

RENTING IN CONVERTED GREEN BUILDINGS: EXPLORATORY STUDY ON OFFICE TENANTS VIEWS

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PURPOSE:
Greening the existing stock of non-green office buildings in South Africa is a significant challenge faced by the local green industry. This study evaluated the opinions of tenants of non-green office buildings in Gauteng, South Africa on renting green office space in existing office buildings.

ABSTRACT

Purpose

Greening the existing stock of non-green office buildings in South Africa is a significant challenge faced by the local green industry. This study evaluated the opinions of tenants of non-green office buildings in Gauteng, South Africa on renting green office space in existing office buildings.

Methodology

This report builds on a previous study by Hoffman & Pedregal¹ on the opinions and beliefs of Gauteng office tenants on converting existing office buildings into Green Star SA certified buildings. Data was acquired with a Likert-scale based questionnaire completed by 32 randomly selected commercial office tenants from A-rated office buildings in Sandton, Rosebank and Centurion.

Findings

The study indicated that 81% of office tenants support knowledge about environmental sustainability but only 50% have green building strategies and only 22% are considering renting space in a converted Green Star SA certified office building soon. Small firms and recently established firms were much less supportive of green building practices.

Limitations

A larger, more representative follow-up study is necessary to provide industry stakeholders with more authoritative findings. More specific information is required on what will persuade tenants to actively pursue green office space.

Value

This study described the views of commercial office tenants regarding renting green office space offered in existing office buildings. Evidence was provided that supplying focussed information and education to office tenants may be an efficient way to stimulate demand for green office space

Keywords: Converted office space, Existing buildings, Green Building, Office tenants, South Africa.

INTRODUCTION

During the previous decade the general levels of awareness in South Africa regarding the limitations of our natural world has increased significantly. Concepts such as ozone depletion, climate change, carbon footprint and sustainability often appear in the public domain and are discussed in the media. The built environment is one of the largest contributors to this predicament. A total of 40% of global energy use and 32% of the world's resources are linked to buildings and up to 30% of global greenhouse gas emissions originate from the built environment^{2,3,4}. Local studies confirmed similar statistics for the South Africa construction industry^{5,6}.

The built environment therefore has the potential to make a significant contribution towards a more sustainable, greener world. This will require new buildings to be built according to green principles, but also for the existing stock of buildings be converted to environmentally sustainable principles. To understand and stimulate the demand for green office space in existing buildings will be an important future challenge for the green industry.

Importance of the Study

Property owners, developers and the green industry will have to be aware of the dynamics of supply and demand of green office space. The opinions of tenants regarding green office space and

of their subsequent behaviour will be a very important part of this process. This study described the views of a selection of commercial office tenants regarding renting green office space offered in existing office buildings. This information will assist property owners, developers and the green industry to effectively communicate with office tenants about green building and to stimulate demand for green office space offered by existing non-green buildings.

REVIEW OF RELATED LITERATURE

The International Scenario

The challenge presented to the international built environment at the end of the 20th century to address global environmental sustainability effectively, was substantial and required international coordination and organization. The World Green Building Council (WGBC) was established in 1998 with nine founding members - Australia, Brazil, Canada, India, Japan, South Korea, Mexico, Spain and the USA⁷.

Many WGBC members developed and launched green building rating tools to certify buildings that qualify as green buildings, suited to their local conditions. Well-known green building rating systems are the Building Research Establishment Environmental Assessment Method (BREEAM) tool launched in the United Kingdom in 1990, Leadership in Energy and Environmental Design (LEED) launched in the United States in 2000 (WGBC, 2014) and the Green Star system launched in Australia in 2003⁷.

Green Building Council of South Africa (GBCSA)

The GBCSA was established in 2007 in South Africa and since then has certified more than 200 green buildings⁸. South Africa is still the only established member of the WGBC on the African continent with Ghana, Kenya, Mauritius, Namibia, Zambia and Nigeria as prospective members, Tanzania as an emerging member and Botswana and Zimbabwe identified as potential future members⁹. The GBCSA has the vision to be a leader in transforming the South African property industry to allow South Africans to work and live in healthy, efficient and productive environments¹⁰.

The South African Green Star SA rating system was launched by the GBCSA in 2008 and is based on the Australian Green Star tool, but customised for the South African landscape and context¹⁰. The large majority of initial South African green building initiatives focussed on new buildings. However new buildings only account for about 2 percentage of the total commercial building stock¹¹. In support of the process of upgrading existing non-green buildings to green certified buildings, the GBCSA also launched the Existing Building Performance Tool (Pilot version) in 2013 which is a performance based tool. The certification is only valid for a three year period. This ensures that buildings continue to operate in a sustainable manner¹⁰.

This tool focuses on measurable performance indicators such as energy and water, management policies and plans required to achieve environmental performance, and lease agreements with building tenants. The tool caters for a broad range of existing buildings including office buildings and allows for the fair and independent benchmarking, rating and certification of environmental design initiatives for existing building stock¹¹.

The progress of converting the existing stock of South African office buildings into certified green buildings has accelerated more recently. Of a total of 189 Green Star SA certified buildings a total of 60 existing buildings have to date been certified by the GBCSA as Green Star SA buildings, mostly through the use of the Existing Buildings Performance tool. Approximately 3 million m² of green construction area has been provided to the property

industry⁸. It is a very positive start to the challenge of greening the large stock of existing non-green office buildings but much work must still be done.

A recent study by Hoffman & Pedregal¹ evaluated office tenants of major commercial office nodes in South Africa on green building and the conversion of conventional buildings to provide green office space. A total of 59,4% of respondents agreed that green credentials are important to their firms. The majority of respondents were therefore sufficiently convinced by the merits of green building to want to be known to actively support green building. However only 34,4% of tenants already include green initiatives in their operational strategies. Action seems to lag behind beliefs.

International developments on refitting of existing office buildings

The importance of the green retrofitting of existing buildings is widely recognised internationally. Retrofitting refers to the altering and upgrading an existing building into a green building instead of building a new green building¹². A survey by Fitch & Laquidara-Carr found that more than 50% of industry stakeholders support retrofitting. Countries with volatile energy prices such as South Africa also stand to benefit more from savings on operating cost¹³. Fitch & Laquidara-Carr support green building through retrofitting of existing buildings in countries with older building stock, such as in the United Kingdom and Germany¹³. A South African study¹⁴ also found that retrofitting can result in significant energy savings.

An integrated design team and development process is essential if retrofitted projects want to reduce energy consumption by 30% or more¹⁵. Stakeholder opinions on retrofitting are important and are widely acknowledged. In a 2013 United States study¹⁶ confirmed that different levels of industry stakeholders all agreed on the necessity to refit existing buildings and that the main sustainability focus areas are to save energy, reduce costs and adhere to government policy.

However to convert the opinions into reality is a significant challenge. A 2012 New Zealand study by Bond and Perrett¹⁷ confirmed low client demand is a primary barrier to green building growth. Out of a list of ten possible barriers to green building, lack of client demand was identified as the most important barrier. Other significant barriers were high cost of green building, lack of government incentives and unwillingness to commit to extra costs. The study by Hoffman and Pedregal¹ confirmed that the lack of demand is also applicable in South Africa.

The sustainability industry has also experienced some opposition. Leadership in Energy and Environmental Design (LEED) in the United States is increasingly criticised for only rewarding incremental solutions towards sustainability and the retrofitting of existing buildings. A study¹⁸ in a Colorado study proposed a more in-depth green design approach informed by local geographic conditions and natural climate systems.

Non-alignment of stakeholder interest

Many stakeholders in the construction and property industry consider adaptability of existing building stock a desirable design characteristic. The alignment of the interest of different stakeholder groups will support adaptability¹⁹. Developers will prefer adaptable buildings as they will attract higher prices from investors, who in turn will be able to more easily lease such buildings to tenants and end-users.

The non-alignment of stakeholders' interests can also be linked with green retrofitting of buildings. The misalignment of incentives of developers, investors and tenants known as the

'vicious circle of blame' often prevents investment in green retrofitting of buildings²⁰. The 'vicious circle of blame' concept introduced by David Cadman in 2000, suggested that the lack of commitment to adopt healthier and/or more resource-efficient real estate practices originated in the sequentially blaming of each other by investors, tenants, contractors and developers. Property owners will typically only decide to energy retrofit existing buildings once the demand for such strategy will ensure an acceptable rate of return on investment²¹.

Developers' financial dilemma has always been one of risk and return. Research however has pointed out that energy retrofitting of existing building stock may reduce investors' risk. Tenant demand combined with increasing awareness of climate change will readily attract and retain tenants for sustainable buildings and thus reduce the development risk²².

South African developments

Real Estate Investment Trusts (REIT's) were introduced in 2013 in South Africa. Morgan Stanley Capital International's (MSCI) Environmental Social Governance (ESG) research concluded that the top drivers of green building include a regulatory environment, instability in fossil energy prices and stakeholder awareness. In combination these three concepts creates a 'green wave' in property investment. Andrew König of Redefine, which is the 2nd largest local REIT company, noted in 2014 that green building in South Africa has largely focussed on new construction. Most investors refurbish their existing buildings incrementally toward more sustainable buildings (without Green Star SA certification) as most tenants can't afford to pay the green premium on new buildings²³.

THE APPROACH OF THIS STUDY

This study supports the argument that the rate of the green retrofitting of South African office building stock can be accelerated by increasing the tenant demand for green office space. If more office tenants renting space in non-green buildings express a demand for green office space, developers will respond to this need. The study argument therefore accepts and supports some of the underlying principles of the 'circle of blame' concept referred to above.

For tenants to have a greater demand for green office space, they must be sufficiently informed about the benefits offered by green buildings practises and of the need of their own participation in the process. If renting office space in a green building makes business sense to office tenants, the study assumes that demand from tenants for green office space will increase.

Once the growing demand for green office space becomes known in the market, developers and building owners will in response act to supply the market with more green office space. If this new demand from tenants for green office space is significant, new green buildings will only be able to satisfy a limited portion of this new demand. The remainder of the demand will have to be supplied by the conversion of existing office stock to green buildings.

Organisations such as the GBCSA and the South African Property Owners Association (SAPOA) are capable of informing and educating tenants in this regard. However to effectively communicate with and inform tenants on green building, the current status quo of tenants views must be known. This study describes the opinions of office tenants regarding this subject and will provide green building stakeholders with some perspective on the challenge of this conversion process and how to approach it with more certainty and better focus.

METHODOLOGY

This report builds on the findings of a previous study by Hoffman & Pedregal' on the opinions and beliefs of Gauteng based office tenants on converting existing office buildings into Green Star SA certified buildings. The study interviewed 32 respondents from disciplines of :

Accounting (9,4%),
Law (6,3%),
Engineering (6,3%),
IT (9,4%),
Marketing (6,3%),
Consultancy (12,5%),
Medicine (21,9%)
and others (28,1%).

The respondents of the study can therefore be considered to be a reasonably varied group of firms representing many different industries of the South African economy. The study also indicated that the large majority of office tenants are small or relatively small firms with more than 87% of firms having less than 40 employees and with no firm with more than 80 employees.

A 5 point Likert scale (Strongly Disagree, Disagree, Neutral, Agree and Strongly Agree) was used to describe office tenants' views on green building aspects and about converting existing office buildings into Green Star SA certified buildings.

In aid of basic statistical analysis, the data was awarded numerical values:

Strongly Disagree = 1,
Disagree = 2,
Neutral = 3,
Agree =4 and
Strongly Agree =5.

Average scores were calculated for the different statements and questions of the questionnaire. An average score of less than 1,80 was considered a significantly negative opinion.

An average score of 1,81 – 2,60 was considered as negative, an average score of 2,61 – 3,40 was considered as neutral, an average score of 3,41 – 4,20 was considered positive and an average score of more than 4,20 was considered as significantly positive.

DATA ANALYSIS

The study describes two basic aspects of the opinions of office tenants regarding the conversion of existing office buildings into green buildings that will be very important for creating future demand for green building space:

- 1 Do office tenants know enough about Green building to understand that their contribution and participation in this process by renting space in a Green building will support environmental sustainability?
- 2 If they do, have their conviction resulted in action or business strategy to decide to rent space in a Green building in the near future?

Renting space in a Converted Green Star SA office building

This study first considered if office tenants were informed enough about Green building to understand that their contribution and participation in this process by renting space in a Green building will support environmental sustainability.

A total of 81,3% of the respondents agreed with the statement that renting space in a Green Star SA certified office building will support environmental sustainability. Only 6,3% disagreed with a further 12,5% being neutral 3 (see Figure 1). The average score was 4,06 out of 5,00 which classify the opinion on this issue as significantly positive.

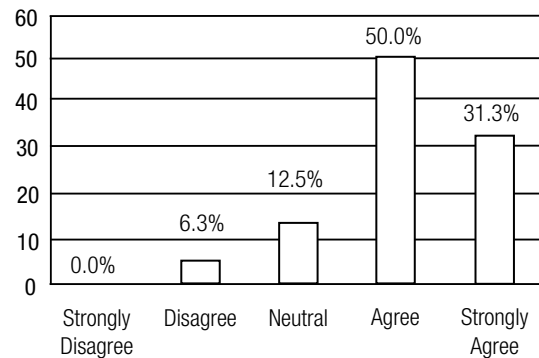


Figure 1: Renting in a converted Green Star building supports environmental sustainability

When asked to respond to the statement:

“As tenants you are considering moving into a converted Green Star SA certified office building once your current lease expires” only 21,9% of the respondents agreed. 37,5% was neutral while 40,7% replied negatively. The average score was 2,81 out of 5,00 which classify the opinion as neutral, but close to the negative edge of the stated range (2,61-3,40). The data is detailed in Figure 2.

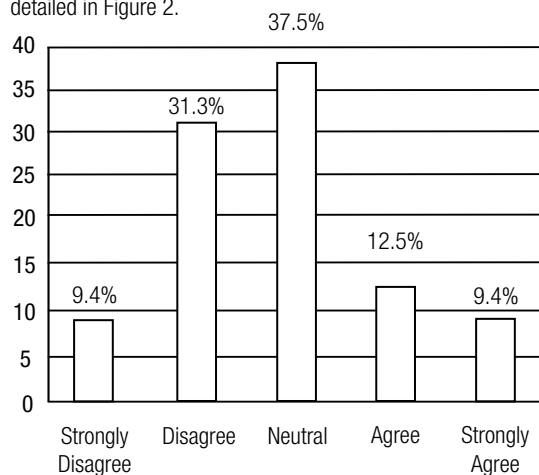


Figure 2: Considering to rent in a converted Green Star building

This finding confirmed that when evaluated on their actions in support of green building the respondents' displayed a 44,5% less positive response (4,06 / 2,81 - 1 = 44,5%) than when tested on their insight into green building (21,9% positive vs. 81,3%). A substantial part of the respondents was still negative or undecided about the decision to rent space in a converted Green Star building in the near future.

Table 1: Renting in a converted Green Star SA office building (Q9 & Q10)

	Mean	Standard Deviation	Variance	Skewness
Intend to rent space in a converted green building	2,81	1,06	1.13	0,33
Green buildings support environmental sustainability	4,06	0,83	0.68	-0,82

The two findings merit further analysis to enable this study to describe the opinions of respondents in more detail.

Renting in a Green Star building support environmental sustainability

According to Figure 1 only 18,8% of respondents was neutral or did not agree that renting in a green building will support environmental sustainability. The professional discipline of each responding firm indicated that medical firms and marketing firms were much more negative regarding this aspect with a total of 50% of firms being neutral or not agreeing.

The age of responding firms however revealed significant additional insight into this aspect. A total of 40% of firms not older than 5 years was neutral or did not agree that renting in a green building will support environmental sustainability. This response is 213% as high as the average group response of 18,8% (40% ÷ 18,8% = 212,8%). A total of 91% of firms older than 5 years agreed with the statement which is 484% higher than the average group response (91% ÷ 18,8% = 484,0%). Figure 3 details the relationship between firm age and opinion that renting in a converted green building will contribute to environmental sustainability.

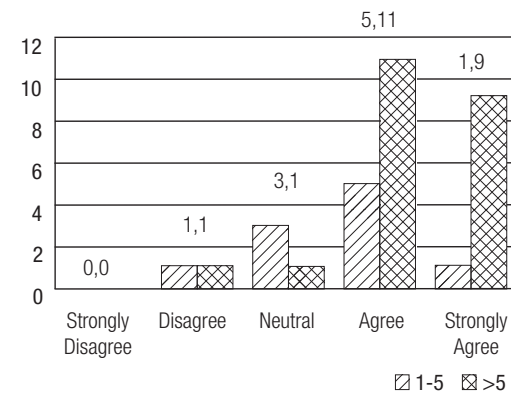


Figure 3: Firm age compared against opinion on renting in a converted Green Star building to support environmental sustainability

In order to further describe the above matter the respondents' considered views on whether renting in a green building will support environmental sustainability were compared against their responses on how important their firms regard having green credentials. Figure 4 presents a detail of the responses from respondents on these two aspects.

The linear relationship between the independent variable Y and the dependent variable X was explored by simple linear regression analysis to calculate the best fit straight-line (see Figure 4 line AB) to describe the data²⁴:

$$Y_i = \beta_0 + \beta_1 X_i + \epsilon_i \quad (4.1)$$

where

β_0 = Y intercept for the population

β_1 = slope for the population

ϵ_i = random error in Y for observation x_i

The correlation between the independent variable Y and the dependent variable X was described with the Pearson product moment correlation²⁵ which suited the ordinal nature of the data²⁶.

The Y intersection of the regression line was calculated at 2,51 with the slope being 0,44. The random error in Y for observation x_i of 0,70 indicated that only 30% of the measure of variability around the regression line could be explained by the regression

line. The Pearson correlation (r) of 0,57 indicated a fair amount of positive correlation between the independent and dependent variables of the data. However the coefficient of determination (r^2) indicated that only 32,5% of the variation of the dependent variable Y can be explained by the independent variable X.

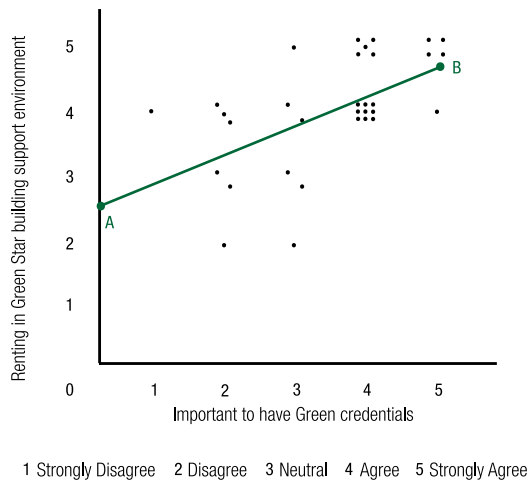


Figure 4: Correlation between renting in a Green Star building to support sustainability and the importance of having green credentials.

A total of 50% of respondents had perfectly correlated responses on the above two aspects. Of the remaining 50% of respondents, 87,5% (14 out of 16) displayed a more positive response to knowledge about green building than to taking a decision on green building (average score of 3,75 vs. 2,50 out of 5,00).

All respondents who agreed on the importance of having green credentials also agree that green renting supports environmental sustainability. A total of 73% of respondents who agreed that green renting supports environmental sustainability, also agreed that green credentials are important. The 19% of respondents who agreed that green renting supports environmental sustainability but did not agree that green credentials are important are all small firms with less than 20 employees.

To conclude this part of the study a similar correlation approach was applied to evaluate the respondents' views on renting in a green building to support environmental sustainability against their responses to have green initiatives as part of your firms' operational strategies (see Figure 5).

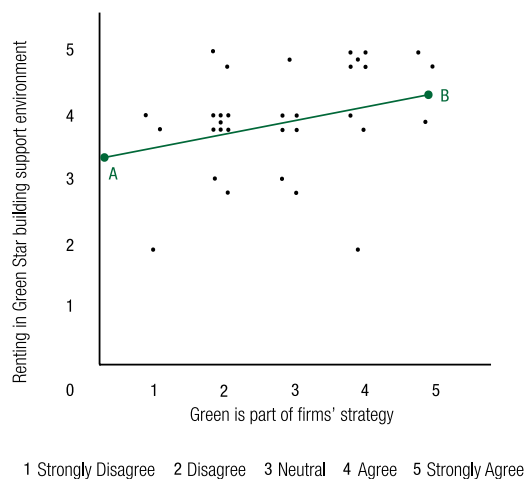


Figure 5: Correlation between renting in a Green Star building to support sustainability and having green initiatives as part of company strategy

Figure 5 reveals a much weaker relationship between the two sets of data compared to the relationship detailed in Figure 4. It must however be remembered that Figure 5 evaluates the relationship between an opinion on green building concepts versus an action in support of green building.

The Y intersection of the regression line was calculated at 3,30 with a slope of 0,26. The random error in Y for observation x_i of 0,79 indicated that only 21% of the measure of variability around the regression line could be explained by the regression line. The Pearson correlation (r) of 0,37 indicated a weak positive correlation between the independent and dependent variables of the data. The coefficient of determination (r^2) therefore confirmed that only 13,7% of the variation of the dependent variable Y can be explained by the independent variable X.

Only 18,8% of respondents revealed a perfectly corresponding relationship in their responses to both statements. Of the remaining 81,2% of respondents, 92,3% (24 out of 26) displayed a more positive response on knowledge about green building compared to take a decision on green building (average score of 4,17 vs. 2,50 out of 5,00). Only 38,5% of respondents who agreed that renting in a green building support environmental sustainability have already incorporated green initiatives in their firms' strategies. A total of 50% of all respondents agree with the concept that renting in a green building support environmental sustainability but they do not yet include green initiatives as part of their firms' strategies. Only 6,3% of firms were more positive on having green strategies than they were about the concept of supporting sustainability through renting in a green building.

Tenants considering to move into a converted Green Star SA certified office building

According to Figure 2 as many as 40,7% of respondents disagreed that they are considering to move into a converted green building. Only 21,9% of the respondents replied with a positive answer while 37,5% was neutral. No accounting, engineering, law or marketing firm replied positively to the statement. Firms with no more than 20 employees had an average score of 2,75 while firms with more than 20 employees had an average score of 3,25, which lend some support to the previous indication that smaller firms are less positive about supporting green buildings. Firm age did not add any significant further insight to the analysis.

Respondents decision on renting in green buildings in the near future were then compared against their responses on how important their firms regard having green credentials (see Figure 6). Similar to the data from Figure 5, this analysis also evaluates the correlation between an opinion on green building concepts versus an action in support of green building. Figure 6 revealed a relatively weak positive correlation between the independent and dependent variables. It must again be remembered that Figure 6 describes the relationship between a decision on green building versus an action in support of green building.

The Y intersection of the regression line was calculated at 1,16 with a slope of 0,47. The random error in Y for observation x_i of 0,98 indicated that only 2% of the measure of variability around the regression line could be explained by the regression line. The Pearson correlation (r) of 0,47 indicated a weak positive correlation between the independent and dependent variables of the data. The coefficient of determination (r^2) therefore confirmed that only 22,1% of the variation of the dependent variable Y can be explained by the independent variable X.

A total of 34% of respondents showed an exact correlation in their opinions regarding the two mentioned aspects. Of the remaining 68% of respondents, 81,0% (17 out of 21) were more

positive about green credentials than renting in a green building (average score of 3,94 vs. 2,41 out of 5,00). Only 31,6% of respondents who agreed that green credentials is important are considering to rent in a converted green building in future. A total of 59,4% of all respondents agree with the importance of green credentials for their firms but they do not yet consider renting in a green office building.

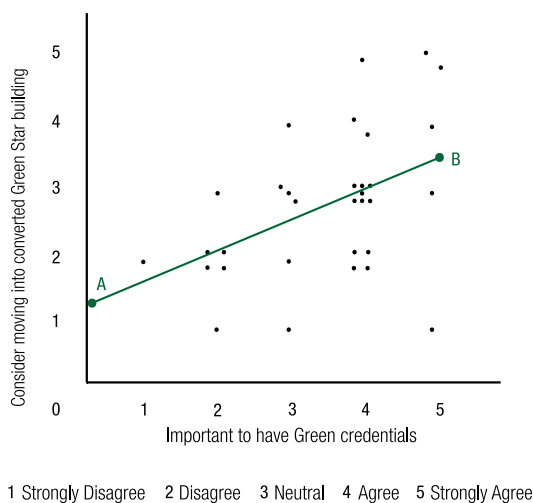


Figure 6: Relationship between moving into a Green Star building and having green credentials

The data also provided some support of the previous findings on the more negative opinions held by smaller firms. Of the respondents who were negative about having green credentials 86% were also negative about renting in green buildings. All of them were small firms with less than 20 employees.

A total of 68,4% of respondents who were positive on having green credentials are still not positively considering to rent space in a green building soon. This finding strongly agreed with previous findings and supports the argument that even though managers of firms are supporting green building concepts, they may need more information before converting their opinions into action.

In conclusion the above relationship approach was applied to evaluate the respondents' views on renting in a converted green building in the near future against their responses to including green initiatives in firms' operational strategies'. Figure 7 presents a detail of the responses on these two statements.

Figure 7 revealed a relatively weak positive correlation between the independent and dependent variables. The Y intersection of the regression line was calculated at 1,15 with a slope of 0,57. The random error in Y for observation x_1 of 0,87 indicated that only 13% of the measure of variability around the regression line could be explained by the regression line. The Pearson correlation (r) of 0,62 indicated some positive correlation between the independent and dependent variables of the data. The coefficient of determination (r^2) therefore confirmed that only 38,4% of the variation of the dependent variable Y can be explained by the independent variable X.

A total of 47% of respondents showed an exact correlation in their responses while 44% more had responses that were closely correlated. Only 9% of respondents had non-aligned opinions on these to statements. The above findings support the proposition made earlier that to compare respondents' opinions on two green building concepts will most likely reveal high degree of correlation. The same logic therefore predicts that to compare two different actions of respondents in support of green buildings is likely to reveal significant correlation, even

though the scores for the opinions on actions in support of green buildings may be lower (more negative) than the scores on opinions about green building.

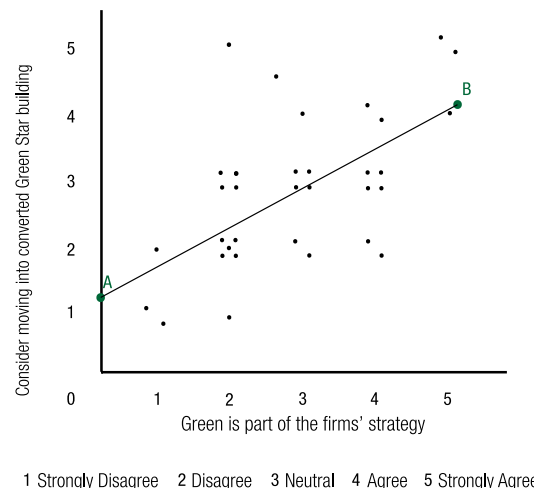


Figure 7: Relationship between moving into a Green Star building and having green initiatives part of company strategy

FINDINGS

This study re-visited the data from the study by Hoffman & Pedregal¹. and further explored the data to search for possible relationships or linkages between the results of specific questions. The study also highlighted important findings related to strategic decision making aspects of the respondents participating in the study.

A total of 81,3% of respondents agreed that renting space in a green building will support environmental sustainability achieving a significantly positive score of 4,06 out of 5,00 (Figure 1). However only 21,9% of respondents' firms were considering to rent space in a green building (Figure 2). The consequential demand for green office space can be expected to be relatively weak. This finding is of specific importance to the GBCSA and their recent initiatives to expand green building to the stock of existing non-green buildings in South Africa¹⁰. Any potentially significant challenges to the advancement of green building needs to be noted, described and addressed.

The above finding identified such an important problem area that probably are hampering and obstructing the advancement of green building in South Africa. To be able to address the problem area it is important to explain and describe the nature of the problem and the probable causes of it in as much detail as possible. For this reason the results of the above findings were analysed in more detail.

The study found that firms not older than 5 years were 213% more inclined to disagree that renting in a green building supports environmental sustainability than older firms (Figure 8). A possible explanation for this finding may be that younger firms are still trying to establish themselves in the market and they may therefore often be under significant financial pressure. Young firms may also be hampered by capacity constraints and may therefore not have the 'luxury' to also focus on secondary issues such as environmental sustainability nor be able to afford the additional expenses of renting in a more expensive green building even though the payback period may only be say 5-8 years.

The study also found that 84% of respondents' views on renting in green buildings to support sustainability agree to a significantly extent with their views on the importance of green credentials for their firms. This finding is in agreement with

the findings of international studies^{13, 16} that the retrofitting of existing non-green buildings is considered to be an important part of the green building initiative.

The study however also indicated that 26,9% of respondents who agreed that renting in green buildings will support environmental sustainability, did not agree that green credentials are important to their firms (Figure 4). These firms that did not support green credentials are all small firms with not more than 20 employees. The finding that a substantial portion of tenants is informed about green building, but is still not embracing green building principals is very important to property industry stakeholders concerned about stimulate support for green building amongst tenants.

The high degree of agreement of views confirmed by the above analysis may be explained by the fact that the two aspects considered refer only to what respondents think about green building and not what they are actually doing about it. In general for managers of firms to have opinions on something does not in itself cost firms money, does not require capacity and does not have consequences. However to actually act on such opinions such as accepting a strategy or making a renting decision will have consequences.

People in general and more specifically managers and decision makers of firms need information or education to recognize and accept a new concept or change their opinion on something. However for managers to take action on new opinions will probably require a higher order of understanding and conviction, because action will have consequences and therefore contain risks. This argument therefore expects that when evaluating an opinion on green building against an action on green building, the correlation may well be much lower.

The findings detailed in Figure 5 confirmed the above argument as only 38,5% of respondents who agree that renting in green buildings support sustainability have already incorporated green initiatives in their firms' strategies. Figure 5 also confirmed that 50% of respondents who agreed that renting in green buildings will support environmental sustainability, did not have green initiatives as part of their firms' strategies. This finding supported the previous finding that managers of firms renting space in office buildings are sufficiently informed on green building concepts to have definite and mainly supportive opinions thereon. However conclusive action by a substantial majority of firms in support of green building is still lacking. This finding also supports the finding of the New Zealand study¹⁷ and the earlier proposal of Cadman²¹ that weak demand for green office space is a significant green building challenge.

Analysis of the data in Figure 2 on firms that are considering to rent space in converted green buildings, revealed that firms with no more than 20 employees scored on average 2,75 out of 5,00 while firms with more than 20 employees scored 3,25. Table 4 indicates that 18,8% of firms are negative about both aspects and all of them are small firms. These findings support previous findings that smaller firms have generally more negative views on green building.

Figure 7 indicates that of all firms not considering to rent in converted green buildings soon, 69,2% were also negative about including green principles in their firms' strategies. A total of 78% of these firms were small firms. As a regulatory environment to support green building does not yet exist in South Africa, very little financial incentives exist to assist young firms with new green building strategies. MSCI research²³ also regards a supporting regulatory environment as essential for green building progress.

CONCLUSION

A significantly more positive opinion was expressed by office tenants regarding renting space in a green building in support environmental sustainability compared to their view on actually deciding to rent space in a converted green building in future. Their knowledge about green building has not yet resulted into a significant increase in demand for converted green office space.

The study identified that a substantial portion of office tenants has been educated and convinced about the benefits of green building but they have not yet become active supporters of sustainability by applying green building principles in the running of their firms. Smaller and younger office tenant firms indicated a much higher likelihood to display such behaviour.

This finding indicates that office tenants may need more information to convince them of the benefits of green building. The finding may also suggest that tenants need more time to get used to the relatively new concept of green building before deciding to use the benefits offered by green building as part of their future business strategy.

Industry stakeholders such as the GBCSA, SAPOA, professional associations and councils as well as academic institutions may benefit from taking note of the above findings. The rate of converting the current stock of South African office buildings to Green Star SA rated buildings must be accelerated. This study provided evidence that more specifically focussed information and education of office tenants may be a very efficient way to address this challenge.

RECOMMENDATIONS

The following recommendations are suggested for future research to further explore the findings made by this study:

- A larger, more representative study should be done to provide industry stakeholders with more authoritative findings;
- The findings that smaller and younger firms are more negative about supporting green buildings should be studied in more detail;
- Further research should be done to establish what information is required by managers of firms to persuade them to put their positive opinions on green building into physical actions and strategies;
- Research should be done to describe the effect of the new GBCSA Existing Building Performance Tool on the rate of conversion of existing buildings into Green Star SA certified buildings; and
- Research should be done on optimal ways for professional associations, academic institutions and the GBCSA to inform and educate stakeholders on sustainability and the business case for green building.

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