

DECISION-MAKING IN PROPERTY INVESTMENT BY PROPERTY FUND MANAGERS

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Abstract

The assets under management of property fund managers have been increasing over the last decade. The low interest rate environment and stability of property values relative to other asset class values has made property an attractive to wholesale investors. A large number of these investors are superannuation funds, who invest in property indirectly through property fund managers. As the characteristics of property, such as large value, heterogeneity, illiquid and large transaction costs, are so different to other asset classes, decision making by property fund managers is not expected to be the same as decision making on other asset classes. This paper surveys fourteen property fund managers on the factors that influence their decision making. The analytical hierarchical process (AHP) is used to allow pair-wise comparisons of the relative factors to be undertaken. This allows the factors to be ranked in order of importance. The factor strategic decision making is found to be considerably more important than the other factors in the survey. This is very different to the findings of earlier surveys in the United States, the Netherlands and Australia, which found geographical location and property type to be the preferred factors.

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1. Introduction

Property is a valuable asset class in the portfolio of a superannuation scheme (Newell 2007). The unique characteristics of property, such as its heterogeneous nature, large size, indivisibility, high transaction costs and low level of liquidity, mean that it is not highly correlated with other asset classes and provides favourable returns over the long run. The unique characteristics also mean the decision-making process used when deciding on investments in this asset class will differ from other asset classes. The long term nature of property investments makes them very suitable for superannuation schemes, as the schemes receive regular contributions from members but only make payments to them when they reach retirement age. The time lag between the contributions and retirement payments allows the schemes to focus on investing the contributions in long term investments. In Australia the Superannuation Guarantee Charge has made it compulsory for workers to contribute to superannuation schemes since 1992. Consequently, the level of funds held by Australian superannuation schemes has been continually increasing. In March 2017 the total amount of assets held by these schemes was \$2,259.4 million, which was an increase of 11.2% since 2016. The percentage of these funds invested by schemes with more than 4 members in direct and indirect property was 7% and 2%, respectively (Australian Prudential Regulation Authority 2017, pp. 6 and 17)³. This asset allocation to property by the superannuation schemes has been fairly consistent since the early 1990s.

In Australia there are very few superannuation schemes that have a sufficient level of funds and expertise to invest in direct property by themselves. As a result the majority of the schemes need to invest through a property fund manager. Unlisted property funds are able to provide the schemes with access to attractive investments in property through experienced property fund managers (Parker 2016, p. 382)⁴. The heavy reliance on property fund managers by Australian superannuation schemes and the decision-making process used by property investors provided the motivation for this paper. The purpose of this paper is to identify the major factors that influence the investment decisions made by Australian property fund managers. This is an area that very little research has been undertaken on in Australia.

Due to the personal judgement and independent nature of the factors used in this decision-making process, property fund managers are surveyed on their decision making using the multi-criteria decision making process known as Analytic Hierarchy Process (AHP) (Saaty and Vargas, 2012, p. 1)⁵. Factors used in the decision-making process are organised by AHP into a hierarchical structure. Several levels make up the hierarchy with the factors on each level being independent and homogenous. The factors on lower levels are

³ Australian Prudential Regulation Authority. 2017 Quarterly Superannuation Performance, March.

⁴ Parker, D. 2016 Property Investment Decision Making by Australian Unlisted Property Funds: An Exploratory Study, *Property Management*, Vol 34, Issue 5, pp. 381-395.

⁵ Saaty, T.L., and Vargas, L.G. (1991) *Prediction, Projection and Forecasting*, Kluwer Academic Publishers: Massachusetts.

decompositions of the factors that lie on the level above them. A calculation is made of the relative importance, or weight, of each factor in terms of the factors on the same level. This is superior to simply calculating a quantity value for each factor, as measures of relative importance allow direct comparisons to be made between the factors. A literature review will now be undertaken on previous studies that have examined decision-making in property investments. A description will then be made of how the AHP research method is used to rank the relative importance of the factors that influence the decision-making. The conclusion will then summarise the research findings.

2. Literature Review

In its annual survey on Australian property funds, Property Investment Research reports that assets under management held by property funds has been steadily increasing over the last decade. They attribute this increase since 2014 to a low interest rate environment and stability of property values relative to other asset classes, such as equity and debt (Property Investment Research 2016, p. 6). Research on decision making by these wholesale investors when investing in property is limited. The majority of research has been undertaken on institutional investors, such as superannuation funds and insurance companies, who often invest in property through property funds. A survey by Wiley (1976) in the 1972 on decision making in property investments by institutional investors in Canada and the United states, was the first major attempt to explore this area of research.

Wiley's (1976) survey asked institutional investors about certain decisions they made when investing in property. The topics covered were property type, evaluation of returns and risk, use of computer programs and planned holding periods. The next surveys on property investment by institutional investors did not take place until a decade later. Surveys by Farragher (1982), Page (1983), Webb (1984) and Webb and McIntosh (1986) asked institutional investors in the United States similar questions to Wiley (1976) as well as questions on how they invested in real estate, portfolio composition and international investments. In the 1990s real estate became recognised by institutional investors as a viable alternative asset class due to its properties of being an inflation hedge and low correlation with other asset classes (Ibbotson and Siegal (1984) and Hartzell, Hechman and Miles (1987)). Institutional investors in the United States were surveyed by Lougard (1992) and Worzala and Bajtelsmit (1997) during the 1990s on some of the topics in the earlier surveys. They also asked questions on the use of modern portfolio theory. In addition Lougard (1992, p. 363) asked the survey respondents about the performance goals for their managers. De Wit (1996) undertook a similar survey to Webb (1984) and Lougard (1992) on insurance companies and pension funds in the Netherlands. Farragher and Kleiman (1996) surveyed institutional investors in the United States and included questions on the entire decision making process with respect to qualitative and quantitative risk assessment. The survey was repeated by Farragher and Savage (2008) a decade later and found very little difference to most of the responses made to the earlier survey. The only major difference was that in the Farragher and Kleiman's (1996) survey 70% of the

respondents used qualitative risk assessment while in Farragher and Savage (2008) survey it had decreased to 70%.

Surveys on property investment by institutional investors in Australia have been undertaken by Newell, Stevenson and Rowland (1993), Boyd, MacGillivray and Schwartz (1995), Rowland and Kish (2000), Newell (2008) and Reddy (2012). Newell et al.'s (1993) survey asked a wide range of questions on property type, geographical location, priority of property investment criteria, investment return evaluation measures, length of holding period and computer usage. Boyd et al.'s (1995) survey asked similar questions to the overseas surveys. Rowland and Kish's (2000) survey included questions on their portfolio's allocation to direct and indirect property. The survey by Newell (2008) asked respondents about their portfolio allocation, benchmark use, required return expectations and use of asset consultants. The most recent survey by Reddy (2012) survey asked several questions on portfolio allocation to property, and similar questions to the previous surveys on measures on investment returns and risk assessment.

While all the surveys, apart from De Wit (1996)⁶, were mail surveys, there were differences in the time period of the survey, category and country of institutional investor surveyed, and questions asked. Consequently, no direct comparison can be made of their survey responses. However, the responses to surveys supported property type and geographical location as the main factors influencing property investment. In terms of property type, retail and office were preferred over industry and residential property.

A survey approach is also adopted by this paper to identify the major factors that influence decision making by property fund managers when they invest in property. Instead of asking respondents to choose between groups of factors, this paper will ask respondents how much they prefer alternative factors.

3. Research Method

To identify factors that have a major influence on decision making by property fund managers a survey questionnaire was prepared in the manner required by the analytical hierarchy process (AHP). Saaty (1994, 2008) developed AHP based on the concept that survey respondents should use pair-wise comparisons to rank the importance of one factor over another factor. This multi-factor decision-making methodology requires each factor to be independently compared to other factors. Typically multi-criteria decision-making methodologies, such as the Weighted Sum Model, require that all factors are considered at the same time. This is inferior to AHP, because when survey respondents need to show their preference across more than two factors they tend to favour one factor disproportionately over the other factors (Doloi, 2010 p. 844). In order to overcome this bias, most multi-criteria decision-making methodologies require a very large sample size to ensure the results will be statistically robust and reliable. This large sample size requirement does not apply to AHP (Saaty, 1980). If independence exists between all the factors included in the

⁶ De Wit (1996) undertook a face-to-face interview.

survey the results should be reliable. Independent factors are required to be in the survey, so that the survey responses would be able to truly reflect the importance of the factors to the respondents.

Previous surveys on decision making by managed funds were the initial source that the factors to be included in the survey were obtained from. However, advice from two academics, with extensive research background on property, was then used to decide on the final factors to be included in the survey. The academics advice on the selection of factors allowed independence between the factors to be maintained.

“Decomposition, comparative judgements, and hierarchical composition or synthesis of priorities” are the three basic principles behind AHP (Foreman and Selly 2001, p. 51). According to these principles the decision-making problem can be broken down into four steps (Zahedi 1986, p. 96).

1. A decision hierarchy is established with the decision making factors on each level of the hierarchy being identified.
2. Pair-wise comparisons of the factors are then used to collect the input data. A judgemental matrix is then created from these comparisons.
3. The relative weights of the decision-making factors are then generated from the matrices using the “eigenvalue” method.
4. Aggregating the relative weights of the decision-making factors will allow their ratings to be determined.

The decision hierarchy in the first step is in the form of a Value Tree hierarchy. The decision-making factors are organised in the following order. At the top of the tree is the decision goal. The general factors used to make decisions are placed on the upper level of the tree. Each factor can be broken down into sub-factors. These sub-factors are placed on the lower level of the tree. This hierarchy only exists if there is independence between all the factors and sub-factors. AHP can be used to find the best alternative factor or the relative importance of the all the alternative factors⁷. This paper examines the latter.

The judgemental matrix for the pair-wise comparisons required by the second step assumes n factors are being compared, $F_1...F_n$. The relative weight, w_{ij} , in the pair-wise comparison will reflect the priority (or significance) of one factor, F_i , with respect to another factor, F_j . The pair-wise comparisons will form a square matrix of the factors where the rows show the ratios of the weights of each factor with respect to the other factor. These weights will now be known as weights of importance and typically they are normalised to add up to one. The constraints on the square matrix $A = (w_{ij})$ of order n will be $w_{ij} = 1/w_{ji}$, for $i \neq j$, and $w_{ii} = 1$, for i (Saaty and Vargas 2012, p. 26). Equation (1) shows how the matrix is written up.

⁷ The AHP can be used to determine the best alternative or the relative importance of the alternatives (Saaty 2008, p. 84)

$$A = \begin{pmatrix} \frac{w_1}{w_1} & \dots & \frac{w_1}{w_n} \\ \frac{w_1}{w_1} & & \frac{w_1}{w_n} \\ \vdots & \ddots & \vdots \\ \frac{w_n}{w_1} & \dots & \frac{w_n}{w_n} \\ \frac{w_1}{w_1} & & \frac{w_1}{w_n} \end{pmatrix} \quad (1)$$

The eigenvalue method in step three is applied to step two's judgemental matrix to estimate the weightings for each of the factors and sub-factors in the Value Tree. This can be done using EXCEL spreadsheets but is very time consuming. ExpertChoiceTM significantly reduces the time involved in doing the estimations and so was used in this paper. It is assumed that the weights reflect the priorities of the respondents. So the vector of priorities is derived from judgemental matrix using the eigenvalue formulation $Aw = nw$, with w being the vector of priorities of order n ⁸. This is shown in equation (2).

$$\begin{pmatrix} \frac{w_1}{w_1} & \dots & \frac{w_1}{w_n} \\ \frac{w_1}{w_1} & & \frac{w_1}{w_n} \\ \vdots & \ddots & \vdots \\ \frac{w_n}{w_1} & \dots & \frac{w_n}{w_n} \\ \frac{w_1}{w_1} & & \frac{w_1}{w_n} \end{pmatrix} \begin{pmatrix} w_1 \\ \vdots \\ w_n \end{pmatrix} = n \times \begin{pmatrix} w_1 \\ \vdots \\ w_n \end{pmatrix} \quad (2)$$

Assuming w_{ij} represents the importance of factor i over factor j , and w_{jk} represents the importance of factor j over factor k , the weights will be transitive if the importance of factor i over factor k equals $w_{ij}w_{jk}$ or $w_{ij}w_{jk} = w_{ik}$ for all i, j , and k . The relative importance of a pair of factors will be given the judgement that one factor is absolutely more important than the other factor, strongly more important, moderately more important, and so on. A number scale can be used to indicate the relative importance of each judgement. This paper uses a scale of 1 to 5. However, for matrices reflecting human judgements the condition $w_{ij}w_{jk} = w_{ik}$ may be violated. Human judgements may not always be exact as it has been found that while a person may prefer F_1 to F_2 and F_2 to F_3 , they may also prefer F_3 to F_1 . As a result only estimates of w_i/w_j will be obtained.

To confirm whether $w_{ij}w_{jk} = w_{ik}$ is consistent and not violated a w vector of order n is derived so that $Aw = \lambda_{\max}w$ and $\lambda_{\max} \geq n$. Here w is an eigenvector of order n and λ is an eigenvalue. When $\lambda_{\max} = n$ a consistent matrix will exist. A level of inconsistency between the judgements exists when there is a difference between λ and n . Saaty (1987) argues that a low level of inconsistency is acceptable as it is highly unlikely that there will be consistency with human judgements. A Consistency Ratio (CR) can be estimated to validate if the weights are acceptable estimates. The CR is calculated using a Consistency Index (CI) and average consistency random index (RI). Equation (3) shows how the CI is the variance of error arising from the estimation of w_{ij} (Saaty and Vargas 2012, p.8).

$$CI = (\lambda_{\max} - n)/(n-1) \quad (3)$$

RI is calculated from a large number of randomly generated reciprocal matrices of the same order n as the CI are used to calculate the RI. Dividing CI by RI will produce the CR as shown in equation (4).

⁸ The priority vector is an eigenvector of the relative importance of all the criteria.

$$CR = CI/RI \quad (4)$$

Saaty (1987, p. 171) used 500 randomly generated reciprocal matrices using the scale of 1/9, 1/8, ..., 1, ..., 8, 9 to calculate RIs for an order size of 2 to 14⁹. *Table 1* lists these RIs:

Table 1 – Average random consistency index (RI)

<i>n</i>	2	3	4	5	6	7	8	9	10	11	12	13	14
RI	0.00	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49	1.51	1.48	1.56	1.57

When $CR = 0$ the weights are consistent. Saaty proposed that a CR of 10% or less would support the weights as being non-random and fairly consistent (Saaty 1987, p. 172). A CR threshold of 10% would be acceptable for AHP research intending to establish a specific outcome for decision makers. The data being generated would be definitive. However, in this paper the generated data is descriptive as AHP is being used to examine the importance of factors and sub-factors. It is not looking to determine the best factor or sub-factor. With descriptive data, inconsistencies can be expected. Consequently, a CR higher than 10% could still be acceptable if the reasons for supporting consistency are logical.

The final step is to aggregate the relative importance of each pair-wise comparison so the survey responses can be analysed. This aggregation reduces the bias occurring when only one respondent's judgements are considered. Arithmetic averaging is used to do this aggregation¹⁰. The respondents weights for each factor and sub-factor are averaged and then used to rank how important the factors and sub-factors are in decision-making. The higher the average weight, the more important the factor or sub-factor will be in the decision-making process, so the higher the ranking it is given. The ranking of the factors could easily be done by simply comparing the average weights. As the AHP weight for the sub-factors were for their factor rather than the decision goal, the sub-factor weights needed to be multiplied by the average weight of their factor. This allowed the sub-factor weights to sum up to 100% and so be global weights. EXCEL spreadsheets were used to do this aggregation of results.

4. The Analytic Hierarchy Process (AHP) Value Tree

It is essential that the survey respondents are not overpowered with too many factors and sub-factors to choose between (Millet and Harker 1990, pp. 88-89). The greater the number of factors and sub-factors on the Value Tree, the more likely the respondents are going to be inconsistent and less judgemental in their responses to the survey questions. Thirty minutes is a comfortable period of time to complete a survey as it should not prove too tiring for respondents. In addition thirty minutes would be more manageable by the respondents being surveyed. This is because they are property fund managers responsible

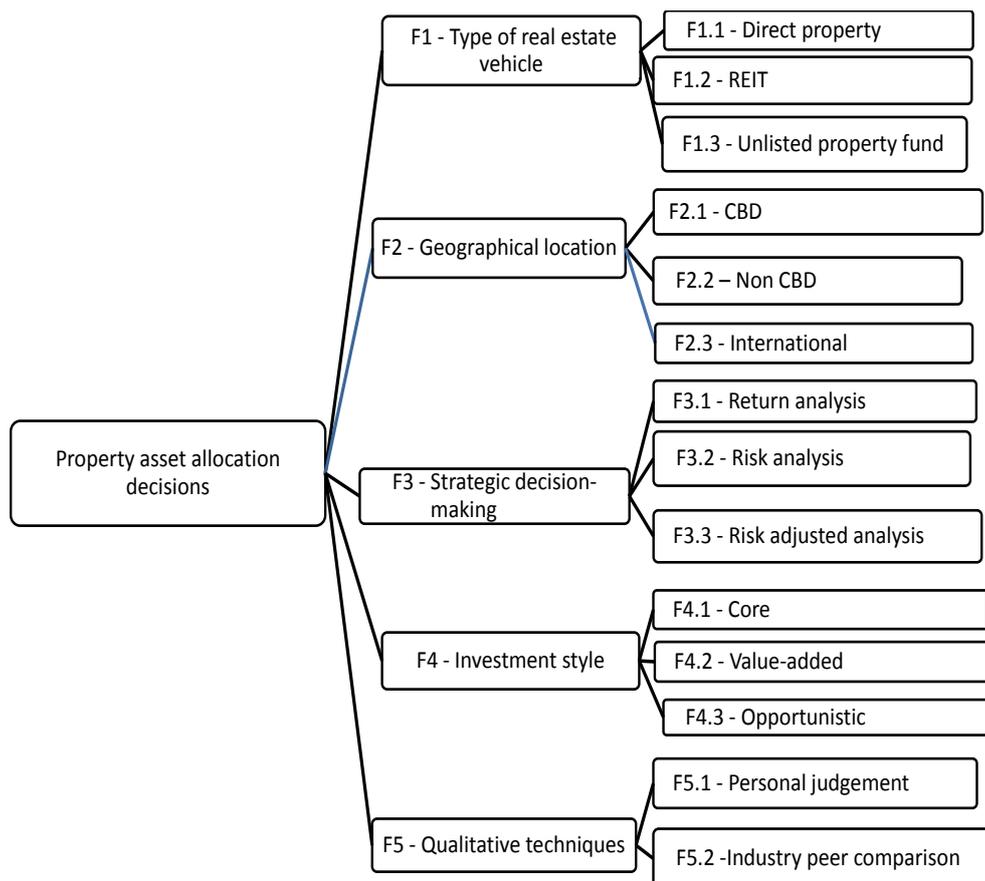
⁹ There has been criticism of the reliability of RI when the order is greater than 14 and the same methodology used by Saaty is adopted. This criticism does not affect this paper as the order size in the paper is less than 14.

¹⁰ The aggregates were very similar under both arithmetic averaging and geometric averaging as the number of respondents was not small.

for managing large property portfolios so they do not have a lot of time to complete the survey. The number of factors and sub-factors covered by the survey was restricted to a number that would allow the survey to be completed within thirty minutes. In addition psychological experiments have shown that it is difficult for individuals to compare more than seven items (plus or minus two) at the same time (Millar 1956). So it was decided to limit the number of factors to five and to have no more than four sub-factors for each factor. This would also allow the respondents to complete the survey easily within a thirty minute time frame.

Figure 1 shows the Value Tree with the final selection of factors and sub-factors. At the top of the tree is the decision goal, decisions on property asset allocations. Five factors are on the level below. The factors are type of real estate vehicle, geographical location, strategic decision-making, investment style, and qualitative techniques. Originally property type was going to be included as factor. However, as nearly half of the survey respondents only invest in one property type, industrial, office or retail, it was removed. On the bottom level there are thirteen sub-factors in total spread across the factors.

Figure 1 - Value Tree of criteria that affect decisions on property asset allocation.



The respondents did not provide any negative feedback on the relevancy of the factors and sub-factors during the interviews. This implies that the selected factors and sub-factors are used when making decisions on property investments.

5. Survey Design

Pairwise comparisons of the factors and sub-factors on the AHP hierarchy value tree in *Figure 1* are the basis of the questions in the survey. The questions ask the survey respondents to compare a pair of factors or sub-factors and to indicate the relative importance of each alternative factor or sub-factor. The respondents should not find this too difficult as it is easier to make relative judgements instead of absolute judgements. A nine-point number scale is used to determine the relative importance of each alternative in the pair. Number five is the upper limit on the scale and one is the lower limit. A ranking of number of five is given to one of the alternatives if it is regarded as having absolute importance over the other alternative. If alternatives are regarded to be equally important the ranking of one will be given. The nine point number scale should be easy for the respondents to comprehend according to Millar’s (1956) observation that psychologically people are able to compare up to nine items. In order for the survey respondents to understand the different level of feelings that each number of the scale represents, definitions and explanations of the level of feeling represented by each number were provided before the survey began. This will decrease the risk that the respondents could differ in how they interpret the feelings represented by the numbers (Saaty 1977, pp. 245-246). Descriptions of the feelings represented by each number in the scale from 1 to 5 are provided below in Table 2.

Table 2 - The scale of the relative degree of importance

Degree of importance	Relative judgemental preference of one alternative over another
1	Equal importance – The alternatives are regarded as being equally important.
2	Slight importance of one over the other - Judgement that one alternative is slightly favoured over the other alternative.
3	Moderate importance of one over the other - Judgement that one alternative is moderately favoured over the other alternative.
4	Strong importance of one over the other - Judgement that one alternative is favoured strongly over the other alternative.
5	Absolute importance of one over the other – Judgement favouring one alternative at the highest possible order of affirmation

It is essential that the survey respondents indicate the relative importance of all possible pairings. An in-built redundancy exists when respondents indicate the alternative they prefer from a pairwise comparison. This allows AHP to confirm that the respondents are making reliable and consistent responses (Forman and Selly 2001, p.45). Each of the five factors on the upper level of the tree is paired with the other factors creating ten pairs. The

fourteen sub-factors on the bottom level of the tree are sorted into pairs for the factor they represent. This creates thirteen pairs. The survey questionnaire includes pairwise comparison questions on all the factor pairs and sub-factor pairs. Consequently, there are twenty six questions in the survey, ten for the factor pairs and thirteen for the sub-factor pairs. *Table 3* provides a summary of the pairs in the survey.

Table 3 - Pair-wise comparisons from the Value Tree.

FACTORS (10 pairs)	SUB-FACTORS (13 pairs)
F1 - Type of real estate vehicle	F1.1 - Direct property F1.2 - REITs F1.3 - Unlisted property fund (3 pairs)
F2 – Geographical location	F2.1 – CBD F2.2 – Non CBD F2.3 – International (3 pairs)
F3 – Strategic decision making	F3.1 – Return analysis F3.2 Risk analysis F3.3 – Risk adjusted analysis (3 pairs)
F4 – Investment style	F4.1 Core F4.2 Value-added F4.3 Opportunistic (3 pairs)
F5 – Qualitative techniques	F5.1 – Personal judgement F5.2 – Industry peer comparison (1 pair)

6. Survey Participants

Between March and April 2016 fourteen property fund managers located in Sydney were asked to complete the questionnaire survey by way of a face-to-face interview. AHP research is best undertaken using face-to-face interviews, as deciding on the relative importance of a pair of factors requires some thought. A verbal explanation of how this is done at the start of the interview and during the interview ensures the respondents are able to provide the most correct response. All the respondents manage property portfolios valued at over several millions of dollars and did not have the time required to read through and understand material explaining how to do AHP pair-wise comparisons. Consequently, the response rate for postal mail surveys would have been very low. The use of face-to-face interviews was able to generate a very high response rate. The respondents were told that the research was being undertaken under the Australia’s Code of Practice and the Australian Code for the Responsible Conduct of Research. Therefore, before the survey interview the respondents were provided with a Participant Information Sheet explaining the survey process. They also were also required to sign a Participant Consent Form. The name of the respondent was not recorded on their completed survey to ensure the privacy of their responses could not be breached.

The survey respondents were selected using the criterion that they were a fund manager of an Australian property fund; the fund they managed mainly invested in direct property; their property investments were in Australia; and they were located in Sydney. The decision to only survey funds investing mainly in direct property and not Australian Real Estate Investment Trust (A-REITs) was due to correlation being found to exist between share market returns and returns on REITs (Goetzmann and Ibbotson 1990 and Hoesli and Oikarinen 2012). This could be expected as A-REITs are listed on the Australian Securities Exchange (ASX), so general share price movements could influence movements in REITs returns. Property security funds that only invest in other property funds were also not surveyed as they do not make the final decision on what property to invest in. The restriction to survey only Sydney based property fund managers was due to the researchers residing in Sydney and the travel costs and time making it not feasible to travel to non-Sydney locations. The 2015 edition of the Australian Property Funds Industry Survey¹¹ published by Property Investment Research (PIR) was used to identify the respondents that meet the criterion. This publication provides the most current comprehensive database on Australian property funds. Seventy six property fund managers were profiled in the 2015 edition. In total they managed three hundred and nine property funds. Of the seventy six property fund managers twenty six were not located in Sydney; six of the Sydney based property fund managers only invested in Real Estate Investment Trusts (REITs), and one did not invest in Australia. After removing these thirty three, this left forty three property fund managers that meet the criterion. Interviews were able to be organised with respondents from fourteen of the property fund managers. Eight of these managed a diversified property portfolio; three managed an office property portfolio; two a retail property portfolio and one an industrial property portfolio. While the interviewed property fund managers made up only 33% of the final group of forty three property fund managers that met the criterion, the majority managed some of the largest property portfolios in Australia. The total asset under management (AUM) for the property fund of the respondent and the total AUM managed by the respondent are provided in Table 5.1.

Table 4 Assets Under Management (AUM) for Property Funds¹²

	Total AUM of Property Group	Total AUM for Respondent	%
Respondent 1	\$3,617mIn	\$3,239mIn	90
Respondent 2	Not available	Not available	100
Respondent 3	\$19,384mIn	\$5,800mIn	30
Respondent 4	\$33,000mIn	\$33,000mIn	100
Respondent 5	\$8,122mIn	\$3,003mIn	37
Respondent 6	\$15,908mIn	\$11,260mIn	71
Respondent 7	\$22,000mIn	\$22,000mIn	100
Respondent 8	\$3,256mIn	\$3,256mIn	100

¹¹ Property Investment Research (2015) Australian Property Funds Industry Survey: Fourteenth edition.

¹² The AUM have been collected from the websites of the property funds or the Property Investment Research (2016) Australian Property Funds Industry Survey: Fourteenth edition.

Respondent 9	\$1,483mln	\$1,483mln	100
Respondent 10	\$23,809mln	\$6,755mln	28
Respondent 11	\$27,989mln	\$22,200mln	79
Respondent 12	\$1,220mln	\$537mln	44
Respondent 13	\$623mln	\$623mln	100
Respondent 14	\$11,139mln	\$9,433mln	85

7. Consistency

Of the fourteen property fund managers surveyed, two had consistency ratios (CR) higher than 40%, two had CRs slightly higher than 20%, and the remaining ten has CRs slightly higher than 10% or less. Saaty's (19987) recommended threshold for the CR is 10%. While a suggested way to lower the CRs is to redo the interview, it is felt that this type of intervention could influence the personal judgement of the re-interviewed respondent. The preferred option was to only use the responses to the first interview. So it was decided to remove the responses by the two property fund managers whose CR was greater than 40%. Their removal had very little impact on the weights and ratings given on the factors and sub-factors. The average CR for the remaining ten property fund managers is 11% compared to 16% when all fourteen are included.

8. Evaluation of Results and Findings

In *Table 5* the AHP average weights for the factors and sub-factors are ranked. Of the five factors, the weight for "*Strategic Decision Making*" (29.415) is close to double that of the other four factors weights. These four factors have very similar weights with only 1.36% difference between them. So while the highest ranked factor is clearly "*Strategic Decision Making*" the ranking order of the remaining four factors does not reflect how close their weights are. The weight for "*Investment Style*" (17.98%) is slightly higher than the others making it the second ranked factor followed by "*Geographical Location*" (17.67%); "*Type of Real Estate Vehicle*" (17.21%); and then "*Qualitative Techniques*" (16.62%). The distribution of factor weightings and rankings can be used to separate the AHP results into two levels of importance:

Level 1: Major Importance (>18%) – "*Strategic Decision Making*"

Level 2: Moderate Importance (<18%) – "*Investment Style*", "*Geographical Location*", "*Type of Real Estate Vehicle*" and "*Qualitative Techniques*".

The fourteen sub-factor weightings have smaller weightings than the factors. This reflects the greater number of sub-factors compared to the number of factors. There is a greater dispersion of the sub-factor weightings. Unlike the factor weightings, there is not one factor that has a weighting significantly higher than the others. The highest ranked sub-factor "*Risk Adjusted*" (12.54%) is only weighted about 1% higher than the next two sub-factors, "*Direct Property*" (11.42%) and "*Personal Judgement*" (11.40%), 2% higher than the following three, "*Core*" (10.84%), "*Return*" (10.38%) and "*CBD*" (10.29%), and just over one third higher than the seventh ranked sub-factor. However, the highest ranked sub-factor's weight is more

than double that of three of the remaining sub-factors and three times that of four of the remaining sub-factors. Three levels of importance can be established for the AHP results from the distribution of factor weightings and rankings:

Level 1: Major Importance (>10%) – *“Risk Adjusted”, “Direct Property”, “Personal Judgement”, “Core”, “Return”, “CBD” and “Risk”.*

Level 2: Moderate Importance (<10% and >4%) – *“Industry Peer Comparison”, “Non-CBD” and “Value-added”.*

Level 3: Minor Importance (<4%) – *“REITs”, “Unlisted Property Fund”, “Opportunistic” and “International”.*

Table 5 – AHP Weightings for Factors and Sub-factors: All 14 Property Funds)

	Weight %	Rank
<i>Factors</i>		
Strategic Decision Making	29.41	1
Investment Style	19.14	2
Type of Real Estate Vehicle	18.58	3
Qualitative Techniques	16.52	4
Geographical Location	16.34	5
<i>Sub-factors</i>		
Risk adjusted	13.04	1
Direct property	12.21	2
Core	11.69	3
Personal judgement	11.64	4
Return	9.51	5
CBD	9.44	6
Risk	6.85	7
Value-added	5.01	8
Industry peer comparison	4.88	9
Non-CBD	4.52	10
REITs	3.42	11
Unlisted property fund	2.92	12
Opportunistic	2.44	13
International	2.39	14

The publicly available information on the surveyed unlisted property funds indicates they actively manage their property portfolios to optimise returns over the long run. This can explain why they ranked *“Strategic Decision Making”* as the most important factor. One of the respondents commented that they are interested in the property investment opportunities that will give them the best result for their clients. The clients of the respondent’s property funds are superannuation funds, with six of the respondents stating that 1, 5, 30, 35, 35, 50 and 55 superannuation funds respectively are their clients. Two of the respondents commented that their clients are some of the largest superannuation funds in Australia. Another commented that superannuation funds do not want to have a large

number of property fund managers but prefer to use a few of the big property fund managers that gave them a lot of choices to invest in. As the major investment objective of superannuation funds is to maximise the long-run returns on their investment portfolios with the minimum risk, the *“Strategic Decision Making”* by the property fund managers would focus on this objective. One respondent stated that strategic decision making was always undertaken before anything else.

The reasons behind the similar weights given by the respondents to the remaining factors are not known. However, as their weights are half of the *“Strategic Decision Making”* weight, it implies they have a moderate impact on decision making by the property fund managers. *“Geographical Location”* was the only one of these factors that respondents commented on. Two of the respondents stated that this factor had very little impact on their decisions. One of them stated that considered demographics rather than geography when deciding on what property to invest in.

Of the seven sub-factors that are regarded as being of Major Importance, three are the sub-factors of the highest ranked factor *“Strategic Decision Making”*. These are *“Risk Adjusted”*, *“Return”* and *“Risk”*. The highest ranked sub-factor was *“Risk Adjusted”* while *“Return”* was ranked number five and *“Risk”* number seven. Three of the fourteen respondent commented on the relative importance of the sub-factors. One of them managed the fourth largest property fund and stated that valuations of property needed to take into account risk and return simultaneously. However, the second respondent, who managed the third largest property fund, stated that they regarded return and risk as just as important and considerably more important than risk adjusted analysis. With risk analysis they undertook a lot of sensitivity tests, such as worst case/best case. The third respondent, who managed the second smallest property fund, commented that it was hard to undertake risk adjusted analysis due to the illiquid nature of property. This made it difficult to obtain a large enough data set of property value observations to undertake risk analysis. Instead they mainly looked at the absolute return on potential property investments.

The second highest ranked sub-factor was *“Direct Property”*. This was expected as one of the criteria for selection of survey respondents was that the mainly invested in direct property. The two other sub-factors of *“Type of Real Estate Vehicle”*, *“REITs”* and *“Unlisted Property Funds”*, are only regarded as being of Minor Importance. Several of the respondents stated that their client’s only wanted to invest in direct property. However, a few held REITs and/or unlisted property funds that had been invested in prior to the global financial crisis. One respondent stated that they could not exit from the unlisted property fund they held for several more years. Most of the respondents mentioned that the larger superannuation funds required a lot of control over their property investments. Consequently, they entered into 50/50 joint ventures with the property fund.

“Personal Judgement”, one of the two *“Qualitative Technique”*, is ranked as the third highest sub-factor. *“Industry Peer Comparison”* is regarded as being of Moderate

Importance. However, one respondent stated that qualitative techniques were over rated as it was extremely difficult to make the correct judgement.

“Core” is the fourth highest ranked sub-factor. The other two sub-factors of the factor “Investment Style”, “Value-added” and “Opportunistic”, are regarded to be of Moderate Importance and Minor Importance respectively. One respondent commented that the larger superannuation funds had a more flexible mandate than the small superannuation funds. This allowed them to invest in value-added and opportunistic property as well as core property. However, one respondent stated that they only invested in industrial core property and another stated they mainly invested in core (90%) retail property. Only one respondent stated that their mandate with superannuation funds was to invest in non-core property, this was value-added retail property.

The sub-factors of the factor “Geographical Location” are ranked as being the sixth, ninth and least important sub-factor. “CBD” is the sub-factor of Major Importance, “Non-CBD” is of Moderate Importance and “International” is of Minor Importance.

Table 5 – AHP Sub-Group Rankings for Factors and Sub-factors (5 factors)

	Wholesale (7)	Retail (2)	Office (2)	Industrial (1)	Overall
<i>Factors</i>					
Strategic Decision Making	1	1	2	2	1
Investment Style	4	3	5	1	2
Geographical Location	3	5	1	3	3
Type of Real Estate Vehicle	2	4	3	4	4
Qualitative Techniques	5	2	4	5	5
<i>Sub-factors</i>					
Risk adjusted	2	5	4	2	1
Direct property	1	3	2	4	2
Personal judgement	5	4	3	10	3
Core	6	6	5	1	4
Return	3	8	6	6	5
CBD	4	1	1	3	6
Risk	7	7	7	11	7
Industry peer comparison	11	9	10	5	8
Non-CBD	9	1	8	7	9
Value-added	8	12	11	8	10
REITs	10	10	12	14	11
Unlisted property fund	14	10	12	12	12
Opportunistic	12	14	13	8	13
International	13	13	8	13	14

9. Conclusion

Unlisted property funds are one of the main ways that Australian superannuation funds invest in property. While some of the large superannuation funds have enough funds

to directly invest property, they also enter into joint ventures with an unlisted property fund. This paper uses the AHP technique to survey property fund managers on the factors that they regard as the most important when they decide on the properties to directly invest in. AHP allows the survey responses to generate weights from pair-wise comparisons that can be used to rank the factors based on how important they are.

Previous surveys undertaken in the United States, the Netherlands and in Australia identified geographical location and property type, in particular office and retail, as the major factors influencing property investment by institutional investors. The AHP analysis undertaken in this paper identifies "*Strategic Decision Making*" as close to double the importance of the other four factors being considered. The preference for "*Strategic Decision Making*" is supported by its three sub-factors, "*Risk Adjusted*", "*Return*", and "*Risk*", being all regarded as being of major importance. The survey respondents provided differing comments on the preferred sub-factor. However, the average survey responses indicate that "*Risk Adjusted*" was slightly more important than "*Return*" followed by "*Risk*". These findings suggest that more in-depth research should be undertaken on "*Strategic Decision Making*" by property fund managers. Analysis of the preferred measures return, risk and risk adjusted returns measures would reveal the relative importance of these measures in decision making on property investments.

10. References

Australian Prudential Regulation Authority. (2017) Quarterly Superannuation Performance, March.

Bowling, A. (2005) Mode of Questionnaire Administration can have a Serious Effects on Data Quality, *Journal of Public Health*, Volume 27, Number 3, pp.281-291.

Boyd, T., MacGillivray, H. and Schwartz, A.L. (1995) A Survey of Real Estate Capital Budgeting Practices in Australia, *Journal of Real Estate and Literature*, volume 3, pp. 193-201.

Brueggeman, W.B., and Fisher, D.F. (2011) *Real Estate Finance and Investments*, Fourteenth edition, McGraw-Hill Irwin, New York.

Case, K.E. (1994) Land Prices and House Prices in the United States, *Housing Markets in the US and Japan*, National Bureau of Economic Research, edited by Noguchi Y. and Poterba J. pp. 29-48.

De Wit, D.P.M. (1996) Real Estate Portfolio Management Practices of Pension Funds and Insurance Companies in the Netherlands: A Survey, *The Journal of Real Estate Reserach*, volume 11, number 2, pp. 131-148.

Farragher, E.J. (1982) Investment Decision-Making Practices of Equity Investors in Real Estate, *The Real Estate Appraiser and Analyst*, Summer, pp. 36-41.

Farragher, E.J. and Kleiman, R.T. (1996) A Re-examination of Real Estate Investment Decision making Practices, *The Journal of Real Estate Portfolio Management*, volume 2, number 1, pp. 31-39.

Farragher, E.J. and Savage, A. (2008) An Investigation of Real Estate Investment Decision-Making Practices, *Journal of Real Estate Practice and Education*, volume 11, number 1, pp. 29-40.

Forman, E.H., and Selly, M.A. (2001) *Decision by Objectives: How to Convince Others that you are Right*, World Scientific, Singapore.

Goetzmann, W.N., and Ibbotson, R.G. (1990) The Performance of Real Estate as an Asset Class. *Journal of Applied Corporate Finance*, Vol 13, pp. 65–76.

Hartzell, D., Hechman, J. and Miles, M. (1987) Real Estate Returns and Inflation. *AREUEA Journal*, volume 15, number 1, pp. 617-637.

Hauke, J., and Kossowski T. (2011) Comparison of Values of Pearson's and Spearman's Correlation Coefficients on the Same Sets of Data, *Quaestiones Geographicae*, Volume 30, Issue 2, pp.87-93.

Hoesli, M., and Oikarinen, E. (2012) Are REITs Real Estate: Evidence from International Sector Level Data. *Journal of International Money and Finance*, Vol 31, Number 77, pp. 1823–1850.

Ibbotson, R. and Siegal, L. (1984) Real Estate Returns: A Comparison with Other Investments. *AREUEA Journal*, volume 12, number 3, pp. 219-242.

Louargand, M.A. (1992) *A Survey of Pension Fund Real Estate Portfolio Risk Management Practices*, *The Journal of Real Estate Research*, volume 7, number 4, pp. 361-373.

Markowitz, H.M. (1959) *Portfolio Selection: Efficient Diversification of Investments*, John Wiley & Sons, New York.

Millar, G.A. (1956) The Magical Number Seven, Plus or Minus Two: Some Limits on our Capacity for Processing Information, *The Psychological Review*, Volume 63, pp. 81-97.

Millet, I., and Harker, P.T. (1990) Globally Effective Questioning in the Analytic Hierarchy Process, *European Journal of Operational Research*, Volume 48, pp. 88-97.

Newell, G., Stevenson, K., and Rowland, P. (1993) Institutional Investor Criteria for Property Investment, *The Valuer and Land Economist*, volume 32, number 6, pp.450-454.

Newell, G. (2007) The Significance of Property in Industry-Based Superannuation Funds, *Australia and New Zealand Property Journal*, volume 1, number 1, pp. 34-43.

Newell, G. (2008) The Significance of Property in Superannuation Funds, *Australia and New Zealand Property Journal*, volume 1, number 8, pp. 670-677.

Nulty, D.D. (2008) The Adequacy of Response Rates to Online and Paper Surveys: What can be done? *Assessment and Evaluation in Higher Education*, Volume 33, Number 3, June, pp. 301-314.

Page, D.E. (1983) Criteria for Investment Decision Making: An Empirical Study, *The Appraisal Journal*, October, volume 51, issue 4, pp. 498-508.

Parker, D. (2016) Property Investment Decision Making by Australian Unlisted Property Funds: An Exploratory Study, *Property Management*, Vol 34, Issue 5, pp. 381-395.

Property Investment Research. (2016) *Australian Property Funds Industry Survey*. Fifteenth edition.

Reddy, W. (2012) Determining the Current Optimal Allocation to Property: A Study of Australian Fund Managers, *Paper presented at the 18th Annual Pacific-Rim Real Estate Society Conference*, Adelaide, Australia, 15th-18th January, 2012.

Rowland, P, and Kish, J. (2000) Decision Making by Property Fund Managers: A Survey, *Australian Property Journal*, May, pp. 104-111.

Saaty, T.L. (1977) A Scaling Method for Priorities in Hierarchical Structures, *Journal of Mathematical Psychology*, Volume 15, Number. 3-5, pp. 234-281.

Saaty, R.W. (1987) The Analytic Hierarchy Process – What it is and how it is used, *Mathematical Modelling*, Volume 9, Number 3-5, pp. 161-176.

Saaty, T.L. (1980) *The Analytic Hierarchy Process*, McGraw-Hill: New York.

- Saaty, T.L. (2008) Decision Making with the Analytic Hierarchy Process, *International Journal of Services Sciences*, Volume 1, Number 1, pp. 83-98.
- Saaty, T.L., and Vargas, L.G. (2012) *Models, Methods, Concepts and Applications of the Analytic Hierarchy Process*, 2nd edition, International Series in Operations Research and Management Science, volume 175, Springer Science+Business Media, New York.
- Seltman, H.J. (2015) *Experimental Design and Analysis*, Department of Statistics, Carnegie Mellon University, 8th September 2015.
- Silverman, D. (2002) *Doing Qualitative Research: A Practical Handbook*, Sage Publications Ltd, London.
- Webb, J.R. (1984) Real Estate Investment Acquisition Rules for Life Insurance Companies and Pension Funds: A Survey, *AREUEA Journal*, volume 12, number 4, pp.495-520.
- Webb, J.R, and McIntosh, W. (1986) Real Estate Investment Acquisition Rules for REIT's: A Survey, *The Journal of Real Estate Research*, Fall, volume 1, number 1, pp.77-98.
- Wiley, R.J. (1976) Real Estate Investment Analysis: An Empirical Study, *The Appraisal Journal*, October, volume 44, issue 4, pp.586-592.
- Williams, L.J., and Abdi, H. (2010) Fisher's Least Significant Difference (LSD) Test, *Encyclopaedia of Research Design*, Sage Publications, Thousand Oaks, California.
- Worzala, E.M, and Bajtelsmit, V.L. (1997) Real Estate Asset Allocation and the Decision making Framework used by Pension Fund Managers, *Journal of Real Estate Portfolio Management*, volume 3, number 1, pp.46-56.
- Zahedi, F. (1986) The Analytic Hierarchy Process: A Survey of the Method and its Applications, *Interfaces*, Volume 16, Number 4, pp. 96-108.