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Real estate research trends and most impact real estate journals: a co-citation analysis

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ABSTRACT

This paper identifies the main trends in real estate research on frequently cited documents on the Web of Science database for 1990–2019, using quantitative methods in document-citation analysis. From the co-citation among the most cited 44 documents, this research presents a two-dimension visual mapping structure of real estate research and its important fields globally. Using statistical analyses including (1) correlation analysis, (2) factor analysis, (3) multi-dimensional scaling, this study identifies nine research trends on reducing significance order: (1) performance and investment features of property, (2) house price – household income, consumption, and investment, (3) house price setting, (4) amenity in property valuation, (5) green factor in the property market, (6) housing discrimination and segregation, (7) urban development, (8) modelling for real estate subsector and (9) urban transformation in cities of China. A further two clusters are formed as housing and investment property with factors surrounding the two. The top five ranking journals from the cited papers are presented. Findings of the study contribute to providing insights on the multidisciplinary structure of real estate research using quantitative method of bibliometric technique. This is believed to be the first study presenting comprehensive aspects of real estate research using co-citation analysis.

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1. Introduction and motivation

Property and real estate play an important role in many areas of daily life, investment, and research. Property disciplines have gained significant interest from academics, with their topics catching up interest in investment for the professional community, and diversified facets of the ordinary community. Property and real estate have developed in various sectors including residential, commercial, industrial, and health care, in the forms of private and securities. It can also be seen in the form of infrastructure and urban development. Together with the broad area of property and real estate, it is necessary to review the systematic research areas of property and real estate.

To understand the epistemology and knowledge structure of real estate research, analyse scholars and publication contents is quite popular. Analysing the development in knowledge and theory on one hand provides understanding on the development of

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ideas, valid methodology used as well as its implications. On the other hand, this highlights the effects of academic forces and knowledge formation trends. In addition, the analysis of epistemology can be a useful means to develop a general understanding of how knowledge unfolds as well as its impacts on intellectual and education products of the researched field.

An approach of a study for this kind can be on a qualitative (descriptive) or quantitative basis. This analysis, in particular, is performed with bibliometric technique, to identify the most influential documents. Through these documents, we thoroughly understand the main knowledge in property and real estate disciplines. This kind of analysis is also an effective approach for the "research holes" and the orientation of future research lines. This article also aims at being a quick reference that allows new researchers to become familiar with this field of inquiry (Acedo & Casillas, 2005). Another name of research trends, some researchers have referred to as research priorities, which can be summarised in consolidating research by Newell, Worzala, McAllister, and Schulte (2004a). The authors consolidated the separate four surveys in general and particularly real estate research topics in U.S. (Worzala, 2002), Australia (Newell, Acheampong, & Worzala, 2002), U.K. (Newell, McAllister, & Worzala, 2003, 2004b) and Germany (Schulte, Newell, & Worzala, 2003). While these studies present an approach to determine research trends, in terms main research topic, it seems that there is no citation analysis on the main trends of the real estate disciplines so far.

Together with the literature review, reference check shows the influential journals, one of the main sources to create research agenda to become mainstream in research. In this regard, previous studies have assessed the impact of the top real estate journals in terms of their rankings by surveying method (Diaz, Black, & Rabianski, 1996; Gibler & Ziobrowski, 2002; Webb & Albert, 1995), citation (Redman, Manakyan, & Tanner, 1998, 1999), and threshold citation (Hardin, Liano, & Chan, 2006). The results show a thorough picture of high ranked journals on the general as well as international real estate

The objectives of this study are, therefore, to explore the trends of real estate and property research using citation analysis of articles on the Web of Science database in the areas of real estate research by identifying the most cited documents, the formed clusters and relationship between those documents. In particular, it aims to answer the following research questions:

RQ 1: What are the main trends in the area of real estate research?

RQ 2: How are these trends located relatively to each other?

RQ 3: What are the journals with the most impact?

By answering these research questions, this study will provide a thorough insight into real estate studies and their related research branches. A comparison of the results with previous studies is also performed. This will be the first citation analysis on the real estate research using Web of Science data.

2. Literature review

In line with the broad coverage of real estate (e.g. accommodation and residential, commercial, retail, health care, industry, and urban development, private and public sector), real estate research has grown to cover this broad area to understand the nature,

structure and closeness, as well as administering those areas. Research topics and further trends are formed as the outcomes from the influenced corporate donors, current popularity within the academic community, and gain access to highly sought-after slots in peer-reviewed journals (Souza, 2000). He argues that the focus will shift from the physical to the financial. While more than a decade ago, analysis was an intense investigation in portfolio management theory in both the real estate and capital markets, the research topics in real estate and property in the fourth technology revolution has seen new topics such as proptech, constech in the current trend.

To analyse the areas of property and real estate research, the common approach is to analyse the popular journals in the area of property and real estate. For individual academicians, it is started by searching specific keywords on websites (e.g., Google Scholar, Web of Science) or publications (eg., Emerald, Taylor and Francis groups). The research result depicts the picture from some related documents for the area.

Some studies attempted to trace the development and evolution of the research agenda of leading journals and real estate conferences. Adair, Crosby, Watkins, and Lim (2000) trace the topics of the papers presented at the RICS Cutting Edge property research conference between 1993 and 1999 to map the changing emphasis on particular research themes. Ong, Ooi, and Wong (2001) assess 11 real estate, property and land journals in the US and UK to categorise the research approaches as theoretical modelling, empirical testing, case study, and descriptive evaluation. The authors claim these four categories as content with the trends of research advocated by Souza (2000), where research consisted of advanced theory building, system development, mathematical programming and hypothesis testing applied directly to real estate.

Newell (2003) summarised the papers submitted to PRPRJ over 2001–02 to assess a range of key journal quality issues. He shows that valuation was the main research topic, covering areas such as valuation accuracy, expert valuation witnesses, valuation of contaminated land, ethics and computer-assisted valuations. Other research areas to figure prominently were housing, property companies/LPTs and property markets.

In determining research topics on a broader level, there are studies based on surveys in the US, UK, Australia, Germany to summarise the research priorities in property. These results reflex the viewpoints of the research fund managers in these advanced markets on a global level. They are meant most priorities from the industry perspective and leant on the practical extreme. Besides the property or real estate as a keyword, there are mixed-asset portfolio, risk management, performance measurement, diversification (Table 1).

From a national level in Asia, Razali, Adnan, and Baharom (2009) summarise twelve main research topics (Table 1). This shows more detailed areas of the property in investment and market, valuation, and regulations. Overall, the historical studies show the main research priorities according to industry communities and the main themes of property and real estate research from academic nationally.

In terms of citation analysis, this is a branch of bibliometric analysis. Particularly, it assesses the impact and quality of a scientific publication, an author, or an institution based on the number of times the subject is cited. Not only an academic visual foundation, but bibliometrics is also a tool to know how other researchers respond to a peer's work. Citation analysis comes in two levels, the physical and substance. The physical is measured by simply counting the subject documents show up as cited. An example of this is Dombrow and Turnbull (2004), who use citation counts to rank authors. The

Table 1. Research topics and priorities from diversified viewpoints.

12 Research areas (Razali et al., 2009)	4 International research priorities (Newell et al., 2004a)
1. Performance measures of property	1. The role of real estate in a mixed-asset portfolio
2. Macroeconomic factors affecting property	2. Real estate and portfolio risk management
3. Diversification in valuation technique and process	3. Performance measures for real estate
4. Property investment strategies	4. Diversification within real estate portfolios
5. Portfolio management	
6. Technological changes affecting property	
7. Role of international real estate	
8. Regulatory changes affecting property	
9. Demographic changes affecting property	
10. Microeconomic factors affecting property	
11. Housing	
12. Facilities Management	

Source: Newell et al. (2004a), Razali et al. (2009).

substance assesses the quality of the relationship between the subject documents or authors to see the intellectual patterns (Baker, 1990).

Co-citation analysis provides an insight structure of a research field on the ground that pairs of documents appearing together in the list of references can share common points. When two authors or papers are shown regularly together, their ideas are likely to be related to each other (Pasadeos, Phelps, & Kim, 1998). As such this methodology is a proven experiment tool for describing the intellectual pattern of many fields, including education (Özçınar, 2015), marketing (Backhaus, Lügger, & Koch, 2011), operations management (Pilkington & Meredith, 2009), information science (Zhao & Strotmann, 2008), strategic management (Nerur, Rasheed, & Natarajan, 2008), and tourism (McKercher, 2008; Ortalo-Magne & Rady, 2006), behavioural finance (Ángeles López-Cabarcos, Pérez-Pico, Vázquez-Rodríguez, & López-Pérez, 2019) just to name a few. It is a common research method to analyse citations and articles in leading journals in the same field. Nevertheless, there is no co-citation analysis in real estate to one's knowledge, this study is the first one to identify the main field and development in the subfields of real estate research.

In this study, the subfield characteristics will be categorised by the intellectual nature of their particularity. Small (1973) recommended that document co-citation analysis (DCA) assess the network created by the paper linkage from their joint citations by later papers. Author co-citation analysis (ACA) uses authors to create a visual network of authors within a selected field (White & Griffith, 1981; White & McCain, 1998). Journal co-citation (JCA) is the analysis of some selective journals in a particular field as the analysed subject (McCain, 1991a, 1991b). The relationship of those journals is evaluated regarding the exportation and significance of citations between them (Sugimoto, Pratt, & Hauser, 2008). This study focuses on DCA to identify the main research core in the area of real estate.

The document co-citation method, as perceived by the community of citing authors, measure the closeness level between documents. Citation is a more effective symbol than words as it indicates fellow recognitions (Small, 2003). By citing a document, significant terms, methods, or opinions are spread across a field, its patterns work as a visualised progress of these prime ideas (Small, 1973). Furthermore, co-citation helps recognize coherent research issues from categorising and combining documents for their co-

reference as a formed group of highly co-cited papers (Franklin & Johnston, 1988). Indeed, many studies have shown the co-citation method as an effective method in exploring the intellectual progress of a field (Acedo, Barroso, & Galan, 2006; Nerur et al., 2008; Ramos-Rodriguez & Ruiz-Navarro, 2004; Small, 1973; White & Griffith, 1981).

Co-reference patterns will progress and change with new documents constantly shown as cited and citing a document. This will add new citations, derank the co-citation documents and remove the old ones from the cluster. In this way, the co-citation method can help to study these changing structures to trace the development of a specialty. It also evaluates the degree of development and integration between the fields (Small, 1973). As such, progressing citation structure over time may be employed to file specialty trends (Sullivan, Koester, White, & Kern, 1980).

3. Method

This study uses Document Co-citation Analysis (DCA), which is one of the bibliometrics. Bibliometrics refers to "the collection, the handling, and the analysis of quantitative bibliographic data, derived from scientific publications" (Veerbek, Debackere, Luwel, & Zimmerman, 2002). One of the most common bibliometric techniques is cocitation analysis, a method used to examine relationships among articles or authors contributing to the development of a research field (Di Stefano, Peteraf, & Verona, 2010). Specifically, document co-citation analysis (DCA) studies a network of co-cited references (Small, 1973, 2003). The fundamental assumption is that co-citation clusters reveal the underlying intellectual structures; as such, the study of a co-citation network focuses on interpreting the nature of a cluster of cited documents and interrelationships between clusters (Chen, Ibekwe-SanJuan, & Hou, 2010). With this methodology, our study aims at identifying the trends dominating the field of real estate and property research.

To assess the main trend of real estate research and their relative positions to each other, this study uses the methodology of co-citation technique. Particularly, with a keyword of "real estate" or "property" from the Web of Science, it shows us a list of documents with reducing order of citation frequency. We pick the top 100 original most cited documents. This means that they have the highest citation number which has keywords "property" or "real estate" on the Web of Science database. It is noted that the Web of Science is prefered over other sources as it is well-known for its collection of high ranked publications.

From the 100 original documents, 72 documents were shortlisted after screening for relevance, accuracy and highest citation frequency within the Web of Science database. Further from the 72 documents, a process of narrowing our sample using co-citation-correlation within the 72 documents is performed. This drops down by two documents. A series of continuous tests for factor loading and reliability testing in SPSS allows us to drop further documents with absolute factor loading lower than 0.6 leads us to a final sample of 44 documents. As such, our final sample for analysing of main trends in real estate research sees only 44 documents.

From this co-citation of the sample of 44 documents, we also perform cluster analysis to analyse the relationship among the subfields and multidimensional scaling (MDS) to get an intellectual map of real estate research.

Retrieval of co-citation matrix on 44 most cited documents. As mentioned above, the list of documents was provided at the outcome of the keyword "property" or "real estate" provided in the WoS. The list of documents is recorded in the reducing order of citation number. As such, most cited documents in this study are considered within the Web of Science database only. A co-citation frequency of each pair of the 44 documents is achieved from the Web of Science to form the co-citation matrix. The main diagonal is treated as not applicable or zero as suggested by (McCain, 1990; Ramos-Rodriguez & Ruiz-Navarro, 2004). From this co-citation table, a Pearson correlation is converted for further analysis. Pearson's correlation coefficient (r) measures the strength of the association between the two variables. The nearer the scatter of points is to a straight line, the higher the strength of association between the variables. Although Ahlgren, Jarneving, and Rousseau (2003) found Pearson R failed in their stability tests, White (2003) rechecked their results and showed it well reliable in co-citation analysis. Therefore, this study continues to use the Pearson correlations for analysis. Based on the Pearson matrix, multidimensional scaling (or factor analysis) and the two-dimensional map analysis will be performed for the main trend assessment.

3.1. Factor analysis

For purpose of document citation analysis, a factor is defined when documents have loadings outside the range of −0.6 and 0.6. This study sees all 44 documents meet this criterion. Those documents in an area convey some concepts, are co-cited in the same particular area will highly be categorised in one factor. A subfield belongs to a factor that indicates an intellectual trend defined by authors with a load corresponding to that subfield or factor (Peek & Rosengren, 2000).

3.2. Multidimensional scaling (MDS)

Factor analysis is performed in SPSS to produce multidimensional scaling analysis. This process detects correlations between primary variables thus forming new factors. Factor loadings indicate the extent to which the document belongs or loads on predetermined factors based on research questions. Therefore, the factors are considered subfield when the theoretical background is collected to check the documents loaded within the factor. The matrix of raw co-citation is analyzed using analysis on the key element with varimax rotation (i.e., replacing missing values with the average value) (Nerur et al., 2008).

Multidimensional scaling (MDS) generates a visual chart of relative distance among the papers or authors. This comes from the principle that two similar documents will be located closely (Leydesdorff & Vaughan, 2006). The reliability of the MDS' results is measured by the low stress and proportion of variance (R^2) as they show the solution dimensions. In this study is the two-dimensional solution with the conceptual distance between intellectual strands of research (McCain, 1990).

Table 2 presents some statistical features on our data of the 44 analysed documents. On average a document has 165 citations by another document from the Web of Science as of 2019. The median value of the publication year is 2003 while the oldest year sees 1990 and the latest is 2012. This means these old documents remain the foundation for the current trends in property and real estate research as recorded by Web of Science. No

Table 2. Data statistics.

	CITATION_FREQUENCY	YEAR
Mean	165	
Median	143.5	2003
Maximum	490	2012
Minimum	104	1990
Std. Dev.	70.20	5.47
Skewness	2.35	(0.34)
Kurtosis	10.36	2.30

Source: Compilation by the authors from the Web of Science (2019).

later documents than 2012 win a slot of the mainstream in what is referred to as trends of the real estate research. The skewness of 2.35 shows a more proportion of citations earlier than in 2003. Kurtosis higher than 3 implies a heavy distribution on both tails (Table 2).

4. Results and discussion

4.1. Factor analysis

Nine factors were obtained to summarise the nine trends from the 44 most co-cited documents, with their eigenvalue minimum of 1.155 and a maximum of 10.204 (Table 3). The Eigenvalue shows highest for factor 1 (trend 1) reducing to lowest factor 9 (trend 9). The Eigenvalue also illustrates the significance, strength and clarity of a particular trend. On one hand, the strength and clarity are presented in the number of cited documents each trend carries. On the other hand, the significance of each trend underlies its nature quality and impact on property and real estate research in general. In this meaning, trend 1 (performance and investment features of property) covers a broad area of the industry and professional field, trend 2 (house price – income, consumption, and investment) covers the classic area of economic theory. Both are considerable, strong, and outstanding. Trends 3 (house price setting), 4 (amenity in valuing residential properties) are considered sub-fields compared with trends 1 and 2, which are smaller yet significant though. Trends 5 (green factor), 6 (housing discrimination and segregation), 7 (urban development), 8 (modelling for real estate subsectors) are all either emergence or phrasal. Trend 9 (urban transformation cities in China) can be seen smallest and may be of a specific context, herein China.

Table 3. Eigenvalue of the 9 factors.

Factor	Eigenvalue
1	10.204
2	7.746
3	5.277
4	5.019
5	2.878
6	2.853
7	2.556
8	2.143
9	1.155

4.2. Factor analysis

4.2.1. Trend 1: performance and investment features of property

With nine documents being filed (see Table 4), this trend is the most outstanding in the real estate research domain. As an investment asset class, real estate integrates with stocks (Ling & Naranjo, 1999), which reflects information about the real estate security market (Chan, Hendershott, & Sanders, 1990). Furthermore, real estate investment trusts (REITs) characteristics are closer to those of stocks than to bonds (Glascock, Lu, & So, 2000). One of the common features of stock markets is that they tend to delay reaction to information inflow from some industries. Instead, the stock market will slowly absorb and diffuse fundamental information across the market (Hong, Torous, & Valkanov, 2007). On an appraisal basis, lagged real estate security market embedded the information in infrequent property appraisals after modifying its persistent feature in periodical appraisal (Fisher, Geltner, & Webb, 1994).

Between the property indices, REITs show to be the most liquid and fastest in reflecting information in its price, thus the indices of REITs-based lead the other of property-based; however, it displays more volatility in the short-run (Farley, Steeh, & Krysan, 1994). As REITs are closed to operating companies, IPO activities of REITs and operating companies are also assessed and compared (Ling & Ryngaert, 1997).

Among the real estate security firms (listed property companies), the significant difference across the traded real estate firms is partly from the underlying properties, which have different cash flows and different specific risks (Gyourko & Keim, 1992). As such risk and returns of listed property companies see significant relation between stock returns (i.e. property securities) and both underlying rents and property value changes (Quan & Titman, 1999). In addition, property prices are also found to be significantly

Table 4. Real estate research at Web of Science (1990–2019): Factor loadings of 9 trends.

Trend No.	Document	Factor loading	Trend No.	Document	Factor loading
1	Gyourko & Keim, 1992	0.980	4	Jim & Chen, 2006	0.938
	Ling & Naranjo, 1999	0.974		Benson et al., 1998	0.931
	Chan et al., 1990	0.964		Crompton, 2001	0.878
	Glascock et al., 2000	0.960		Bourassa et al., 2003	0.852
	Fisher et al., 1994	0.941		Anselin & Lozano-Gracia, 2006	0.827
	Ling & Ryngaert, 1997	0.933		Pace et al., 1998	0.778
	Quan & Titman, 1999	0.900		Huang et al., 2010	0.750
	Chan et al., 2011	0.836	5	Jakob, 2006	0.977
	Hong et al., 2007	0.746		Wiley et al., 2010	0.974
2	Piazzesi et al., 2007	0.957		Fuerst & McAllister, 2011	0.973
	Campbell & Cocco, 2007	0.947	6	Krysan & Farley, 2002	0.982
	Himmelberg et al., 2005	0.947		Ross & Turner, 2005	0.982
	Ortalo-Magne & Rady, 2006	0.911		Farley et al., 1994	0.981
	Chaney et al., 2012	0.902	7	Waddell et al., 2003	0.906
	Bostic et al., 2009	0.887		Cervero & Landis, 1997	0.883
	Peek & Rosengren, 2000	0.802		Hess & Almeida, 2007	0.835
	Grenadier, 1996	0.715	8	Tseng, 2009	0.970
3	Anglin et al., 2003	0.977		Zavadskas et al., 2010	0.954
	Yavas & Yang, 1995	0.976		Gomes & Rangel, 2009	0.930
	Knight, 2002	0.975	9	Gaubatz, 1999	0.953
	Rutherford et al., 2005	0.943		Wu, 2000	0.936
	Levitt & Syverson, 2008	0.917			
	Genesove & Mayer, 1997	0.814			

Source: Authors' compilation from SPSS

influenced by GDP growth rates. Particularly, property is proved to be effective as a long-term hedge against inflation but failed on a year-to-year basis (Quan & Titman, 1999).

At a more extensive level, investment strategies are considered different at different economic stages. Particularly, the expansion stage sees an investment strategy away from safe investment – gold to risky asset – stock whilst crisis periods see investment strategy to land on quality (safe investment) of treasury bonds and away from stocks (Chan, Treepongkaruna, Brooks, & Gray, 2011).

In brief, trend 1 has described and discussed the features, speed of value adjustment among the direct property and real estate, property securities and REITs; their relationships with other investment assets and long-term inflation hedge. As an investment class, real estate will continually grow and develop its financial forms of investment, this trend shows the basic and core trend in real estate and surely is among those that attract the most academic research of all times. This trend remains the strongest and is similar to one of the findings in Newell et al. (2004a) and Razali et al. (2009).

4.2.2. Trend 2: house price – income, consumption, and investment

With eight documents being filed (see Table 4), trend 2 is also categorised as one of the trends that attract most research interest describing the relationship of house price with household income, consumption, and investment. This factor also discusses financing activities and house price bubbles. Particularly, house prices indicate the wealth of homeowners. Thus it has the largest effect on those own home only without a regular income, in this case, older homeowners. On the other hand, those who own no home with regular income therefore this has the smallest effect on younger renters. Furthermore, regional house prices affect respective consumption growth as well as correlated with aggregate financial market status. Once again, predictable changes in house prices are also correlated with those in consumption, especially for borrowing constrained households (Campbell & Cocco, 2007).

A life-cycle model of the housing market (Ortalo-Magne & Rady, 2006) with credit constraint showed a delay in first home buyers while leading others to a smaller transaction than their plans. House prices behave quite reasonably. Particularly, when they looked overvalued across the cities they would experience house price decline significantly. Furthermore, the cost of owning and renting a house are related in a way that makes them reasonably valued (Himmelberg, Mayer, & Sinai, 2005).

In addition, housing wealth effects and its estimated elasticities are found robust to its volatility and trend deviations. Consumption is also different significantly among the credit and non-credit constrained households (Bostic, Gabriel, & Painter, 2009) while housing share can be used to forecast excess returns on stocks.

Inseparable preferences describe households' concern with comprehensive risk, which motivates low changes in security prices (Piazzesi, Schneider, & Tuzel, 2007). Further, when a firm is more credit-constrained its sensitivity of investment to collateral value is stronger the more likely a firm is to be credit constrained (Chaney, Sraer, & Thesmar, 2012). Given the US is a highly advanced market, the external shock has a real effect on construction activity in this commercial property market (Peek & Rosengren, 2000). This fact is seen similar to other commercial property markets as well.

As a complicated matter of combining property cycle and timing for property development, Grenadier (1996) develops a model to make a strategic decision for this issue.

Particularly, his model assesses what forms the behaviour of the developer industry. The model can also rationalise such irrational responses as some markets experienced building booms in the downturns of property demand and its values.

In short, this trend has described and discussed the behavioural relationship among income, consumption, and investment in the housing market. Even though this trend has discussed the complicated behaviours among the participants in the housing market, not just only supply and demand sides, but also the financial institutions and regulators, it is found typical with the housing topic as perceived by Razali et al. (2009). These principal behaviours can be referred to as a benchmark for academics and industry in submarkets and future research.

4.2.3. Trend 3: house price setting

This trend is not far behind trends 1 and 2, files six documents discussing all components in house price setting (see Table 4).

In a transaction, the selling party has two key objectives, namely to get the highest possible price in the shortest possible time. These are separate and trade-off targets but are closely related via the initial listing price. The too high or too low listing price affects its time on market (TOM), which in return has a final impact on the settled price. This is because of an unavoidable bargain between the seller and buyer. Although the listing price was first taken based on the property appraisal, which comes from search work and curvature map of the listing price. In the end, the settled price is a comprehensive result of listing price from the bargaining power and commission rate (Yavas & Yang, 1995). Not only too high but setting a house at a price too low also affects its marketability (Anglin, Rutherford, & Springer, 2003), which means a lower price and longer time to settle (Knight, 2002). For the house buyers, it is a matter of signal extraction, a higher list price can be magnified for those with low predicted variance in the list price.

In terms of transaction information, real estate agents are always to be in a better position than their clients, which means agents may exploit this advantage. How are agent-owned houses sold compared to client-owned ones? It was reported that the first ones were not sold faster but at a premium price (Rutherford, Springer, & Yavas, 2005). This may mean the agent-owners are more knowledgeable and insist on finding the right buyer. Also, hired agents were found to distort incentives whilst owner-agents would pursue the first best buyer (Levitt & Syverson, 2008).

Debt status also affects the house price setting. The house owners with a high loan ratio will make a higher listing price. As such, they will accept a longer expected time on the market for a higher settled price compared to those low debt owners (Genesove & Mayer, 1997). In brief, this trend is a combination of trends 1 and 2 to discuss the details of the behaviour of the players in the housing market and is typical to the research topic as perceived by Razali et al. (2009).

4.2.4. Trend 4: amenity in valuing residential properties

This trend files seven documents covering amenity and quality components in valuing residential properties (see Table 4).

Amenity adds value to the residential value. This counts local public goods, including transit framework, pure air, key high schools and main universities. Even though most of

these are located externally, they are significant determinants of property prices (Pace, Barry, & Sirmans, 1998).

The amenity value refers to factors external to the property but is beneficial to the residents. Regarding urban planning and development, they can be thought of as green spaces, water bodies and a clean environment. However, this value is difficult to quantify in the planning work. Assess the possible amenity factors, in particular, Guanzhou, Jim and Chen (2006) quantified and found the highest to lowest added value factors are distance to water bodies (13.2%), high storey on the multi-storey buildings (9.2%), and green views (7.1%). Something that has no use to residents will have no added value. A nearby wood amenity that has no public access is the case. A surprising finding is noise exposure in the city did not affect negatively. This is an obvious and substantial bias in terms of air pollution (Anselin & Lozano-Gracia, 2006).

The highest pay is seen in Bellingham, Washington, where diversified views, from low lake and ocean to high mountain have been paid 60% more than comparable homes (Benson, Hansen, & Schwartz, 1998).

Another aspect of research in amenity value is that a higher price for houses near the park will lead to higher tax which can afford to develop a park. This is sizable up to 20% value-added for rear and front faced quiet park whereas 10% value-added for up to three blocks away from a heavily used park (Crompton, 2001).

The significance of amenity and location have come to the need for an accurate model for hedonic predictions (Bourassa, Hoesli, & Peng, 2003). This also supports the suggestion of a property price model with geography and time-weighted regression (Huang, Wu, & Barry, 2010).

In short, this trend has focused on identifying and valuing various amenity components in the housing value that was previously overlooked. It also attempts to apply and define models to include amenity in house value. This trend is considered a new finding from the previous studies.

4.2.5. Trend 5 green factor

This trend files three documents (Fuerst & McAllister, 2011; Jakob, 2006; Wiley, Benefield, & Johnson, 2010) analyse the impact of the green factor on property markets (see Table 4).

Green factor refers to energy-efficient factor included in decision-making for new constructions and renovations. The basis for the analysis is a comparison of the marginal costs from implementing new technologies and comprehensive benefits. Whilst new designing technologies play important role in cost reduction and energy effective environmental policies, its dynamic measures limit the decisions to costs and thus may lead to erroneous decisions. Comprehensive benefits include noise reduction, indoor quality, and living comfort. Although comprehensive benefits are difficult to quantify thus overlooked they may be significant to the same level of energy-saving benefits (Jakob, 2006).

In terms of green factors, it can be certified and noncertified buildings. The main causes for price differences between the two types are marginal user benefits, lower operating costs as well as lower investment risk (Fuerst & McAllister, 2011). Particularly, green buildings receive higher rents, maintain a regularly high level of occupancy, and are sold at a significant premium price (Wiley et al., 2010). In brief, whilst the cost of the green factor may be erroneously estimated, its adding value is

significant. This trend is also one of the new findings compared with the above literature review section.

4.2.6. Trend 6: housing discrimination and segregation

This trend files three documents (Farley et al., 1994; Krysan & Farley, 2002; Ross & Turner, 2005) focused on housing discrimination and segregation (see Table 4).

The discrimination of the white and black Americans toward each other are different. While the white Americans feel uncomfortable to move in with more than a few black Americans in a neighbourhood, black Americans, mainly from the fear of white hostility, are willing to move in if there is a black presence but prefer 50–50 areas (Krysan & Farley, 2002).

Similar discrimination is found in rental and owner-occupier property markets, though decreased significantly. The discrimination is against not only the African Americans regarding racial steering but also Hispanics regarding getting financing (Ross & Turner, 2005).

Between the two opposite assumptions account for black-white discrimination in residential housing, the conventional type with white preferences as a discriminatory practice can best explain the continuing segregation in the Detroit area (Farley et al., 1994).

In brief, this trend has focused particularly on American society to explain the discrimination in the housing market in America.

4.2.7. Trend 7: urban development

This factor files four documents that focus on assessing the impact of urban development on regional growth (Cervero & Landis, 1997) (see Table 4). In more particular, the proximity to light rail stations is more significant than a physical walking distance in adding value to residential property (Hess & Almeida, 2007). This trend also involves a study on the comprehensive choices and implementation of the new urban simulation system (Waddell, Borning, & Noth, 2003). This is one of the new findings regarding research trends in real estate. It contributes to urban economics and real estate development.

4.2.8. Trend 8 modelling for real estate subsectors

This trend files three documents (Gomes & Rangel, 2009; Tseng, 2009; Zavadskas, Turskis, & Tamosaitiene, 2010) with modelling for important factors in the three main property sub-sectors, namely real estate agent, development and valuation (see Table 4).

First is the combination of the DEMATEL method with grey theory and fuzzy possible theory to model for customer service expectation empirical experiment in real estate agent (Tseng, 2009).

Another model for risk assessment in construction projects using a set of factor attribution in decision making (Zavadskas et al., 2010). Particularly, when a development project is commenced, a list of stakeholders with objectives and interests is set up. The risk factors are evaluated against the attributes of the construction process to the overall efficiency and project value.

In the valuation area, a TODIM method is used with a multi-criteria decision (Gomes & Rangel, 2009). This method is used to rank properties with diversified characteristics and a wide range of rental values. Enhanced further to the model is the sensitivity analysis which reinforces the outcome reliability.

In brief, this trend involves the main modelling in the important areas of the property: real estate agent, property development and property valuation. It is not surprising to see them applied and cited by many researchers later. As this trend covers modelling applied on three areas of the property can be seen somewhat related to valuation area, risk management and real estate agency.

4.2.9. Trend 9: urban transformation cities in China

This trend files two documents (Gaubatz, 1999; Wu, 2000) analyse the models and procedures in transforming main cities in China (eg., Beijing, Shanghai and Guangzhou) (see Table 4). The authors focus on the patterns of planned usage of land, structure and building height, urban renovation and land and property privatisation. Particularly for Shanghai to become a world city, significant and penetrating impact of globalisation in transitional economies, the growth of inward investment in property development, has marked on the successful urban transformation. In other words, it is the combined impact of relative advantages between internal and external movements to make urban change for the special socialist – communism economies.

Overall sees trend 1 the biggest and strongest as shown in its factor loading, number of cited documents and citations. This also matches with the research priorities from the combined views of academic and professional researchers conducted in the US, UK, Australia and Germany (Newell et al., 2004a; 2004b) regarding the role and performance of real estate in a diversified portfolio. Trends 2 and 3 are related to general property economics. Trend 4 delves more into the residential sector, which can also be seen as one aspect for the fund managers. Trend 5 is the newly emerging factor and applies broadly to property and real estate. Trends 6 and 9 are particularly to the two largest national markets globally. However, this can shed light on other individual markets. Trends 7 and 8 are separately related to the area of development and research approach respectively. These are also considered big areas and main streams in real estate research.

4.3. Multidimensional scaling (MDS)

To present visually the relationship among the 9 trends of real estate research over the period 1990–2019, Figure 1 presents the two-dimension vision map of 44 co-cited documents showing similarities between the documents. The stress (0.14635) under 0.2 and R^2 (0.90526) values indicate the fitness of the graph. As seen from the map, the documents are located based on the proximity in the co-citation matrix, with a high value indicating high similarity. This also visualizes the theoretical distance between various research topics.

There are two big clusters, with trends 2 and 3 forming one and the other seven trends the biggest cluster. Trends 2 and 3 make a cluster of house price settings and their consequent issues. Furthermore, these two trends are considered an area of property economics. With these exceptionally special goods, house pice is setting as a sequent behaviour of sellers, buyers and agents on the informational ground of supply and demand and bargaining power. The time that property being listed on market affects all involved parties on the ground of transparent information. The situation may change when the seller's agent takes advantage of superior information to distort commission income compared to an owner agent who would choose to pick

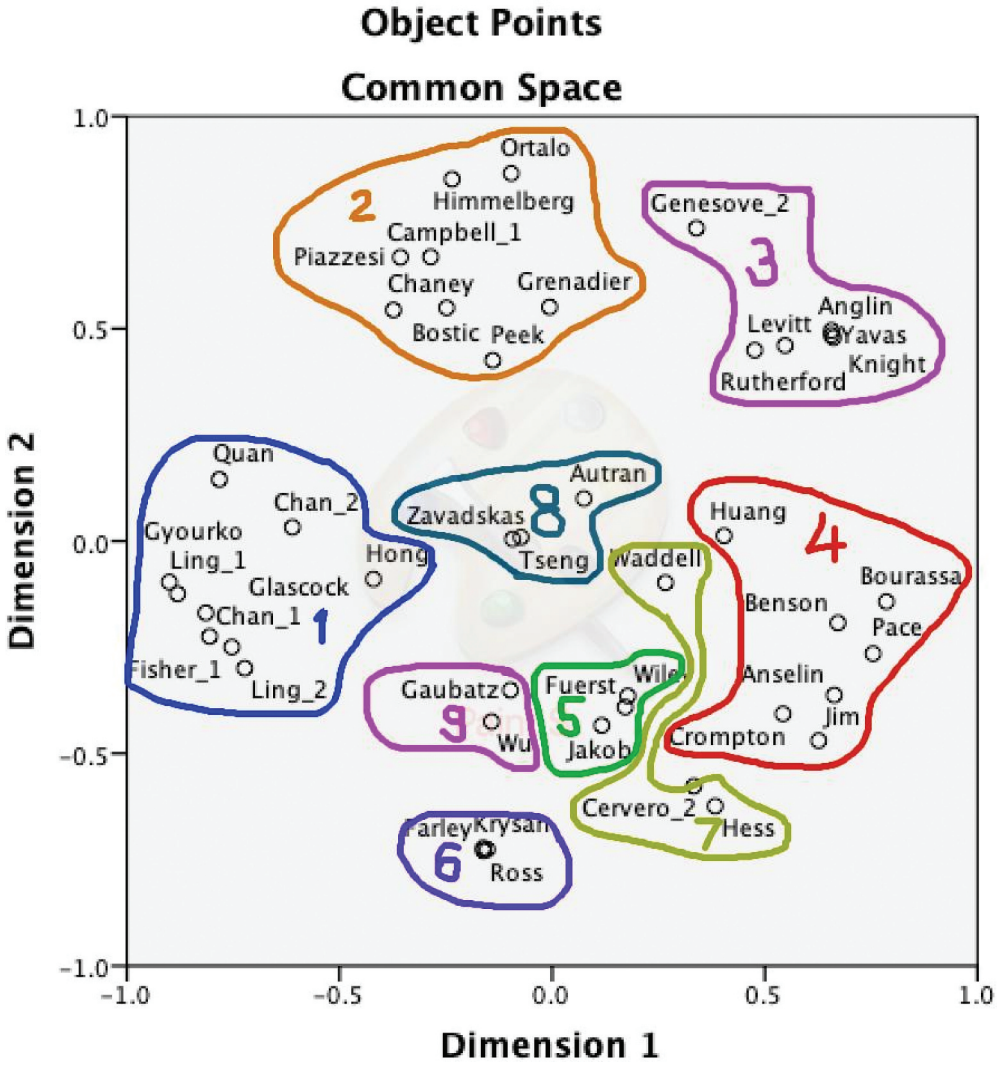

Figure 1. Academic structure of Web of Science: Real Estate (1990–2019). Source: Authors' compilation from the Web of Science (2019).

the first correct price in return for a relatively long time on the market. Other such factors can affect seller's behaviour and psychology as debt ratio, pressure from foreclosure and death can influence both bargaining power and time on market which ultimately define settled price. As an indication of wealth, house price affects such consumption activities as consumption in senior owners, financing in constrained borrowers and investment in developers and renters. This cluster forms the housing issues in general.

Trends 1 and 4 are located at the 2 ends of the biggest cluster, defining property as an investment asset class. On the left end stands the characteristics of the investment property (i.e. trend 1). The features covered in that trend is commercial property, listed

property securities of all forms. Listed property securities are the most liquid investment that is integrated with the stocks while also carry information of commercial property on a periodical basis. The right end of this cluster sees the research trend of value-added amenity in property. While amenity refers to the facilities upraising real estate value and life quality, and urban development upgrades the infrastructure. Overall, these two trends refer to the two biggest parts of property, investment and valuation. Trend 1 is similar to the four areas of research priorities suggested by Newell et al. (2004a). Trend 4 is an area of house valuation and hedonic combination, which was the key topic as determined from the Pacific Rim Property Research Journal (Newell, 2003).

Trend 5 (green factor) stands nearby has common point with amenity is its quality components, which can be linked by the hedonic model for valuation. Urban development (trend 6) involves upgrading infrastructure and transforming a region. They both are correlated for their involvement with the improving quality of life. On the other hand, the green factor mainly involves energy efficiency and environment friendly with the comfort the facilities bring to the users. This cluster overall can be named the quality components and urban development. These two trends can also be seen as value-added factors for a hedonic model in valuation.

Trend 8 (modelling in property subsector) is located in the middle of the 4 biggest trends (#1 – #4) as it involves the modelling in the property development, real estate agent and valuation. These three cited documents are so strongly influenced in the related areas that are still applied in its industries.

Trends 9 (urban transformation cities in China) and 6 (housing discrimination and segregation) involve individual but big markets (e.g. China and the US), showing their small impact on the research community. Nevertheless, they can be a benchmark and significant to maintain a trend of property research in the US. These two trends may form different streams in the future, when it becomes global culture (discrimination) or developing/emerging markets (ie., urban transformation).

A relevant study in terms of research trends in property and real estate, Newell et al. (2004a) show priorities of real estate research from the viewpoints of fund managers. Trend 1 (performance and investment features of property) is more relevant and closed to the priorities for investment fund managers. Other trends are but on the reducing level of relevance to the investment property and increasing relevance to the housing issues. This also shows a broader term of trends in real estate research.

In brief, this bigger cluster, located at the lower part analysis fills the research gap with the detailed picture of investment (at the very left side), valuation (at the very right side). Between the two sides are the supplements of the hedonic model for valuation and urban transformation aspects in housing investment.

5. Ranking of highly cited journals

To explore the most influencing journals in the area of real estate research, in particular, those published the 44 highly co-cited real estate studies, Table 5 presents the top five ranking journals. Seven journals are ranked in the top five with two journals were ranked # 4 and #5 each. Journal of Real Estate Finance and Economics (ranking #1) and Real Estate Economics (#2) are continually in top rank according to different criteria and fundamentals (Redman et al., 1998) as well as for their international community

Table 5. Ranking journals in real estate research: Current vs previous studies.

JOURNAL NAME	Current	Redman et al. (1998)	Hardin et al. (2006)	International community (Worzala & Tu, 2010)	International analysis involved (Newell, 2014)
JOURNAL OF REAL ESTATE FINANCE AND ECONOMICS	**1**	**4**	**2**	**3**	**Yes**
REAL ESTATE ECONOMICS	**2**	**1**	**1**	**1**	**Yes**
JOURNAL OF FINANCIAL ECONOMICS	3	6	7	N/A	N/A
AMERICAN ECONOMIC REVIEW	4	7	8	N/A	N/A
URBAN STUDIES	4	22	31	N/A	N/A
REVIEW OF ECONOMICS AND STATISTICS	5	12	11	N/A	N/A
JOURNAL OF THE AMERICAN REAL ESTATE AND URBAN ECONOMICS ASSOCIATION	5	N/A	N/A	N/A	N/A

Source: Compilated by authors

(Worzala & Tu, 2010) and involving in an international analysis of real estate (Newell et al., 2002). The Journal of Financial Economics (ranked # 3) was ranked # 6 and 7 for the influential journals by Redman et al. (1998) and Hardin et al. (2006) respectively. However, it was not recognised by international researchers or for its international analysis in real estate (Worzala & Tu, 2010; Newell et al., 2002). Similarly, American Economic Review (ranked #4) was also consistently ranked lower for its influence while Urban Studies (ranked #4) and Review of Economics (#5) were ranked significantly different compared to the previous ranking. Particularly, Urban Studies were ranked lower by Redman et al. (1998) and Hardin et al. (2006). Journal of the American Real Estate and Urban Economics Association (ranked #5) was not recognised in the previous studies at all. This sees the stable performance of long-standing journals with some emerging journals in the Web of Science data.

6. Conclusions

This article has presented the 9 trends and two main clusters of real estate research using co-citation analysis. With data from the Web of Science over the period of 1990–2019, the paper has identified 44 most co-cited documents, which make up 9 trends of real estate research: (1) performance and investment features of property, (2) house price – household income, consumption, and investment, (3) house price setting, (4) amenity in property valuation, (5) green factor in the property market, (6) housing discrimination and segregation, (7) urban development, (8) modelling for real estate subsector and (9) urban transformation in cities of China. Two clusters have been further formed: (1) house price setting and (2) value of investment property, with factors surrounding these two. The findings of the paper contribute to providing insights on the multidisciplinary structure of real estate research using the bibliometric technique. The ranking of the respective journals recognised from those documents files two long-standing journals as Journal of Real Estate Finance and Economics and Real Estate Economics, with other four emerging journals ranking in the influencing real estate journals. This shows significant results of the Web of Science database.

This research has some limitations, which mainly come from the choice of data source and method used. First, data used in this study is from the Web of Science, which includes only those journals provided on this website. This sees the absence of some major UK journals while most of the discussed journals in this study are from America. Second, the period covered in this study is 19 years; a long period is sufficient to assess the validity of the major research areas. However, a long period may also overwrite an extinguished and a newborn trend of research. In other words, this may overlook the most recent trend while sustaining the quite outdated documents. A subperiod of ten years and a broader database or author citation analysis may reinforce the findings in this research.

Despite the limitations, the advances and strengths of the method and data used in this research have reinforced the valid findings of nine trends as discussed. This can be used as crosschecks and developments for future mainstreams of property and real estate research. Some of the mainstreams are the strong currencies, with some going to become stronger and more outstanding whilst others being overridden by new ones. All present the certain and non-stop progress of development and dying nature.

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References

Acedo, F. J., Barroso, C., & Galan, J. L. (2006). The resource-based theory: Dissemination and main trends. *Strategic Management Journal*, *27*(7), 621–636.

Acedo, F. J., & Casillas, J. C. (2005). Current paradigms in the international management field: An author co-citation analysis. *International Business Review*, *14*(5), 619–639.

Adair, A. S., Crosby, N., Watkins, C. A., & Lim, L. C. (2000, September 6-8) The contribution of the RICS cutting edge conference to real estate research: The participants, their impact and the research agenda. Paper presented at the RICS Cutting Edge Conference, London.

Ahlgren, P., Jarneving, B., & Rousseau, R. (2003). Requirements for a cocitation similarity measure, with special reference to Pearson's correlation coefficient. *Journal of the American Society for Information Science and Technology*, *54*(6), 550–560.

Ángeles López-Cabarcos, M., Pérez-Pico, A. M., Vázquez-Rodríguez, P., & López-Pérez, M. L. (2019). Investor sentiment in the theoretical field of behavioural finance. *Economic Research-Ekonomska Istraživanja*. doi:10.1080/1331677X.2018.1559748

Anglin, P. M., Rutherford, R., & Springer, T. M. (2003). The trade-off between the selling price of residential properties and time-on-the-market: The impact of price setting. *Journal of Real Estate Finance and Economics*, *26*(1), 95–111.

Anselin, L., & Lozano-Gracia, N. (2006). Errors in variables and spatial effects in hedonic house price models of ambient air quality. *Empirical Economics*, *34*(1), 5–34.

Backhaus, K., Lügger, K., & Koch, M. (2011). The structure and evolution of business-to-business marketing: A citation and co-citation analysis. *Industrial Marketing Management*, *40*(6), 940–951.

Baker, D. R. (1990). Citation analysis: A methodological review. *Social Work Research & Abstracts*, *26*(3), 3–10.
Benson, E. D., Hansen, J. L., & Schwartz, A. L. (1998). Pricing residential amenities: The value of a view. *Journal of Real Estate Finance and Economics*, *16*(1), 55–73.
Bostic, R., Gabriel, S., & Painter, G. (2009). Housing wealth, financial wealth, and consumption: New evidence from micro data. *Regional Science and Urban Economics*, *39*(1), 79–89.
Bourassa, S. C., Hoesli, M., & Peng, V. S. (2003). Do housing submarkets really matter? *Journal of Housing Economics*, *12*(1), 12–28.
Campbell, J. Y., & Cocco, J. F. (2007). How do house prices affect consumption? Evidence from micro data. *Journal of Monetary Economics*, *54*(3), 591–621.
Cervero, R., & Landis, J. (1997). Twenty years of the bay area rapid transit system: Land use and development impacts. *Transportation Research Part A: Policy and Practice*, *31*(4), 309–333.
Chan, K. C., Hendershott, P. H., & Sanders, A. B. (1990). Risk and return on real estate: Evidence from equity REITs. *Real Estate Economics*, *18*(4), 431–434.
Chan, K. F., Treepongkaruna, S., Brooks, R., & Gray, S. (2011). Asset market linkages: Evidence from financial, commodity and real estate assets. *Journal of Banking and Finance*, *35*(6), 1415–1426.
Chaney, T., Sraer, D., & Thesmar, D. (2012). The collateral channel: How real estate shocks affect corporate investment. *The American Economic Review*, *102*(6), 2381–2409.
Chen, C., Ibekwe-SanJuan, F., & Hou, J. (2010). The structure and dynamics of co-citation clusters: A multiple-perspective co-citation analysis. *Journal of the American Society for Information Science and Technology*, *61*(7), 1386–1409.
Crompton, J. L. (2001). The impact of parks on property values: A review of the empirical evidence. *Journal of Leisure Research*, *33*(1), 1–31.
Di Stefano, G., Peteraf, M., & Verona, G. (2010). Dynamic capabilities deconstructed: A bibliographic investigation into the origins, development, and future directions of the research domain. *Industrial and Corporate Change*, *19*(4), 1187–1204.
Diaz, J., III, Black, R. T., & Rabianski, J. (1996). A note on ranking real estate research journals. *Real Estate Economics*, *24*(4), 551–563.
Dombrow, J., & Turnbull, G. K. (2004). Trends in real estate research, 1988–2001: What's hot and what's not. *The Journal of Real Estate Finance and Economics*, *29*(1), 47–70.
Farley, R., Steeh, C., & Krysan, M. (1994). Stereotypes and segregation: Neighborhoods in the Detroit area. *American Journal of Sociology*, *100*(3), 750–780.
Fisher, J. D., Geltner, D. M., & Webb, R. B. (1994). Value indices of commercial real estate: A comparison of index construction methods. *Journal of Real Estate Finance and Economics*, *9* (2), 137–164.
Franklin, J. J., & Johnston, R. (1988). Co-citation bibliometric modeling as a tool for S&T policy and R&D management: Issues, applications, and developments. In A.F.J. van Raan (Ed.), *Handbook of quantitative studies of science and technology* (pp. 325–389). North-Holland, BV: Elsevier Science Publisher.
Fuerst, F., & McAllister, P. (2011). Green noise or green value? Measuring the effects of environmental certification on office values. *Real Estate Economics*, *39*(1), 45–69.
Gaubatz, P. (1999). China's urban transformation: Patterns and processes of morphological change in Beijing, Shanghai and Guangzhou. *Urban Studies*, *36*(9), 1495–1521.
Genesove, D., & Mayer, C. J. (1997). Equity and time to sale in the real estate market. *American Economic Association*, *87*(3), 255–269.
Gibler, K. M., & Ziobrowski, A. J. (2002). Authors' perceptions and preferences among real estate journals. *Real Estate Economics*, *30*(1), 137–157.
Glascock, J. L., Lu, C. L., & So, R. W. (2000). Further evidence on the integration of REIT, bond, and stock returns. *Journal of Real Estate Finance and Economics*, *20*(2), 177–194.
Gomes, L. F. A. M., & Rangel, L. A. D. (2009). An application of the TODIM method to the multicriteria rental evaluation of residential properties. *European Journal of Operational Research*, *193*(1), 204–211.

Grenadier, S. R. (1996). The strategic exercise of options: Development cascades and overbuilding in real estate markets. *Journal of Finance*, *51*(5), 1653–1679.
Gyourko, J., & Keim, D. B. (1992). What does the stock market tell us about real estate returns? *Real Estate Economics*, *20*(3), 457–485.
Hardin, W. G., Liano, K., & Chan, K. C. (2006). Influential journals, institutions and researchers in real estate. *Real Estate Economics*, *34*(3), 457–478.
Hess, D. B., & Almeida, T. M. (2007). Impact of proximity to light rail rapid transit on station-area property values in Buffalo, New York. *Urban Studies*, *44*, 1041–1068.
Himmelberg, C., Mayer, C., & Sinai, T. (2005). Assessing high house prices: Bubbles, fundamentals and misperceptions. *Journal of Economic Perspectives*, *19*(4), 67–92.
Hong, H., Torous, W., & Valkanov, R. (2007). Do industries lead stock markets? *Journal of Financial Economics*, *83*(2), 367–396.
Huang, B., Wu, B., & Barry, M. (2010). Geographically and temporally weighted regression for modeling spatio-temporal variation in house prices. *International Journal of Geographical Information Science*, *24*(3), 383–401.
Jakob, M. (2006). Marginal costs and co-benefits of energy efficiency investments - The case of the Swiss residential sector. *Energy Policy*, *34*(2), 172–187.
Jim, C. Y., & Chen, W. Y. (2006). Impacts of urban environmental elements on residential housing prices in Guangzhou (China). *Landscape and Urban Planning*, *78*(4), 422–434.
Knight, J. R. (2002). Listing price, time on market, and ultimate selling price: Causes and effects of listing price changes. *Real Estate Economics*, *30*(2), 213–237.
Krysan, M., & Farley, R. (2002). The residential preferences of blacks: Do they explain persistent segregation? *Social Forces*, *80*(3), 937–980.
Levitt, S. D., & Syverson, C. (2008). Market distortions when agents are better informed: The value of information in real estate transactions. *The Review of Economics and Statistics*, *90*(4), 599–611.
Leydesdorff, L., & Vaughan, L. (2006). Co-occurrence matrices and their applications in information science: Extending ACA to the web environment. *Journal of the American Society for Information Science and Technology*, *57*(12), 1616–1628.
Ling, D. C., & Naranjo, A. (1999). The integration of commercial real estate markets and stock markets. *Real Estate Economics*, *27*(3), 483–515.
Ling, D. C., & Ryngaert, M. (1997). Valuation uncertainty, institutional involvement, and the underpricing of IPOs: The case of REITs. *Journal of Financial Economics*, *43*(3), 433–456.
McCain, K. W. (1990). Mapping authors in intellectual space: A technical overview. *Journal of the American Society for Information Science*, *41*(6), 433–443.
McCain, K. W. (1991a). Mapping economics through the journal literature: An experiment in journal cocitation analysis. *Journal of the American Society for Information Science*, *42*(4), 290–296.
McCain, K. W. (1991b). Core journal networks and cocitation maps: New bibliometric tools for serials research and management. *The Library Quarterly*, *61*(3), 311–336.
McKercher, B. (2008). A citation analysis of tourism scholars. *Tourism Management*, *29*(6), 1226–1232.
Nerur, S. P., Rasheed, A. A., & Natarajan, V. (2008). The intellectual structure of the strategic management field: An author co-citation analysis. *Strategic Management Journal*, *29*(3), 319–336.
Newell, G. (2003). Analysis of pacific rim property research journal performance. *Brisbane*, *9*, 20–22.
Newell, G. (2014). Ranking of the property journals. *Journal of Property Investment & Finance*, *32* (2), 2.
Newell, G., Acheampong, P., & Worzala, E. (2002). Property research priorities in Australia. *Pacific Rim Property Research Journal*, *8*(2), 127–139.
Newell, G., McAllister, P., & Worzala, E. (2003). Property research priorities in the U.K *Journal of Property Investment and Finance*, *22*(3), 269–282.

Newell, G., McAllister, P., & Worzala, E. (2004b). Property research priorities in UK. *Journal of Property Investment and Finance*, *25*(2), 147–165.
Newell, G., Worzala, E., McAllister, P., & Schulte, K. W. (2004a). An international perspective on real estate research priorities. *Journal of Real Estate Portfolio Management*, *10*(3), 161–170.
Ong, S. E., Ooi, J., & Wong, N. H. (2001). Crossing the great divide?: A survey of US and UK real estate journals. *Journal of Property Investment and Finance*, *19*(6), 519–535.
Ortalo-Magne, F., & Rady, S. (2006). Housing market dynamics: On the contribution of income shocks and credit constraints. *The Review of Economic Studies*, *73*(2), 459–485.
Özçınar, H. (2015). Mapping teacher education domain: A document co-citation analysis from 1992 to 2012. *Teaching and Teacher Education*, *47*, 42–61.
Pace, R. K., Barry, R., & Sirmans, C. F. (1998). Spatial statistics and real estate. *Journal of Real Estate Finance and Economics*, *17*(1), 5–13.
Pasadeos, Y., Phelps, J., & Kim, B. H. (1998). Disciplinary impact of advertising scholars: Temporal comparisons of influential authors, works and research networks. *Journal of Advertising*, *27*(4), 53–70.
Peek, J., & Rosengren, E. S. (2000). Collateral damage: Effects of the Japanese bank crisis on real activity in the United States. *The American Economic Review*, *90*(1), 30–45.
Piazzesi, M., Schneider, M., & Tuzel, S. (2007). Housing, consumption and asset pricing. *Journal of Financial Economics*, *83*(3), 531–569.
Pilkington, A., & Meredith, J. (2009). The evolution of the intellectual structure of operations management—1980–2006: A citation/co-citation analysis. *Journal of Operations Anagement*, *27* (3), 185–202.
Quan, D. C., & Titman, S. (1999). Do real estate prices and stock prices move together? An international analysis. *Real Estate Economics*, *27*(2), 183–207.
Ramos-Rodriguez, A. R., & Ruiz-Navarro, J. (2004). Changes in the intellectual structure of strategic management research: A bibliometric study of the Strategic Management Journal, 1980–2000. *Strategic Management Journal*, *25*(10), 981–1004.
Razali, M. N., Adnan, Y. M., & Baharom, Z. A. (2009, January 18-21) Real estate research agenda: The contribution of Malaysian real estate researchers. Presented at the Pacific Rim Real Estate Society Conference, Sydney, Australia.
Redman, A. L., Manakyan, H., & Tanner, J. R. (1998). The ranking of real estate journals: A citation analysis approach. *Financial Practice and Education*, *8*(Fall/Winter, 1998), 59–69.
Redman, A. L., Manakyan, H., & Tanner, J. R. (1999). A normalized citation analysis of real estate journals. *Real Estate Economics*, *27*(1), 169–182.
Ross, S. L., & Turner, M. A. (2005). Housing discrimination in metropolitan America: Explaining changes between 1989 and 2000. *Social Problems*, *52*(2), 152–180.
Rutherford, R. C., Springer, T. M., & Yavas, A. (2005). Conflicts between principals and agents: Evidence from residential brokerage. *Journal of Financial Economics*, *76*(3), 627–665.
Schulte, K., Newell, G., & Worzala, E. (2003) Property research priorities in Germany. Paper presented at ERES Conference, Helsinki.
Small, H. (1973). Co-citation in the scientific literature: A new measure of the relationship between two documents. *Journal of the American Society for Information Science and Technology*, *24*(4), 265–269.
Small, H. (2003). Paradigms, citations, and maps of science: A personal history. *Journal of the American Society for Information Science and Technology*, *54*(5), 394–399.
Souza, L. (2000). Academic and applied real estate research: “as two worlds collide” or “as two worlds divide”. *Journal of Real Estate Portfolio Management*, *6*(1), 97–100.
Sugimoto, C., Pratt, J., & Hauser, K. (2008). Using field co-citation analysis to assess reciprocal and shared impact of LIS/MIS fields. *Journal of the American Society for Information Science*, *59*(9), 1441–1453.
Sullivan, D., Koester, D., White, D. H., & Kern, R. (1980). Understanding rapid theoretical change in particle physics: A month-by-month co-citation analysis. *Scientometrics*, *2*(4), 309–319.

Tseng, M. L. (2009). A causal and effect decision making model of service quality expectation using grey-fuzzy DEMATEL approach. *Expert Systems with Applications*, *36*(4), 7738–7748.
Veerbek, A., Debackere, K., Luwel, M., & Zimmerman, E. (2002). Measuring progress and evolution in science and technology-I: The multiple uses of bibliometric indicators. *International Journal of Management Reviews*, *4*(2), 179–211.
Waddell, P., Borning, A., & Noth, M. (2003). Microsimulation of urban development and location choices: Design and implementation of UrbanSim. *Networks and Spatial Economics*, *3*(1), 43–67.
Webb, J. R., & Albert, J. D. (1995). Evaluating the real estate journals: The main stream finance perspective. *Journal of Real Estate Research*, *10*(2), 217–226.
White, H. D. (2003). Pathfinder networks and author co-citation analysis: A remapping of paradigmatic information scientists. *Journal of the American Society for Information Science and Technology*, *54*(5), 423–434.
White, H. D., & Griffith, C. (1981). Author cocitation: A literature measure of intellectual structure. *Journal of the American Society for Information Science*, *32*(3), 163–171.
White, H. D., & McCain, K. W. (1998). Visualizing a discipline: An author co-citation analysis of information science, 1972 – 1995. *Journal of the American Society for Information Science*, *49*(4), 327–355.
Wiley, J. A., Benefield, J. D., & Johnson, K. H. (2010). Green design and the market for commercial office space. *Journal of Real Estate Finance and Economics*, *41*(2), 228–243.
Worzala, E. (2002). Bridging the practical/academic divide in real estate. *Pacific Rim Property Research Journal*, *8*(1), 3–14.
Worzala, E., & Tu, C. (2010). Real estate journal quality: Perceptions of the international real estate research community. *Journal of Real Estate Literature*, *18*(1), 21–39.
Wu, F. L. (2000). The global and local dimensions of place-making: Remaking Shanghai as a world city. *Urban Studies*, *37*(8), 1359–1377.
Yavas, A., & Yang, S. W. (1995). the strategic role of listing price in marketing real-estate - theory and evidence. *Real Estate Economics*, *23*(3), 347–368.
Zavadskas, E. K., Turskis, Z., & Tamosaitiene, J. (2010). Risk assessment of construction projects. *Journal of Civil Engineering and Management*, *16*(1), 33–46.
Zhao, D., & Strotmann, A. (2008). Comparing all-author and first-author co-citation analyses of information science. *Journal of Informetrics*, *2*(3), 229–239.