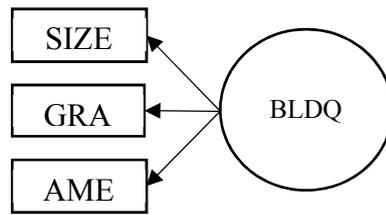
Figure 5.3 Example of a reflected measurement model adopted in this research

Justifications for selecting the reflective measurement model for this research are follow.

1. *Exploratory nature of this research*: In this research, the main intention is to investigate the relationships among various tenants' identities, motivators and rental based on several behavioural theories, rather than to identify the impact of specific measurement items. Therefore, the reflective measurement model was preferred over the formative model approach, as the adoption of a reflective measurement model is more appropriate for theory testing; whereas the formative model should be used for theory confirmation and identification of most important measurement items reflecting a relevant construct (Hair *et al.*, 2017b); and

2. *Measurement items are interchangeable:* In this research, for example, the quality of office buildings, which is a part of the tangible aspect of office buildings, is represented by three measurement items: (i) office space size; (ii) building grade and (iii) amenities. As suggested by Kim and Lim (2018a), these three items are highly correlated to each other and sometimes even interchangeable (for example, Premium and A-grade office buildings are generally larger and taller, and provide better on-site amenities). Jarvis *et al.* (2003) note the reflective model approach should be used when the measurement items of the respective construct describe the same or similar contents or are interchangeable

5.3.4. Evaluation of measurement models

In this research, (as discussed in Section 5.2) both classical and contemporary construct validation approaches were adopted to evaluate internal consistency reliability, uni-dimensionality, and convergent and discriminant validity (see Table 5.3). Following are discussions about the construct validation process adopted by this research.

Table 5.3 Classification of construct validation approach

Classical validation approach	Contemporary validation approach
Cronbach's alpha and item-to-total correlation ▪ Internal reliability / consistency	Confirmatory factor analysis (CFA) ▪ Internal reliability / consistency ▪ Uni-dimensionality ▪ Convergent validity ▪ Discriminant validity
Exploratory factor analysis (EFA) ▪ Sampling adequacy ▪ Communalities ▪ Uni-dimensionality	

5.3.4.1. Sampling adequacy and communalities

It is important to assess sampling adequacy and communalities in EFA. Specifically, sampling adequacy shows the appropriateness of data (i.e. measurement items) before extracting any constructs (Williams *et al.*, 2010). Widely used measures of sampling adequacy (MSA) are Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity (Cerny and Kaiser, 1977; Williams *et al.*, 2010). Meanwhile, communalities show the degree of variance in each measurement item that is accounted for by the respective factor (Hogarty *et al.*, 2005). Therefore, higher communalities are preferable.

In this research, KMO value over 0.5 and Bartlett less than 0.05 (Christiansen *et al.*, 2014), and communalities of 0.6 for most measurement items (Hair *et al.*, 2010) and/or have at least 0.4 for each measurement item (Costello and Osborne, 2005) are adopted. Therefore, any measurement items not meeting this threshold are considered for removal, unless otherwise justified.

5.3.4.2. Internal reliability

Internal reliability indicates the reliability of measurement items based on the intra-scale consistency of the responses (Boyle, 1991). Evaluation of internal reliability is essential for behavioural studies where the precision of their measurement items is a major concern (Raykov, 1997). In particular, obtained survey responses can be affected by various issues from the background knowledge of survey respondents to the length of the structured survey questionnaire (Suhr, 2003). Therefore, having internal reliability is desirable in any research adopting the survey as the method of data collection. Although several measures are available to indicate internal reliability including Cronbach's alpha (α) and item-to-total correlation, and composite reliability are frequently used (Tavakol and Dennick, 2011; Nunnally, 1978; Raykov, 1997).

Cronbach's alpha (α) indicates the reliability of survey measures as a number between 0 and 1. The general rule of thumb is the higher the value of Cronbach's alpha, the higher the reliability. Meanwhile, the generally recommended threshold of alpha varies by study and ranges from 0.70 to 0.95 (Tavakol and Dennick, 2011); although there are several studies that indicate that alpha of 0.6 is also acceptable, especially for exploratory studies (Hume *et al.*, 2006; Nunnally, 1978; Robinson *et al.*, 1991). It should be noted that values over 0.9 are generally not recommended as it may indicate unnecessary redundancy of measurement items, rather than having a desirable level of internal reliability (Streiner, 2003). In this research, a more stringent threshold of 0.7 is adopted, as recommended by Nunnally (1978).

The Cronbach's alpha formula given by Hair *et al.* (2017b) is shown in Eq. 5-1:

$$\text{Cronbach's alpha } (\alpha) = \left(\frac{M}{M-1}\right) \cdot \left(1 - \frac{\sum_{i=1}^{M} s_i^2}{s_t^2}\right) \qquad \textit{Eq. 5-1}$$

Where s_i^2 shows the variance of the indicator measurement item i of a specific construct, measured with M measurement items (i = 1, 2, 3, ..., M), and s_i^2 is the variance of the sum of individual measurement items (Hair *et al.*, 2017b).

Item-to-total correlations show correlations between measurement items within the same construct (subscale for single construct and wholescale for multi-dimensional constructs). Several studies (Pallant, 2011; Nunnally, 1978; Comrey and Lee, 1992) recommend that threshold value of 0.3 can be used to determine the internal reliability of measurement items for both subscale and wholescale. Following these recommendations, any items having correlations below 0.3 were removed.

Meanwhile, despite their popularity in today's behavioural studies (Hutti *et al.*, 2015; Lonial and Carter, 2015; Karim and Noor, 2017), Cronbach's alpha and item-to-total correlations have a number of limitations, such as overestimation of reliability and high sensitivity to the number of items (Hair *et al.*, 2017b; Peterson and Kim, 2013). These limitations led to several studies (Agbo, 2014; Sijtsma, 2009) claiming that alternative measures should be used to indicate the reliability of the survey responses. To this extent, the more contemporary approach of composite reliability (ρ_c), which takes account of factor loadings of each item is adopted.

Composite reliability also has a range of 0 to 1, with higher values indicate better internal reliability (Hair *et al.*, 2017b). The generally accepted cut-off value of for composite reliability is 0.7 (or above 0.6 for exploratory studies), although values over 0.90 (and definitely above 0.95) may indicate redundancy of items (Hair *et al.*, 2017b; Tavakol and Dennick, 2011). In this research, a more stringent threshold value of 0.7 is used.

The formula for composite reliability is shown in Eq. 5-2:

$$Composite\ reliability\ (\rho_c) = \frac{\left(\sum_{i=1}^{M} l_i\right)^2}{\left(\sum_{i=1}^{M} l_i\right)^2 + \sum_{i=l}^{M} var(e_i)} \qquad \text{Eq. 5-2}$$

Where l_i represents the standardised factor loadings of the measurement item of i measured with M measurement item, e_i represents the errors of the measurement item (Section 5.2.2), and $var(e_i)$ shows the variance of the measurement error defined as $1 - l^2$ (Hair *et al.*, 2017b).

5.3.4.3. Uni-dimensionality

An assessment of uni-dimensionality is required to ensure a set of measurement items of the survey is related to an equivalent construct: it can be assessed by both EFA and CFA (Segars, 1997). Given the exploratory nature of this research, EFA was first undertaken using SPSS 23 prior to the CFA. Generally, EFA allows exploring the pattern of relationships between measurement items and their equivalent constructs, and therefore assesses the uni-dimensionality of measurement items within their equivalent constructs (Lim *et al.*, 2011). CFA was then employed to further assess the composition of individual constructs, based on the generated *t*-statistics for each measurement item. This two-stage approach is deemed to be necessary because of the limited availability of the related studies; whereby a considerable amount of the measurement items used in the questionnaire survey were developed based on the systematic literature review and meta-analysis, and preliminary interviews (Section 4.4.1). When applying EFA, Osborne (2015) suggests the criterion discussed in Section 5.3.4.6 should be considered.

5.3.4.3.1. Method of extraction

Several types of procedures can be used to extract constructs through EFA. For example, principal component analysis (PCA) is one of the widely used procedures in EFA, especially

when the purpose of the analysis is to reduce the number of measurement items, while retaining as much of the original measurements' variance as possible (Conway and Huffcutt, 2016; Osborne, 2015). Principal axis factoring (PAF) is another method that has its advantages when there are few measurement items per construct and for over-extraction (Winter and Dodou, 2012). Although there is no consensus on which method should be used, PCA was chosen for this research over PAF as it is generally recommended for exploratory research (Gorsuch, 1983).

5.3.4.3.2. Number of constructs to retain

Determining the number of constructs to retain is important as it can affect the results of EFA, including its robustness and the balance between 'reduction' and 'representation' (Hayton *et al.*, 2016). Several methods can be adopted to help to decide a number of constructs to retain. These include Kaiser's Eigenvalue greater than 1 rule, Catella's Scree plot, Velicer's minimum average plot (MAP) test and Horn's parallel analysis (Ledesma and Valero-Mora, 2007).

In this research, Kaiser's Eigenvalue and Catella's Scree plot are adopted; According to Fabrigar *et al.* (1999), Eigenvalue has advantages in its simplicity and objectivity, and the number of constructs is decided based on how many constructs have Eigenvalues over 1. The Scree plot is also used as a supplementary method, as it allows visual representation of the Eigenvalue.

5.3.4.3.3. Method of rotation

Once a method of extraction is decided, a method of rotation of the retained constructs should be determined as unrotated results are often hard to interpret, even with a plot (Osborne, 2015; Yaremko *et al.*, 1986). There are two types of rotation: (i) orthogonal when assuming the constructs are independent and not correlated to each other, and (ii) oblique when assuming the constructs are correlated to each other (Abdi, 2003).

In this research, varimax rotation, which is one type of orthogonal rotation, is used as the constructs of this research are designed to be independent of each other. Moreover, varimax rotation is chosen because of its popularity in factor analysis over other methods, such as equimax or oblimin methods (Samuels, 2016; Osborne, 2015; Forina *et al.*, 1989). In fact, Kim and Mueller (1978) and Gorsuch (2014) state that choosing one of the commonly available methods of rotation such as varimax is recommended, unless otherwise justifiable.

5.3.4.4. Convergent validity

Convergent validity is a measure of construct validity which shows the extent to which operations (e.g. tests) measure the concept that it is supposed to measure (Cook and Campbell, 1979; Bagozzi *et al.*, 1991). Therefore, an establishment of convergent validity means which two measurement items related to each other capture a common construct (Carlson and Herdman, 2010). An assessment of convergent validity is important in this research to ensure if the measurement items which were developed throughout several steps (e.g. systematic literature review, meta-analysis and preliminary interviews) accurately represent respective constructs.

To evaluate the convergent validity, two measures can be used: (i) indicator reliability; and (ii) Average Variance Extract (AVE) (Hafiz and Shaari, 2013). The indicator reliability shows the size of factor loadings; AVE shows the amount of variance of the construct explained by its measurement items (Hair *et al.*, 2017b). The AVE can be calculated using Eq-5.3:

$$\text{AVE} = \left(\frac{\sum_{i=1}^{M} l_i^2}{M} \right) \qquad \text{Eq. 5-3}$$

In this research, the factor loading of 0.45 was first adopted in EFA as suggested by Comrey and Lee (1992). In CFA, convergent validity was established when the factor loading of the measurement item and AVE are at least 0.7 and a 0.5, respectively, as recommended by several studies (Hair *et al.*, 2017b; Alarcón and Sánchez, 2015; Fornell and Larcker, 1981). Therefore, this research removed any items with factor loadings below 0.7, if it led to an increase of AVE and did not contribute to content validity.

5.3.4.5. Discriminant validity

Discriminant validity is another sub-component of construct validity. Discriminant validity ensures if two conceptually similar concepts are dissimilar to each other (Hair *et al.*, 2017b; Hair *et al.*, 2010). This can be confirmed by reviewing three different measures: (i) cross-loadings; (ii) Fornell-Larcker criterion; and (iii) heterotrait-monotrait ratio of correlations (HTMT).

To establish discriminant validity, the size of factor loadings on the associated construct should be higher than the factor loadings of other constructs that are theoretically meant to not correlate (Bertea and Zait, 2011; Hair *et al.*, 2017b). In this research, an assessment of cross-loadings was undertaken during both EFA and CFA processes. Factor loadings differences between cross-loaded items of 0.2 are adopted, as suggested by Howard (2015).

The Fornell-Larcker criterion compares the square root of each construct's AVE with the correlations with other constructs in the model. In this context, an establishment of discriminant validity can be confirmed if the square root of each construct's AVE is greater than its highest correlations of other constructs (Hair *et al.*, 2017b). In this research, an assessment was undertaken based on the Fornell-Larcker criterion during CFA.

Meanwhile, both cross-loadings and Fornell-Larcker criterion were criticised for not accurately determining the discriminant validity in the SEM context (Henseler *et al.*, 2015). Therefore, a new method of HTMT was introduced. According to Henseler *et al.* , HTMT is the,

> *... average of the heterotrait-heteromethod correlations (i.e. the correlations of indicators across constructs measuring different phenomena), relative to the average of the monotrait-heteromethod correlations (i.e. the correlations of indicators within the same construct)* (2015, p. 121).

In other words, HTMT is the ratio of between-trait correlations to the within-trait correlations (Hair *et al.* 2017). According to several studies (Hair *et al.*, 2017b; Ab Hamid *et al.*, 2017; Henseler *et al.*, 2015), HTMT value above 0.9 (or 0.85 when the constructs in the model are more conceptually dissimilar) shows a lack of discriminant validity while values close to 1 indicates a lack of discriminant validity. This is further confirmed by performing the bootstrapping procedure with 5,000 subsamples in PLS-SEM. If a confidence interval (CI) contains the value 1, it indicates a lack of discriminant validity (Hair *et al.*, 2017b).

In this research, the value of 0.9 was adopted for HTMT as some of the constructs share some commonalities in their characteristics (e.g. tenants' expectation to become a socially conscious organisation ($X3_{SOCO}$) and to become a sustainable organisation ($X3_{SUSO}$) (see Section 6.3.2.3 for more details). This is followed by the bootstrapping procedure (n=5,000). Collectively, this allows a comprehensive evaluation of the discriminant validity of the measurement model.

5.3.4.6. Removal of irrelevant measurement items

The removal of irrelevant (or inconsistent) measurement items can be done based on several criteria discussed above; however, it should be noted there is no single, definitive way of removing irrelevant measurement items (Comrey and Lee, 1992). Rather, it is possible to make a judgemental call based on the above criteria (Matsunaga, 2010). For example, irrelevant measurement items can be removed by reviewing low communalities of each item, items with low correlation coefficients, low significance of factor loadings, existence of cross-loadings and their magnitudes and expected increase in α after item deletion (Matsunaga, 2010; Hair *et al.*, 2010; Costello and Osborne, 2005). Moreover, qualitative aspects of the construct(s) can be also examined if the remaining items make theoretical sense, as stated by Matsunaga (2010). Table 5.4 shows a guideline adopted for the removal of irrelevant measurement items in this research.

In addition, it seems important to further highlight some cautions about the removal of any irrelevant or inconsistent measurement items. Ideally, the removal can be justified if it leads to an increase in Cronbach's Alpha (α) (Field, 2006); however, it should be noted that expected changes in α after removal of irreverent items (shown as 'Cronbach's Alpha if Item Deleted' in SPSS) should not be changed significantly, otherwise, this may point to the unreliability of the questionnaire (Field, 2006). Further, factor analysis cannot be undertaken for a construct consisting of a single measurement item. Therefore, the dependent construct (Y), rental, is excluded from this process.

Table 5.4 Criteria used in this research for the removal of irrelevant measurement items

▪ **Cronbach's alpha** ▪ **Item-to-total correlation**	**Exploratory Factor Analysis (EFA)**	**Confirmatory Factor Analysis (CFA)**
Cronbach's alpha must be over 0.7 (Nunnally, 1978)	Factor loadings must be over 0.45 (Comrey and Lee, 1992)	Factor loadings must be over 0.7 and AVE must be at least 0.5 (Hair *et al.*, 2017b; Alarcón and Sánchez, 2015; Fornell and Larcker, 1981)
Item-to-total correlation must be over 0.3 (Pallant, 2011; Nunnally, 1978; Comrey and Lee, 1992)	KMO value must be over 0.5 and Bartlett must be less than 0.05 (Christiansen *et al.*, 2014)	Composite reliability must be over 0.7 (Hair *et al.*, 2017b; Tavakol and Dennick, 2011)
	Communalities must be over 0.6 for most measurement items (Hair *et al.*, 2010) and/or have at least 0.4 for each measurement item (Costello and Osborne, 2005)	Factor loadings of measurement items assigned to relevant construct must be higher than all of its cross-loadings for all other irrelevant measurement items (Hair *et al.*, 2017b)
	Cross-loadings must be less than 0.2 (Howard, 2015)	t-statistics must be over 1.96 (Hair *et al.*, 2017b)
		Square root of each construct's AVE must be greater than its highest correlations of another construct (Fornell and Larcker, 1981)
		HTMT values must be less than 0.9 and the Confidence Interval (CI) must not contain a value of 1 (Hair *et al.*, 2017b)

5.3.5. Evaluation of the structural model

Figure 5.4 shows the procedures used for evaluating the structural model specified in this research (see Section 5.3.2). Evaluation of the structural model requires an assessment of collinearity issue, path coefficient, coefficient of determination and f^2 effect sizes. Collectively, this determines if the hypothesised relationships between constructs can be statistically supported or not, and their implications.
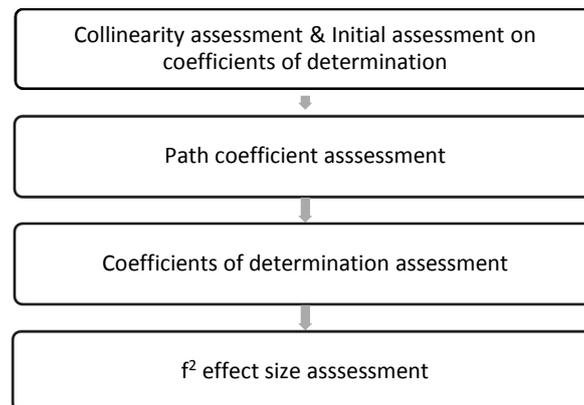
Figure 5.4 Structural model evaluation procedures (adopted from Hair et al. (2017b))

5.3.5.1. Collinearity and coefficient of determination (R^2)

First, the severity of the collinearity of the structural model is assessed. This is an essential step as the estimation of the path coefficients of the structural model is based on the ordinary least square (OLS) regression (Hair *et al.*, 2017b). In this research, to assess the severity of collinearity, Hair *et al.*'s (2017b) recommendation of variance inflation factor (VIF) value of least than 5 is adopted. If severe collinearity is found, the affected constructs can be either removed or merged, into higher-order constructs (HOC), as recommended by Hair *et al.* (2017b).

The coefficient of determination (R^2) is to measure the predictive power of the structural model, and the R^2 values could range from 0 to 1. In view of this, it is recommended any predicted constructs of the structural model have R^2 at least over 0.1 as this indicates the constructs have a minimum level of the predictive power (Falk and Miller, 1992). Therefore, an initial assessment of R^2 was undertaken based on 0.1 to determine its predictive power. A more detailed analysis of R^2 is provided in Section 5.3.5.3.

5.3.5.2. Path coefficient assessment

The second stage of the structural model evaluation is the assessment of path coefficients and their statistical significance. In particular, the size of path coefficients reflects the magnitudes of the hypothesised relationships based on a value between -1 to +1. Statistical significance of the paths is reflected by either t-values or p-values. For two-tailed tests, Hair *et al.* (2017b) note that t-value over 1.96 indicates the statistical significance at *p*=0.05, and that a t-value of 1.65 (*p*=0.10) is acceptable for exploratory studies.

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In this research, more stringent thresholds of t-value over 1.96 and p-value under 0.05 are used to determine the significance of the paths. This helps to determine if the hypothesised relationships are supported, or not. Thereafter, a comparison of the significance of the paths is undertaken to see the relationship between predictor and predicted constructs. For this, direct, indirect and total effects are calculated.

5.3.5.3. *The coefficient of determination (R^2)*

According to Chin (1998b), the R^2 values of 0.67, 0.33, and 0.19 can be determined to be substantial, moderate and weak, respectively. However, Hair *et al.* (2011) recommend that the R^2 value of 0.75, 0.50, and 0.25 denote substantial, moderate and weak power respectively. Their study further highlights that recommended R^2 values depend on areas of studies and the complexity of the model. Meanwhile, Mac Nally (2000) argues that no matter the different classification of ranges, higher R^2 is desirable when the model is more complex.

In this research, the guidelines suggested by Falk and Miller (1992) and Hair *et al.* (2011) are adopted to determine the predictive power of the structural model, although having relatively low R^2 is also expected considering the exploratory nature of the research.

5.3.5.4. *Effect size*

The effect size of f^2 indicates the strength of the hypothesised relationships between two constructs (Wellner *et al.*, 2015). The effect size of f^2 is calculated based on the R^2 obtained using Eq. 5-4:

$$f^2 = \frac{R^2_{included} - R^2_{excluded}}{1 - R^2_{included}} \qquad \qquad Eq.\ 5\text{-}4$$

Where $R^2_{included}$ and $R^2_{excluded}$ are the R^2 values of the predicted construct when an associated predictor construct is included or excluded from the model (Hair *et al.*, 2017b). To report the size of f^2 effect size, this research uses Cohen's (1977) guideline that the effect size of 0.35, 0.15 and 0.02 can be interpreted as strong, moderate, and weak, respectively; whereas effect size below 0.02 could be considered as negligible.

5.3.6. Moderator analysis

Moderator analysis can be viewed as an analysis to test heterogeneity in the data, to determine the effect of a moderator construct on the relationship between predictor and predicted constructs (Hair *et al.*, 2017b). In general, the moderator construct can be either categorical or continuous in nature.

In this study, the moderator analysis was conducted to examine the influence of market and regulatory forces on tenants' leasing decisions about the greenness of their office buildings (i.e. H5a-H5d). The 'two-stage approach' is preferred over other approaches (e.g. product indicator approach or orthogonalising approach) as the method of moderator analysis. Details about different moderator approaches and the justifications of adopting the two-stage approach are presented following.

5.3.6.1. Methods of moderator analysis

Methods of moderator analysis include: (i) the product indicator approach; (ii) the orthogonalising approach; and (iii) the two-stage approach. Each approach has its own advantages and disadvantages over the others, as follows:

1. *Product indicator approach*: This approach was introduced by Kenny and Judd (1984) and is the standard approach for creating the interaction term (the term represents effects of interaction between predictor and predicted constructs) in regression analysis (Hair *et al.*, 2017b). One of the distinctive characteristics of this approach, compared with more traditional methods for detecting moderating effects such as ANOVA, is the 'error-free' assumption. Similar to PLS-SEM, the product indicator approach does not assume the measurement items are free from errors (Berz, 2016). Therefore, when applying this approach, attempts to reduce possible errors should be made to have accurate and precise results. In addition, as this approach inevitably introduces collinearity in the path model, reducing the level of collinearity is required through, for example, standardisation of measurement items of the moderator construct (Hair *et al.*, 2017b). Once applied properly, Henseler and Chin (2010) note this approach offers an accurate prediction, especially when the sample size or the number of measurement items per construct is medium to large. On the other hand, this approach is applicable only if the predictor or moderator construct has reflective measures, not formative measures (Hair *et al.*, 2017b).

Moreover, the product indicator approach requires an adjustment of the coefficient of the interaction term. Therefore, Hair *et al.* (2017b) suggest that adoption of this method is generally not recommended for PLS-SEM, despite its wider usage in many studies, as the required function is not implemented to the SamrtPLS 3.0's algorithm (Hair *et al.*, 2017b).

2. *Orthogonalising approach*: This approach was introduced by Little *et al.* (2006) as an extension of the product indicator approach and recognises the limitations of product indicator approach, such as the inability of complete removal of collinearity among the constructs included in the PLS model (Hair *et al.*, 2017b). Further, this approach has substantial advantages over other approaches in prediction accuracy, especially when the sample size is small or there are relatively few measurement items per construct (Henseler and Chin, 2010). Little *et al.* (2006) also claims that the orthogonalising approach is technically and conceptually more straightforward, thus allowing easier interpretation. On the other hand (similar to the product indicator approach) this approach is only applicable when reflective measurement models are adopted for predictor and moderator constructs (Hair *et al.*, 2017b). Moreover, it is not free from errors, and thus may create bias in results (Little *et al.*, 2006).

3. *Two-stage approach*: Chin *et al.* (2003) introduce another approach of moderating analysis, which involves the two-stages: the first stage of the model without the interaction term (i.e. main effect model) and the second stage with the interaction term. Its advantages over others are the universal applicability in that it can be applied to both formative and reflective models (Hair *et al.*, 2017b; Henseler and Chin, 2010).

5.3.6.2. *Justification of the two-stage approach*

In terms of the reflectively designed measures of the model, it is possible to adopt any of the three approaches in Section 5.3.6.1. In this case, it is reasonable to adopt a guideline suggested by Henseler and Chin (2010), as it specifies the methods of choosing the appropriate approach based on the purpose of the analysis. For example, if the primary purpose of the moderating analysis is to minimise estimating bias of moderating effects and to maximise prediction of predictor construct, the orthogonalising approach should be adopted considering its high

prediction accuracy. However, if the primary purpose is to reveal the significance of the moderating effect, the two-stage approach is recommended.

In this research, the two-stage approach was adopted over other approaches. This is because the primary purpose of moderator analysis in this research is to understand if and to what extent the moderating effect (i.e. market and regulatory forces) plays a role in a relationship between various tenants' motivators (i.e. predictor constructs) and their decision about the greenness of their office buildings (i.e. predicted construct). This is further supported by Henseler and Chin (2010) who suggest that the two-stage approach is more appropriate than others if the primary purpose of moderator analysis of the research is hypothesis testing. Additionally, the two-stage approach is more appropriate if both predictor and moderator constructs are reflectively measured (Hair *et al.*, 2017b).

5.4. Summary

This chapter presents the methods of analysis of this research, which involves discussions about the data analysis methods and a detailed process of analysis to achieve the research aim and objectives. In this research, PLS-SEM is selected over CB-SEM or the first-generation multivariate methods, given its appropriateness to the context of this research. The adoption of PLS-SEM requires undertaking several procedures to ensure the reliability and validity of data. These include sample data preparation, specification and evaluation of measurement and structural model of the research. Additionally, the details of the moderator analysis and justification for selecting the two-stage approach are covered in this chapter. Chapters 6 presents the result of the analysis starting from discussions about the measurement models of this research.

Chapter 6. MEASUREMENT MODELS

6.1 Introduction

This chapter presents the findings and discussions of the measurement models. First, the profile of survey respondents is presented in Section 6.2 to establish the reliability and trustworthiness of the sample data collected. Section 6.3 discusses the results of the classical and the contemporary validation processes to provide confidence in the reliability and validity of data required for the subsequent stage of analysis discussed in Section 6.4.

6.2 Sample profile and response rate

6.2.1 Survey respondents

As outlined in Section 4.6.1.1, a total of approximately 1,300 potential respondents were targeted for the questionnaire survey. Of these, only 51 valid responses were collected, thus representing a response rate of 3.9%. Despite this, the sample size fulfils the minimum requirement of 50 for Exploratory Factor Analysis (EFA) and PLS-SEM, respectively, as specified by Hair *et al.* (2010) and Winter *et al.* (2009) (see Section 5.2.1 and 5.2.2).

Table 6.1 summarises the demographic characteristics of the survey respondents. It can be seen that 68.6% of the respondents (n=35) are executives and senior-level management (i.e. Chief Executive Officer, Sustainability director) of their organisations who are responsible for making various strategic decisions including their office leasing decisions. The rest of 31.4% of the respondents (n=16) are from middle-level management or lower (e.g. Office leasing manager) who are also familiar with their organisations' leasing decisions. In terms of their experience, the results show that the participants have work experiences ranging from 1 year to 29 years, with the mean and median value of 9 years and 8 years, respectively. Further, about 75% of them (n=38) have previous experience in leasing a green building. Collectively, this shows that their opinions shared for this research are noteworthy and reliable.

Table 6.1 General information on the respondents

Description	Frequency (Percentage)
Position	
Senior-level management (e.g. CEO, COO, Director)	35 (68.6%)
Middle-level management or lower (e.g. Office manager)	16 (31.4%)
Years of experience	
Less than 5 years	13 (25.5%)
5-10 years	19 (37.3%)
Over 10 years	19 (37.3%)
Mean	9 years
Median	8 years
Previous experience in leasing green building	
Yes	13 (25.5%)
No	38 (74.5%)

Table 6.2 summarises the background information about respondents' organisations. It is seen that 51.0% of them are from the professional, scientific and technical sector (n=26), followed by 31.4% from the finance and insurance sector (n=16) and 17.6% from the rental, hiring and real estate sector (n=9). In terms of business coverage, the statistics reveal that most of the respondents' organisations (n=49) operate their businesses at least at the national level; except for two organisations which are locally-based. Respondents' organisations have an annual turnover ranging from A$500 thousand to A$2.5 billion. Of these, more than one-third of these organisations (n=18) make an annual turnover of A$10 million or above. Further, almost 90% of the respondent organisations (n=45) are recorded as private limited; whereas 9.8% of them (n=5) are publicly listed to the Australian Stock Exchange (ASX). These respondents' organisations have a domestic workforce size ranging from two to 1,500. Of these, 83.4% of them (n=42) were classified as small- to medium-size businesses employing less than 199 people, based on the classification by the Australian Bureau of Statistics (ABS, 2017).

Table 6.2 General information of respondents' organisations

Description	Frequency (Percentage)
Sector	
Finance and Insurance	16 (31.4%)
Rental, Hiring and Real Estate	9 (17.6%)
Professional, Scientific & Technical	26 (51.0%)
Business model	
Business to Business (B2B)	25 (49.0%)
Business to Consumer (B2C)	4 (7.8%)
Both (B2B & B2C)	21 (41.2%)
Unknown/No response	1 (2.0%)
Business coverage	
International (e.g. Europe, USA, Asia-Pacific)	16 (31.4%)
Regional (e.g. Australia and New Zealand)	8 (15.7%)
National	25 (49.0%)
Local	2 (3.9%)
Type of business entity	
Private limited	45 (88.2%)
Publicly listed (e.g. ASX)	5 (9.8%)
Unknown/No response	1 (2.0%)
Legal structure	
Profit	45 (88.2%)
Non-profit	5 (9.8%)
Unknown (no response)	1 (2.0%)
Annual Turnover (AUD)	
Zero to less than 50k	0 (0%)
50k to less than 200k	0 (0%)
200k to less than 2M	7 (13.7%)
2M to less than 5M	10 (19.6%)
5M to less than 10M	7 (13.7%)
10M or more	18 (35.3%)
Unknown/No response	9 (17.6%)
Mean	$132,102,381
Median	$5,500,000
Size of the workforce (Australia only)	
1 to 4 employees	3 (5.9%)
5 to 19 employees	18 (35.3%)
20 to 199 employees	21 (41.2%)
200+ employees	9 (17.6%)
Mean	154
Median	32

6.2.2 Respondents' office buildings

In terms of respondents' current offices/office buildings, Table 6.3 shows that over half of their offices (n=27) are being used as a representative office/single office with Net Lettable Area (NLA) of less than 1,000sqm. Approximately 65% of these respondents' offices (n=33) are occupied for less than five years, which is more common of the small- to medium-size organisations. Over 70% of respondents' office buildings are high-rise office buildings of seven storeys or more (Craighead, 2009). Moreover, all of them are located within a range of 1km from the nearest station, and the NABERS and Green Star ratings of their office buildings range from 0 Stars to 5.5 Stars, and 0 Stars to 6 Stars, with mean values of 2.6 Stars and 1.6 Stars, respectively. The results show that median rental paid for these offices is $801-900/sqm, which is consistent with the recent Sydney CBD office market rental showing gross effective rental of $894/sqm (Cushman & Wakefield, 2016). In particular, approximately 70% of organisations (n=37) pay rental less than $1,000/sqm for their offices. Of the obtained information, the level of the greenness of tenants' office buildings (Z5) and rental (Y) were used in subsequent stages of analysis, such as Exploratory Factor Analysis (EFA) and structural equational modelling (SEM). The rest of the information is used to substantiate research findings where relevant.

Table 6.3 General information on the respondents' office buildings

Description	Frequency (Percentage)
The primary function of the office	
International headquarters	3 (5.9%)
National headquarters	20 (39.2%)
Representative office / Single office	27 (52.9%)
Unknown/No response	1 (2.0%)
Tenancy type	
Tenant occupied	51 (100%)
Owner occupied	0 (0%)
Length of occupancy	
Less than five years	33 (64.7%)
Five to ten years	13 (25.5%)
Over ten years	5 (9.8%)
Mean	4.6 years
Median	3 years
Age of the building	
Less than five years	2 (3.9%)
Six to ten years	4 (7.8%)
Over ten years	44 (86.3%)
Unknown/No response	1 (2.0%)

Mean	32.1 years
Median	25 years
Net Lettable Area (NLA)	
Under 1,000sqm	27 (52.9%)
1,000sqm - 2,000sqm	6 (11.8%)
Over 2,000sqm	6 (11.8%)
Unknown/No response	2 (3.9%)
Mean	986.4sqm
Median	400.0sqm
Number of floors	
Less than seven storeys	15 (29.4%)
Seven storeys or more	36 (70.6%)
Mean	22 floors
Median	20 floors
Distance to the nearest train station	
Less than 1km	51 (100%)
Over 1km	0 (0%)
Mean	0.46km
Median	0.5km
Level of the greenness	
NABERS 4 Stars or over	25
NABERS less than 4 Stars	26
Green Star 4 Stars or over	14
Green Star less than 3 Stars	37
Mean (NABERS)	2.6 Stars
Mean (Green Star)	1.6 Stars
Median (NABERS)	3.5 Stars
Median (Green Star)	0 Stars
Annual gross rental	
Less than $500/sqm	3 (5.9%)
$501/sqm-$1,000/sqm	33 (64.7%)
$1,000/sqm-$1,500/sqm	11 (21.6%)
Over $1500/sqm	4 (7.8%)
Mean	9.4 ($801-900/sqm)
Median	9.0 ($801-900/sqm)

6.3   Results of the classical validation approach

As discussed in Section 5.3.4.2, to ensure the internal reliability and validity of the sample data and to identify constructs, the classical approach of Cronbach's alpha and the item-to-total correlation were first calculated, followed by EFA. Table 6.4 shows the categorisation of constructs, and the number of expected constructs (or factors) determined by their characteristics. For example, tenants' leasing motivators related to the office building's tangible

aspects are expected to be congregated into four constructs of (i) building quality (e.g. height, size, age), (ii) indoor environmental quality (e.g. thermal quality, acoustic quality), (iii) leasing contract features (e.g. lease term, lease type) and (iv) sustainability features (e.g. energy efficiency). Conversely, office rental is expected to have only one construct, given the usage of the single measurement item (Section 4.5.2). The expected number of constructs associated with each construct is further confirmed after EFA.

Table 6.4 Categorisation of constructs

Item Code	Description	No. of expected constructs (or factors)	No. of measurement items
TA	Tenants' leasing motivators related to the tangible aspect of office buildings (X1)	4	24
SY	Tenants' leasing motivators related to symbolic aspects of office buildings (X2)	2	14
EP	Tenants' expectations from leasing their offices (X3)	2	14
OV	Tenants' organisational values reflecting their identity (X4)	4	20
Greenness	The level of the greenness of tenants' offices (X5)	1	2
CS	The 'push and pull' moderators (Z)	2	7
RP	Rental (Y)	1	1
	Total	16	82

Table 6.5 presents the results of (i) Cronbach's alpha showing the internal reliability (or consistency) of constructs and (ii) factor loadings of measurement items associated with respective constructs. It should also be noted that any irrelevant (or inconsistent) measurement items removed during the EFA procedures are marked with asterisks (*). Also, the values in parenthesis show the relevant scores (e.g. Cronbach's alpha coefficient and factor loadings) before removing irrelevant measurement items. For item-to-total correlation for the subscale, values before removing irrelevant measurement items are not shown because of changes in the number of constructs while performing EFA. Details of the results shown in Table 6.5 are discussed in the following Sections 6.3.1 to 6.3.2.

Table 6.5 Results of the classical construct validation approaches

Item Code	Constructs and Corresponding Measurement Items	Corrected item-to-total Correlation Subscale	Corrected item-to-total Correlation Wholescale	Factor Loadings (FL)
X1: Tenants' leasing motivators related to tangible aspects of their office buildings Cronbach's alpha (α): 0.855 (0.871)				
TA 1	Proximity to nearby amenities*		(0.377)	(0.588)
TA 2	Proximity to public transport*		(0.366)	(0.649)
TA 3	Proximity to major roads	0.581	0.426	0.874
TA 4	Proximity to major clients*		(0.286)	(0.811)
TA 5	Proximity to major competitors	0.581	0.369	0.833
TA 6	Office space size	0.617	0.499	0.786
TA 7	Office floor level*		(0.402)	(0.821)
TA 8	Building's age*		(0.545)	(0.599)
TA 9	Building's grade	0.621	0.534	0.763
TA 10	Building's sustainability ratings*		(0.674)	(0.826)
TA 11	Building's amenities	0.598	0.452	0.785
TA 12	Building's thermal quality*		(0.719)	(0.530)
TA 13	Building's acoustic quality	0.682	0.675 (0.660)	0.747 (0.689)
TA 14	Building's lighting quality	0.661	0.530 (0.540)	0.812 (0.779)
TA 15	Building's IAQ	0.734	0.669 (0.670)	0.801 (0.766)
TA 16	Building's energy efficiency*		(0.690)	(0.707)
TA 17	Building's water efficiency	0.765	0.689 (0.741)	0.718 (0.771)
TA 18	Building's environmental performance	0.707	0.603	0.712 (0.775)
TA 19	Building renovation*		(0.516)	(0.467)
TA 20	Mechanical and electrical services*		(0.590)	(0.511)
TA 21	Lease term	0.596	0.426	0.748
TA 22	Lease type	0.638	0.441	0.769
TA 23	Lease pre-commitment	0.659	0.429	0.799

TA 24	Build-out	0.593	0.475	0.757
X2: Tenants' leasing motivators related to symbolic aspects of their office buildings Cronbach's alpha (α): 0.869 (0.871)				
SY1	Comfortable office environment	0.610	0.522 (0.507)	0.807 (0.793)
SY2	Safe office environment	0.518	0.555 (0.540)	0.538 (0.525)
SY3	Internally connected office environment*		(0.231)	
SY4	Externally connected office environment	0.392	0.369 (0.380)	0.502 (0.479)
SY5	Prestigious office environment*		(0.287)	(0.894)
SY6	Aesthetically pleasing office environment	0.701	0.647 (0.663)	0.825 (0.823)
SY7	Employee-friendly office environment	0.732	0.685 (0.673)	0.796 (0.822)
SY8	Collaborative office environment	0.575	0.604 (0.575)	0.565 (0.597)
SY9	Environmentally-friendly office environment	0.572	0.543 (0.510)	0.819 (0.845)
SY10	Healthy office environment	0.693	0.713 (0.697)	0.673 (0.685)
SY11	Office environment with cutting-edge technologies	0.631	0.534 (0.574)	0.809 (0.803)
SY12	Office environment for a better customer experience*		(0.426)	
SY13	Office environment to attract future employees	0.614	0.615 (0.655)	0.679 (0.616)
SY14	Office environment that well-reflects the corporate identity	0.703	0.683 (0.691)	0.714 (0.662)
X3: Tenants' expectations from leasing their offices Cronbach's alpha (α): 0.954 (0.957)				
EP1	Market leading organisation*		(0.760)	(0.609)
EP2	Fast follower organisation	0.656	0.438 (0.453)	0.861 (0.856)
EP3	Socially responsible organisation	0.807	0.715 (0.719)	0.815 (0.804)
EP4	Economically feasible organisation*		(0.784)	
EP5	Environmentally friendly organisation	0.881	0.680 (0.693)	0.897 (0.897)
EP6	Collaborative organisation	0.784	0.770 (0.782)	0.789 (0.781)
EP7	Ethical organisation	0.838	0.855 (0.864)	0.767 (0.756)
EP8	Trustworthy organisation	0.889	0.852 (0.842)	0.883 (0.879)
EP9	Innovative organisation	0.938	0.888 (0.884)	0.938 (0.933)
EP10	People-first organisation	0.883	0.847 (0.841)	0.893 (0.888)
EP11	Fair organisation	0.786	0.811 (0.816)	0.728 (0.718)

EP12	Flexible organisation	0.840	0.790 (0.770)	0.888 (0.887)
EP13	Publicly well-known organisation	0.861	0.839 (0.839)	0.851 (0.846)
EP14	Approachable organisation	0.851	0.836 (0.834)	0.818 (0.810)
X4: Tenants' organisational values reflecting their identity Cronbach's alpha (α): 0.891 (0.927)				
OV1	Leadership	0.787	0.697 (0.705)	0.805 (0.801)
OV2	Growth*		(0.487)	
OV3	Stability*		(0.591)	
OV4	Teamwork	0.817	0.766 (0.777)	0.751 (0.739)
OV5	Openness	0.749	0.638 (0.641)	0.776
OV6	Diversity*		(0.629)	0.777 (0.775)
OV7	Safety*		(0.459)	
OV8	Innovation	0.763	0.702 (0.712)	(0.769)
OV9	Efficiency*		(0.690)	
OV10	Social responsibility	0.802	0.557 (0.524)	0.894 (0.898)
OV11	Virtue*		(0.500)	
OV12	Environmental sustainability	0.649	0.492 (0.484)	0.791 (0.788)
OV13	Customer satisfaction	0.786	0.603 (0.623)	0.875 (0.867)
OV14	People (Employee)	0.738	0.676 (0.686)	0.798 (0.795)
OV15	Community (Corporate Citizenship)	0.849	0.666 (0.645)	0.898 (0.898)
OV16	Acknowledgement	0.658	0.628 (0.629)	0.741 (0.736)
OV17	Uniqueness	0.570	0.420 (0.446)	0.865 (0.831)
OV18	Approachability	0.570	0.509 (0.546)	0.803 (0.824)
OV19	Productivity*		(0.670)	(0.682)
OV20	Collaboration*		(0.716)	
X5: The level of the greenness of tenants' office buildings Cronbach's alpha (α): 0.721				
NS	NABERS ratings	0.563	0.563	0.884
GS	Green Star ratings	0.563	0.563	0.884
Y: Rental				

Cronbach's alpha (α): N/A (N/A)				
RP1	Rent	N/A	N/A	N/A
Z: Push and Pull moderators				
Cronbach's alpha (α): 0.748 (0.797)				
CS1	Relationship with the landlord	0.364	0.364 (0.366)	0.567 (0.859)
CS2	Financial incentives from the landlord	0.438	0.438 (0.420)	0.622 (0.710)
CS3	Government support and incentives	0.601	0.601 (0.625)	0.791 (0.913)
CS4	Government regulations	0.730	0.730 (0.736)	0.859 (0.836)
CS5	Competition against competitors*		(0.622)	(0.742)
CS6	Financial constraints at the time of leasing	0.513	0.513 (0.585)	0.696 (0.576)
CS7	Availability of suitable office stocks at the time of leasing*		(0.294)	(0.798)

6.3.1 Cronbach's alpha and items-to-total correlation

It is found that the internal reliability of measurement items measured by Cronbach's alpha (α) shows α ranges from 0.721 to 0.954 after removing irrelevant measurement items. This represents the satisfactory level of the internal reliability of multi-dimensional constructs by achieving α over 0.7 (see Section 5.3.4.2). It is noted that α is often reduced after the removal process; however, this is considered as a necessary sacrifice to retain only the relevant measurement items. This is especially necessary as many measurement items adopted in this survey were developed based on preliminary interviews. Meanwhile, a total of 13 constructs extracted from EFA (see Section 6.3.2) shows α ranges from 0.716 to 0.965 thus, shows internal reliability of the measurement items associated with each construct.

It should be also noted that two of the extracted constructs (see Table 6.11 and 6.13) show α above the generally recommended threshold of 0.9. This may indicate the existence of irrelevant or inconsistent measurement items associated with the construct and may require further removal of measurement items through the confirmatory validation approach (see Section 6.4).

Conversely, the results of the item-to-total correlation for subscale and wholescale show α range from 0.364 to 0.938 and 0.364 to 0.888, respectively. This meets the recommended threshold of minimum 0.3 thus, showing the satisfactory level of internal reliability of the measurement items. For example, the construct showing tenants' motivations, in regard to the tangible aspect of office buildings (X1), consistently shows item-to-total correlations for subscale above the threshold value of 0.3. This indicates that measurement items associated with each construct have a sufficient level of internal reliability (i.e. these measurement items are measuring the same construct). Similarly, the measurement item for 'proximity to major clients (TA4)' was removed due to its low item-to-total correlations (i.e. 0.286), followed by further removal of several other measurement items (e.g. TA1, TA2, TA7). In the end, this led to the remaining measurement items having item-to-total correlations for wholescale for a range of 0.369 to 0.689. This ensures that the remaining measurement items have a satisfactory level of reliability as measurement items of the tangible aspect of an office building.

Based on the results, the internal reliability of the retained measurement items is established. Section 6.3.2 discusses constructs extracted from EFA and their implications.

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6.3.2 Exploratory factor analysis (EFA)

The below sub-sections present the results of EFA and their interpretation based on the adopted thresholds and guidelines discussed in Section 5.3.4.2.

6.3.2.1 *Factor analysis of tenants' leasing motivators related to the tangible aspect of office buildings (X1)*

Kaiser-Meyer-Olkin (KMO) and Bartlett's test, in regard to tenants' leasing motivators related to the tangible aspect of office buildings (X1), are 0.711 ($p=0.000$) and thus show the adequacy of the sample. The results of the communalities also indicate that all retained measurement items have communalities ranges from 0.629 to 0.831, which is above the adopted threshold of 0.5. This led to the subsequent stages of EFA as presented following.

Table 6.6 shows the results of the total variance explained using the Eigenvalue. It is found that these four constructs meeting the Eigenvalue greater than 1.0 explain 72.09% of the total variance. Overall, the results indicate the successful extraction of the four constructs related to the tangible aspect of office buildings. This is further supported by the Scree plot showing the number of extracted four constructs above the value of 1 (y-axis) (Figure 6.1). It should be noted that several measurement items expected to be retained (e.g. building age, energy efficiency) were eventually dropped to maintain the internal reliability of data. For instance, proximity to public transport (TA2) was removed, although this is not entirely surprising considering all tenants are located within a 1km of walking distance to the nearest train station (see Section 6.2.2).

Table 6.6 Total variance explained for the tangible aspect of office buildings (X1)

Construct (Factor)	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	5.217	37.266	37.266
2	2.085	14.896	52.161
3	1.557	11.120	63.281
4	1.233	8.805	72.086
5	.861	6.151	78.237
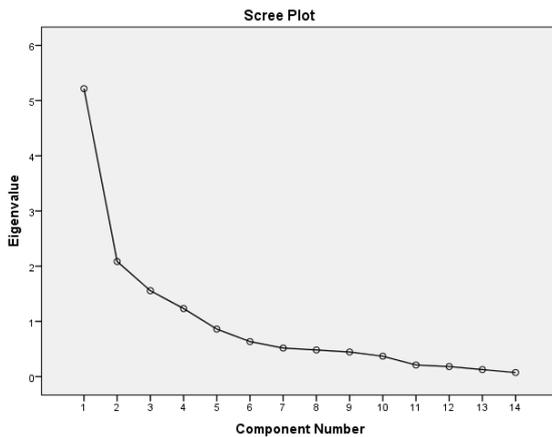
Figure 6.1 Scree plot for the tangible aspect of green and non-green buildings (X1)

Table 6.7 shows the construct matrix for measurement items. It should be noted that blank cells contain loadings below the threshold value of 0.45. It can be seen that all retained measurement items are loaded consistently with the respective construct with factor loadings (FL) ranging from 0.712 to 0.874 (as also presented in Table 6.5), thus representing a relatively high level of convergent validity of measurement items within the respective construct. Also, the low cross-loadings (<0.2) across constructs indicates that each retained measurement item only belongs to a single construct.

Specifically, it is found that the first construct is associated with five measurement items of: 'lighting quality' (TA14, FL=0.812), 'indoor air quality' (TA15, FL=0.801), 'building's acoustic quality' (TA13, FL=0.747), 'water efficiency' (TA17, FL=0.718) and 'environmental performance' (TA18, FL=0.712) and explains 37.27% of the total variance. To this extent, the first constructs explain building sustainability ($X1_{BLDS}$), as they are all closely related to indoor environmental quality (IEQ) and environmental performance (e.g. water efficiency, carbon efficiency) of office buildings as it is stated by NABERS (2018).

The second construct account 14.9% of the total variance explained, and represent the lease contract features ($X1_{LEAS}$) as it consists of 'lease pre-commitment' (TA23, FL=0.799), 'lease type' (TA22, FL=0.769), 'build-out' (TA24, FL=0.757) and 'lease term' (TA21, FL=0.748). This is a construct that is identified as a significant determinant of rental from previous studies (see Section 2.4.2).

The next construct consists of 'office space size' (TA6, FL=0.786), 'building amenities' (TA11, FL=0.785) and 'building grade' (TA9, FL=0.763) thus, it describes a construct of building quality ($X1_{BLDQ}$). The importance of building quality was noted by some preliminary interview

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participants, who state that they leased their current office because they "tick the boxes" (Kim *et al.*, 2019).

Finally, it is found that the last construct consists of only two measurement items of 'proximity to major roads' (TA3, FL=0.874) and 'proximity to major competitors' (TA5, FL=0.833). Therefore, this explains the location as a means of proximity ($X1_{PROX}$). This, again, is consistent with the results of previous studies.

Collectively, the results show that the measurement items used to assess tenants' motivation towards the tangible aspect of office buildings (X1) can be explained based on the four constructs identified. Therefore, the Hypothesis 1 (H1) of this research is divided into H1-1, H1-2, H1-3 and H1-4.

Table 6.7 Construct (factor) matrix for measurement items of a tangible aspect of office buildings (X1)

	Construct (Factor)			
	1 (α: 0.874)	2 (α: 0.790)	3 (α: 0.758)	4 (α: 0.716)
TA14_Building's lighting quality	.812			
TA15_Building's IAQ	.801			
TA13_Building's acoustic quality	.747			
TA17_Building's water efficiency	.718			
TA18_Building's environmental performance	.712			
TA23_Lease pre-commitment		.799		
TA22_Lease type		.769		
TA24_Build-out		.757		
TA21_Lease term		.748		
TA6_Office space size			.786	
TA11_Building's amenities			.785	
TA9_Building's grade			.763	
TA3_Proximity to major roads				.874
TA5_Proximity to major competitors				.833

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalisation.
Rotation converged in six iterations.

6.3.2.2 Factor analysis of tenants' leasing motivators related to the symbolic aspects of office buildings (X2)

The results of KMO and Bartlett's test for tenants' motivators related to the symbolic aspect of office buildings (X2) validates the convergent validity of the sample by KMO of 0.821 and the

significance of Bartlett's results (*p*=0.000). Meanwhile, communalities show a range of 0.517 and 0.764. Although there are two measurement items showing communalities below the recommended threshold of 0.6 (0.517 for SY8, 0.583 for SY13), it is deemed as satisfactory considering majority of the measurement items (seven out of nine) are still over the minimum communalities of 0.4 (Section 5.3.4.1).

Table 6.8 and Figure 6.2 show there are two constructs extracted after removing irrelevant measurement items, such as the 'externally-connected office environment' (SY4) having factor loadings of 0.406. The results indicate that these two constructs showing the Eigenvalue over 1 explain over 65% of the total variance.

Table 6.8 Total variance explained for the symbolic aspect of office buildings (X2)

Construct (Factor)	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	4.564	50.713	50.713
2	1.334	14.820	65.533
3	.839	9.322	74.856
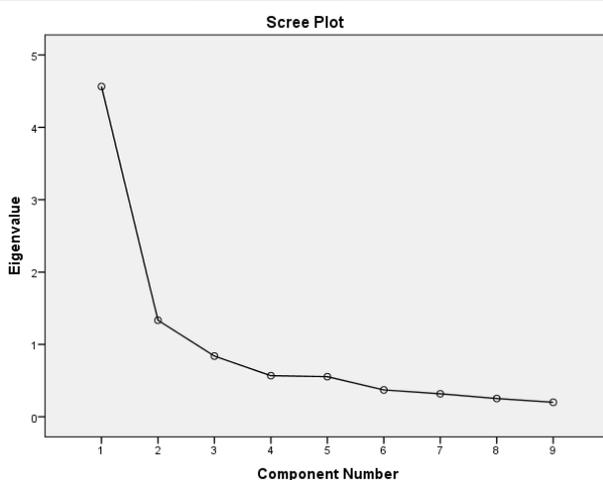
Figure 6.2 Scree plot for the symbolic aspect of green & non-green buildings (X2)

Table 6.9 shows two constructs were extracted with measurement items having factor loadings ranging from 0.594 to 0.839 and from 0.681 to 0.821, respectively. Again, this was obtained after removing irrelevant measurement items having factor loadings less than 0.45 (e.g. SY4) and correlation coefficients less than 0.3 (e.g. SY3, SY5). In general, the results show that all retained measurement items have factor loadings above 0.45, without cross-loadings over 0.2.

In particular, the first extracted construct includes measurement items of: 'aesthetically pleasing office environment' (SY6, FL=0.839); 'employee friendly office environment' (e.g. enough spaces for everyone) (SY7, FL=0.832); 'comfortable office environment' (SY8, FL=0.810);

'healthy office environment' (SY10, FL=0.669); and 'collaborative office environment' (e.g. more open spaces) (SY8, FL=0.594). The findings are line with those of Kim and Jung (2015) namely that these five measurement items are highly related to employees' job satisfaction and perceived performance. This is further supported by the preliminary interview findings with the key leasing decision makers of green buildings in Sydney CBD, that provision of employee benefits through the more occupant-friendly environment is one of their biggest considerations when leasing an office (see Section 4.4.3). Therefore, this construct can be defined as the symbolic values of office buildings that are related to employees ($X2_{EMPL}$).

The next construct explains 14.8% of the total variance and consists of the: 'office environment with cutting-edge technologies' (SY11, FL=0.821); 'environmentally friendly office environment' (SY9, FL=0.811); 'office environment that well-reflects the corporate identity' (SY14, FL=0.710); and 'office environment to attract future employees' (SY13, FL=0.681). Therefore, unlike the construct representing symbolic values of office buildings that are related to employees ($X2_{EMPL}$), this construct is more related to the interests of organisations. Therefore, it can be defined as the symbolic values of office buildings related to the organisation ($X2_{ORGS}$). Considering the two constructs associated with the symbolic aspect of office buildings, the Hypothesis 2a (H2a) and Hypothesis 2c (H2c) of this research are divided into H2a-1, H2-2, and H2c-1 and H2c-2, respectively.

Table 6.9 Construct (factor) matrix for measurement items of the symbolic aspect of office buildings (X2)

	Construct (Factor)	
	1 (α: 0.851)	2 (α: 0.756)
SY6_Aesthetically pleasing office environment	.839	
SY7_Employee-friendly office environment	.832	
SY1_Comfortable office environment	.810	
SY10_Healthy office environment	.669	
SY8_Collaborative office environment	.594	
SY11_office environment with cutting-edge technologies		.821
SY9_Environmentally-friendly office environment		.811
SY14_Office environment that well-reflects the corporate identity		.710
SY13_Office environment to attract future employees		.681

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in three iterations.

6.3.2.3 Factor analysis of tenants' expectations from leasing their offices (X3)

It is found that the KMO and Bartlett's test results for tenants' expectations (X3) (KMO=0.888, $p=0.000$) is deemed satisfactory. Likewise, all retained measurement items belonging to this shows communalities ranging from 0.688 to 0.920 thus, can be also considered as satisfactory.

Table 6.10 and Figure 6.3 show that two constructs were extracted based on the Eigenvalue greater than 1.0. The first construct has a high Eigenvalue of 8.105 and accounts for over 67.5% of the total variance explained. On the other hand, the second construct has relatively low Eigenvalue of 1.535 and explains 12.8% of the total variance.

Table 6.10 Total variance explained for tenants' expectations from leasing their offices (X3)

Construct (Factor)	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	8.105	67.543	67.543
2	1.535	12.791	80.334
3	.574	4.784	85.118
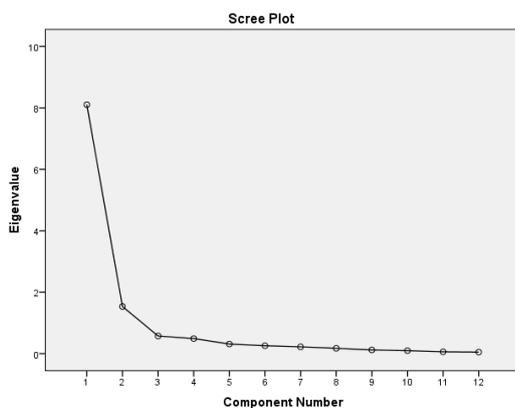
Figure 6.3 Scree plot for tenants' expectations from leasing their offices (X3)

Table 6.11 shows that all measurement items across the two constructs have maximum and minimum loadings of 0.728 and 0.938, respectively. In particular, it is found that the first construct is associated with nine measurement items, namely: 'innovative organisation' (EP9, FL=0.938); 'people-first organisation' (EP10, FL=0.893); 'flexible organisation' (EP12, FL=0.888); 'trustworthy organisation' (EP8, FL=0.883); 'publicly well-known organisation' (EP13, FL=0.851); 'approachable organisation' (EP14, FL=0.818); 'collaborative organisation' (EP6, FL=0.789); 'ethical organisation' (EP7, FL=0.767); and 'fair organisation' (EP11, FL=0.728).

These values are well-aligned with the widely accepted definition of Corporate Social Responsibility (CSR) that, "the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society at large" (Holme and Watts, 1999, p. 3). Therefore, this construct could be defined as expectations to become a socially conscious organisation ($X3_{SOCO}$), which is expected by the wider community now (Loosemore and Lim, 2016).

On the other hand, the next construct explaining 12.8% of the total variance (as it is reflected by an Eigenvalue of 1.535) consists of three measurement items of: 'environmentally friendly organisation' (EP5, FL=0.897); 'fast follower organisation' (EP2, FL=0.861); and 'socially responsible organisation' (EP3, FL=0.815). Collectively, this construct represents tenants' expectations related to Corporate Sustainability (CS). These measurement items describe meeting the needs of interests of direct, indirect and future stakeholders, while maintaining and contributing to the three domains of sustainability: economic, social and environmental sustainability (Dyllick and Hockerts, 2002). Therefore, this construct could be defined as the tenants' expectations to become a sustainable organisation by pursuing corporate sustainability ($X3_{SUSO}$). This is further supported by the exploratory interview findings that many organisations leased green buildings partly because they do not want to be left behind their competitors in their commitment to sustainability (i.e. 'Keeping up with the Joneses') (Kim *et al.*, 2019).

Overall, the results show that tenants' expectations from leasing their offices are mostly explained by their expectations for being a socially responsible organisation (or corporate) whilst being a sustainable organisation could be used as supplementary. Considering the two extracted constructs, Hypothesis 2b (H2b) and Hypothesis 2d (H2d) of this research are divided into H2b-1, H2b-2 and H2d-1, H2d-2, respectively.

Table 6.11 Construct (factor) matrix for tenants' expectations from leasing their offices (X3)

	Construct (Factor)	
	1 (α: 0.965)	2 (α: 0.885)
EP9_Innovative organisation	.938	
EP10_People-first organisation	.893	
EP12_Flexible organisation	.888	
EP8_Trustworthy organisation	.883	
EP13_Publically well-known organisation	.851	
EP14_Approachable organisation	.818	
EP6_Collaborative organisation	.789	
EP7_Ethical organisation	.767	
EP11_Fair organisation	.728	
EP5_Environmentally friendly organisation		.897
EP2_Fast follower organisation		.861
EP3_Socially responsible organisation		.815

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in three iterations.

6.3.2.4 Factor analysis of tenants' organisational values reflecting their identity (X4)

KMO and Bartlett's test results for tenants' organisational values (X4) indicates a satisfactory level of convergent validity with 0.836 and p-value of 0.000, respectively. Moreover, the twelve measurement items retained from EFA have communalities of the minimum of 0.641 and a maximum of 0.863. Again, considering the adopted threshold of communalities is 0.6, it could be confirmed that all measurement items reflecting tenants' organisational values are well-correlated to each other.

In regard to tenants' organisational values, four constructs were initially extracted then subsequently reduced to three constructs (see Table 6.12 and Figure 6.4). These three constructs explain approximately 75% of the total variance. Of these, the first construct explains over 48% of the total variance.

Table 6.12 Total variance explained for tenants' organisational values reflecting their identity (X4)

Construct (Factor)	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	5.812	48.437	48.437
2	2.069	17.238	65.675
3	1.125	9.373	75.048
4	.680	5.670	80.717
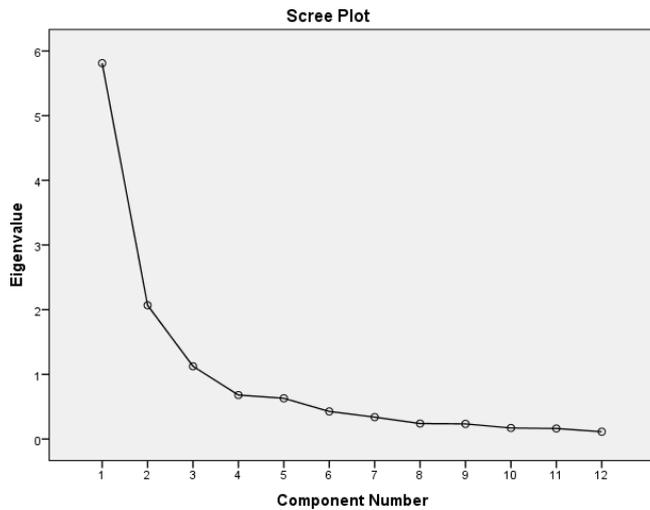
Figure 6.4 Scree plot for tenants' organisational values reflecting their identity (X4)

Table 6.13 presents a total of twelve measurement items extracted under the three constructs following the removal of any irrelevant measurement items. Factor loadings ranging from 0.741 to 0.898 indicate that the measurement items have a sufficient level of convergent validity.

Specifically, the first construct has an Eigenvalue of 5.82, containing: 'customer satisfaction (OV13, FL=0.875); 'leadership' (OV1, FL=0.805); 'people (employees)' (OV14, FL=0.798); 'innovation' (OV8, FL=0.777); 'openness' (OV5, FL=0.776); and 'teamwork' (OV4, FL=0.751). Therefore, this construct characterises organisational identity for people-focused organisations ($X4_{PEOP}$) as all these measurement items are related to either employees or outside stakeholders, such as customers and future employees.

Meanwhile, the second construct contains measurement items of: 'community (corporate citizenship)' (OV15, FL=0.898); 'social responsibility' (OV10, FL=0.894); and 'environmental sustainability' (OV12, FL=0.791) which are all related to the concept of triple bottom line of sustainability (United Nations, 1987). The 'acknowledgement' (OV16, FL=0.741) item is also aligned with the exploratory interview findings that organisations lease 'certified' green buildings because they want to be acknowledged by others for their efforts towards social responsibility, environmental responsibility and community engagement. To this extent, this construct signifies tenants' organisational identity as a sustainability-focused organisation ($X4_{SUST}$).

The last construct, consisting of 'uniqueness' (OV17, FL=0.865); and 'approachability' (OV18, FL=0.803) represents tenants' organisational identity as a unique and approachable

organisation (X4$_{UNIA}$). It should be noted that 'community' (OV15, FL=0.485) was also extracted while cross-loaded across the first construct of the people-focused organisation (X4$_{PEOP}$); however, as the cross-loadings are over 0.2, it can be disregarded.

Table 6.13 Construct (factor) matrix for tenants' organisational values reflecting their identity (X4)

	Construct (Factor)		
	1 (α: 0.918)	2 (α: 0.875)	3 (α: 0.726)
OV13_Customer satisfaction	.875		
OV1_Leadership	.805		
OV14_People (Employee)	.798		
OV8_Innovation	.777		
OV5_Openness	.776		
OV4_Teamwork	.751		.485
OV15_Community (Corporate Citizenship)		.898	
OV10_Social responsibility		.894	
OV12_Environmental sustainability		.791	
OV16_Acknowledgement		.741	
OV17_Uniqueness			.865
OV18_Approachability			.803

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in five iterations.

6.3.2.5 *Factor analysis of tenants' leasing decisions about the greenness of office buildings (X5)*

Tenants' leasing decisions about the greenness of office buildings (X5) using NABERS ratings and Green Star ratings show KMO of 0.500 and the significance of 0.000. Considering the threshold value of KMO in this research is 0.5, the results are deemed as satisfactory, albeit by a narrow margin. The relatively low KMO found may be determined by the usage of only two measurement items to reflect the level of the greenness of tenants' office buildings (see Section 4.4.2.1.2). Communalities of the two measurement items are equally 0.782 thus, could be deemed as satisfactory.

Table 6.14 and Figure 6.5 show that only a single construct was extracted. Again, this is not a surprising result considering only two measurement items were used to measure the greenness of tenants' office buildings. Overall, these two measurement items explain over 78% of the total variance with the Eigenvalue of 1.563.

Table 6.14 Total variance explained for tenants' leasing decisions about the greenness of their office buildings (X5)

Construct (Factor)	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	1.563	78.172	78.172
2	.437	21.828	100.000
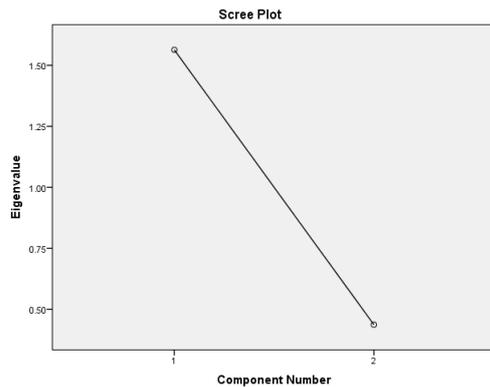
Figure 6.5 Scree plot for tenants' choices towards the greenness of their office buildings (X5)

Table 6.15 shows that the factor loadings of the two measurement items are 0.884. These considerably high loadings (i.e. above 0.7) help to establish a high degree of convergent validity between the two measurement items, within a single construct.

Table 6.15 Construct (factor) matrix for tenants' choices towards the greenness of their office buildings (X5)

	Construct (Factor)
	1 (α: 0.721)
NABERS ratings	.884
Green Star ratings	.884

Extraction Method: Principal Component Analysis.
One construct (factor) extracted.

6.3.2.6 Factor analysis of market and regulatory forces (Z)

It is found that the moderator construct, Z, has relatively low KMO of 0.584 that was reduced from its initial value of 0.688; however, it can be deemed as satisfactory as it is still over the threshold value of 0.5. Similarly, the values of communalities show ranges of 0.370 to 0.856 across the retained measurement items. It is noted that there are two items of 'relationships with the landlord' (CS1, FL=0.370) and 'financial incentives from the landlord' (CS2, FL=0.382) having communalities under the minimum threshold of 0.4. However, these items could be retained at this stage considering the elimination of measurement items solely based on low

communalities should be undertaken very carefully. This is related to the purpose of factor analysis, which is to extract constructs based on different measurement items. In particular, although some measurement items may have low communalities, they could be still used as an important indicator which explains certain construct despite its low correlation with other measurement items. Thus, measurement items showing the relatively fewer communalities will be eliminated in the subsequent stage of CFA, if necessary.

Table 6.16 and Figure 6.6 reveal a single construct explains over half of the total variance. It is noted that although this is less than the suggested percentage of variance explained of 0.6, this is still acceptable considering the exploratory nature of this research requiring KMO over 0.5 (See Section 5.3.4.1).

Table 6.16 Total variance explained for push and pull forces (Z)

Construct (Factor)	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	2.557	51.147	51.147
2	.995	19.909	71.056
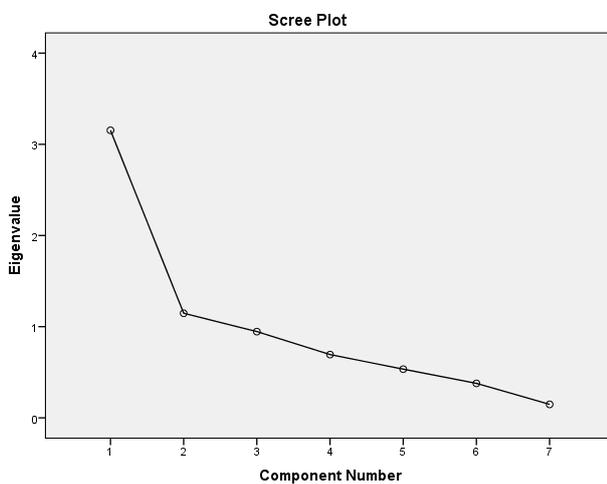
Figure 6.6 Scree plot for push and pull forces (Z)

Table 6.17 shows a single construct with loadings from 0.567 to 0.859 following the removal of two measurement items, Competition against competitors (CS5) and Availability of suitable stocks at the time of leasing (CS7). Overall, this helps to have a sufficient level of item-to-total correlation and factor loadings of retained measurement items. It should be also noted that the

results indicate that all five measurement items do not have any cross-loadings, as all measurement items were loaded as a single construct.

In particular, the result indicates that the market and regulatory forces affecting tenants' leasing decisions about the greenness of office buildings could be explained as one construct instead of two separate constructs of 'carrot' and 'stick', as initially expected (see Table 6.4). The five measurement items associated with the single-dimensional construct Z include: 'government regulations' such as building energy disclosure (CS4, FL=0.859); 'government support and incentives' such as tax benefits (CS3, FL=0.791); 'financial constraints at the time of leasing' (CS6, FL=0.696); 'financial incentives from the landlords' (CS2, FL=0.622); and 'relationship with the landlords' (CS1, FL=0.567). Therefore, this explains the influence of market and regulatory forces which may play a moderating role in tenants' leasing decisions.

Table 6.17 Construct (factor) matrix for push and pull forces (Z)

	Construct (Factor)
	1 (α: 0.748)
CS4_Government regulations (e.g. energy efficiency disclosure)	.859
CS3_Government support and incentives (e.g. tax benefits)	.791
CS6_Financial constraints at the time of leasing	.696
CS2_Financial incentives from the landlord	.622
CS1_Relationship with the landlord	.567
Extraction Method: Principal Component Analysis. One component extracted.	

6.4 Results of the contemporary validation approach

Following the removal of inconsistent measurement items and extraction of constructs through the EFA procedures, Confirmatory Factor Analysis (CFA) was undertaken using SmartPLS 3.0 software. This includes the establishment of: (i) internal consistency reliability; and (ii) constructs validity by evaluating convergent and discriminant validity. This further ensures reliability and validity of data by considering the interrelationships among the 'multi-dimensional' constructs extracted from the EFA. In this process, three measures were adopted, as discussed in Section 5.3.4.5. In particular, this research adopts (i) Cronbach's alpha and composite reliability for internal reliability, (ii) minimum factor loadings of 0.7 and Average Variance Extracted (AVE) of 0.5 for convergent validity and (iii) Cross-loadings, Fornell-Larcker criterion and Heterotrait-Monotrait Ratio of Correlations (HTMT) for discriminant

validity. Table 6.18 presents the categorisation of different constructs based on the results of the EFA discussed in Section 6.3.

Table 6.18 Revised categorisation of constructs

Construct (Factor)	No. of items after EFA	Remaining measurement items after EFA
X1		
Construct 1: Building sustainability (X1$_{BLDS}$)	5	TA13, TA14, TA15, TA17, TA18
Construct 2: Lease contract features (X1$_{LEAS}$)	3	TA21, TA22, TA23, TA24
Construct 3: Building quality (X1$_{BLDQ}$)	4	TA6, TA9, TA11
Construct 4: Proximity (X1$_{PROX}$)	2	TA3, TA5
X2		
Construct 1: Employee related symbolic values (X2$_{EMPL}$)	5	SY1, SY6, SY7, SY8, SY10
Construct 2: Organisation related symbolic values (X2$_{ORGS}$)	4	SY9, SY11, SY13, SY14
X3		
Construct 1: To become a socially conscious organisation (X3$_{SOCO}$)	9	EP6, EP7, EP8, EP9, EP10, EP11, EP12, EP13, EP14
Construct 2: To become a sustainable organisation (X3$_{SUSO}$)	3	EP2, EP3, EP5
X4		
Construct 1: People-focused (X4$_{PEOP}$)	6	OV1, OV4, OV5, OV8, OV13, OV14
Construct 2: Sustainability-focused (X4$_{SUST}$)	4	OV10, OV12, OV15, OV16
Construct 3: Unique and approachable (X4$_{UNIA}$)	2	OV17, OV18
X5		
Single construct: Greenness (X5)	2	GB1, GB2
Z		
Single construct: Market and regulatory forces	5	CS1, CS2, CS3, CS4, CS6
Y		
Single construct: Rental	1	RP1

6.4.1   Internal reliability

First, the internal reliability of the multi-dimensional constructs extracted from EFA is tested using Cronbach's alpha. As discussed in Section 5.3.4.2, Cronbach's alpha of 0.7 is often used to measure the internal reliability although 0.6 can also be considered as acceptable. Figure 6.7 shows the results of Cronbach's alpha presented by SmartPLS: a range of 0.721 to 1.000 thus, deemed as satisfactory. It should be noted that the value of 1.000 was obtained from the dependent construct (Y) of the research, rental, which uses the single-measurement item.
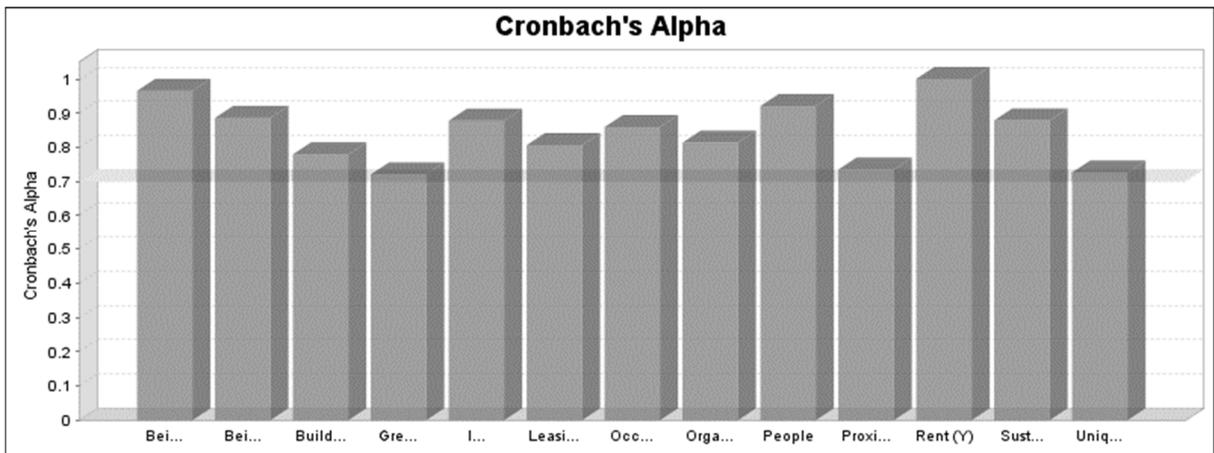
Figure 6.7 Cronbach's alpha after the removal of the irrelevant item

Figure 6.8 shows the results of composite reliability, indicating a minimum of 0.865 and a maximum of 1.000. Besides rental (Y), a construct of Expectation to become a socially responsible organisation (X3$_{SOCO}$) shows a composite reliability score of 0.970, which is above the generally recommended threshold of 0.95. However, this tolerated in this research given the nature of the reflective model, which may have similar measurement items representing the same construct (see Section 5.3.5.1). Overall, the results of composite reliability show a satisfactory result, confirming the establishment of internal reliability.
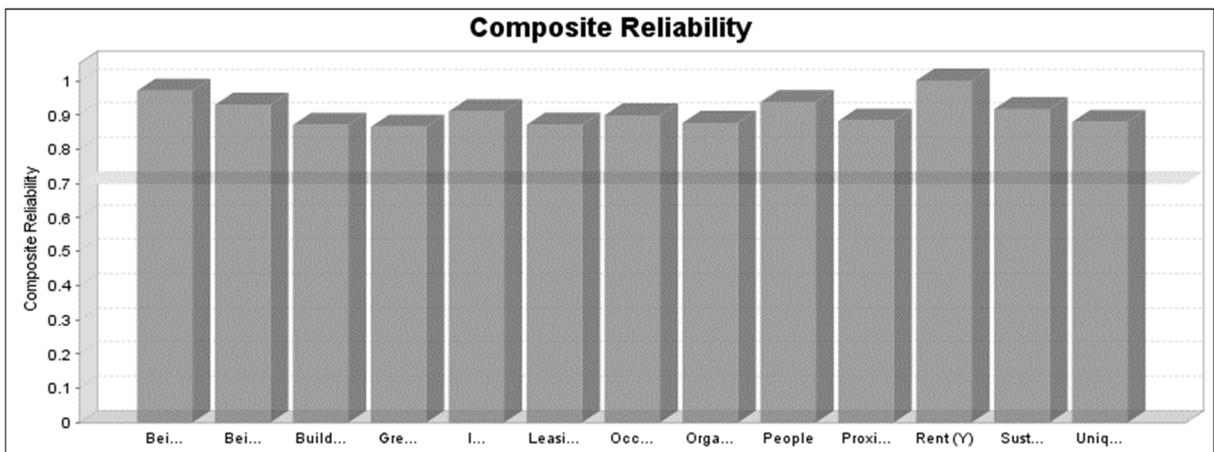
Figure 6.8 Composite reliability after the removal of the irrelevant measurement items

6.4.2 Convergent validity

It is found that all measurement items have factor loadings above 0.7. This indicates that no measurement items needed to be removed to raise AVE (Section 5.3.4.4). Moreover, the result shows that the obtained AVE are over the minimum threshold of 0.5, ranging from 0.629 to 1.000 (see Figure 6.9). Again, the AVE value of 1.000 is obtained from the dependent construct

(Y) of the research using a single measurement item. Collectively, the test results provide confidence in convergent validity.
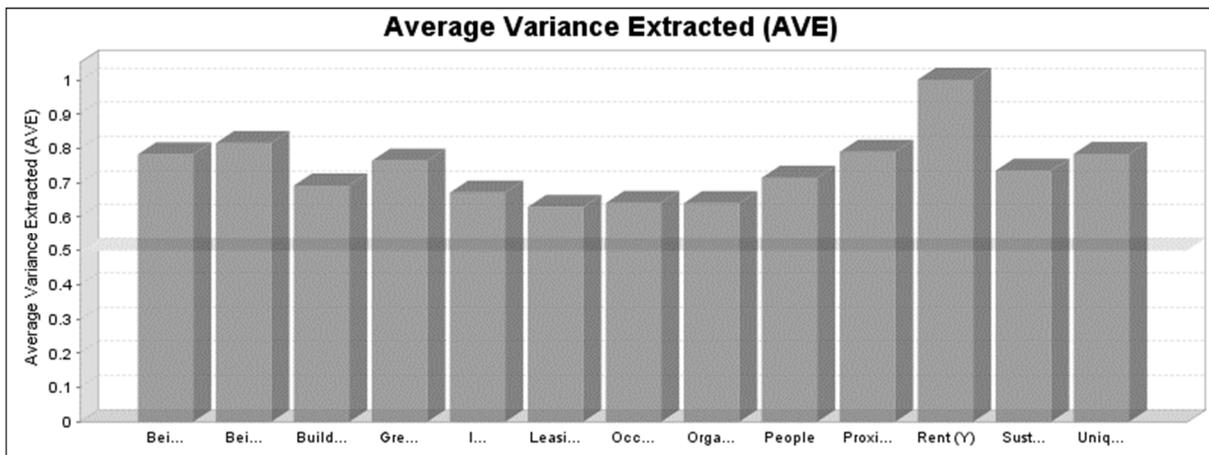
Figure 6.9 AVE after removal of the irrelevant measurement items

6.4.3 Discriminant validity

Table 6.19 shows that each measurement item's factor loadings on the associated construct (highlighted in grey) always appear larger than any of their cross-loadings on other constructs. For example, a construct of 'building quality' ($X1_{BLDQ}$) has three measurement items and their lowest loadings of 0.823 (TA6) is higher than the loadings of all other measurement items not associated with the construct. This implies that no measurement items were assigned incorrectly to irrelevant constructs; therefore, successfully establishes discriminant validity.

Fornell-Larcker criterion was also adopted to further confirm the discriminant validity of the identified constructs. If discriminant validity is established, a construct can always better explain the variance of its own measurement item(s) than any other unrelated constructs (Ab Hamid *et al.*, 2017). For instance, Table 6.20 shows that the square root of AVE of a construct $X3_{SOCO}$ (Expectation to become a socially conscious organisation) is 0.885, which is higher than the correlations of any other constructs. This is shown consistently throughout all other constructs, thus helps to provide discriminant validity of the identified constructs.

Finally, the HTMT ratio of correlation is used to ensure the discriminant validity of retained data. The results of the HTMT calculation in Table 6.21 show that all values are significantly less than the adopted threshold of 0.85 and therefore, the results support the establishment of discriminant validity. It is further confirmed that the lower (2.5%) and upper (97.55) bounds of Confidence Interval (CI) support the discriminant validity of the constructs. Specifically, it is

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found that all the relationships CI less than 0.85 and does not contain the value 1. Therefore, an establishment of discriminant validity can be confirmed.

Overall, the results of a confirmatory validation approach confirm that both internal reliability and construct reliability (i.e. convergent validity and discriminant validity) are successfully established. The summary of the results of confirmatory validations and the developed PLS path model of the research are shown in Table 6.22.

Table 6.19 Cross-loading analysis

	X5	X1BLDQ	X1BLDS	X1LEAS	X1PROX	X2EMPL	X2ORGS	X4PEOP	X4SUST	X4UNIA	X3SOCO	X3SUSO	Y
NABE	0.953	0.301	0.286	0.124	-0.014	0.365	0.465	0.386	0.261	0.169	0.121	-0.116	0.111
GRST	0.788	0.037	-0.059	0.106	-0.006	0.093	0.102	0.294	0.02	0.154	0.108	-0.104	-0.054
TA11	0.285	0.848	0.542	0.178	-0.053	0.384	0.417	0.12	0.415	-0.031	0.095	0.212	0.338
TA6	0.05	0.807	0.415	0.216	0.262	0.174	0.305	0.131	0.457	-0.009	0.111	0.295	0.135
TA9	0.228	0.84	0.444	0.167	0.412	0.256	0.431	0.179	0.446	0.233	0.136	0.162	0.244
TA13	0.127	0.472	0.8	0.403	0.294	0.521	0.369	0.257	0.213	0.361	0.311	0.399	0.15
TA14	0.178	0.335	0.769	0.314	0.148	0.49	0.386	0.205	0.153	0.274	0.276	0.219	0.148
TA15	0.108	0.398	0.832	0.426	0.244	0.585	0.389	0.252	0.243	0.27	0.298	0.2	0.239
TA17	0.19	0.564	0.868	0.243	0.386	0.322	0.668	0.299	0.594	0.302	0.407	0.468	0.112
TA18	0.174	0.514	0.825	0.156	0.347	0.26	0.53	0.144	0.521	0.273	0.275	0.423	0.08
TA21	0.25	0.133	0.321	0.826	0.101	0.58	0.442	0.252	0.127	0.278	0.209	0.001	0.098
TA22	0.11	0.104	0.331	0.803	0.169	0.431	0.275	0.196	0.038	0.208	0.122	0.253	-0.028
TA23	-0.004	0.163	0.243	0.782	0.248	0.321	0.23	0.109	0.179	0.194	0.302	0.218	0.103
TA24	-0.004	0.32	0.26	0.761	0.237	0.468	0.283	0.224	0.209	0.218	0.077	0.057	0.172
TA3	-0.056	0.203	0.366	0.176	0.897	-0.061	0.162	0.231	0.264	0.401	0.232	0.344	0.025
TA5	0.037	0.211	0.265	0.228	0.88	0.026	0.266	0.047	0.139	0.122	0.238	0.378	0.22
SY1	0.159	0.217	0.363	0.5	-0.043	0.755	0.304	0.223	0.033	0.268	0.226	0.011	0.234
SY10	0.349	0.366	0.587	0.516	0.011	0.816	0.562	0.22	0.262	0.184	0.373	0.189	0.095
SY6	0.178	0.166	0.384	0.461	0.026	0.827	0.442	0.29	0.002	0.309	0.18	0.039	0.184
SY7	0.242	0.265	0.413	0.49	-0.036	0.874	0.473	0.278	0.112	0.218	0.241	-0.019	0.091
SY8	0.289	0.329	0.268	0.344	-0.055	0.723	0.49	0.331	0.282	0.059	0.269	0.119	0.056
SY11	0.066	0.418	0.502	0.259	0.32	0.36	0.781	0.08	0.547	0.24	0.433	0.561	-0.001
SY13	0.521	0.256	0.446	0.316	0.219	0.501	0.797	0.5	0.315	0.362	0.44	0.24	-0.065
SY14	0.24	0.427	0.385	0.455	0.094	0.541	0.84	0.367	0.524	0.257	0.369	0.251	0.025
SY9	0.36	0.398	0.539	0.262	0.154	0.412	0.782	0.188	0.596	0.099	0.384	0.311	0.135
SY1	0.453	0.319	0.312	0.226	0.226	0.178	0.264	0.855	0.413	0.367	0.135	0.118	-0.039

SY13	0.27	0.102	0.083	0.073	0.168	0.109	0.156	0.826	0.253	0.343	0.061	0.213	-0.17
SY14	0.436	0.017	0.192	0.206	0.017	0.359	0.369	0.831	0.405	0.369	0.337	0.16	-0.163
SY4	0.218	0.23	0.311	0.269	0.163	0.262	0.36	0.884	0.399	0.632	0.313	0.263	-0.068
SY5	0.269	0.038	0.307	0.263	0.018	0.431	0.298	0.842	0.286	0.475	0.25	0.082	-0.041
SY8	0.333	0.143	0.168	0.188	0.248	0.259	0.308	0.833	0.401	0.46	0.163	0.169	-0.059
OV10	0.151	0.471	0.356	0.103	0.1	0.239	0.634	0.349	0.894	0.097	0.278	0.385	0.104
OV12	0.161	0.478	0.494	0.141	0.325	0.19	0.539	0.293	0.808	0.217	0.263	0.402	-0.038
OV15	0.19	0.403	0.415	0.092	0.134	0.115	0.513	0.427	0.923	0.248	0.36	0.495	0.034
OV16	0.192	0.442	0.239	0.26	0.22	0.031	0.433	0.432	0.798	0.34	0.375	0.433	0.144
OV17	0.265	0.078	0.341	0.258	0.372	0.169	0.242	0.436	0.189	0.902	0.186	0.256	-0.117
OV18	0.044	0.057	0.295	0.254	0.143	0.308	0.28	0.51	0.28	0.869	0.234	0.227	-0.101
EX10	0.223	0.102	0.26	0.178	0.045	0.344	0.422	0.275	0.326	0.101	0.903	0.496	-0.096
EP11	-0.021	0.149	0.374	0.167	0.313	0.191	0.517	0.102	0.469	0.111	0.842	0.631	0.022
EP12	0.178	0.228	0.438	0.167	0.063	0.361	0.475	0.122	0.292	0.153	0.871	0.427	0.08
EP13	0.154	0.204	0.436	0.172	0.272	0.263	0.523	0.341	0.472	0.238	0.901	0.532	-0.019
EP14	0.035	-0.081	0.337	0.251	0.273	0.333	0.412	0.128	0.188	0.285	0.887	0.524	-0.035
EP6	0.177	0.139	0.265	0.186	0.199	0.31	0.474	0.4	0.276	0.25	0.822	0.495	-0.013
EP7	0.038	0.059	0.356	0.221	0.392	0.27	0.336	0.265	0.243	0.353	0.872	0.615	0.042
EP8	0.122	0.123	0.261	0.17	0.29	0.202	0.332	0.197	0.297	0.19	0.913	0.497	-0.015
EP9	0.167	0.147	0.311	0.258	0.196	0.351	0.498	0.28	0.312	0.177	0.946	0.493	-0.03
EP2	-0.153	0.051	0.218	0.162	0.437	0.028	0.125	0.122	0.215	0.316	0.356	0.797	-0.016
EP3	-0.119	0.357	0.446	0.098	0.321	0.09	0.47	0.183	0.562	0.177	0.631	0.937	-0.145
EP5	-0.083	0.248	0.456	0.155	0.374	0.102	0.456	0.211	0.513	0.276	0.586	0.966	-0.172
Y	0.063	0.298	0.173	0.11	0.134	0.166	0.035	-0.1	0.068	-0.124	-0.007	-0.135	1

Note NABE: NABERS ratings, GRST: Green Star ratings, BLDQ: Building quality, BLDS: Building sustainability, LEAS: Lease contract features, PROX: Proximity, OCCU: Occupant related symbolic values, ORGS: Organisation related symbolic values, PEOP: People, SUST: Sustainability, UNIA: Unique and approachable, SOCO: Expectation to become a socially conscious organisation, SUSO: Expectation to become a sustainable

Table 6.20 Fornell-Larcker criterion

	$X3_{SOCO}$	$X3_{SUSO}$	$X1_{BLDQ}$	$X5$	$X1_{BLDS}$	$X1_{LEAS}$	$X2_{EMPL}$	$X2_{ORGS}$	$X4_{PEOP}$	$X1_{PROX}$	Y	$X4_{SUST}$	$X4_{UNIA}$
$X3_{SOCO}$	0.885												
$X3_{SUSO}$	0.597	0.903											
$X1_{(BLDQ}$	0.136	0.262	0.832										
$X5$	0.13	-0.125	0.238	0.874									
$X1_{BLDS}$	0.388	0.43	0.567	0.191	0.819								
$X1_{LEAS}$	0.222	0.148	0.222	0.131	0.368	0.793							
$X2_{EMPL}$	0.326	0.087	0.337	0.306	0.517	0.584	0.801						
$X2_{ORGS}$	0.506	0.414	0.467	0.384	0.587	0.404	0.569	0.801					
$X4_{PEOP}$	0.265	0.195	0.172	0.395	0.285	0.254	0.329	0.36	0.846				
$X1_{PROX}$	0.264	0.405	0.232	-0.013	0.357	0.226	-0.022	0.238	0.16	0.889			
Y	-0.007	-0.135	0.298	0.063	0.173	0.11	0.166	0.035	-0.1	0.134	1		
$X4_{SUST}$	0.37	0.5	0.525	0.202	0.444	0.171	0.172	0.621	0.435	0.229	0.068	0.857	
$X4_{UNIA}$	0.235	0.273	0.077	0.183	0.361	0.289	0.264	0.293	0.531	0.299	-0.124	0.261	0.886

Table 6.21 HTMT ratio

	X3SOCO	X3SUSO	X1BLDQ	X5	X1BLDS	X1LEAS	X2EMPL	X2ORGS	X4PEOP	X1PROX	Y	X4SUST	X4UNIA
X3SOCO													
X3SUSO	0.622												
X1BLDQ	0.182	0.299											
X5	0.172	0.162	0.253										
X1BLDS	0.409	0.455	0.666	0.253									
X1LEAS	0.253	0.218	0.295	0.165	0.441								
X2EMPL	0.358	0.12	0.396	0.325	0.597	0.673							
X2ORGS	0.568	0.472	0.58	0.452	0.673	0.477	0.676						
X4PEOP	0.277	0.215	0.22	0.468	0.297	0.27	0.361	0.4					
X1PROX	0.305	0.519	0.384	0.09	0.428	0.309	0.077	0.32	0.239				
Y	0.045	0.131	0.325	0.11	0.19	0.14	0.178	0.078	0.111	0.161			
X4SUST	0.395	0.541	0.637	0.248	0.473	0.224	0.221	0.729	0.476	0.28	0.1		
X4UNIA	0.282	0.353	0.176	0.24	0.45	0.368	0.335	0.392	0.641	0.418	0.145	0.335	

Table 6.22 Summary of the results of construct validation approaches

		Internal Reliability		Convergent Validity				Discriminant Validity
		Cronbach's alpha	Composite reliability	Factor loadings	t-statistics	Indicator reliability	AVE	HTMT CI
Constructs (Factors)	**Measurement Items**	**> 0.7**	**> 0.6**	**> 0.7**	**>1.96**	**> 0.45**	**> 0.5**	**< 0.85**
X1$_{BLDS}$	TA14_Building's lighting quality	0.874	0.911	0.769	9.965	0.591	0.671	Yes
	TA15_Building's IAQ			0.832	14.019	0.692		
	TA13_Building's acoustic quality			0.8	10.876	0.64		
	TA17_Building's water efficiency			0.868	24.025	0.753		
	TA18_Building's environmental performance			0.825	15.631	0.681		
X1$_{LEAS}$	TA23_Lease pre-commitment	0.790	0.872	0.782	8.668	0.612	0.629	Yes
	TA22_Lease type			0.803	8.367	0.645		
	TA24_Build-out			0.761	7.016	0.579		
	TA21_Lease term			0.826	9.661	0.682		
X1$_{BLDQ}$	TA6_Office space size	0.758	0.871	0.807	11.627	0.651	0.692	Yes
	TA11_Building's amenities			0.848	18.724	0.719		
	TA9_Building's grade			0.84	13.952	0.706		
X1$_{PROX}$	TA3_Proximity to major roads	0.716	0.883	0.897	7.522	0.805	0.79	Yes
	TA5_Proximity to major competitors			0.88	8.741	0.774		
X2$_{EMPL}$	SY6_Aesthetically pleasing office environment	0.851	0.899	0.827	20.379	0.684	0.641	Yes
	SY7_Employee-friendly office environment			0.874	22.788	0.764		
	SY1_Comfortable office environment			0.755	9.987	0.57		
	SY10_Healthy office environment			0.816	17.105	0.666		
	SY8_Collaborative office environment			0.723	7.698	0.523		
X2$_{ORGS}$	SY11_Office environment with cutting-edge technologies	0.756	0.877	0.781	9.301	0.61	0.641	Yes
	SY9_Environmentally-friendly office environment			0.782	10.589	0.612		

	SY14_Office environment that well-reflects the corporate identity			0.84	15.202	0.706		
	SY13_Office environment to attract future employees			0.797	5.691	0.635		
$X3_{SOCO}$	EP9_Innovative organisation	0.965	0.97	0.946	46.365	0.895	0.783	Yes
	EP10_People-first organisation			0.903	27.228	0.815		
	EP12_Flexible organisation			0.871	17.088	0.759		
	EP8_Trustworthy organisation			0.913	28.739	0.834		
	EP13_Publically well-known organisation			0.901	25.643	0.812		
	EP14_Approachable organisation			0.887	18.81	0.787		
	EP6_Collaborative organisation			0.822	14.544	0.676		
	EP7_Ethical organisation			0.872	22.691	0.76		
	EP11_Fair organisation			0.842	6.641	0.709		
$X3_{SUSO}$	EP5_Environmentally friendly organisation	0.885	0.93	0.966	80.004	0.933	0.816	Yes
	EP2_Fast follower organisation			0.797	9.672	0.635		
	EP3_Socially responsible organisation			0.937	23.855	0.878		
$X4_{PEOP}$	OV13_Customer satisfaction	0.918	0.938	0.826	8.001	0.682	0.715	Yes
	OV1_Leadership			0.855	11.907	0.731		
	OV14_People (Employee)			0.831	14.621	0.691		
	OV8_Innovation			0.833	10.42	0.694		
	OV5_Openness			0.842	18.794	0.709		
	OV4_Teamwork			0.884	14.839	0.781		
$X4_{SUST}$	OV15_Community (Corporate Citizenship)	0.875	0.917	0.923	31.177	0.852	0.735	Yes
	OV10_Social responsibility			0.894	17.818	0.799		
	OV12_Environmental sustainability			0.808	13.118	0.653		
	OV16_Acknowledgement			0.798	12.702	0.637		
$X4_{(UNIA)}$	OV17_Uniqueness	0.726	0.879	0.902	19.746	0.814	0.784	Yes
	OV18_Approachability			0.869	8.776	0.755		
$X5$	NABERS ratings	0.721	0.865	0.953	25.005	0.908	0.764	Yes
	Green Star ratings			0.788	10.066	0.621		
Y	Rental	1	1	1	-	1	1	Yes

6.5 Summary

This chapter is an overview of sample data, including the background information of respondents, their organisation and office buildings. The obtained data were the first to review to ensure their reliability and trustfulness. Then, they were evaluated using both the classical (i.e. Cronbach's alpha and item-to-total correlation, EFA) and more contemporary and confirmatory (CFA) validation approaches. The test results confirm an establishment of strong reliability and validity of the obtained data. Moreover, several different constructs underlying tenants' office leasing behaviours are seen. This indicates their behaviours are explained in several dimensions. Eventually, these allow the progression to the next stage of the research to assess relationships among tenants' various leasing motivators, their leasing decisions about the greenness of office buildings, and rental based on the established PLS path model.

Chapter 7. STRUCTURAL MODEL

7.1. Introduction

This chapter presents the findings of the structural model that was developed based on the result of the measurement models discussed in Chapter 6. Section 7.2 is an assessment of the collinearity of the structural model, followed by an initial evaluation of the coefficient of determination (R^2). Section 7.3 discusses ways by which to achieve the second and third objectives of this research, and the findings of the structural model are presented, with a particular focus on the hypothesised relationships among constructs representing tenants' leasing behaviours (X1-X5) and rental (Y). Finally, Section 7.4 discusses the moderating effects of market and regulatory forces (Z) on the relationship between tenants' leasing motivators (X1-X4) and their leasing decisions (X5) are presented. This addresses the fourth objective of this research.

7.2. Assessment on collinearity and coefficient of determination (R^2) of the structural model

The evaluation of the structural model requires undertaking several steps, as introduced in Section 5.3.5. First, the structural model was assessed to determine the level of collinearity exists, by measuring the Variance of Inflation Factor (VIF). The test results show the VIF values ranging from 1.211 to 2.917 within the structural model are considerably below the recommended threshold value of 5 (see Section 5.3.5.1). This then confirms that collinearity is not a major issue in this research.

Next, an initial assessment of the coefficient of determination (R^2) of the predicted constructs (X1-X3, X5, Y) was undertaken to determine if they have sufficient predictive power. It was found that R^2 of the ten predicted constructs of the structural model range from 0.101 to 0.557 and therefore considered as satisfactory. Then, implications of the R^2 of each construct are elaborated.

7.3. Interpretation and discussions of findings of the structural model

To achieve the second and third objectives of this research, interpretation and discussions of findings of the structural model are presented, with particular attention given to their implications in explaining tenants' leasing behaviours and their impact on rental. Table 7.1 shows that 13 out of 63 paths (including direct[A], indirect[B] and total effects[C]), demonstrate the

relationships between respective predictor and predicted constructs are found to be statistically significant, with *p*-values less than 0.05 and t-statistics over 1.96 (denoted as * in Table 7.1). These significant relationships are discussed in subsequent sections starting from the predictor constructs related to tenants' leasing behaviours (Section 7.3.1-7.3.4) and ending with the predictor constructs of rental (Section 7.3.5). In terms of these significant relationships, correlation tests were conducted to help explain to what extent they are related to each other. Figure 7.1 shows the structural model developed for this research and the significant relationships established.

Figure 7.1 PLS Structural Model of the Research (β for direct effect unless otherwise stated (^{B}Indirect, ^{C}Total))

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Table 7.1 Results of structural model

Hypothesis	Predicted construct	Relationship	β (direct[A])	β (indirect[B])	β (total[C=A+B])	R^2	f^2	Supp-orted
H1-1	$X1_{BLDS}$	$X4_{PEOP} \rightarrow X1_{BLDS}$	-0.029	-	-0.029	0.262^{**}	0.001	N
		$X4_{SUST} \rightarrow X1_{BLDS}$	**0.385***	**-**	**0.385***		**0.162^{**}**	**Y**
		$X4_{UNIA} \rightarrow X1_{BLDS}$	**0.276***	**-**	**0.276***		**0.074^{*}**	**Y**
H1-2	$X1_{LEAS}$	$X4_{PEOP} \rightarrow X1_{LEAS}$	0.113	-	0.113	0.101	0.009	N
		$X4_{SUST} \rightarrow X1_{LEAS}$	0.067	-	0.067		0.004	N
		$X4_{UNIA} \rightarrow X1_{LEAS}$	0.212	-	0.212		0.036^{*}	N
H1-3	$X1_{BLDQ}$	$X4_{PEOP} \rightarrow X1_{BLDQ}$	-0.049	-	-0.049	0.280^{**}	0.002	N
		$X4_{SUST} \rightarrow X1_{BLDQ}$	**0.557***	**-**	**0.557***		**0.348^{**}**	**Y**
		$X4_{UNIA} \rightarrow X1_{BLDQ}$	-0.042	-	-0.042		0.002	N
H1-4	$X1_{PROX}$	$X4_{PEOP} \rightarrow X1_{PROX}$	-0.075	-	-0.075	0.117	0.004	N
		$X4_{SUST} \rightarrow X1_{PROX}$	0.186	-	0.186		0.032^{*}	N
		$X4_{UNIA} \rightarrow X1_{PROX}$	0.291	-	0.291		0.069^{*}	N
H2a-1	$X2_{EMPL}$	**$X1_{BLDS} \rightarrow X2_{EMPL}$**	**0.396***	**-**	**0.396***	0.557^{**}	**0.186^{**}**	**Y**
		$X1_{LEAS} \rightarrow X2_{EMPL}$	**0.452***	**-**	**0.452***		**0.377^{***}**	**Y**
		$X1_{BLDQ} \rightarrow X2_{EMPL}$	0.137	-	0.137		0.023^{*}	N
		$X1_{PROX} \rightarrow X2_{EMPL}$	**-0.290***	**-**	**-0.290***		**0.157^{**}**	**Y**
H2c-1		$X4_{PEOP} \rightarrow X2_{EMPL}$	0.196	0.055	0.251		0.053^{*}	N
		$X4_{SUST} \rightarrow X2_{EMPL}$	-0.174	**0.205***	0.030		**0.040^{*}**	**Y**
		$X4_{UNIA} \rightarrow X2_{EMPL}$	0.008	0.114	0.123		0.000	N
H2a-2	$X2_{ORGS}$	**$X1_{BLDS} \rightarrow X2_{ORGS}$**	**0.307***	**-**	**0.307***	0.547^{**}	**0.109^{*}**	**Y**
		$X1_{LEAS} \rightarrow X2_{ORGS}$	0.211	-	0.211		0.001	N
		$X1_{BLDQ} \rightarrow X2_{ORGS}$	0.022	-	0.022		0.080^{*}	N
		$X1_{PROX} \rightarrow X2_{ORGS}$	-0.027	-	-0.027		0.001	N
H2c-2		$X4_{PEOP} \rightarrow X2_{ORGS}$	0.033	0.016	0.049		0.001	N
		$X4_{SUST} \rightarrow X2_{ORGS}$	**0.430***	0.139	**0.569***		**0.240^{**}**	**Y**
		$X4_{UNIA} \rightarrow X2_{ORGS}$	-0.001	0.120	0.119		0.000	N
H2b-1	$X3_{SOCO}$	$X1_{BLDS} \rightarrow X3_{SOCO}$	0.323	-	0.323	0.261^{*}	0.074^{*}	N
		$X1_{LEAS} \rightarrow X3_{SOCO}$	0.075	-	0.075		0.006	N

		Path	Direct	Indirect	Total	R^2	f^2	Sup.
		X1$_{BLDQ}$ → X3$_{SOCO}$	-0.260	-	-0.260		0.050*	N
		X1$_{PROX}$ → X3$_{SOCO}$	0.123	-	0.310		0.017	N
H2d-1		X4$_{PEOP}$ → X3$_{SOCO}$	0.065	0.003	0.067		0.004	N
		X4$_{SUST}$ → X3$_{SOCO}$	0.303	0.008	0.310		0.073*	N
		X4$_{UNIA}$ → X3$_{SOCO}$	-0.033	0.151	0.119		0.001	N
H2b-2	X3$_{SUSO}$	X1$_{BLDS}$ → X3$_{SUSO}$	0.242	-	0.242		0.050*	N
		X1$_{LEAS}$ → X3$_{SUSO}$	-0.035	-	-0.035		0.002	N
		X1$_{BLDQ}$ → X3$_{SUSO}$	-0.148	-	-0.148		0.020	N
		X1$_{PROX}$ → X3$_{SUSO}$	**0.254***	**-**	**0.254***	0.386*	**0.087***	**Y**
		X4$_{PEOP}$ → X3$_{SUSO}$	-0.116	-0.023	-0.139		0.013	N
H2d-2		**X4$_{SUST}$ → X3$_{SUSO}$**	**0.448***	0.056	**0.504***		**0.192****	**Y**
		X4$_{UNIA}$ → X3$_{SUSO}$	0.076	0.140	0.216		0.006	N
	X5	X1$_{BLDS}$ → X5	-0.035	0.059	0.025		0.001	N
H3a		X1$_{LEAS}$ → X5	-0.081	0.094	0.013		0.006	N
		X1$_{BLDQ}$ → X5	0.190	0.029	0.219		0.028*	N
		X1$_{PROX}$ → X5	-0.038	-0.084	-0.122		0.002	N
H3b		X2$_{ORGS}$ → X5	0.425	-	0.425		0.098*	N
		X2$_{EMPL}$ → X5	-0.042	-	-0.042	0.360*	0.001	N
H3c		X3$_{SOCO}$ → X5	0.128	-	0.128		0.013	N
		X3$_{SUSO}$ → X5	-0.395	-	-0.395		0.114*	N
		X4$_{PEOP}$ → X5	0.341	0.059	**0.400***		0.104*	**Y**
H3d		X4$_{SUST}$ → X5	-0.123	-	0.038		0.009	N
		X4$_{UNIA}$ → X5	0.031	-0.070	-0.039		0.001	N
	Y	X1$_{BLDS}$ → Y	0.056	-0.045	0.011		0.002	N
H4a		X1$_{LEAS}$ → Y	-0.006	0.043	0.038		0.000	N
		X1$_{BLDQ}$ → Y	**0.354***	**0.015**	**0.369***		**0.095***	**Y**
		X1$_{PROX}$ → Y	0.184	-0.098	0.086		0.029*	N
H4b		X2$_{ORGS}$ → Y	-0.180	-0.027	-0.207	0.197	0.016	N
		X2$_{EMPL}$ → Y	0.130	0.003	0.133		0.008	N
H4c		X3$_{SOCO}$ → Y	0.145	-0.008	0.137		0.013	N
		X3$_{SUSO}$ → Y	-0.356	0.025	-0.331		0.072*	N

		X4$_{PEOP}$ → Y	-	0.025	0.025		-	N
-		X4$_{SUST}$ → Y	-	0.017	0.017		-	N
		X4$_{UNIA}$ → Y	-	-0.010	-0.010		-	N
H4d		X5 → Y	-0.063	-	-0.063		0.004	N

Note. *p<0.05, R^2 *0.25 **0.50 ***0.75, f^2 *0.02 **0.15 ***0.35

7.3.1. Impact on the tangible aspects of office buildings (X1)

In this research (as discussed in Section 6.3.2.1) the tangible aspects of office buildings were found to have four constructs: (i) 'building sustainability' ($X1_{BLDS}$); (ii) 'lease contract features' ($X1_{LEAS}$); (iii) 'building quality' ($X1_{BLDQ}$); and (iv) 'proximity' ($X1_{PROX}$). Of these, the results in Table 7.1 and Figure 7.1 show that tenants' leasing motivator of 'building sustainability' ($X1_{BLDS}$) was positively influenced by their identity of being 'sustainability-focused' ($X4_{SUST}$) and 'unique and approachable' ($X4_{UNIA}$), with the R^2 of 0.262.

The R^2 of 0.262 means that these two identities explain 26.2% of the variance of tenants' leasing motivator, in relation to the sustainability aspects of office buildings. This concurs with Eichholtz *et al.*'s (2009) belief that some organisations (e.g. firms in environmentally sensitive industries) tend to consider building sustainability more seriously; for example, to enhance their reputation as an advocate of environmental protection. As such, it partially supports the Hypothesis 1-1 (H1-1) of this research that tenants' identity has a significant positive impact on their focus on the sustainability performance of their office buildings.

In addition to the above findings, tenants' identity of being a 'sustainability-focused' ($X4_{SUST}$) is also found as a significant positive predictor of 'building quality' ($X1_{BLDQ}$) with the R^2 of 0.101. This indicates that tenants' identity of being 'sustainability-focused' ($X4_{SUST}$) explains 10.1% of the variance of their relations with 'building sustainability' ($X1_{BLDS}$) ($f^2=0.074$). Once again, this strengthens the relationship between the tangible aspects of office buildings and tenants' identity. Indeed, this aligns with Dovey (1992) who argues that the tangible aspects of office buildings, such as the foyers, the views, the interior settings and the tallness often relate to tenants' corporate cultures and the values they want to reflect. Therefore, the result partially supports the Hypothesis H1-3 (H1-3) of this research that tenants' identity has a significant positive impact on building quality. Discussions of the aforementioned significant relationships are provided below.

7.3.1.1. Tenants' identity of being sustainability-focused (X4$_{SUST}$)

The result of path analysis shows that tenants' identity of being 'sustainability-focused' ($X4_{SUST}$) has a higher significant positive impact on 'building quality' ($X1_{BLDQ}$) than on 'building sustainability' ($X1_{BLDS}$) with the corresponding path coefficient (β) of 0.557 ($p=0.000$, $f^2=0.348$) and 0.385 ($p=0.001$, $f^2=0.162$). This means that sustainability-focused organisations are likely to put a greater emphasis on building quality, as characterised by three measurement items: (i)

'office space size' (TA6, FL=0.807); (ii) 'building grade' (TA9, FL=0.840); and (iii) 'building amenities' (TA11, FL=0.848) than the sustainability aspects of office buildings.

This finding aligns with the result of the correlation test that shows the significant positive correlations between measurement items associated with these two constructs (Table 7.2). Specifically, 'acknowledgement' (OV16) is found as moderately and positively correlated with 'office space size' (TA6) and 'building grade' (TA9). This reflects that tenants' want to be acknowledged for their internal (e.g. employees) or external (e.g. general public) stakeholders for their efforts towards social and environmental responsibility, and community engagement, are likely to choose office buildings with larger Net Lettable Area (NLA) and having as a superior grade (e.g. Premium or A-grade buildings).

Moreover, it is also found that 'social responsibility' (OV10) and 'environmental sustainability' (OV12) are positively correlated with 'building grade' (TA9) and 'office space size' (TA6), although to a weak extent. This may indicate that tenants promoting these two aspects of sustainability are likely to prefer office buildings with a superior grade. This strengthens the strong association between building quality and the sustainability level of office buildings (Eichholtz *et al.*, 2010a, 2013) and therefore, are likely preferred by tenants who consider themselves as a leader in sustainability (Kim *et al.*, 2019).

Table 7.2 Correlations between tenants' identity of being sustainability focused (X4$_{SUST}$) and building quality (X1$_{BLDQ}$)

Item Code	TA6	TA9	TA11	OV10	OV12	OV15	OV16
TA6	1.000						
TA9	.571**	1.000					
TA11	.501**	.547**	1.000				
OV10	.315*	.360**	.283*	1.000			
OV12	.351*	.389**	.250	.569**	1.000		
OV15	.225	.294*	.349*	.752**	.588**	1.000	
OV16	**.407****	**.436****	.347*	.581**	.416**	.687**	1.000

*Note *. significant at the 0.05 level **. significant at the 0.01 level*

Meanwhile, the significant relationship between the 'sustainability-focused' (X4$_{SUST}$) and 'building sustainability' (X1$_{BLDS}$) constructs reveals that sustainability-focused organisations are also more likely to focus on the sustainability performance of office buildings (e.g. less CO_2 and waste emissions, better IEQ). This tends to support Reichardt *et al.*'s (2012) and Eichholtz *et al.*'s (2010c) assertion there is an increasing number of organisations pursuing corporate

social responsibility (CSR), and that they share a lot of commonalities by putting more emphasis on the sustainability of their office buildings. This finding may also indicate that the sustainable performance of office buildings may help organisations to portray their sustainability-related organisational values more effectively. This is further reinforced by the preliminary interview findings that the key motivational driver for most interviewees' organisations is because they want to portray their corporate image as a sustainability leader. For example, Interviewee D, whose company operates in the real estate sector, says that:

> *So, sustainability means healthy building for our staff and we want to be seen as best in class and a market leader and attaching our brand to the best. I think sustainability is seen to be something that represents the best* (Interviewee D, from the rental, hiring and real estate sector).

The above findings about the significant emphasis on sustainability performance of office buildings given by sustainability-focused organisations are further supported by the results of correlation test (Table 7.3) showing a moderate and positive correlation between 'community (corporate citizenship)' (OV15) and two of the measurement items associated with 'building sustainability' ($X1_{BLDS}$) (i.e. 'water efficiency' (TA17); and 'environmental performance' (TA18)). Similarly, it was found that 'social responsibility' (OV10) is strongly and positively correlated with office buildings' environmental performance (TA18). As such, these reveal that tenants promoting themselves as corporate citizens and socially responsible organisation are likely to put heavy emphasis on office buildings providing better indoor environmental quality (IEQ) and superior environmental performance such as less CO_2 emissions.

Table 7.3 Correlations between tenants' identity of being sustainability-focused ($X4_{SUST}$) and building sustainability ($X1_{BLDS}$)

	TA13	TA14	TA15	TA17	TA18	OV10	OV12	OV15	OV16
TA13	1.000								
TA14	.627**	1.000							
TA15	.770**	.672**	1.000						
TA17	.509**	.469**	.569**	1.000					
TA18	.453**	.462**	.499**	.883**	1.000				
OV10	.211	.173	.222	**.458****	.396**	1.000			
OV12	.234	.231	.193	**.595****	**.673****	.569**	1.000		
OV15	.304*	.287*	.368**	**.483****	**.432****	.752**	.588**	1.000	
OV16	.174	.059	.229	.351*	.209	.581**	.416**	.687**	1.000

*Note *. significant at the 0.05 level. **. significant at the 0.01 level*

7.3.1.2. Tenants' identity of being unique and approachable (X4$_{UNIA}$)

In this research, it was found that tenants' identity of being 'unique and approachable' (X4$_{UNIA}$) has a significant and positive impact on their leasing motivation towards 'building sustainability' (X1$_{BLDS}$) (β=0.276, p=0.003, f^2=0.074). Therefore, it is understood that 'unique and approachable' organisations' focus on 'building sustainability' (X1$_{BLDS}$) is rather weak, especially compared with the emphasis given by 'sustainability-focused' organisations (β=0.385, p=0.001, f^2=0.162) (see Section 7.3.1.1).

Nonetheless, this significant positive relationship means that organisations who value being uniqueness and approachableness are more likely to emphasise office buildings with higher IEQ and sustainability benefits. This phenomenon is echoed by Interviewee J in the preliminary interview, who states:

> *The market place is fairly small and transparent. We put 'unique'* [Organisation name] *approach we put a lot of value on people and culture and our contribution to society, not just as a service perspective but also some of the charitable organisations we contribute too. But sustainability and the environment are big motivators. But we knew that other organisations, particularly in this area, would be doing similar things. Others would do a similar approach but ours is quite 'unique' in a way that we've gone about particularly moving into this building*

<div align="center">(Interviewee J, from the professional, scientific and technical sector)</div>

This demonstrates that sustainable buildings providing superior IEQ and environmental performance are being perceived by tenants as an effective tool in differentiating themselves from their competitors. This concurs with the findings of Khanna *et al.* (2013) that organisations often use certain aspects of their office buildings to reinforce their identity and to express brand values. Moreover, the result of correlation test (Table 7.4) shows a weak but positive correlation between 'uniqueness' (OV17), and four of the measurement items associated with 'building sustainability' (X1$_{BLDS}$): 'acoustics quality' (TA13); 'lighting quality' (TA14); 'water efficiency' (TA17); and 'environmental performance' (TA18). This might indicate that Sydney CBD office tenants who value uniqueness as their core organisational value are more likely to be motivated by better IEQ and the superior environmental performance of office buildings.

Table 7.4 Correlations between unique and approachable (X4$_{UNIA}$) and building sustainability (X1$_{BLDS}$)

	TA13	TA14	TA15	TA17	TA18	OV17	OV18
TA13	1.000						
TA14	.627**	1.000					
TA15	.770**	.672**	1.000				
TA17	.509**	.469**	.569**	1.000			
TA18	.453**	.462**	.499**	.883**	1.000		
OV17	.395**	.325*	.259	.284*	.338*	1.000	
OV18	.251	.215	.317*	.289*	.192	.538**	1.000

*Note *. significant at the 0.05 level. **. significant at the 0.01 level.*

7.3.2. Impact on the symbolic aspects of office buildings (X2)

There are two constructs associated with the symbolic aspects of office buildings, 'employee related' (X2$_{EMPL}$) and 'organisation related' (X2$_{ORGS}$). Of these, the results in Table 7.1 and Figure 7.1 show that employees' perception of the symbolic aspects of an office building (X2$_{EMPL}$) is influenced by three out of four predictors describing the tangible aspects of office buildings: (i) 'building sustainability' (X1$_{BLDS}$); (ii) 'proximity' (X1$_{PROX}$); and (iii) 'lease contract features' (X1$_{LEAS}$), with a R^2 of 0.557. This shows that over half of employees' perception of the symbolic aspects of their office building (e.g. as comfortable and aesthetically pleasing) can be explained by these three aspects of office buildings.

Moreover, it supports implications of the findings of Ledgerwood *et al.* (2007) that various tangible aspects of office buildings may have a significant impact on how employees perceive and define the symbolic values of their office buildings. As such, it partially supports Hypothesis 2a-1 (H2a-1) of this research (that the tangible aspects of office buildings have a significant positive impact on employee related symbolic values of office buildings).

In addition, it is found that employee related symbolic values of office buildings (X2$_{EMPL}$) are indirectly influenced by the tenants' identity of being 'sustainability-focused' (X4$_{SUST}$). This indirect relationship, therefore, shows that sustainability-focused organisations are likely to emphasise how their employees perceive their office buildings. This may be partially explained by Wilkinson *et al.* (2011) who suggest that early adopters of building sustainability, who are likely the 'sustainability-focused organisations', may benefit from intangible benefits, such as better employee satisfaction. Therefore, this partially supports the Hypothesis 2c-1 (H2c-1) of this research (that tenants' identity of being sustainability-focused has a significant positive impact on employee related symbolic values of office buildings).

Next, tenants' emphasis on 'building sustainability' ($X1_{BLDS}$) and their identity of being 'sustainability-focused' ($X4_{SUST}$) is found as predictors of tenants' perception of 'organisation related symbolic values of their office buildings' ($X2_{ORGS}$) with an R^2 of 0.547. This again means that these two aspects were accounted by over half of how tenants perceive the symbolic values of their office buildings. These triangular relationships support Adnan and Daud (2010) and Sing *et al.* (2004) that branding and image of office buildings is often an office leasing motivator. For example, a sustainability-focused organisation may put heavy emphasis on the sustainability performance of office buildings ($X4_{SUST} \rightarrow X1_{BLDS}$) as the symbolic values of these office buildings are closely related to their identity ($X4_{SUST} \rightarrow X2_{ORGS}$): the sustainability aspects of office buildings characterised by superior IEQ and better environmental performance (e.g. less CO_2 emissions) make these buildings perceived as more environmentally-friendly ($X1_{BLDS} \rightarrow X2_{ORGS}$) and thus, provides identity benefits to the organisation. Collectively, this partially supports the Hypothesis H2a-2 and H2c-2 of this research showing the significant positive impact of building sustainability ($X1_{BLDS}$) and tenants' identity of being sustainability-focused ($X4_{SUST}$) on the organisation related symbolic values of office buildings ($X2_{ORGS}$). Details of the aforementioned relationships are discussed following.

7.3.2.1. Building sustainability ($X1_{BLDS}$)

In this research, it was found that the level of sustainability ($X1_{BLDS}$) of tenants' office buildings plays a significant role in driving employees' ($X2_{EMPL}$) and organisations' ($X2_{ORGS}$) perception of their symbolic values, with the corresponding path coefficients of 0.396 ($p=0.003$, $f^2=0.186$) and 0.307 ($p=0.034$, $f^2=0.109$). This indicates that the effect of office sustainability performance has a greater impact on organisations' perception on their office buildings than employees'. This finding supports the importance of building sustainability as a catalyst to create symbolic values for organisation characterised by: (i) 'aesthetically pleasing' (SY6, FL=0.827); (ii) 'employee-friendly' (SY7, FL=0.874); (iii) 'comfortable' (SY1, FL=0.755); 'healthy' (SY10, FL=0.816); and (iv) 'collaborative' (SY10, FL=0.723) office environment.

Specifically, the result of the correlation test (Table 7.5) shows that better 'indoor air' (IAQ) (TA15), 'acoustic' (TA13) and 'lighting' (TA14) qualities positively correlate with how employees perceive their office environment as 'comfortable' (SY1), 'aesthetically pleasing' (SY6), 'employee-friendly' (SY7) and 'healthy' (SY10). This, therefore, agrees with Dastbaz *et al.* (2016) and Heerwagen and Zagreus (2005) that buildings with superior IEQ often provide

the employee with a better sense of place and place attachment; in turn, they help them to have psychological ownership of their workspace. This phenomenon is further supported by the preliminary interview findings, whereby Interviewee F (who works as a director in the real estate sector) says that employees today expect their offices to be sustainable, not only because they contribute to the environment, but also because they are directly related to the workspace where they spend most of the time (see Kim *et al.* (2019) for details of the preliminary interview findings).

Table 7.5 Correlations between employee related symbolic values of office buildings (X2$_{EMPL}$) and building sustainability (X1$_{SUST}$)

	SY1	SY6	SY7	SY8	SY10	TA13	TA14	TA15	TA17	TA18
SY1	1.000									
SY6	.603**	1.000								
SY7	.567**	.752**	1.000							
SY8	.335*	.596**	.703**	1.000						
SY10	.554**	.547**	.626**	.500**	1.000					
TA13	.324*	**.435****	**.454****	.227	**.546****	1.000				
TA14	**.412****	**.478****	.351*	.270	**.408****	.627**	1.000			
TA15	**.464****	**.500****	**.483****	.261	**.635****	.770**	.672**	1.000		
TA17	.212	.162	.190	.179	.399**	.509**	.469**	.569**	1.000	
TA18	.123	.140	.146	.150	.378**	.453**	.462**	.499**	.883**	1.000

*Note *. significant at the 0.05 level. **. significant at the 0.01 level.*

7.3.2.2. *Lease contract features (X1$_{LEAS}$)*

Next, the results in Table 7.1 and Figure 7.1 show that lease contract features (X1$_{LEAS}$), are characterised by: (i) 'lease term' (TA21, FL=0.826); (ii) 'lease type' (TA22, FL=0.803); (iii) 'lease pre-commitment' (TA23, FL=0.782); and (iv) 'build-out' (TA24, FL=0.761). This also significantly affects how employees perceive their office environment (X2$_{EMPL}$) by posing a path coefficient of 0.452 (*p*=0.001, f^2=0.377). This can be partially explained by: (i) the agreement between tenant organisations and landlords for inclusion of conditions to regularly maintain, monitor and upgrade the workspace environment for the well-being of their employees; and (ii) the guidelines set up by the tenant organisations to administer the use of workspaces and manage their employees' behaviour at work. This aligns with Lizieri (2003), who states that impacts of office space requirements can be varied by the nature of employees' work (e.g. requiring a collaborative working environment), which can impact on how they perceive their office environment. Interestingly, this is the picture that emerges from the preliminary interviews of

this research. Interviewee A (a sustainability director at a real estate firm) pointed out that a 'build-out' clause was included in his or her organisation's lease contract that landlords should undertake any repair or upgrade any work to ensure a conducive work environment for employees, before the organisation moved in.

This finding could be further supported by the result of the correlation test (Table 7.6). The results show that 'lease term' (TA21) is moderately and positively correlated with 'comfortable' (SY1), 'aesthetically pleasing' and 'employee-friendly' office environment. Similarly, 'lease type' (TA22) also has a moderate and positive correlation with 'comfortable' (SY1), 'aesthetically pleasing' (SY6), and 'healthy' (SY10) office environment. These, therefore, indicate that negotiating the appropriate length of the lease term (e.g. long or short lease) and lease type (e.g. net, gross or modified-gross) may influence how employees positively perceive their office environment.

Table 7.6 Correlations between employee related symbolic values of office buildings (X2$_{EMPL}$) and lease contract features (X1$_{LEAS}$)

	SY1	SY6	SY7	SY8	SY10	TA21	TA22	TA23	TA24
SY1	1.000								
SY6	.603**	1.000							
SY7	.567**	.752**	1.000						
SY8	.335*	.596**	.703**	1.000					
SY10	.554**	.547**	.626**	.500**	1.000				
TA21	**.465****	**.534****	**.524****	.304*	.382**	1.000			
TA22	**.442****	**.458****	.390**	.224	**.450****	.659**	1.000		
TA23	.297*	.285*	.273	.148	.316*	.535**	.646**	1.000	
TA24	**.442****	.315*	.355*	.300*	.379**	.504**	.590**	.637**	1.000

*Note *. significant at the 0.05 level. **. significant at the 0.01 level.*

7.3.2.3. Proximity (X1$_{PROX}$)

In contradiction to the above findings, the 'proximity' (X1$_{PROX}$) construct, which is characterised proximity to (i) 'major roads' (TA3, FL=0.897) and (ii) 'major competitors' (TA5, FL=0.880), was found to have negative impact on 'employee related symbolic values of office buildings' (X2$_{EMPL}$) with a path coefficient of -0.290 (*p*=0.025, f^2=0.157). This indicates that the proximity to major roads and competitors could bring about employees' negativity about their office buildings. This tends to support Capolongo and Settimo's (2017) conclusion that Nitrogen Dioxide (NO$_2$) created from a busy road use can negatively affect the IEQ of office buildings and, in turn, negate occupants' satisfaction with their office environment. Also, this

concurs with Shalley and Oldham (1997) who imply the negative relationship between proximity to competitors and individuals' psychological states. Nonetheless, the results of the correlation test (Table 7.7) show that there was no correlation between the measurement items associated with these two constructs. This suggests that further research may be required to investigate this negative relationship identified in this research (discussed further in Section 9.7).

Table 7.7 Correlations between symbolic values of office buildings related to employees (X2$_{EMPL}$) and proximity (X1$_{PROX}$)

	SY1	SY6	SY7	SY8	SY10	TA3	TA5
SY1	1.000						
SY6	.603**	1.000					
SY7	.567**	.752**	1.000				
SY8	.335*	.596**	.703**	1.000			
SY10	.554**	.547**	.626**	.500**	1.000		
TA3	-.126	-.049	-.070	-.124	-.140	1.000	
TA5	-.010	-.008	-.051	-.020	.040	.579**	1.000

*Note *. significant at the 0.05 level. **. significant at the 0.01 level.*

7.3.2.4. *Tenants' identity of being sustainability-focused (X4$_{SUST}$)*

It is also found that 'organisation related symbolic values of office buildings' (X2$_{ORGS}$) is positively and significantly related to tenants' identity of being 'sustainability-focused' (X4$_{SUST}$), by posing a path coefficient of 0.430 (p=0.012, f^2=0.240). This shows that tenants appreciating sustainability-related organisational values are likely to put emphasis on office buildings that well-reflect their identity. This again agrees with several studies (Khanna *et al.*, 2013; Levy and Peterson, 2013; Jang *et al.*, 2018) that show tenants' willingness to portray their identity is a significant leasing motivator. This is also consistent with the findings of the preliminary interview with green building tenants in Sydney CBD, that at least eight out of nine interviewees agreed that reflection of their identity (which is sustainability in this case) by their office buildings was one of their biggest leasing motivators (see Section 7.3.1.1 for more details). Moreover, the co-occurrence network of words generated from the prescribed responses (Figure 7.2) shows a close relationship between several related words, such as 'scar', 'signage', 'strategy', 'brand' and 'locate', and thus reflect a close relationship between tenants' identity of being sustainability-focused and the symbolic values of their office buildings (Kim *et al.*, 2019).

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Figure 7.2 Co-occurrence network of words (adopted from Kim et al. (2019))

In addition to the above, the correlation test result (Table 7.8) shows that 'social responsibility' (OV10) is positively and moderately correlated with an office environment that is 'environmentally friendly' (SY9), having 'cutting-edge technologies' (SY11) and 'well-reflects their corporate identity' (SY14). 'Environmental sustainability' (OV12) also has a positive and moderate correlation with an office environment that is 'environmentally friendly' (SY9) and having 'cutting-edge technologies' (SY11). Collectively, this indicates that tenants prioritise social responsibility and environmental sustainability, which is often emphasised by big corporations (Silberhorn and Warren, 2007), and are likely attracted by an office environment that can reflect their identity.

Table 7.8 Correlations between organisation related symbolic values of office buildings (X2ₒᵣₘₛ) and tenants' identity of being sustainability-focused (X4ₛᵤₛₜ)

	SY9	SY11	SY13	SY14	OV10	OV12	OV15	OV16
SY9	1.000							
SY11	.481**	1.000						
SY13	.480**	.566**	1.000					
SY14	.470**	.568**	.712**	1.000				
OV10	**.494****	**.422****	.388**	**.527****	1.000			
OV12	**.642****	**.410****	.219	.315*	.569**	1.000		
OV15	.392**	**.435****	.307*	.337*	.752**	.588**	1.000	
OV16	.344*	.320*	.251	.353*	.581**	.416**	.687**	1.000

*Note *. significant at the 0.05 level. **. significant at the 0.01 level.*

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It should also be noted that tenants' identity of being 'sustainability-focused' ($X4_{SUST}$) has a significant impact on the 'employee related symbolic values of office buildings' ($X2_{EMPL}$) although indirectly (β=0.205, p=0.037). This creates another triangular relationship between constructs of $X4_{SUST}$, $X1_{BLDS}$ and $X2_{EMPL}$; however, these organisations are likely to place a heavier emphasis on 'organisation related symbolic values' ($X2_{ORGS}$) (f^2=0.240) over 'occupant related symbolic values' ($X2_{EMPL}$) (f^2=0.040), considering the difference in path coefficients and f^2 effect sizes.

7.3.3. Impact on tenants' expectations (X3)

Tenants' 'expectations' for their building (X3) consists of two constructs to become: (i) a 'socially conscious' ($X3_{SOCO}$); and (ii) a 'sustainable' ($X3_{SUSO}$) organisation. Of these, only 'expectation to become a sustainable organisation' ($X3_{SUSO}$) construct, characterised by 'environmentally friendly' (EP5, FL=0.966); 'fast follower' (EP2, FL=0.864); and 'socially responsible' (EP3, FL=0.937) organisations, were found to be influenced by two of its predictors of 'proximity' ($X1_{PROX}$) and 'sustainability-focused organisation' ($X4_{SUST}$), with R^2 of 0.386. These two significant relationships reveal that the two constructs of office building's location as well as tenants' identity as a sustainability-focused organisation explain 38.6% of the leasing motivator related to the expectation to become a sustainable organisation. Therefore, it supports the Hypothesis 2b-2 (H2b-2) and 2d-2 (H2d-2) that proximity and tenants' identity has a significant positive impact on their expectations to become a sustainable organisation. Discussions of the aforementioned significant relationships are provided following.

7.3.3.1. Proximity (X1_PROX)

The result shows that 'proximity' ($X1_{PROX}$) has a significant positive impact on tenants' 'expectation to become a sustainable organisation' ($X3_{SUSO}$) with the path coefficient of 0.254 (p=0.040, f^2 of 0.087). This finding aligns with the importance of location as a tenants' office leasing motivator, as noted by several studies, including Singer *et al.* (2007) and Nourse *et al.* (1993). For instance, it was found that organisations often prefer locating nearby their major competitors, when they expect to gain economic benefits (i.e. 'agglomeration economies') (Moulaert and Gallouj, 1993). Sydney's Martin Place is a prime example of this, as several large organisations from the finance and insurance sector have located themselves in a cluster at this site; similar examples include Wall Street and Silicon Valley in the US. Moreover, the finding agrees with McCauley and Stephens (2012) who state that tenants who expect to

become a sustainable organisation may prefer to cluster together; this is often termed the 'green cluster strategy'. This could be related to the 'halo-effect', connected with the organisation's branding and image. This is supported by several studies (Nelson, 2007; Runde and Thoyre, 2010; Peloza *et al.*, 2012), whereby the 'halo' is linked with tenants' expectation towards their office buildings. For example, locating near competitors could be one of the significant leasing motivators to become a 'fast-follower' (EP2), as is noted: "… for the big 4, if one does something, rest will follow" (Interviewee H, from the professional, scientific & technical sector)

The above finding could be further supported by the result of the correlation test (Table 7.9) that shows that 'proximity to major competitors' (TA5) was moderately and positively correlated with tenants' expectation about becoming a 'fast-follower' (EP2) organisation. Moreover, 'proximity to major roads' (TA3) (which may explain proximity to major competitors) also shows a correlation with their expectation to become a 'fast-follower' (EP2) and 'socially responsible' (EP3) organisation although the strength of the correlation is rather weak.

Table 7.9 Correlations between tenants' expectations to become a sustainable organisation (X3$_{SUSO}$) and proximity (X1$_{PROX}$)

	EP2	EP3	EP5	TA3	TA5
EP2	1.000				
EP3	.584**	1.000			
EP5	.684**	.785**	1.000		
TA3	.299*	.302*	.317*	1.000	
TA5	**.446****	.246	.367**	.579**	1.000

*Note *. significant at the 0.05 level. **. significant at the 0.01 level.*

7.3.3.2. *Sustainability-focused organisation (X4$_{SUST}$)*

It is found there is a significant relationship between tenants' identity of being 'sustainability-focused' (X4$_{SUST}$) and their 'expectation to become a sustainable organisation' (X3$_{SUSO}$) with the path coefficient of 0.448 (p=0.018, f^2=0.192). The higher path coefficient and f^2 reveals that tenants' expectation about being sustainable was indeed largely driven by their identity, rather than their emphasis on the locational aspects of office buildings (see Section 7.3.3.1). Again, this finding supports the findings of the preliminary interview that eight interviewees show a consensus that representation of their identity is related to their office leasing motivator; for example, by having an expectation to become a corporate citizen (see Section 7.3.2).

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The result of correlation test (Table 7.10) further reveals that tenants' expectation about 'socially-responsible' (EP3) was moderately and positively correlated with tenants' identity characterised by 'social responsibility' (OV10); 'environmental sustainability' (OV15); and 'acknowledgement' (OV16). This, therefore, explains that tenants valuing these three aspects are more likely to have a higher expectation about being socially responsible. This is partially supported by the findings of Eichholtz *et al.* (2009) that organisations' CSR and marketing policies are key office leasing motivators for many tenants that are with sustainability-focused. Similarly, tenants' expectation about 'environmentally-friendly' (EP5) was also found as moderately and positively correlated with the organisational value of 'environmental sustainability' (OV12). This indicates that organisations adopting, for example, office waste and energy usage reduction programs, are likely to have higher expectation towards being seen as a strong advocate of environmental sustainability as a corporate citizen by their employees, customers and other stakeholders.

Table 7.10 Correlations between tenants' expectation to become a sustainable organisation (X3$_{SUSO}$) and their identity of being a sustainability-focused (X4$_{SUST}$)

	EP2	EP3	EP5	OV10	OV12	OV1	OV16
EP2	1.000						
EP3	.584**	1.000					
EP5	.684**	.785**	1.000				
OV10	.155	.404**	.299*	1.000			
OV12	.209	.377**	.462**	.569**	1.000		
OV15	.205	.422**	.388**	.752**	.588**	1.000	
OV16	.249	.401**	.334*	.581**	.416**	.687**	1.000

*Note *. significant at the 0.05 level. **. significant at the 0.01 level.*

7.3.4. Impact on tenants' leasing decisions about the greenness of office building (X5)

In this research, the result of the test for total effects[C] (i.e. the sum of direct[A] and indirect effects[B]) (Table 7.1) shows there is a significant relationship between tenants' identity of being 'people-focused' (X4$_{PEOP}$) and their leasing decisions about the greenness of office buildings (X5) at the path coefficient of 0.400 (p=0.016, f^2=0.104) at R^2 of 0.104. This indicates that tenants' identity of being 'people-focused' characterised by 'leadership' (OV1, FL=0.855); 'teamwork' (OV4, FL=0.884); 'openness' (OV5, FL=0.842); 'innovation' (OV8, FL=0.833); 'customer satisfaction' (OV13, FL=0.826); and 'people' (e.g. employees)' (OV14, FL=0.831) somehow affect their leasing decisions about NABERS and Green Star ratings. This aligns with Waidyasekara and Sandamali (2012) who state that an organisation prioritising their employee

and customer satisfaction is likely to put more emphasis on environmental sustainability (or the 'greenness'). This is exemplified by the case of the Greater Pittsburgh Community Food Bank in the US, which adopted LEED certification for their office building as part of their effort to reflect their people-focused identity (Biggart *et al.*, 2013). This is also contended by Sroufe *et al.* (2010); namely, that organisations prioritising people-related values often focus on having a sustainability policy and initiatives, although they tend to prioritise the social and cultural aspects to a greater extent rather than solely focus on the environmental aspects (e.g. having green building certifications for their office buildings). Overall, this finding partially supports the Hypothesis 3d (H3d) of this research that tenants' identity has a positive significant impact on their leasing decisions about the greenness of office buildings.

The above discussed findings about people-focused organisations' emphasis on the levels of greenness of office buildings is further supported by the result of correlation test (Table 7.11) that four (OV1, OV4, OV8, OV13) out of five organisational values describing tenants' identity of being 'people-focused' ($X4_{PEOP}$) are correlated with NABERS ratings whereas, three of them (OV1, OV8, OV13) are also correlated with Green Star ratings. Although these correlations were mostly weak, the result suggests that tenants promoting these organisational values as a people-focused organisation are more likely to lease office buildings with higher NABERS and Green Star ratings.

Table 7.11 Correlations between tenants' identity of being people-focused ($X4_{PEOP}$) and their leasing decisions about the level of the greenness of office buildings (X5)

	OV1	OV4	OV5	OV8	OV13	NABERS	Green Star
OV1	1.000						
OV4	.624**	1.000					
OV5	.601**	.775**	1.000				
OV8	.564**	.420**	.521**	1.000			
OV13	.530**	.445**	.547**	.501**	1.000		
NABERS	**.468****	.304*	.254	.398**	.306*	1.000	
Green Star	.358**	.105	.132	.290*	.338*	.526**	1.000

*Note *. significant at the 0.05 level. **. significant at the 0.01 level.*

It should be acknowledged there is a lack of evidence to claim there is any direct or indirect relationship between these two constructs considering no significant positive (β=0.341, *p*=0.056) and indirect (β=0.059, *p*=0.645) impacts were found. This may be due to the relatively

small sample size used in this research (n=51) which barely passes the recommended minimum thresholds for PLS-SEM (i.e. n=50). Similarly, this research also finds no significant positive relationship between the 'the level of the greenness of tenants' office building' (X5) and other possible predictors describing their leasing motivators (X1-X4). For example, the insignificant relationship between tenants' identity of being 'sustainability-focused' ($X4_{SUST}$) and 'the level of the greenness of office building' (X5) (β=-0.123, p=0.697) reflects that even organisations valuing the sustainability may not necessarily lease office buildings with NABERS or Green Star ratings. Considering the significant role of tenants' identity of being 'sustainability-focused' ($X4_{SUST}$) and 'building sustainability' ($X1_{BLDS}$) (Section 7.3.1.1), this implies that these organisations may put emphasis on the level of sustainability of their office buildings, rather than the certifications.

7.3.5. Impact on rental (Y)

It is found that the tenants' office 'rental' (Y) was significantly driven by the 'quality' of their office buildings ($X1_{BLDQ}$), with the positive path coefficient of 0.354 (p=0.043, f^2=0.095). This indicates that building quality could be considered a predictor of rental in the Sydney CBD office market. This finding is well-supported by numerous studies (Eichholtz *et al.*, 2013; Reichardt *et al.*, 2012; Chegut *et al.*, 2011) showing the significant role of building quality as one of the major rental determinants (see Section 2.4.2, about determinants of office rental).

Further, the responses given from the preliminary interview reveal that even the tenants of green buildings chose their current offices (despite the higher rental), not only because of the higher energy efficiency, but also because of their superior building quality. This is as the majority of them are either Premium or A-grade office buildings providing better amenities and services, they often command higher rental compared with B or lower grade office building counterparts. This agrees with the findings from the meta-analysis that building quality was found as one of the significant rental determinants (Kim *et al.*, 2017a). Moreover, this echoes a recent study showing the superior quality of Sydney CBD located green buildings (e.g. they are generally larger, taller and newer than the non-green counterparts), and thus likely to command higher rental (Kim and Lim, 2018a). Collectively, the result shows the Hypothesis 4a (H4a) of this research is partially supported.

The significant relationship between these two constructs can be further explained by looking at the result of the correlation test (Table 7.12). The result reveals that rental was weakly but

positively correlated with 'building amenities' (TA11). This may indicate that the rental of office buildings in Sydney CBD is mostly attributed to tenants' preferences on the provision of better amenities for employees. Interestingly, this echoes Interviewee E (from the real estate sector) who notes that increasing number of tenants are giving heavy emphasis on the end-of-trip facilities (e.g. shower), gym and concierge services to create better workplace environment.

Table 7.12 Correlations between building quality ($X1_{BLDQ}$) and rental (Y)

	Y	TA6	TA9)	TA11
Y	1.000			
TA6	.096	1.000		
TA9	.230	.571**	1.000	
TA11	.326*	.501**	.547**	1.000

Note *. significant at the 0.05 level. **. significant at the 0.01 level.

Further, the unique benefits associated with the 'level of the greenness of office buildings' (X5) could seem to be a 'small bonus' for many tenants, and therefore did not significantly contribute to rental (Y) (β=-0.063, p=0.711). This is consistent with Gabe and Rehm (2014) who show the significant contribution of the quality of Sydney located office buildings on their rental, but not the level of greenness. Perhaps, the effect of the greenness on rental is diminished by the 'agglomeration effect', considering the amount of green building stock in Sydney CBD. A large number of the office building stock in Sydney CBD are also green buildings, and this makes the 'greenness' of their buildings the norm in the market, and thus minimises the impact on rental (Kim *et al.*, 2019). This is supported by an opinion shared by Interviewee F:

> *I think 10 years ago, that was a differentiator but now it's just expected. I remember tried to recruit people who're in the 20s, 30s, and one of the things that I used to talk about is the fact that, at that time, we're in one of the first 5 Stars NABERS energy rating – tenancy. These days, people just expect that. Back then, it was 'WoW' and we used to very proud of that. Because it was groundbreaking at that time. It's not groundbreaking anymore* (Interviewee F from the real estate sector)

Similarly, the locational effect by means of 'proximity' ($X1_{PROX}$) is found as not having a significant impact on rental (β=0.184, p=0.328). It is assumed that this is mainly due to the nature of Sydney CBD, which allows relatively easy access to 'major roads' (TA3), 'major competitors' (TA5) and other amenities, regardless of office location.

7.4. Moderating effects of market and regulatory forces (Z)

To achieve the fourth objective of this research, the moderating effect of market and regulatory forces (Z) on the relationship between various tenants' leasing motivators (X1-X4) and their leasing decision about the level of the greenness of office buildings (X5) are analysed. To do this, four sets of moderator models embracing the following were developed and tested: (i) tangible aspects of office buildings (X1); (ii) symbolic aspects of office buildings (X2); (iii) tenants' expectations (X3); and (iv) identity (X4). All the constructs used in the previous stages of the research were adopted as all of them were found to have sufficient predictive power (i.e. $R^2 > 0.1$) (see Section 7.2). To analyse the moderating effect of market and regulatory forces (Z), this research adopts the two-stage approach (explained in Section 5.3.6).

7.4.1. Moderating effects of market and regulatory forces (Z) on the relationships between the tangible aspects of office buildings (X1) and their leasing decision about the level of the greenness of office buildings (X5)

Figure 7.3 shows the model developed to examine the moderating effects of the market and regulatory forces (Z) on the relationships between 'building sustainability' ($X1_{BLDS}$), 'lease contract features' ($X1_{LEAS}$), 'building quality' ($X1_{BLDQ}$) 'proximity' ($X1_{PROX}$) and tenants' leasing decisions about 'the level of greenness of their office buildings' (X5). In Stage 1 of the moderator analysis, the main effect model was created without the interaction terms (e.g. $X1_{BLDS}*Z$). This was followed by Stage 2 of the analysis, the simple effect model, involving the interaction term of each construct. Then, path coefficients of each construct and their p-values, R^2 and f^2 effect sizes were calculated in both models to understand the significance and strength of the moderating effect.

Table 7.13 shows the moderator analysis results. In Stage 1 of the analysis, none of the predictors (i.e. $X1_{BLDQ}$; $X1_{BLDS}$; $X1_{LEAS}$; and $X1_{PROX}$) is found to have significant impact ($p < 0.05$) on tenants' leasing decision about the level of greenness of their office buildings, with R^2 of 0.134 and respective coefficients ranging from -0.104 to 0.254. Thereafter, the results from Stage 2 show that there is a slight increase in R^2 from 0.134 to 0.160, although still none of the predictors had a significant impact on tenants' leasing decisions. Moreover, the results show none of the interaction terms is found as significant while showing the small f^2 effect size of 0.03. This thus indicates that the market and regulatory forces (Z) do not moderate the relationship between tenants' emphasis on the tangible aspects of office buildings (X1) and

their leasing decisions about the greenness of office buildings (X5). Therefore, the result shows that Hypothesis 5a (H5a) of this research is not supported.
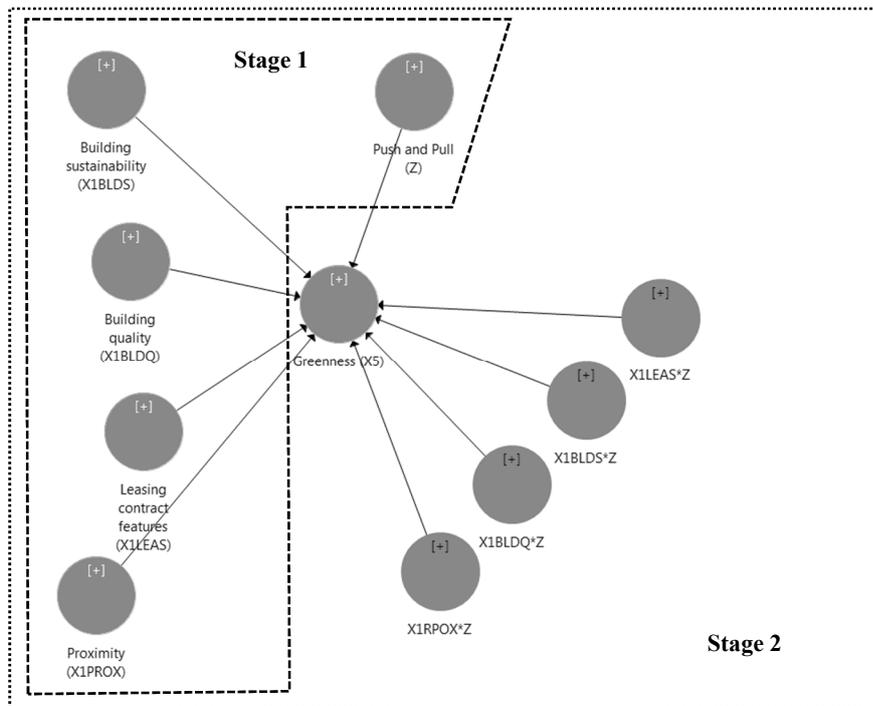

Figure 7.3 Moderating effects of market and regulatory forces on the relationship between X1 and X5

Table 7.13 Results of the moderating effects of market and regulatory forces on the relationship between X1 and X5

	Stage 1	Stage 2
Construct	**β-value**	**β-value**
Building sustainability (X1$_{BLDS}$)	-0.015	-0.004
Building quality (X1$_{BLDQ}$)	0.254	0.284
Lease contract features (X1$_{LEAS}$)	0.181	0.152
Proximity (X1$_{PROX}$)	-0.104	-0.099
Market and regulatory forces (Z)	0.058	0.026
X1$_{BLDS}$ * Z		-0.110
X1$_{BLDQ}$ *Z		-0.013
X1$_{LEAS}$ *Z		-0.084
X1$_{PROX}$ *Z		-0.041
R^2	0.134	0.160
f^2		0.03

Note. *$p < 0.05$

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7.4.2. Moderating effects of market and regulatory forces (Z) on the relationships between the symbolic aspects of office buildings (X2) and their leasing decision about the level of the greenness of office buildings (X5)

Figure 7.4 shows the model that examined the moderating role of the market and regulatory forces (Z) on the relationships between the 'employee related' ($X2_{EMPL}$) and 'organisation related' ($X2_{ORGS}$) symbolic values of office buildings (X2) and tenants' leasing decision about the level of the greenness of their office building (X5). Similar to the analysis presented in Section 7.4.1, both of the predictor constructs of $X2_{EMPL}$ and $X2_{ORGS}$ were included without the interaction term (e.g. $X2_{EMPL}*Z$) in Stage 1; thereafter, the interaction term of each construct was included in Stage 2 to calculate their p-values, R^2 and f^2 effect sizes.

Table 7.14 shows the moderator analysis results. It is found that only the 'employee related symbolic values of office buildings' ($X2_{EMPL}$) had a significant effect on tenants' leasing decision about the level of the greenness of their office buildings, with R^2 of 0.249 and coefficient of 0.439 (Stage 1). Thereafter, there is only a slight increase of R^2 to 0.266 with the same coefficient of 0.439 (Stage 2). Moreover, the f^2 effect size effect of 0.002 is found as negligible ($f^2 < 0.02$). These results thus imply that the ways tenants and their employees perceive their office buildings (X2) and their impact on leasing decisions about the greenness of office buildings (X5) are not likely to be affected by market and regulatory forces. Therefore, the Hypothesis 5b (H5b) of this research is not supported.
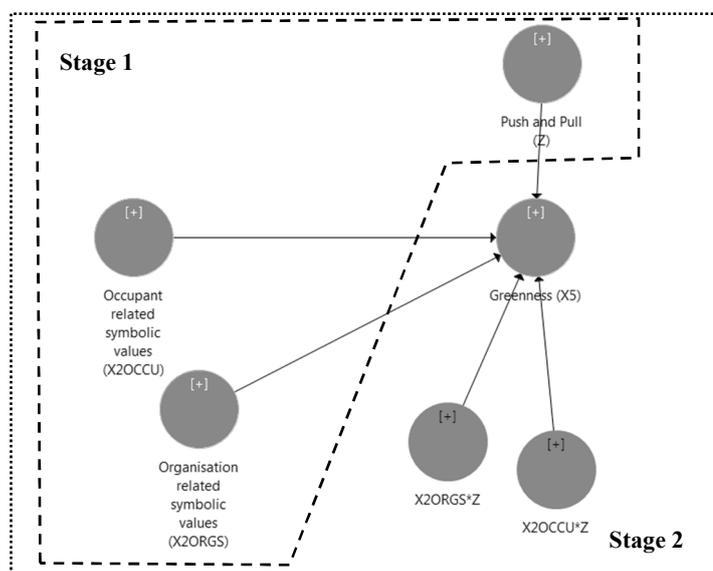
Figure 7.4 Moderating effects of market and regulatory forces on the relationship between X2 and X5

Table 7.14 Results of the moderating effects of market and regulatory forces on the relationship between X2 and X5

	Stage 1	Stage 2
Construct	**β-value**	**β-value**
Occupant related symbolic values (X2$_{EMPL}$)	0.079	0.050
Organisation related symbolic values (X2$_{ORGS}$)	0.439*	0.439*
Market and regulatory forces (Z)	0.019	0.001
X2$_{EMPL}$ * Z		-0.162
X2$_{ORGS}$ * Z		0.037
R^2	0.249	0.266
f^2		0.002

*Note. *p<0.05*

7.4.3. Moderating effects of market and regulatory forces (Z) on the relationships between tenants' expectations (X3) and their leasing decision about the level of the greenness of office buildings (X5)

Figure 7.5 shows the model describing the moderating effects of market and regulatory forces (Z) on the relationships between tenants' expectations (X3) and their decision about the level of the greenness of office buildings (X5). The moderator analysis results (Table 7.15) reveals that tenants' 'expectation to become a sustainable organisation' (X3$_{SUSO}$) is found to have a significant negative effect on their leasing decisions (β=-0.451, p=0.037). However, similar to the finding of Section 7.4.1-2, none of the interaction terms, including X3$_{SUSO}$ * Z, are found as statistically significant. Moreover, the f^2 effect size shows another negligible effect of market and regulatory forces. These collectively mean that the real estate market situation and regulatory changes are not likely to impact on the relationship between tenants' expectation (X3) and their leasing decisions about the greenness of office buildings (X5). Therefore, the results show the Hypothesis 5c (H5c) of this research is not supported.
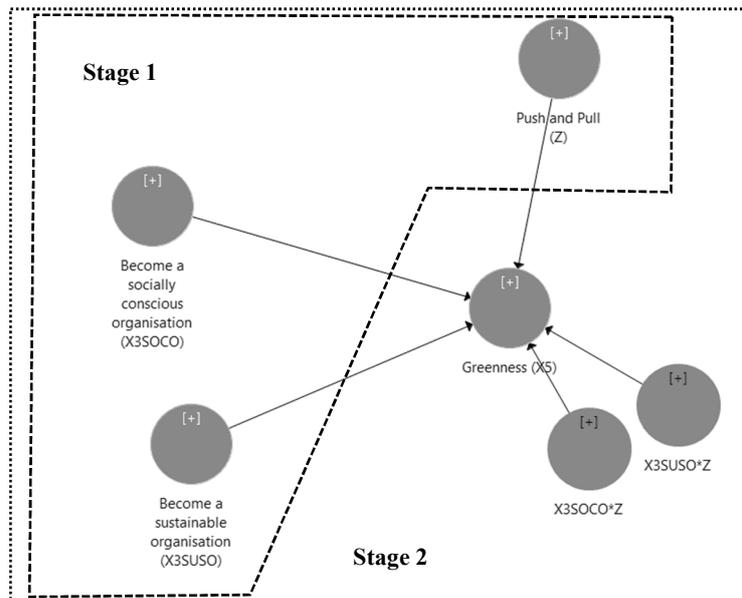
Figure 7.5 Moderating effects of market and regulatory forces on the relationship between X3 and X5

Table 7.15 Results of the moderating effects of market and regulatory forces on the relationship between X3 and X5

	Stage 1	Stage 2
Construct	**β-value**	**β-value**
Become a socially conscious organisation (X3$_{SOCO}$)	0.297	0.224
Become a sustainable organisation (X3$_{SUSO}$)	-0.451*	-0.440
Market and regulatory forces (Z)	0.319	0.396
X3$_{SOCO}$ * Z		-0.109
X3$_{SUSO}$ * Z		0.200
R^2	0.183	0.227
f^2		0.006

*Note. *p<0.05*

7.4.4. Moderating effects of market and regulatory forces (Z) on the relationships between tenants' identity (X4) and their leasing decision about the level of the greenness of office buildings (X5)

Figure 7.6 shows the moderating effects of market and regulatory forces (Z) on the relationship between tenants' identity (X4) and their leasing decisions about the greenness level of their office building (X5). The result presented in Table 7.16 shows that only the relationships between tenants' identity of being 'people-focused' (X4$_{PEOP}$) are found to have a significant effect on their leasing decisions about the greenness of their office buildings (X5), with a positive and significant coefficient of 0.401 and R^2 of 0.186. Thereafter, the increase of R^2 (0.186 → 0.220) and a weak f^2 of 0.040 are found. Nevertheless, similar to the results of the previous analysis (Section 7.4.1-3), the interaction construct of X4$_{PEOP}$ * Z is found to be statistically insignificant (p=0.574); therefore, market and regulatory forces do not moderate

the relationships. Overall, the results show that Hypothesis 5d (H5d) of this research is not supported.
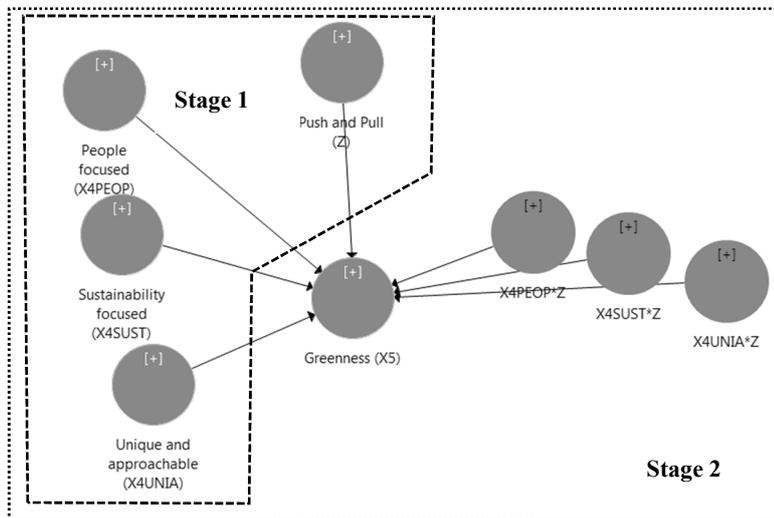
Figure 7.6 Moderating effects of market and regulatory forces on the relationship between X4 and X5

Table 7.16 Results of the moderating effects of market and regulatory forces on the relationship between X4 and X5

	Stage 1	Stage 2
Construct	**β-value**	**β-value**
People-focused (X4$_{PEOP}$)	0.372*	0.401*
Sustainability-focused (X4$_{SUST}$)	-0.043	-0.040
Unique and approachable (X4$_{UNIA}$)	0.073	0.077
Market and regulatory forces (Z)	0.112	0.128
X4$_{PEOP}$ * Z		0.132
X4$_{SUST}$ * Z		-0.174
X4$_{UNIA}$ * Z		0.115
R²	0.186	0.220
f²		0.040

*Note. *p<0.05*

7.5. Summary

This chapter discusses the structural model of the research. The results of the analysis show that a total of 13 out of 63 hypothesised relationships are found to be supported. Most notably, it is found that tenants' identity of being 'sustainability-focused' (X4$_{SUST}$) has a significant positive impact on their emphasis on 'building quality' (X1$_{BLDQ}$) and 'building sustainability' (X1$_{SUST}$) as well as 'employees' (X2$_{EMPL}$) and 'organisation' (X2$_{ORGS}$) relate symbolic values of office buildings. Therefore, it shows the integration of the three behavioural theories could help to explain the relationships among various tenants' leasing motivators.

It is also found that it is not tenants' identity of being 'sustainability-focused' (X4$_{SUST}$), but 'people-focused' (X4$_{PEOP}$) that leads to the 'level of the greenness of their office buildings'

(X5), represented by NABERS and Green Star ratings. As such, this further highlights the symbolic self-completion theory can be useful to explain the reasons behind tenants leasing decisions about the greenness of office buildings. Overall, these findings address the second objective of this research. In addition, the results also show that 'building quality' ($X1_{BLDQ}$) is found as only the significant predictor of Sydney CBD office rental (Y). On the other end, the 'locational' ($X1_{PROX}$) and 'green' (i.e. NABERS and Green Star certifications) (X5) effect on office rental is found as not significant. Moreover, it is also found that symbolic values of office buildings (X2) do not significantly contribute to rental. These findings collectively show the importance of building quality in determining Sydney CBD office rental and address the third objective of this research.

Then, the moderating effects of the market and regulatory forces (Z) on the relationship between various tenants' leasing motivators (X1-X4) and their leasing decisions about the level of the greenness (X5) are examined. The results imply that various 'carrots and sticks', such as favourable relationships with landlords and mandatory energy efficiency disclosure program (i.e. commercial building disclosure) are not likely to hamper tenants' leasing decisions. Although it shows limited applicability of the push-pull theory in this research context, this finding addresses the fourth objective of this research.

In summary, the findings discussed in the chapter help to view the relationships between tenants' key leasing motivators, their leasing decisions about the greenness of office buildings and rental. Chapter 8 discusses the validation of these findings.

Chapter 8. VALIDATION AND IMPLICATIONS OF RESEARCH FINDINGS

8.1 Introduction

This chapter focuses on the validation of the research findings and their implications, with the use of expert interviews. Section 8.2 presents the basic profile of the expert interviewees, followed by a discussion of their opinions on the research findings of tenants' leasing behaviours (X1-X5) and rental (Y), in Section 8.3. Then, discussions about the implication of the research findings are presented in Section 8.4, with particular attention given to the comprehensiveness and usability of the developed PLS path model, towards explaining Sydney office tenants' leasing behaviours.

8.2 Profile of the interviewees

A total of three semi-structured interviews were conducted with experts who were not involved in the preliminary interviews and questionnaire survey of this research. Table 8.1 summarises the profile of the interviewees. To facilitate the interviewing process, an interview guide (see Appendix C) comprising the major findings of this research and established PLS path model was sent to the interviewees.

Table 8.1 List of the interviewees for the validation of the research findings

Interviewee	Sector	Specialities	Title
Interviewee J	Rental, Hiring and Real Estate	Commercial real estate services (including, transaction, tenancy representation, market research)	Sustainability manager
Interviewee K			Senior analyst
Interviewee L			Research director

The three interviewees are from the major commercial real estate firms specialising in commercial real estate services, including transaction, tenancy representation and office market research. These interviewees have expertise in the areas of analysis on the Australian real estate market (including the Sydney CBD market) and/or advisory to tenants, including implications of various sustainability strategies to their offices. Therefore, they have a good understanding of leasing behaviours of various types of tenants who drive the demand in the Sydney CBD office market, including their leasing decisions about the greenness of office buildings and possible impact on rental. This thus allows them to validate the research findings of the

identified relationship among office tenants' leasing motivators, their decisions about the greenness of office buildings and rental.

8.3 Experts' opinions about the research findings

8.3.1 Tenants' office leasing behaviours

In terms of the identified tenants' office leasing behaviours (X1-X5), all three interviewees agreed that tenants' leasing behaviours are influenced by not a single, but multiple, motivators. They all agree that sustainability-focused organisations often prioritise building quality (H1-3: $X4_{SUST} \rightarrow X1_{BLDQ}$). Nonetheless, all interviewees consistently highlight that tenants' emphasis on higher building quality is not only attributed to the tangible aspects of office buildings (e.g. larger NLA). Instead, it is often attributed to the overall sustainability performance of their office buildings (H1-1: $X4_{SUST} \rightarrow X1_{BLDS}$) which generally shows a high association with the level of building quality.

According to Interviewee J, sustainability-focused organisations are often publicly-listed and generally put more emphasis on building quality compared to privately-owned organisations. This is partially because they are very conscious of their public image and thus perceive that commitment to corporate social responsibility (CSR) is an important issue as it helps to improve their reputation in the areas of their business. Moreover, publicly-listed organisations tend to be financially stronger than their privately-owned counterparts to leasing office space in high-quality office buildings which are generally more expensive. This assertion was further reinforced by Interviewee K and Interviewee L that sustainability-focused organisations tend to put more emphasis on the quality of their office buildings as it reflects their branding.

In addition to the above, Interviewee J stated that indoor environmental quality (IEQ) closely related to the sustainability performance of office buildings) is considered the highest priority among top-tier organisations over the last five years, mainly due to the increasing awareness of the benefits of better indoor air quality (IAQ), acoustics and lighting for improving staff health and well-being. As such, these organisations often look for Premium and A-grade office buildings that provide not only superior building quality, but also better IEQ, as they can provide better workplace experience for their employees (and attract and retain talented employees). This supports the opinions of other interviewees that the IEQ of buildings and employee satisfaction are positively related; having superior IEQ is often considered one of the most important considerations for many sustainability-focused organisations today, when

leasing office buildings. For instance, Interviewee K says that organisations are placing greater emphasis on the wellness of their work environment through the provision of natural ventilation, airflow, gym facilities and end-of-trip facilities, mainly to attract and retain talents through the provision of superior IEQ.

The heavy emphasis on the wellness of employees' workspace is aligned with the increasing focus on the 'WELL' certification in the Sydney office market, as highlighted by Interviewees J and L. Unlike many green building certifications, which mostly focus on the environmental aspects of office buildings (see Section 2.2.3), the key emphasis of WELL certification is on the provision of the 'wellness' for building occupants. Therefore, although WELL is still a very new certification, compared with the nationally-recognised NABERS and Green Star, it is gaining more interests from many building owners and tenants, especially among those organisations that are more invested in better employee well-being and productivity.

Interestingly, there seems to be a discrepancy between these three interviewees regarding tenants' emphasis on the environmental aspects of building sustainability. Only Interviewee L expresses his/her view that sustainability-focused organisations tend to place emphasis on both environmental protection and IEQ. On the other hand, Interviewee K comments that the relative importance of the environmental aspects of sustainability is not significant compared with IEQ. This is further highlighted by Interviewee J, who believes tenants generally see Green Star certified buildings as environmentally-friendly buildings; whereas, they see NABERS certified buildings from the aspect of operational efficiency (e.g. energy efficiency and waste reduction). As such, unless tenants are highly interested in Green Star certification, they may not always consider the environmental aspects of sustainability as a priority although it is highly related to the notion of sustainable development.

In response to tenants' emphasis on the symbolic aspects of office buildings, all three interviewees agree there is a strong relationship between the sustainability aspects of office buildings and the symbolic values of organisations (H2a-2: $X1_{BLDS} \rightarrow X2_{ORGS}$) and their employees (H2a-1: $X1_{BLDS} \rightarrow X2_{EMPL}$) towards their office buildings. This is highlighted by Interviewee L who says that the younger generations are increasingly aware of the notion of sustainable development; therefore, they have higher expectations of the work environment of their office spaces. Interestingly, this also relates to staff retention and attraction, and thus forces

an increasing number of sustainability-focused organisations to put more emphasis on the sustainability aspects of office buildings (H1-1: $X4_{SUST} \rightarrow X1_{BLDS}$).

Nonetheless, all interviewees share the view that the symbolic aspects of office buildings are probably not the most significant leasing motivator for many tenants. Rather, as described by Interviewee J, it is related to the culture and strategic direction of an organisation. This could thus help explain why no significant relationship was found between the symbolic aspects of office buildings (X2) and tenants' leasing decisions about the greenness of office buildings (X5) (see Section 7.3.4).

8.3.2 Relationship between tenants' office leasing behaviours and rental (Y)

All three interviewees agree that building quality plays a significant role in driving office rental (H4a: $X1_{BLDQ} \rightarrow Y$); however, Interviewees K and L suggest that its impact on rental is probably not the most significant compared with other determinants, such as access to outside views, amenities and public transports. Nonetheless, Interviewee K notes that the result of this research is understandable considering office buildings in Sydney CBD are clustered together within a relatively narrow geographical boundary, especially compared with Melbourne CBD. Interviewee L adds that tenants' emphasis on building quality often differs from the nature of the organisation. For example, real estate and finance firms often look for office buildings with higher quality and accessible location, which is often pricy. In contrast, these determinants are often perceived less important for other tenants, such as tech-firms.

Meanwhile, Interviewees K and L agree that the level of the greenness represented by NABERS of Green Star rating (X5) ratings has a minimal impact on rental (Y), compared with building quality and locational determinants. This is consistent with the research findings that show there is no significant relationship between the greenness of office buildings and rental (see Section 7.3.5). Specifically, interviewees state that the greenness of office building is not always perceived as a primary interest, particularly for smaller-sized tenants. However, all three interviewees agree that both NABERS and Green Star are becoming mainstream in the Australian office market and tenants often use them as a tool to distinguish certain office buildings from others.

8.4   Implication of the developed PLS path model

In general, all three interviewees agree that the model, which shows the relationships between each construct related to tenants' office leasing behaviours and rental, is understandable. They also tend to agree that the developed PLS path model is comprehensive and accounts for most of the key tenants' leasing considerations. Nonetheless, interviewees generally share the view that a simplified version of the PLS path model should be developed to enhance its usability. Therefore, the research findings have been represented in flowcharts, as per Figures 8.1 and 8.2, for ease of visualisation and understanding. Compared to the PLS path model, these flowcharts highlight only the identified significant relationships using the top-down approach. Moreover, they present the identified measurement items of each construct and their significance.

Generally, Figures 8.1 and 8.2 show if and to what extent tenants' organisational identities lead to their emphasis on various leasing motivators, and decisions about the greenness of office buildings and rental. Consistent with the research findings discussed in Chapter 7 and Section 8.3, Figure 8.1 shows that sustainability-focused organisations are likely to put emphasis, not only on the sustainability aspect of office buildings, but also on building quality that is directly related to rental. On the other hand, the greenness of office buildings (characterised by NABERS and Green Star ratings) is not directly related to tenants' organisational identity of being a sustainability-focused organisation nor significantly contributes to rental. Rather, it is related to tenants' organisational identity of being part of a people-focused organisation (Figure 8.2). Overall, these flowcharts give real estate investors and owners the ability to easily identify appropriate types of tenants based on their office leasing motivators and thus, are able to estimate their leasing behaviours.

Meanwhile, interviewees also made a few suggestions about the research findings and the developed PLS path model. Interviewee K suggests that conducting research in other metropolitan areas (such as Melbourne CBD) would be useful given the different characteristics of each real estate market. Similarly, Interviewee L recommends to further analyse collected data based on different precincts of Sydney CBD to investigate if there are any differences in the identified relationships by micro-location. Admittedly, this research acknowledges a number of additional areas for future research (discussed in Section 9.7).
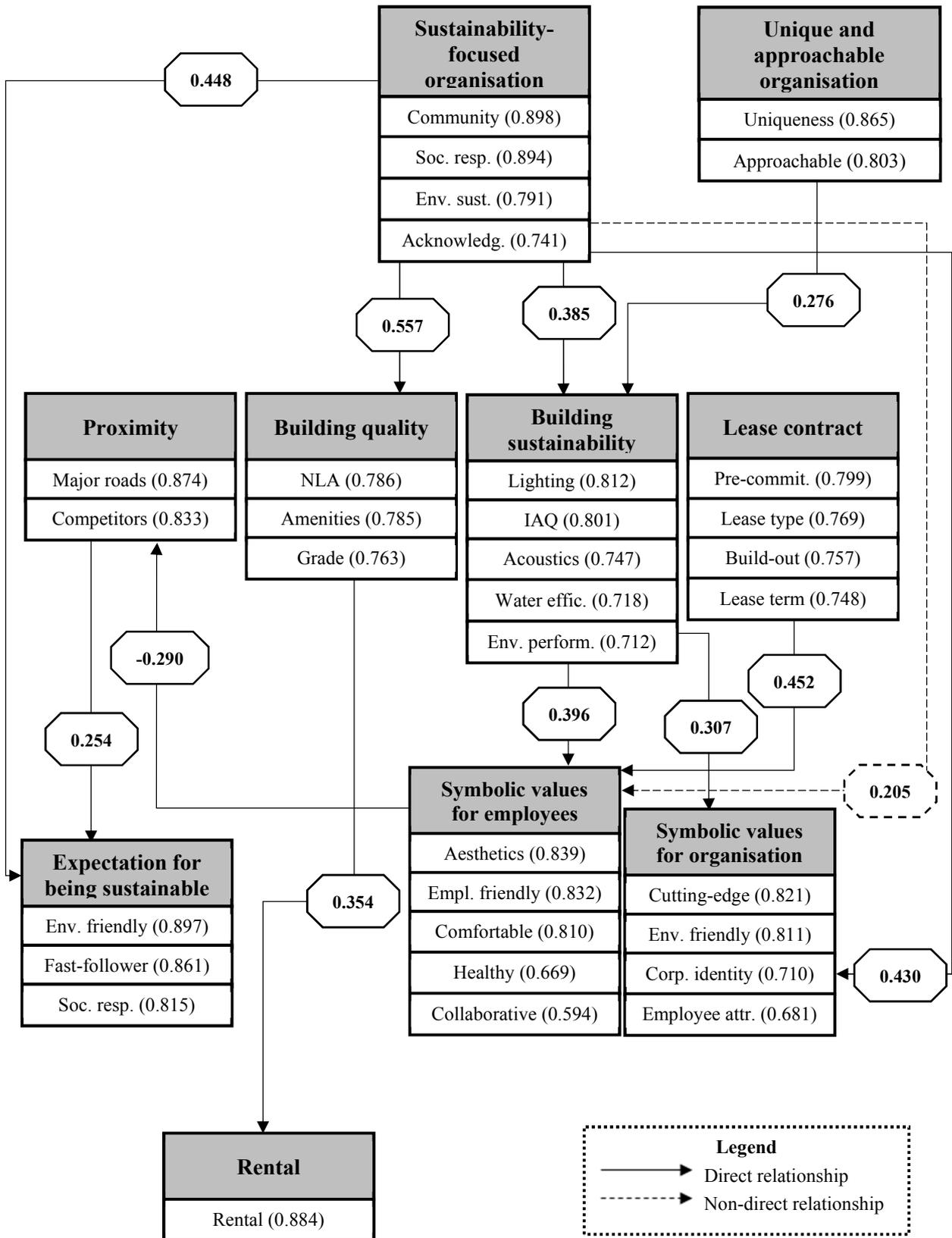
Figure 8.1 Flowchart explaining the relationship between tenants' office leasing behaviours and rental
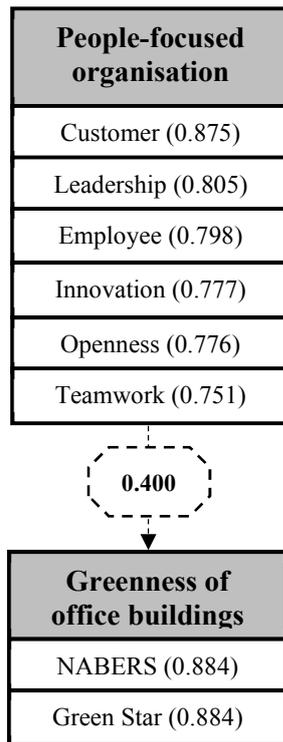
Figure 8.2 Flowchart explaining the relationship between people-focused organisations and the greenness of office buildings

8.5   Summary

This chapter provides experts' opinions about the major findings of this research. To this, three interviews with qualified industry experts from major commercial real estate firms were conducted. In general, all three interviewees show a consensus about the major findings of the research. For instance, interviewees agree that there is a relationship between tenants' organisational identity of being a sustainability-focused organisation and their emphasis on the building quality and sustainability. Three interviewees also agree with the comprehensiveness of the developed PLS path model of this research in explaining the leasing behaviours of Sydney CBD office tenants, although the model can be simplified for better usability for real estate practitioners. It is also suggested that the findings of this research can be further developed for future research. Chapter 9 is a conclusion of this research and provides recommendations for future research directions.

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Chapter 9. CONCLUSIONS

9.1 Summary

Since the 1960s, evidence shows there is a constant increase in the number of green certified buildings across many countries (particularly in the US, UK and Australia). The topics of sustainable development and greenness attract considerable attention from researchers who attempt to document the characteristics and benefits of green certified buildings, by focusing on the perspective of different stakeholders (e.g. employees, organisations). However, from the review of literature, the relationships between the greenness of office buildings and rental had not been fully explored, especially in the context of the Australian real estate market. The key focus of most existing studies is on the investigation of the effects of the tangible aspects of office buildings on rental; whereas, tenants' leasing behaviours in relations to the 'meanings' of those of the tangible aspects, and their collective effects on rental was often neglected.

To fill this gap, this research aims to investigate the determinants of rental of the Australian office building. Particularly, the scope of this research is on the relationships between tenants' leasing behaviours towards the greenness of office buildings and rental. Four research objectives were identified to examine the relationships among various tenants' leasing motivators, their decisions about the greenness of office buildings and rental, and to explore moderating effects of market and regulatory forces on tenants' leasing decisions (see Section 1.4).

To achieve the aim and objectives of this research, a three-pronged research process was used, namely: (i) exploratory; (ii) questionnaire development; and (iii) data collection and analysis phases. Of these, preliminary semi-structured interviews were conducted, with the assistance of an interview guide questionnaire (see Appendix A). Thereafter, the interview findings, in addition to the findings from systematic literature review and meta-analysis, were used to inform the development of the structured survey questionnaire (see Appendix B). The targeted sample for the survey questionnaire is the key informants of the tenants of the Sydney CBD office buildings.

The second-generation multivariate data analysis method of Partial Least Square – Structural Equation Modelling (PLS-SEM) method is used to analyse survey data. A structural model was built and the overall findings were validated through interviews with industry experts (see

Appendix C). The key findings of this research, in terms of the four objectives, are summarised following.

9.2 Key findings of the research and validation of hypotheses

9.2.1 Conceptual framework of tenants' office leasing behaviours

To fulfil the first research objective, systematic literature review and meta-analysis, and investigations on several behavioural theories and concepts were undertaken to develop a conceptual framework of this research. The conceptual framework was developed to investigate the relationships between tenants' office leasing behaviours (X1-X5) and rental (Y), by integrating three behavioural theories: (i) symbolic self-completion theory (see Section 3.3.1); (ii) expectancy-value theory (see Section 3.3.2); and (iii) push-pull theory (see Section 3.3.3).

The developed conceptual framework further reveals there exist complex and multi-layered relationships among the tangible (X1) and symbolic (X2) aspects of office buildings, tenants' expectations (X3) and organisational identity (X4), their leasing decisions about the greenness of office buildings (X5) which could collectively lead to rental (Y). Moreover, it is also shown that tenants' leasing decisions can be moderated by market and regulatory forces (Z). The developed conceptual framework, therefore, implies that tenants' leasing behaviours (X1-X5) must be explained, not only from a single dimension, but from a multidimensional perspective.

9.2.2 Key leasing motivators driving tenants' decisions about the greenness of their office buildings

To fulfil the second research objective, several underlying constructs related to tenants' leasing motivators identified were analysed using the exploratory (EFA) and confirmatory (CFA) factor analysis. The results reveal that most of the constructs related to tenants' office leasing behaviours (X1-X5) are identified as multi-dimensional constructs. Specifically, the tangible aspects of office buildings (X1) are found to consist of four constructs of building sustainability ($X1_{BLDS}$), lease contract features ($X1_{LEAS}$), building quality ($X1_{BLDQ}$) and proximity ($X1_{PROX}$) whereas, symbolic aspects of office buildings (X2) are found to have two constructs of employees- ($X2_{EMPL}$) and organisation- ($X2_{ORGS}$) related symbolic values.

Similarly, tenants' expectations to become a socially conscious ($X3_{SOCO}$) and sustainable ($X3_{SUSO}$) organisation are found as two constructs explaining their expectation towards their leasing decisions (X3). Tenants organisational identity (X4) consist of three constructs of being

'people-focused' (X4$_{PEOP}$), 'sustainability-focused' (X4$_{SUST}$) and 'unique and approachable' (X4$_{UNIA}$).

The aforementioned multi-dimensional constructs imply that tenants' key leasing motivators must be explained accordingly. On the other hand, tenants' decisions about the greenness of office buildings (X5), rental (Y) and the moderating construct of the market and regulatory forces (Z) are found as a single-dimensional construct.

Based on the EFA and CFA results, a structural equation model, comprising a total of 63 paths, was established to test the hypothesised relationships. Of the 16 research hypotheses and their sub-hypotheses related to tenants' leasing behaviours, the path analysis reveals that nine of them are partially supported, as follows:

Hypothesis 1-1 (H1-1) states that tenants' identity (X4) has a significant positive impact on the sustainability performance of office buildings (X1$_{BLDS}$). It is found that tenants' identity of being 'sustainability-focused' (β=0.385) and 'unique and approachable' (β=0.276) are positively and significantly related to their emphasis on the sustainability performance of office buildings. Thus, this hypothesis is ***partially supported.***

Hypothesis 1-2 (H1-2) states that tenants' identity (X4) has a significant positive impact on lease contract features (X1$_{LEAS}$). It is found there is a lack of evidence to support tenants' identity of being 'people-focused' (X4$_{PEOP}$), 'sustainability-focused' (X4$_{SUST}$) and 'unique and approachable' (X4$_{UNIA}$) is positively and significantly related to their emphasis on lease contract features. Thus, this hypothesis is ***not supported.***

Hypothesis 1-3 (H1-3) states that tenants' identity (X4) has a significant positive impact on office building quality (X1$_{BLDQ}$). It is found that tenants' identity of being 'sustainability-focused' (X4$_{SUST}$) (β=0.557) is positively and significantly related to their emphasis on 'building quality' (X4$_{BLDQ}$). Thus, this hypothesis is ***partially supported***.

Hypothesis 1-4 (H1-4) states that tenants' identity (X4) has a significant positive impact on proximity (X1$_{PROX}$). It is found that there is a lack of evidence to support tenants' identity of being 'people-focused', 'sustainable' and 'unique and approachable' is positively and significantly related to their emphasis on proximity. Thus, this hypothesis is ***not supported.***

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Hypothesis 2a-1 (H2a-1) states that tangible aspects of office buildings (X1) have a significant positive impact on employees related symbolic aspects of office buildings (X2EMPL). It is found that tenants' emphasis on 'building sustainability' (β=0.396) and 'lease contract features' (β=0.452), and 'proximity' (β=-0.290) is significantly related to employees related symbolic aspects of their office buildings. Thus, this hypothesis is *partially supported*.

Hypothesis 2a-2 (H2a-2) states that tangible aspects of office buildings (X1) have a significant positive impact on organisation related symbolic aspects of office buildings (X2ORGS). It is found that tenants' emphasis on 'building sustainability' (β=0.307) is positively and significantly related to the organisation related symbolic aspects of their office buildings. Thus, this hypothesis is *partially supported*.

Hypothesis 2b-1 (H2b-1) states that tangible aspects of office buildings (X1) have a significant positive impact on their expectation to become a socially conscious organisation (X3SOCO). It is found there is a lack of evidence to support tenants' emphasis on 'building sustainability', 'lease contract features', 'building quality' and 'proximity' is significantly related to their expectation to become a socially conscious organisation. Thus, this hypothesis is *not supported*.

Hypothesis 2b-2 (H2b-2) states that tangible aspects of office buildings (X1) have a significant positive impact on their expectation to become a sustainable organisation (X3SUSO). It is found that tenants' emphasis on 'proximity' (β=0.254) is positively and significantly related to their expectation to become a sustainable organisation. Thus, this hypothesis is *partially supported*.

Hypothesis 2c-1 (H2c-1) states that tenants' identity (X4) has a significant positive impact on employees related symbolic aspects of office buildings (X2EMPL). It is found that tenants' identity of being 'sustainable' (β=0.205) is positively, significantly and indirectly related to employee related symbolic aspects of office buildings. Thus, this hypothesis is *partially supported*.

Hypothesis 2c-2 (H2c-2) states that Tenants' identity (X4) has a significant positive impact on organisation related symbolic aspects of office buildings (X2ORGS). It is found

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that tenants' identity of being 'sustainable' (β=0.430) is positively and significantly related to the organisation related symbolic aspects of office buildings. Thus, this hypothesis is *partially supported*.

Hypothesis 2d-1 (H2d-1) states that tenants' identity (X4) has a significant positive impact on their expectation to become a socially conscious organisation (X3soco). It is found there is a lack of evidence to support tenants' identity of being 'people-focused', 'sustainability-focused' and 'unique and approachable' is significantly related to their expectation to become a socially conscious organisation. Thus, this hypothesis is *not supported*.

Hypothesis 2d-2 (H2d-2) states that Tenants' identity (X4) has a significant positive impact on their expectation to become a sustainable organisation (X3suso). It is found tenants' identity of being 'sustainability-focused' (β=0.448) is positively and significantly related to their expectation to become a sustainable organisation. Thus, this hypothesis is *partially supported*.

Hypothesis 3a (H3a) states that tangible aspects of office buildings (X1) have a significant positive impact on tenants' leasing decisions about the greenness of office buildings (X5). It is found there is a lack of evidence to support tenants' emphasis on 'building sustainability', 'lease contract features', 'building quality' and 'proximity' is significantly related to their leasing decisions about the greenness of office buildings. Thus, this hypothesis is *not supported*.

Hypothesis 3b (H3b) states that symbolic aspects of office buildings (X2) have a significant positive impact on tenants' leasing decisions about the greenness of their office buildings (X5). It is found there is a lack of evidence to support 'organisation' and 'employee' related symbolic aspects of office buildings are significantly related to their leasing decisions about the greenness of office buildings. Thus, this hypothesis is *not supported*.

Hypothesis 3c (H3c) states that tenants' expectations (X3) have a significant positive impact on their leasing decisions about the greenness of their office buildings (X5). It is found there is a lack of evidence to support tenants' expectation to become a 'socially

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conscious' and 'sustainable' is significantly related to their leasing decisions about the greenness of office buildings. Thus, this hypothesis is ***not supported***.

Hypothesis 3d (H3d) states that tenants' identity (X4) has a significant positive impact on their decisions about the greenness of their office buildings (X5). It is found that tenants' identity of being 'people-focused' (β=400) is positively and significantly related to their leasing decisions about the greenness of office buildings. Thus, this hypothesis is ***partially supported.***

Of the identified significant relationships, it is worth noting that tenants' identity of being 'sustainability-focused' ($X4_{SUST}$) has a positive and significant impact on 'building sustainability' ($X1_{BLDS}$) and building quality ($X1_{BLDQ}$). This reveals that sustainability-focused organisations are likely to emphasise the sustainability aspects of office buildings, especially in regard to better environmental performance (see Section 7.3.1.1). This aligns with the opinions shared by all three expert interviewees that sustainability-focused organisations often consider 'wellness' as a high priority to provide a better workplace environment for their current and future employees. This is supported by the triangular relationship among 'tenants' identity as sustainability-focused' ($X4_{SUST}$), 'building sustainability' ($X1_{BLDS}$) and 'organisation related symbolic values of office buildings' ($X2_{ORGS}$) (as discussed in Section 7.3.2.4).

On the other hand, no significant relationship is found between tenants' identity of being 'sustainability-focused' ($X4_{SUST}$) and the 'level of greenness office buildings' (X5). Considering the aforementioned findings, this suggests that sustainability-focused organisations tend to focus on the overall level of building sustainability, rather than the green building certifications (i.e. NABERS or Green Star). Instead, it is found that it is not 'sustainability-focused' but 'people-focused' organisations ($X4_{PEOP}$) that are likely to put emphasis on the greenness of office buildings.

9.2.3   Collective effects of tangible and symbolic aspects of office buildings on rental

To fulfil the third research objective, the relationship between tenants' leasing behaviours (X1-X5) and rental (Y) was investigated. The results of the analysis show that one out of four hypotheses is partially supported.

Hypothesis 4a (H4a) states that tangible aspects of office buildings (X1) have a significant positive impact on rental (Y). It is found that 'building quality' ($\beta=0.354$) is significantly and positively related to the rental. Thus, this hypothesis is ***partially supported***

Hypothesis 4b (H4b) states that symbolic aspects of office buildings (X2) have a significant positive impact on rental (Y). It is found there is a lack of evidence to support 'organisation' and 'employee' related symbolic aspects of office buildings are significantly related to the rental. Thus, this hypothesis is ***not supported.***

Hypothesis 4c (H4c) states that tenants' expectations (X3) have a significant positive impact on rental (Y). It is found there is a lack of evidence to support tenants' expectations to become a 'socially conscious' and 'sustainable' are significantly related to rental. Thus, this hypothesis is ***not supported.***

Hypothesis 4d (H4d) states that tenants' leasing decisions about the greenness of office buildings (X5) have a significant positive impact on rental (Y). It is found there is a lack of evidence to support the greenness of office buildings is significantly related to the rental. Thus, this hypothesis is ***not supported.***

The result shows that *only* the building quality construct ($X1_{BLDQ}$) has a significant and positive relationship with office rental. This shows the importance of building quality in determining Sydney CBD office rental. Considering the significant relationship between tenants' identity of being 'sustainability-focused' ($X4_{SUST}$) and 'building quality' ($X1_{BLDQ}$) (as discussed in Section 9.2.2), the result implies that sustainability-focused organisations are more likely to pay higher rental than the other counterparts, as they seem to have a superior building quality.

On the other end, it is found that rental is not significantly affected by the level of greenness of office buildings (X5). This suggests that the effect of greenness (or the 'green premium'), locational effect ($X1_{PROX}$), as well as symbolic aspects of office buildings (X2), do not significantly affect rental in the Sydney CBD office market.

9.2.4   Moderating effects of market and regulatory forces on the relationships between tenants' key leasing motivators and their decisions about the greenness of their office buildings

To fulfil the fourth research objective, the moderating role of the market and regulatory forces (Z) on the relationship between tenants' leasing motivators (X1-X4) and their leasing decisions

about the greenness of office buildings (X5) was examined using the two-stage approach. The results of the analysis show that all of the four hypotheses are not supported.

Hypothesis 5a (H5a) states that market and regulatory forces (Z) moderate the relationships between tenants' emphasis on tangible aspects of office buildings (X1) and their leasing decisions about the greenness of office buildings (X5). It is found that market and regulatory forces do not moderate the relationships. Thus, this hypothesis is ***not supported.***

Hypothesis 5b (H5b) states that Market and regulatory forces (Z) moderate the relationships between tenants' emphasis on symbolic aspects of office buildings (X2) and their leasing decisions about the greenness of office buildings (X5). It is found that market and regulatory forces do not moderate the relationships. Thus, this hypothesis is ***not supported.***

Hypothesis 5c (H5c) states that market and regulatory forces (Z) moderate the relationships between tenants' expectations (X3) and their leasing decisions about the greenness of office buildings (X5). It is found that market and regulatory forces do not moderate the relationships. Thus, this hypothesis is ***not supported.***

Hypothesis 5d (H5d) states that market and regulatory forces (Z) moderate the relationships between tenants' identity (X4) and their leasing decisions about the greenness of office buildings (X5). It is found that market and regulatory forces do not moderate the relationships. Thus, this hypothesis is ***not supported.***

That that none of the hypotheses is supported indicates that market and regulatory forces do not have a positive and significant moderating effect on tenants' leasing decisions about the greenness of office buildings. The result may be attributed to the limited availability of mandatory regulations imposed on tenants (see Section 2.2.4). Moreover, the characteristics of the Sydney office market as the 'tenants' market' (see Section 2.4.1) may further limit the moderating effect of market and regulatory forces on tenants' leasing decisions.

9.3   Implication to theory

This research makes five key contributions to theory:

1. This research contributes to the application of behavioural theories in explaining the attributes of rental. Unlike previous studies based on the neo-classical economics paradigm, this research empirically identifies determinants of office rental, based on tenants' leasing behaviours. It is found that tenants' identity of being 'sustainability-focused' can lead to their emphasis on 'building quality' and subsequently, contributes to rental. Thus, the result of this research not only confirms the determinants of rental explained from the neo-classical economics paradigm, but also provides a plausible explanation that understanding tenants' leasing behaviours can be also helpful to identify underlying determinants of rental.

2. This research contributes to theory by showing the applicability of the 'symbolic self-completion theory' in explaining tenants' leasing decisions about the greenness of office buildings. This research provides empirical evidence that tenants' identity (X4) of being 'people-focused' is significantly related to their office leasing decisions (X5) and therefore, supports the claim that there is a close relationship between one's group identity and a building (Ledgerwood *et al.*, 2007). Further, this research shows tenants' identity of being 'people-focused' is also significantly related to the symbolic aspects of office buildings (X2). As such, this research contributes to the theories and concepts related to environmental psychology by showing employees of people-focused organisations may feel a sense of place and place attachment stimulated by the greenness of office buildings.

3. Another theoretical contribution of this research is related to the expectancy-value theory. Specifically, although the result of exploratory factor analysis (EFA) successfully extracted several constructs related to the tenants' 'expectation' (X3) and 'value' (X2) towards office buildings, the research found that neither part of the theory is significantly related to their leasing decisions about the greenness of office buildings (X5). This, therefore, shows that the expectancy-value theory has relatively limited capabilities in explaining the rationale behind tenants' office leasing decisions. However, it should be also acknowledged that this theory has been used in explaining organisational behaviours (Westaby, 2002; Kopelman, 1976). Further research may be required to analyse tenants' office leasing behaviours using this theory in different contexts, to determine its applicability in real estate research.

4. This research also contributes to theory by showing empirical evidence of the interrelationships between the theories adopted in this research: symbolic-self completion theory and expectancy-value theory. It is found that the tenants' identity (X4) does not only affect their leasing decisions (X5) but also has a significant positive relationship with the symbolic aspects of office buildings (X2), as well as tenants' expectations (X3) from their leasing decisions. This implies that the integration of these behavioural theories may be useful to explain the complex interrelationships among tenants' leasing motivators, which may be not sufficiently explainable by a single theory.

5. This research also contributes to the push-pull theory by presenting its applicability in explaining the moderating effects of the market and regulatory forces (Z) on the relationships between tenants' leasing motivators (X1-X4) and their decisions (X5). This research found no significant moderating effects of the market and regulatory forces, and this implies that the theory's role in explaining moderating effects on a relationship between various motivators and decisions may be limited.

9.4   Implications for practice

The findings of this research also have five implications for practice:

1. The empirical findings show that rental (Y) of the Sydney CBD office market can be explained from tenants' emphasis on office building quality ($X1_{BLDQ}$). Although this is not entirely unexpected considering it is one of the typical attributes for office rental, this implies that Sydney CBD office tenants, especially those 'sustainability-focused organisations', are likely to have a higher rental for better quality buildings, when compared to other aspects of office buildings (e.g. location or building sustainability). As such, for real estate investors, investing in building quality would likely lead to a higher return on investment (ROI) than focusing solely on a 'prime location' at least in the Sydney CBD office market context.

2. This research also finds that tenants' identity (X4), especially of being 'sustainability-focused' ($X4_{SUST}$), has a positive significant relationship with 'building quality' ($X1_{BLDQ}$), 'building sustainability' ($X1_{BLDS}$) and 'organisation related symbolic aspects of office buildings' ($X2_{ORGS}$). Additionally, it also finds that 'building sustainability' ($X1_{SUST}$) is emphasised by organisations having an identity of being 'unique and approachable' ($X4_{UNIA}$). As such, these findings imply that 'sustainability-focused

organisations' emphasis on both the tangible and symbolic aspects of office buildings, while showing relatively narrow leasing motivator for unique and approachable organisations. As such, the findings of this research may allow landlords to develop different marketing strategies in targeting appropriate tenants.

3. The significant positive relationships between tenants' identity of being 'people-focused' ($X4_{PEOP}$) and 'employee related symbolic aspects of office buildings' ($X2_{EMPL}$) implies that organisations' strategic office leasing decisions can provide their employees with the 'psychological ownership' of their workplace. Considering employees' psychological ownership of their workspace often make them have higher satisfaction level (Techau *et al.*, 2016), it is suggested for people-focused organisations to consider the symbolic aspects of office buildings when they need to make leasing decisions. This may be particularly important for attracting and retaining younger talented employees, who are often known for their high interest in sustainability.

4. The findings of this research further inform that the level of greenness of office buildings (X5) represented by NABERS and Green Star ratings would be of greater interest to 'people-focused' organisations ($X4_{PEOP}$), than 'sustainability-focused' organisations ($X4_{SUST}$). For government agencies, this implies that targeting and promoting benefits related to 'people', such as pride of committing to the environmental sustainability, could be an effective strategy to achieve the autonomous diffusion of office buildings with higher levels of greenness across the country (e.g. 6 Stars in NABERS and Green Star).

5. The result of the moderating analysis implies that various market and regulatory forces (Z) would not likely significantly affect tenants' leasing decisions about the level of greenness. This may imply a limited impact of the currently imposed building sustainability regulations, such as the mandatory building energy efficiency disclosure program. This further fortifies the aforementioned suggestions that adoption of alternative strategies is suggested if the government aims at increasing the numbers of office buildings with higher levels of greenness.

9.5   Limitations of the research

This research presents empirical findings showing the relationships among tenants' office leasing motivators, leasing decisions about the greenness of office buildings, and rental which

is fully explored in previous studies. Nonetheless, this research also contains five limitations, which must be addressed for future research.

1. The geographical scope of this research is limited to the boundary of the Sydney CBD. This thus could partially lead to the insignificant relationship between proximity ($X1_{PROX}$) and rental (Y). Similarly, the insignificant moderating effect of regulatory and market forces may be also attributed to the geographical scope of this research. For example, Sydney CBD real estate market situation can be considerably different from other Australian CBDs, such as Melbourne CBD or Perth CBD. Therefore, the findings of this research should be interpreted with some caution in its application to the nationwide context.

2. Most of the measurement items in the survey questionnaire of this research, except for those not related to the tangible aspects of office buildings (X1), are developed mainly through preliminary interviews with the key informants from the tenants of Sydney CBD-located green buildings. Therefore, even though this research also used measurement items identified from the systematic literature review and meta-analysis, not all of them may fully reflect the behaviours of tenants locating at other suburbs such as Melbourne CBD or Brisbane CBD. As with the first limitation, this may imply the limited applicability of some of the measurement items and related constructs, which may be specific to tenants of the Sydney CBD office market.

3. The large proportion of small- to medium-size organisations in the obtained survey data must be also taken into account. In this research, over 83% of the survey respondents are small- to medium-size organisations. Considering larger organisations generally put more emphasis on the greenness of their office buildings (Van de Wetering and Wyatt, 2011), this may impact the findings of this research in regards to tenants' leasing decisions about the greenness of office buildings (X5). Similarly, this research did not consider the discrepancy in the proportion of business coverage, business model and other information about respondents' organisations. Hence, the difference in these characteristics may influence the research findings especially in regard to the tenants' leasing behaviours.

4. This research adopted the working definition of rental as 'a sum of base rental and electricity costs paid by tenants (as a form of 'modified gross lease'), but excluding any other outgoings paid by landlords (e.g. repair costs)' (see Section 3.6). Although the

adoption of this working definition is justifiable, it is possible that the insignificant attributes in explaining office rental may be due to such a lease agreement. Therefore, similar to the above, this may influence the findings of this research.

5. The sample size of 51 obtained in this research is relatively small, and placed restrictions on the ability to detect significant effects, especially in the f^2 effect sizes of the identified significant relationships. However, the use of PLS-SEM allows reliability and validity of data and, thereafter, the generation of the PLS path model. However, it should be also acknowledged that the insignificant result of the moderating analysis may be affected by the small sample size.

6. This research adopts a self-reported survey as a major data collection method. Self-reported data has several inherent limitations, such as possible inaccuracies in their responses (Fan *et al.*, 2006; Rosenman *et al.*, 2011), and therefore, its possible errors must be also acknowledged. In this study, several 'screening' questions were used to minimise the risks of having responses from unqualified survey participants. Furthermore, the EFA and CFA test was conducted to ensure the reliability and validity of the obtained survey data. However, there may be still a risk of the obtained data containing some errors, which were not be detected by the aforementioned remedial actions.

9.6   Conclusion

This research addresses the key Research Question:

"What are the tangible and symbolic aspects of office buildings that
can collectively influence their rental?"

It does so by identifying key determinant of rental, building quality, which has a significant positive relationship with tenants' identity and the symbolic aspects of office buildings. Therefore, it confirms that building quality characterised by net lettable area, amenities and grade plays a significant role for rental. The findings further indicate that sustainability-focused organisations tend to put emphasis on these aspects of office buildings while they are also likely to value how their buildings can represent their organisational identity and how employees perceive their workplace. As such, it is deemed that both the tangible and symbolic aspects of office buildings form an important part of tenants' leasing behaviour, and therefore, collectively influence on rental.

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9.7   Directions of future research

There are several areas of interest which can be further explored. Directions of future research are now presented.

1. The identified relationships among tenants' motivators, leasing decisions about the greenness of office buildings, and rental can be further investigated by embracing different city's CBDs (e.g. Melbourne CBD) in Australia. Although Sydney CBD was selected as a geographical scope of this research considering its largest number of green buildings (i.e. NABERS and Green Star), it may have several unique characteristics compared with other Australian CBDs, such as the composition of tenants and real estate market situation. Therefore, the subsequent survey of tenants located at other Australian CBDs would provide further meaningful insights about the identified relationships.

2. Similar to the above, future research can categorise obtained data based on different geographical clusters within Sydney CBD to identify any differences in leasing behaviours of tenants located in the time of writing, Sydney CBD consists of six geographical clusters: City Core, Walsh Bay, The Rocks, Western, Midtown and Southern (PCA, 2019). Of these, City Core includes Martin Place where several financial institutions (e.g. banks) are located. As such, tenants' composition and their leasing behaviours may be different to, for example, the Southern area of Sydney CBD, where several government agencies are located. The categorised data can be analysed using several methods such as multi-group analysis (MGA) and cluster analysis using geographical information system (GIS). For instance, MGA allows comparison between tenant groups located at different parts of Sydney CBD in their leasing behaviours.

3. Moreover, future research should obtain larger sample size and create categories of several different groups, such as their greenness status (e.g. green buildings *versus* non-green buildings), sectors (organisations from the 'FIRE' sectors compared with. organisations from other sectors) and types of business entity (publicly-listed as opposed to privately-owned). For instance, it is suggested that publicly-owned organisations generally have better financial capabilities than privately-owned organisations and this, therefore, may affect their office leasing behaviours.

4. The measurement items adopted in the questionnaire survey of this research can be further elaborated for future research. For instance, this research adopts NABERS and Green Star as the two measurement items reflecting the level of the greenness for office

buildings. Although these two green building certifications are being used nationwide to represent the level of greenness of office buildings, other certifications, such as WELL, can be also considered as another measurement item in future research. In fact, although it is still a very new certification compared with NABERS and Green Star, the WELL certification is expected to be widely adopted in the Australian office sector, especially among large corporations. Therefore, future research should include additional measurement items to further investigate tenants' leasing decisions from more than two dimensions.

5. The findings of this research can be further elaborated by longitudinal studies. Longitudinal studies allow investigation on changes in tenants' leasing behaviours over time. Therefore, the study would show if and to what extent tenants' office leasing behaviours and their relationship with rental changes over a certain period of time. Moreover, longitudinal studies can be useful to analyse the effect of major regulatory changes (e.g. an introduction of new building energy efficiency mandate) or when there is a major event affecting the real estate market, such as a global financial crisis. As such, conducting similar research in future is highly recommended.

6. Although this research targets tenants who lease office spaces, it would be worthwhile for future research to extend its scope to embrace landlords' and investors' perspectives. This would allow an exploration of their behaviours towards the greenness of office buildings, which may significantly differ from the identified tenants' behaviours.

7. The scope of future research could be further broadened to outside Australia to compare tenants' (or landlords' or investors') behaviours towards the greenness of office buildings based on different regions. Australia is generally considered a mature market, in terms of using certifications to reflect the level of greenness of office buildings. As such, the findings of this research may be varied if the same research is conducted in relatively immature regions.

8. This research focuses on the quantitative approach, providing empirical evidence on the relationships between tenants' motivators, leasing decisions about the greenness of office buildings, and rental. The findings could provide a base for future qualitative studies to undertake single or multiple case studies to explain those phenomena.

9. Finally, future research could be aimed at the development of a decision support system (DSS). Although it is not the focus of this research to design a comprehensive predictive

model explaining tenants' office behaviours, this would help real estate investors and government agencies to make strategic decisions based on DSS, and therefore, be able to make other contributions to the practice.

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Appendix A

INTERVIEW GUIDE QUESTIONS

1. From an office tenant's perspective, what do you "generally" consider when make an office leasing decision?

2. Are you aware of the green certification status of your current workplace?

   2.1. What is your general perception on green buildings?

   2.2. What were the main motivations for your organisation to lease your current workplace?

   2.3. What could be the consequence of not leasing your current workplace? (e.g. loss of competitive advantage from inconvenient access to our clients)

   2.4. From the tenant's perspective, were you attracted by the "green building accreditation" status of this building such as "NABERS 6 Star" when you made the leasing decision? If so, to what extent?

   2.5. Are you aware that leasing a green building could require paying higher rents than comparable non-green buildings?

   2.6. What could be other barriers for leasing a green building?

3. Besides being a leading [e.g. financial firm], what values does your organization pursue?

   3.1. What efforts have your organisation made to promote those values?

   3.2. How the leasing decision of the currently occupied building helped your organisation to portray or enhance its values?

   3.3. Do you believe your competitor's in the [e.g. finance/insurance sector] are eager to choose a green building over the non-green alternative? What could be the reasons behind their leasing decisions?

4. We believe the prestigious "image" of the CBD often plays a significant and positive role in office leasing decision as it provides the "symbolic values". How would you describe the term symbolic value for green buildings? Are there any words that you specifically want to use to describe such values? How could you describe the symbolic values for green building?

Appendix B

Dear Sir/Madam,

Your organisation is invited to participate in research to investigate **tenant's leasing motivation in Sydney CBD-located office buildings** (Postcode 2000).

This research is seeking input from a person who;

- played a **significant role** in leasing your current office space (e.g. sustainability director, leasing director)
- has **significant knowledge** in your current office space, including its leasing motivations (e.g. office manager, leasing manager)

If you decide to participate, please kindly complete the **anonymous** online questionnaire. By completing the survey, you will have the option to receive a **complimentary research report** and enter into a draw for one of the four **TerraCycle Zero Waste Boxes**. The questionnaire should take **approximately 10 minutes** to complete.

<u>Guideline for Completing This Survey</u>

1. Please be aware that the survey should be completed based on the **factual information** on your **current office space** located in Sydney CBD (Postcode 2000)
2. Please be aware that the survey should be completed by only a **single person per organisation**

If you believe you are not the right person to participate in this survey, it would be greatly appreciated if you could **forward** this questionnaire to the most appropriate person in your organisation.

We greatly appreciate your time. Please do not hesitate to contact us directly if you have any questions.

This research project is proudly supported by

CITY⬤SWITCH

General information about respondent

1. Please indicate your **current position** (e.g. office director, sustainability manager)

   _____

2. Please indicate your **length of employment**

   _____ years

3. Please indicate your organisation's **main business area(s)** (please tick **all** that applies)
   a. Real Estate (e.g. Leasing, Development, Management, Brokerage, REITs) ☐
   b. Finance and Insurance (e.g. Banking, Asset Management) ☐
   c. Architecture ☐
   d. Legal ☐
   e. Accounting ☐
   f. IT ☐
   g. Engineering ☐
   h. Management Consulting ☐
   i. Others (Please specify _____) ☐

4. Please indicate your organisation's **business model**
   a. B2B (Business to Business) ☐
   b. B2C (Business to Consumer) ☐
   c. Both (B2B & B2C) ☐

5. Please indicate your organisation's **business coverage**
   a. International (e.g. Europe, USA, Asia-Pacific) ☐
   b. Regional (e.g. Australia & New Zealand) ☐
   c. National ☐
   d. Local ☐

6. Please indicate your organisation's type of **business entity**
   a. Private limited (e.g. proprietary, partnership, family business) ☐
   b. Publicly listed (e.g. ASX) ☐
   c. Government department (e.g. Federal, State, Local) ☐

7. Please indicate your organisation's **legal structure**
   a. Profit ☐
   b. Non-profit ☐

8. Please indicate your organisation's approximate **annual turnover**

$\$$_____ per year

9. Please indicate your organisation's approximate **number of employees** (in Australia only)

_____ People

General information about your office space

10. Please indicate the **function** of your current office space

    a. International Headquarters ☐

    b. National Headquarters ☐

    c. Representative office / Single office ☐

11. Please indicate the **tenancy** of your current office space

    a. Owner occupied (My organisation partly or fully **owns** this building) ☐

    b. Tenant occupied (My organisation **leases** this office space) ☐

12. Please indicate your organisation's approximate **length of occupancy** at the current office space

_____ years

13. Please indicate the approximate **age** of your current office building

_____ years

14. Please indicate the approximate **Net Lettable Area (NLA)** of your current office space

_____ sqm

15. Please indicate the approximate **distance** of your current office space from the nearest train station

_____ km

16. Please indicate the **number of floor(s)** of your current office building

_____ st/nd/th floor

17. Please indicate the **floor level(s)** of your current office space (please indicate all if your organisation is occupying than one floor)

_____ st/nd/th floor(s)

18. Please indicate the approximate annual gross **rent** of your current office space (Gross rent: Rent excluding outgoings)

    a. Less than $100 ☐
    b. $100-$200 ☐
    c. $201-$300 ☐
    d. $301-$400 ☐
    e. $401-$500 ☐
    f. $501-$600 ☐
    g. $601-$700 ☐
    h. $701-$800 ☐
    i. $801-$900 ☐
    j. $901-$1,000 ☐
    k. $1,001-$1,100 ☐
    l. $1,101-$1,200 ☐
    m. $1,201-$1,300 ☐
    n. $1,301-$1,400 ☐
    o. $1,401-$1,500 ☐
    p. Over $1,500 ☐

19. Please indicate your **perception** towards your current office space after considering its location, amenities and other factors

Very inexpensive	Inexpensive	Quite inexpensive	Acceptable	Quite expensive	Expensive	Very expensive
1	2	3	4	5	6	7
☐	☐	☐	☐	☐	☐	☐

20. Please indicate the green status of your current office building (e.g. **NABERS and/or Green Star** _____ Stars. Please enter 0 if your office building is not certified by the respective rating scheme)

          NABERS _____
          Green Star _____

21. Please indicate your **previous experience** in leasing a "green building" (i.e. NABERS and/or Green Star 4 Stars or above)

    a. I DO have previous experience in leasing a green building ☐
    b. I DO NOT have previous experience in leasing a green building ☐

22. To what extent do the following attributes affect your **leasing motivation** of the current office space?

	Very insignificantly	Insignificantly	Quite insignificantly	Moderately	Quite significantly	Significantly	Very significantly
	1	2	3	4	5	6	7
TA 1 Proximity to nearby amenities (e.g. café, parking lots)	☐	☐	☐	☐	☐	☐	☐
TA 2 Proximity to public transportation (e.g. bus & ferry stations)	☐	☐	☐	☐	☐	☐	☐
TA 3 Proximity to major roads	☐	☐	☐	☐	☐	☐	☐
TA 4 Proximity to major clients	☐	☐	☐	☐	☐	☐	☐
TA 5 Proximity to major competitors	☐	☐	☐	☐	☐	☐	☐
TA 6 Office space size (e.g. net lettable area, density)	☐	☐	☐	☐	☐	☐	☐
TA 7 Office floor level	☐	☐	☐	☐	☐	☐	☐
TA 8 Building's age	☐	☐	☐	☐	☐	☐	☐
TA 9 Building's grade (e.g. Premium, A, B)	☐	☐	☐	☐	☐	☐	☐
TA 10 Building's sustainability ratings (e.g. NABERS, Green Star)	☐	☐	☐	☐	☐	☐	☐
TA 11 Building's amenities (e.g. bicycle racks, concierge)	☐	☐	☐	☐	☐	☐	☐
TA 12 Building's thermal quality	☐	☐	☐	☐	☐	☐	☐
TA 13 Building's acoustic quality	☐	☐	☐	☐	☐	☐	☐
TA 14 Building's lighting quality (e.g. daylight access)	☐	☐	☐	☐	☐	☐	☐
TA 15 Building's indoor air quality (e.g. natural ventilation)	☐	☐	☐	☐	☐	☐	☐
TA 16 Building's energy efficiency	☐	☐	☐	☐	☐	☐	☐
TA 17 Building's water efficiency	☐	☐	☐	☐	☐	☐	☐
TA 18 Building's environmental performance (e.g. CO_2 emission)	☐	☐	☐	☐	☐	☐	☐
TA 19 Building renovation (e.g. upgraded lightings and lifts)	☐	☐	☐	☐	☐	☐	☐
TA 20 Mechanical and electrical services (e.g. provision of backup power)	☐	☐	☐	☐	☐	☐	☐
TA 21 Lease term	☐	☐	☐	☐	☐	☐	☐
TA 22 Lease type (e.g. gross lease, net lease)	☐	☐	☐	☐	☐	☐	☐
TA 23 Lease pre-commitment	☐	☐	☐	☐	☐	☐	☐
TA 24 Build out (office space improvement before moving in)	☐	☐	☐	☐	☐	☐	☐

23. To what extent do the following **intangible attributes** affect your leasing motivation of current office space?

	Very insignificantly	Insignificantly	Quite insignificantly	Moderately	Quite significantly	Significantly	Very significantly
	1	2	3	4	5	6	7
SY 1 Comfortable office environment	☐	☐	☐	☐	☐	☐	☐
SY 2 Safe office space	☐	☐	☐	☐	☐	☐	☐
SY 3 Internally connected office space (e.g. open staircase)	☐	☐	☐	☐	☐	☐	☐
SY 4 Externally connected office space (e.g. outside view of the office)	☐	☐	☐	☐	☐	☐	☐
SY 5 Prestigious office environment (e.g. the "CBD" location, usage of marble wall)	☐	☐	☐	☐	☐	☐	☐
SY 6 Aesthetically-pleasing office space	☐	☐	☐	☐	☐	☐	☐
SY 7 Employee-friendly office space	☐	☐	☐	☐	☐	☐	☐
SY 8 Collaborative office space (e.g. more open spaces)	☐	☐	☐	☐	☐	☐	☐
SY 9 Environmentally friendly office space	☐	☐	☐	☐	☐	☐	☐
SY 10 Healthy office space	☐	☐	☐	☐	☐	☐	☐
SY 11 Office environment with cutting-edge technologies	☐	☐	☐	☐	☐	☐	☐
SY 12 Office environment for a better customer experience	☐	☐	☐	☐	☐	☐	☐
SY 13 Office environment to attract future employees	☐	☐	☐	☐	☐	☐	☐
SY 14 Office environment that well-reflects corporate identity	☐	☐	☐	☐	☐	☐	☐

24. To what extent do the following attributes affect your **leasing motivation** of the current office space?

	Very insignificantly	Insignificantly	Quite insignificantly	Moderately	Quite significantly	Significantly	Very significantly
	1	2	3	4	5	6	7
CS 1 Relationship with the landlord	☐	☐	☐	☐	☐	☐	☐
CS 2 Financial incentives from the landlord	☐	☐	☐	☐	☐	☐	☐
CS 3 Government support and incentives (e.g. tax benefit)	☐	☐	☐	☐	☐	☐	☐
CS 4 Government regulations (e.g. energy efficiency disclosure)	☐	☐	☐	☐	☐	☐	☐
CS 5 Competition against our competitors ("keeping up with the Joneses")	☐	☐	☐	☐	☐	☐	☐
CS 6 Financial constraints at the time of leasing	☐	☐	☐	☐	☐	☐	☐
CS 7 Availability of suitable office stocks at the time of leasing	☐	☐	☐	☐	☐	☐	☐

25. Please indicate if there were other leasing motivators besides those already listed above

_____

26. To what extent do you agree with the following statements?

*"We believe the term _____ well reflects our organisation's **identity**"*

	Strongly disagree	Disagree	Somewhat disagree	Neither disagree nor agree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7
OV 1 Leadership	☐	☐	☐	☐	☐	☐	☐
OV 2 Growth	☐	☐	☐	☐	☐	☐	☐
OV 3 Stability	☐	☐	☐	☐	☐	☐	☐
OV 4 Teamwork	☐	☐	☐	☐	☐	☐	☐
OV 5 Openness	☐	☐	☐	☐	☐	☐	☐
OV 6 Diversity	☐	☐	☐	☐	☐	☐	☐
OV 7 Safety	☐	☐	☐	☐	☐	☐	☐
OV 8 Innovation	☐	☐	☐	☐	☐	☐	☐
OV 9 Efficiency	☐	☐	☐	☐	☐	☐	☐
OV 10 Social responsibility	☐	☐	☐	☐	☐	☐	☐
OV 11 Virtue	☐	☐	☐	☐	☐	☐	☐
OV 12 Environment sustainability	☐	☐	☐	☐	☐	☐	☐
OV 13 Customer satisfaction	☐	☐	☐	☐	☐	☐	☐
OV 14 People (employee)	☐	☐	☐	☐	☐	☐	☐
OV 15 Community (corporate citizenship)	☐	☐	☐	☐	☐	☐	☐
OV 16 Acknowledgement	☐	☐	☐	☐	☐	☐	☐
OV 17 Uniqueness	☐	☐	☐	☐	☐	☐	☐
OV 18 Approachability	☐	☐	☐	☐	☐	☐	☐
OV 19 Productivity	☐	☐	☐	☐	☐	☐	☐
OV 20 Collaboration	☐	☐	☐	☐	☐	☐	☐

27. Please indicate if there are other terms representing the organisation's identity besides those listed above

_____

28. What practices does your organisation adopt to promote its identity? (e.g. corporate citizenship, pro bono, thought leadership)

_____

29. What practices does your organisation adopt to promote sustainability? (e.g. waste reduction strategy, participating CitySwitch program)

_____

30. To what extent do you agree or disagree with the following statements?

*"When we made the leasing decision of the current office space, we **expected** that this office space would help us to become a(n) _____".*

	Strongly disagree	Disagree	Quite disagree	Neither agree nor disagree	Quite agree	Agree	Strongly agree
	1	2	3	4	5	6	7
EP 1 Market leading organisation	☐	☐	☐	☐	☐	☐	☐
EP 2 Fast follower organisation	☐	☐	☐	☐	☐	☐	☐
EP 3 Socially responsible organisation	☐	☐	☐	☐	☐	☐	☐
EP 4 Economically feasible organisation	☐	☐	☐	☐	☐	☐	☐
EP 5 Environmentally-friendly organisation	☐	☐	☐	☐	☐	☐	☐
EP 6 Collaborative organisation	☐	☐	☐	☐	☐	☐	☐
EP 7 Ethical organisation	☐	☐	☐	☐	☐	☐	☐
EP 8 Trustworthy organisation	☐	☐	☐	☐	☐	☐	☐
EP 9 Innovative organisation	☐	☐	☐	☐	☐	☐	☐
EP 10 People-first organisation	☐	☐	☐	☐	☐	☐	☐
EP 11 Fair organisation	☐	☐	☐	☐	☐	☐	☐
EP 12 Flexible organisation	☐	☐	☐	☐	☐	☐	☐
EP 13 Publicly well-known organisation	☐	☐	☐	☐	☐	☐	☐
EP 14 Approachable organisation	☐	☐	☐	☐	☐	☐	☐

31. Please indicate if there are other expectations besides those listed above

_____

Appendix C

INTERVIEW GUIDE QUESTIONS

1. Do you believe that more sustainability-focused organisations would likely seek higher quality office buildings (e.g. taller, bigger and have more amenities)?

2. Do you believe that more sustainability-focused organisations would likely seek for office buildings providing better indoor environmental quality (IEQ) and sustainability performance (e.g. less CO_2 emissions)?

3. Do you agree that the symbolic aspect of office buildings is mostly attributed to their IEQ and sustainability performance (along with proximity and leasing contract features) than building quality? If yes/no, why?

4. Do you agree that building quality would be the most significant contributor to the rents over other tangible or symbolic aspects of office buildings? If yes/no, why?

5. Do you believe that the greenness of office buildings represented by either NABERS or Green Star ratings would have a minimal impact on the current rent that tenants pay?

6. Do you believe that the greenness of office buildings need to be considered as a part of tangible aspect of office buildings considering the characteristics of the greener buildings in Sydney (usually higher quality, premium/A-grade buildings for greener buildings)?

7. Do you believe any other factors that are not included in the model that you believe would help to explain tenant's office building leasing behaviours and the rents they pay?

8. To what extent does this model have the practicality to explain tenant's office building leasing behaviours? Do you believe there are any other ways to improve its practicality?