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Identification of changed paradigms in CRE research – a systematic literature review 2005-2015

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Abstract

Purpose – As corporations change their way of working, the importance of corporate real estate (CRE) management has increased. Hence, there is a need to structure the existing knowledge and to identify the latest developments in CRE research. This paper aims to identify the major developments and changed paradigms in CRE research in 2005-2015.

Design/methodology/approach – A systematic literature review is conducted, including papers from seven journals. In three sequential scans, papers were identified for the final analysis, keeping 99 of 1,667 papers.

Findings – Based on nine identified developments, two paradigm shifts were found. The shift from cost minimisation to value delivery was identified. Besides solving current problems, value delivery aims to capture the future value and prevent future problems. The second paradigm shift is from buildings to people. Before the shift, buildings refer to value delivery as a transaction, while the shift to people highlights the aim to provide value-in-use.

Research limitations/implications – This paper focusses on corporate offices, excluding retail, health care, education, publicly owned facilities, etc. This research is limited to CRE research. Therefore, the results are applicable to CRE research but do not cover the developments in practice.

Practical implications – For practitioners, this paper offers a possibility to develop their RE strategies by reflecting their current practices with the identified developments and paradigms in the CRE literature. This paper suggests to conduct a similar research in practice to compare the underlying paradigms.

Originality/value – This paper is based on a systematic literature study, and summarises developments in CRE research over the past 10 years.

Keywords Value, Corporate real estate, Office, Workplace, Paradigm, Corporate real estate management

Paper type Literature review

Introduction

Corporate real estate (CRE) research is a young discipline of increasing importance, reflecting the growing professionalisation of CRE management. As corporations seem to change their way of working more frequently, CRE are adapted and organisations move. This means that people responsible for CRE (e.g. facility, asset and property managers) get more responsibility and are looking for research to gain more knowledge. Therefore, there is a need to structure the existing knowledge on this topic and to identify developments and



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changing paradigms in research. Due to constant changes in corporate business, CRE managers constantly need to align corporate portfolios to ensure that changing business needs are supported, as Dewulf *et al.* (2000) suggests. The changes outside corporations, such as in regulations, politics, finance, climate, attitudes and cities, encourage and obligate managers to search for a new course, to replace old practices and to modify CRE. Additionally, trends such as new ways of working, individualisation, digitalisation and sharing lead to modifications in how to accommodate organisations and their employees.

Many papers have stated that how corporates use offices has indeed changed (Gibson and Luck, 2006; Inalhan, 2009; Van Meel, 2011; Harris and Cooke, 2014; Kojo and Nenonen, 2015), but the supply of office space has not (Harris and Cooke, 2014). This mismatch between demand and supply is also highlighted by De Jonge *et al.* (2009), who developed a framework “designing an accommodation strategy” for corporations to deal with the mismatch. In this paper, the focus is on the demand side, i.e. on user organisations and individual users.

This paper identifies the major developments in CRE research that have contributed to changing paradigms in 2005-2015. A short-term perspective is deliberately chosen. The years 2005-2015 cover the phase when Wi-Fi – an innovation that has enabled us to change the way we work – achieved a success in mass-markets (Lemstra *et al.*, 2011) and a great body of knowledge in the field of CRE was published. The scope of this paper is limited to corporate offices and developments that can be identified on global or regional levels. In this paper, a development refers to an advancement in the way CRE functions. The developments in CRE research are studied from the demand side and therefore exclude developments at the supply side such as the perspective of an investor or developer.

This paper is structured in four parts. After the introduction, an overview of the systematic literature review process is presented. Third, the identified developments from literature are summarised and each development is explicated. Fourth, a synthesis is presented to highlight changing paradigms based on the developments. In the last chapter, conclusions are drawn and future research suggested.

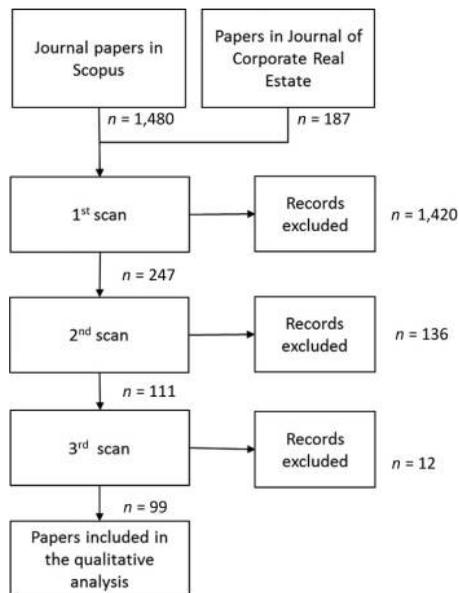
Methodology – a systematic literature study

Several approaches are possible to structure a literature review, such as patchworking, funnelling, zooming and finding intersections (Ridely, 2008). Patchworking suits the aim of this paper. In patchworking (Figure 1), patches are identified that represent research themes (Ridely, 2008). In this approach, all the research themes are identified without including all available literature. This approach fits the paper’s aim to identify major developments in the literature that have contributed to changing paradigms, not to identify a certain group of authors.

Journal selection

To find current scientific knowledge on the topic, scientific journals were selected instead of for example books and research reports. Purposive sampling was used to select representative journals, covering a large range of topics in the field of CRE, identifying all relevant patches. Table I presents a list of selected journals.

Journal of Corporate Real Estate and Facilities were assessed as core journals due to the strong focus on office users. *International Journal of Strategic Property Management*, *Property Management* and *Journal of Real Estate Research* were included for their variety of topics and perspectives including the demand perspective. To cover corporate finance, *Journal of Real Estate Research* and *Journal of Property Research* were included.



Changed
paradigms

Figure 1.
The literature study
scanning steps

Name of the journal	Years	Vol.
<i>Journal of Corporate Real Estate</i>	2005-2015	7-17
<i>Facilities</i>	2005-2015	23-33
<i>International Journal of Strategic Property Management</i>	2005-2015	9-19
<i>Property Management</i>	2005-2015	23-33
<i>Journal of European Real Estate Research</i>	2008-2015	1-8
<i>Journal of Real Estate Research</i>	2005-2015	27-37
<i>Journal of Property Research</i>	2005-2015	22-32

Table I.
Selected journals

Literature scanning

Three scans were conducted to select papers (Figure 1). The papers were collected from two databases: Scopus covered six of the journals, whereas papers published in *Journal of Corporate Real Estate* were retrieved from Emerald's database because only issues published from 2013 onwards were retrievable from Scopus.

Table II presents detailed information from the included and excluded papers in each scan. *Facilities* and the *Journal of Corporate Real Estate* represented 40 and 44 per cent of the included papers, respectively. From the *Journal of European Real Estate Research*, no papers were included in the final analysis. The remaining 16 per cent come from the other four journals.

Criteria to include or exclude a paper

The database was initiated by collecting the basic information including titles, abstracts and publication information from 1,480 papers. Following, three scans were conducted to include

and exclude papers in/from the final analysis based on detailed criteria as presented in [Table III](#).

In the first scan, the paper titles were scanned and when needed also the abstract. Based hereupon, papers with a demand perspective were included and papers without were excluded. For example, if the paper was written from service provider's or investor's perspective or studied a topic related to macroeconomics, the paper was excluded. After the first scan, the number of papers was reduced from 1,667 to 336.

The second scan included two sequential steps where abstracts of the papers were read. When necessary, parts of the paper were read. In the first step, the perspective (demand or supply) and type of property were identified for each paper. Papers without a demand perspective or focus on offices were excluded. An exception was made for theoretical papers that did not clearly state the type of premises. When meeting these two criteria, complementary information was collected in the sequential step, focussing on the topic and key findings of the paper. Based on this information, papers were either included or excluded in/from the analysis based on an assessment where the framework of [Ridely \(2008\)](#) was used. In this framework ([Figure 2](#)), papers are grouped into three groups: papers with a direct connection to the research topic, papers that have an overlap with the research topic and papers connected to broader issues.

Based on the abstract, each paper was assigned to one of these groups, and the argumentation was documented. In the second scan, 134 papers were included for further analysis.

Table II.
The number of included and excluded papers

Scan	Facilities	JofCRE	IJofSPM	JofRER	PM	JofPR	JofERER	Total
<i>First scan</i>								
Excluded	337	83	240	220	257	172	111	1,420
Included	98	104	18	2	14	9	2	247
<i>Second scan</i>								
Excluded	51	56	15	0	8	5	1	136
Included	47	48		2	6	4	1	111
<i>Third scan</i>								
Excluded	7	4	0	0	0	0	1	12
Included	40	44	3	2	6	4	0	99

Table III.
The criteria to include and exclude papers

Phase	Excluding	Including
Initiating the database	Language other than English. Other than scientific papers (e.g. book reviews were excluded)	Papers from 2005-2015 Journals listed in Table I
First scan	Papers written from supply perspective including e.g. service providers, developers and investors. Macroeconometric papers. Papers that do not focus on office, e.g. retail, industrial properties, health care, education facilities or public real estate	Papers written from the demand perspective or having demand as one of the perspectives. Papers focussing on office
Second scan	No full paper available. No perspective on CRE but focus, e.g. on construction process or project management	Full papers Provides perspective to CRE Theoretical papers on CRE
Third scan	No developments were found	Developments were found

In the third scan, the 134 papers were read and scrutinised. In this scan, papers that did not cover any aspects of CRE development, were excluded. Thus, 99 papers were included in the final analysis.

The analysis

The content analysis was conducted using Microsoft Excel. The papers were analysed topic by topic. The scope of searched developments ranged from developments that were still being developed to more matured developments.

According to [Miles and Huberman \(1994\)](#), codes are tags or labels that help to group findings. In this study, the coding provided a system to organise the data and to find links between the findings as [Bradley et al. \(2007\)](#) presents it. The codes were grouped and regrouped until they finally formed patches that represent a development or a group of developments. In total, the analysis included 372 codes from 99 papers, forming 9 groups and 26 sub-groups that present the developments in CRE research.

Results: developments in corporate real estate research

This chapter presents the nine found patches that represent the developments in CRE research. The patches are summarised below:

- (1) Developments in positioning real estate in corporations in CRE research:
 - (1a) Besides a cost element, positioning CRE as a strategic asset.
 - (1b) Real estate management in corporations has professionalised.
 - (1c) CRE related decisions are found to communicate more with HR and ICT.
- (2) Developments in the value delivery approach in CRE research:
 - (2a) From optimising to value delivery.
 - (2b) From economic value to holistic value perception.
- (3) Developments in performance indicators in CRE research:
 - (3a) From cost measurements to measuring also contribution to corporations' objectives.
- (4) Development from cost oriented to cost and productivity oriented in CRE research:
 - (4a) To use less and less office space.
 - (4b) To promote new ways of working and invest in the quality of workplaces.
 - (4c) Geographical redistribution of corporate offices between developed and emerging countries.

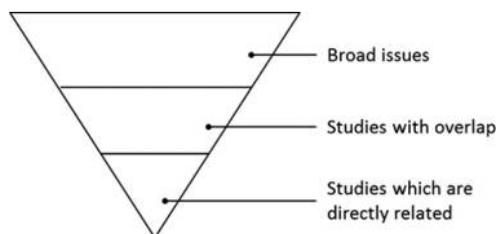


Figure 2.
Assessment
framework from
[Ridely \(2008\)](#)

-
- (5) Developments in outsourcing in CRE research:
 - (5a) Search of alternatives.
 - (6) Developments in sustainability approach in CRE research:
 - (6a) Alongside the environmental aspect, social and economic aspects are gaining more attention.
 - (7b) To neglect sustainability is no longer an option.
 - (7c) Time perspective from short period to the life-cycle of the building.
 - (7) Developments in flexibility requirements in CRE research:
 - (7a) Consolidation of flexibility as a standard demand in contracts and commitment.
 - (7b) Consolidation of flexibility as a standard demand in the physical office environment.
 - (7c) Emergence of flexibility as a standard demand for employees in terms of time and location.
 - (8) Development to promote team and networking over solo working in CRE research:
 - (2a) Teams over individuals:
 - (2b) Working in networks.
 - (9) Developments in the workplace management in CRE research:
 - (9a) From ergonomics to human behaviour.
 - (9b) From owning to sharing.
 - (9c) To trade the lost office elements in workplace transformations for another office element.
 - (9d) Finding a fit between work processes and workplace layouts.
 - (9e) The perception of office noise has started to change.
 - (9f) The increased harnessing of technology in workplaces.

Development in positioning real estate in corporations in corporate real estate research

In CRE literature, positioning of real estate in corporations during the past 10-15 years is consolidated. The literature study identified three major changes. First (1a), in addition to the traditional view of CRE as a cost element, the view of CRE as a strategic asset of corporations has solidified in the CRE literature (Gibson and Luck, 2006; Harris and Cooke, 2014; Haynes, 2012). In literature, the solidification is not only seen among real estate managers but also on corporation level (Ebinger and Madritsch, 2012; Langford and Haynes, 2015). However, it is admitted that the new position is not (yet) widely shared in practice. For example, according to Harris and Cooke (2014), real estate is still often seen as a cost instead of an asset whereas according to Brounen *et al.* (2008) CRE was not the top concern of corporate executives.

Second, during the past 10-15 years (1b), CRE management has taken a big step towards professionalisation (McDonagh, 2008; Harris and Cooke, 2014; McCarty and Gottschalk, 2014). This is explained as a result of improved employee skills (Harris and Cooke, 2014; McDonagh, 2008) and by the increased number of formal, established CRE strategies. Many papers also noticed that the pace of the professional development has not been the same among the corporations: there are corporations in all development stages (McDonagh, 2008)

and in general European and US corporations are found to be ahead of the Asian organisations (Tay and Liow, 2006).

Third (1c), the new state of positioning real estate does not (yet) include systematic cooperation between HR, ICT and RE functions although the importance of communication and cooperation between these functions is emphasised (Lindholm *et al.*, 2006; Shiem-shin *et al.*, 2014; Harris and Cooke, 2014; Jensen *et al.*, 2012). The lack of empirical evidence has not yet pushed CRE research to study this topic in a comprehensive way. For example, based on Sharp's questionnaire study (2013) including 636 responses from CRE managers across 39 countries, (1c) the three units communicate more on an *ad hoc* basis whereas the systematic cooperation is still missing.

Developments in the used value delivery approach in corporate real estate research

In literature, the value delivery of CRE has evolved from optimising service delivery to a holistic value delivery (2a) (Lindholm *et al.*, 2006; Sharp, 2013; Harris and Cooke, 2014; Jensen *et al.*, 2012). McCarty and Gottschalk (2014) explained this:

The emerging organizational blueprint demonstrates a clear move away from the traditional CRE model by optimizing functional service delivery toward a model that drives business integration, strategy development and creative solution deployment.

Value is no longer seen solely as an economic value but has a holistic nature (Jensen *et al.*, 2012). Based on the literature study, three literature streams were identified. In the first stream, the holistic nature is often embodied as added value. The value delivery is extended from shareholder wealth maximisation to contributing to the corporation's business (Gibler and Lindholm, 2012; Lindholm and Leväinen, 2006; Jensen *et al.*, 2012; Langford and Haynes, 2015). For example, CRE can deliver value for marketing and branding purposes (Lindholm *et al.*, 2006; Appel-Meulenbroek *et al.*, 2010; Christersson and Rothe, 2012; Haynes, 2012; Kallio *et al.*, 2015), for innovations and creativity improvements (Lindholm *et al.*, 2006; Parkin *et al.*, 2011), for corporate culture and cultural changes (Warren *et al.*, 2007; Kallio *et al.*, 2015; Brown *et al.*, 2010) and for achieving sustainability goals (Roper and Beard, 2006; Gibler and Lindholm, 2012; Haynes, 2012; Jensen *et al.*, 2014; Masalskyte *et al.*, 2014; Remøy and Van der Voordt, 2014).

In the second stream, the idea is in line with the first stream, but the value delivery is explained through competitive advantage: CRE is found to enhance the competitive advantage of the corporation (Singer *et al.*, 2007; Heywood and Kenley, 2008a, 2008b; De Vries *et al.*, 2008; Hefferan and Wardner, 2012; Shiem-shin *et al.*, 2014).

In the third stream, the attention is on people. In many papers, knowledge workers are regarded the most important asset of companies (Saurin *et al.*, 2008; Inalhan, 2009; Appel-Meulenbroek *et al.*, 2011; Rothe *et al.*, 2012; Harris and Cooke, 2014). Hence, an increasing interest towards workplace management issues is found. For example, the corporate office can be seen as a strategic asset to attract and retain employees. Morgan and Anthony (2008) stated that "workplace has a higher profile role in the war on talent than ever before" and that "many [managers] agree that their building can act as a differentiating factor for potential employees". Similar conclusions are drawn by Lindholm *et al.* (2006) and Gibler and Lindholm (2012).

Developments performance indicators in corporate real estate research

The interest towards performance indicators has been strong for a long time both in academia and practice. Despite the strong interest, not all corporations have CRE-related performance measurements. Langford and Haynes (2015) stated that based on a

report published by EY (2002), “almost 23 per cent [of the responding corporations] had no performance measurement for their CRE at all”. Similarly, Jensen *et al.* (2012) stated that performance measurements are often not listed in the literature, with some exceptions.

Despite the lack of performance indicators presented, a development was identified in the literature: cost measurements are expanded to measure also the contribution of CRE to organisation’s objectives (3a) (Haynes, 2012; Langford and Haynes, 2015; Jensen *et al.*, 2012; Brown *et al.*, 2010). For example, Haynes (2012) stated this clearly:

The demands on the CRE manager require both efficient and effective CRE provision. Efficiency can be demonstrated by cost reduction and is typified by efficiency measures such as cost/m². Effectiveness can be demonstrated by how well the CRE department adds value to the organisation. This could take the form of hybrid metrics such as revenue/m² or profit/m². There is a need for performance metrics that demonstrate effectiveness as well as efficiency.

Development from cost oriented to cost and productivity oriented in corporate real estate research

Productivity and especially productivity increase seem to be the new headache in corporations (Brown, 2008; Morgan and Anthony, 2008; Jensen *et al.*, 2012; Sharp, 2013; Harris and Cooke, 2014). For example, Morgan and Anthony (2008) and Sharp (2013) showed that business managers and leaders have high expectations regarding the contribution of CRE to corporations’ productivity demand.

It seems that cost reduction is transferred productivity enhancement (Morgan and Anthony, Jensen *et al.*, 2012; Sharp, 2013). Jensen *et al.* (2012) explained this through the input-output model:

Improving productivity and decreasing costs turned out to be the most discussed areas of adding value by corporate real estate management. Improving productivity covers the areas of providing a more efficient working environment (input), e.g. less m² and lower costs, and providing effective accommodations and other facilities that support new ways of working and a high quality and quantity of production (output).

In the literature, there are two dominant ways to enhance the productivity: (4a) to use less and less office space (Schwede *et al.*, 2008; Sharp, 2013; Miller, 2014), for example, through providing less and less dedicated desks for employees (Warren *et al.*, 2007; Brunia and Hartjes-Gosselink, 2009; Schlittmeier and Liebl, 2015) and providing more shared space (Rasila and Rothe, 2012; Bennett *et al.*, 2012); and to (4b) promote new ways of working (Jensen *et al.*, 2012; Appel-Meulenbroek *et al.*, 2011) and to invest in the quality of the workplace (Morgan and Anthony, 2008; Sharp, 2013; Harris and Cooke, 2014).

A third way to enhance productivity, although not as dominant as the two previously mentioned, is (4c) to geographically redistribute the corporate office, especially in global corporations. For example, in research by Sharp (2013), including 636 responses from CRE executives from 39 countries, the majority of the CRE managers expected portfolio reductions in most European markets and portfolio growth in countries like China, Russia, South Africa, Brazil and Mexico. Similarly, Too *et al.* (2010) stated that CRE managers have a growing interest in emerging economies. They stated that CRE managers “are attracted to the ‘bargain’ real estate opportunities” in the emerging economies, where 85 per cent of the world’s population will live in the future.

Developments in outsourcing in corporate real estate research

Literature presents that corporations have continued to outsource CRE related services (Gibson and Luck, 2006; Fisher, 2009; Sharp, 2013; Plane and Green, 2012), especially those services that are not strategically important for corporation (Sharp, 2013; McCarty and Gottschalk, 2014). At the same time, for example, the facility management service sector has grown (Sarshar and Pitt, 2009; Meng, 2015). Plane and Green (2012) stated that:

[...] as more organisations made the transition to outsourced FM services, the number of reported cases of failure also began to rise [...] as relationships between clients and contractors did not always prosper as anticipated.

It seems that the failures in outsourcing have led to (5a) searching for alternatives. The focus is shifted from (short-term) transactions to relationships with a long(er)-term focus (Lehtonen and Salonen, 2006; Plane and Green, 2012; Sharp, 2013), although the transaction approach is not rejected (Sarshar and Pitt, 2009; Jensen *et al.*, 2012). Also, the effectiveness of procurements has been discussed (Fisher, 2009; Plane and Green, 2012; Sharp, 2013). For example, Sharp (2013) found that “procurement involvement may hinder the strategic influence of CRE teams, given that 58 per cent of CRE executives say that procurement has limited knowledge of the complexity of CRE services”.

Developments in sustainability approach in corporate real estate research

In the literature, the environmental aspect of sustainability has dominated the discussion. In recent years though (6a), social and economic aspects have gained more attention (Roper and Beard, 2006; Jensen *et al.*, 2012), especially the social aspects such as sustainable behaviour (Christersson and Rothe, 2012; Greene *et al.*, 2014), happier and more productive employees (Armitage *et al.*, 2011) and healthier employees (Roper and Beard, 2006; Jensen *et al.*, 2012).

In the literature, neglecting sustainability is no longer an option for corporations (6b). Sustainability is seen as a risk that needs to be managed (Masalskyte *et al.*, 2014), as a policy shift that needs to be followed (Roper and Beard, 2006) or as an expectation (Masalskyte *et al.*, 2014).

Masalskyte *et al.* (2014) stated that “sustainability is something that cannot be added on later”; it is a matter of a life-cycle. In line with this, (6c) a change in time perspective was identified: instead of focussing on the certain time period defined by a single occupant, the importance of the life-cycle of the building is acknowledged. For example, reuse (Remøy and Van der Voordt, 2014), green buildings (Armitage *et al.*, 2011; Jensen *et al.*, 2012; Meng, 2015), and green building certificates (Christersson and Rothe, 2012; Zieba *et al.*, 2013) are indications of the changed time perspective.

Developments in flexibility requirements in corporate real estate research

In the literature, flexibility has become the new standard for corporations. Due to the changing business environment, flexibility is increasingly preferred on many levels and aspects in corporations (Warren *et al.*, 2007; Too *et al.*, 2010; Harris and Cooke, 2014; Cole *et al.*, 2014).

In the literature, three changes in flexibility requirements were identified. First, (7a) the idea that flexibility needs to be incorporated in contracts and commitments (Lindholm *et al.*, 2006; Haynes, 2012) is solidified. For example, through flexible contracts and commitments unnecessary risks are avoided (Christersson and Rothe, 2012) and running costs and length of commitments are controlled (Harris and Cooke, 2014). Similarly, the idea for (7b) physical flexibility and adaptability of a building (Arge, 2005; Lindholm *et al.*, 2006; Remøy and Wilkinson, 2012; Harris and Cooke, 2014) is consolidated.

Also a third form of flexibility requirement was found: (7c) employees' behaviour is expected to be flexible regarding the time (O'Neill, 2010; Heeroma *et al.*, 2012) and the working location both inside and outside the office (Venezia and Allee, 2007; Inalhan, 2009; Bennett *et al.*, 2010; Cole *et al.*, 2014; Petrulaitiene and Jylhä, 2015; Kojo and Nenonen, 2015).

Development to promote teams and networking over solo working in corporate real estate research

The employee working modus in the knowledge intensive environment has changed. Two developments were found in the literature. First, (8a) team working was preferred over individual working (Warren *et al.*, 2007; O'Neill, 2010; Harris and Cooke, 2014; Petrulaitiene and Jylhä, 2015). Hence, co-working space gains a lot of attention.

Second, the literature states that increasingly more work is done (8b) in networks instead of teams (Szarejko and Trocka-Leszczynska, 2007; Bennett *et al.*, 2012; Remøy and Van der Voordt, 2014). Two network levels were discussed: employees (Szarejko and Trocka-Leszczynska, 2007; Bennett *et al.*, 2010; Bennett *et al.*, 2012) and organisations (Szarejko and Trocka-Leszczynska, 2007; Remøy and Van der Voordt, 2014) working in networks.

Developments in the workplace management in corporate real estate research

Workplace management (WM) has strengthened its role in CRE management literature. The focus has shifted from ergonomics to human behaviour (9a). The research topics cover employee privacy and concentration (Appel-Meulenbroek *et al.*, 2011; Parkin *et al.*, 2011; Haynes, 2012; Kallio *et al.*, 2015), social interaction (Morgan and Anthony, 2008; Greene and Myerson, 2011), employee creativity (Martens, 2011; Sailer, 2011; Cole *et al.*, 2014), culture (Heeroma *et al.*, 2012) and employee health (Appel-Meulenbroek *et al.*, 2011; Too and Harvey, 2012) in the workplace. Many of these studies focus on workplace transformation. It is stated that although the workplace has changed, the habits of the employees have not (Schwede *et al.*, 2008; Inalhan, 2009; Rashid, 2013). This can lead to misuse of work environment (Appel-Meulenbroek *et al.*, 2011).

In the literature, (9b) owning has transformed to sharing. Sharing can take place inside (Brown *et al.*, 2010; Kallio *et al.*, 2015) or outside the corporation (Brinkø *et al.*, 2015; Kojo and Nenonen, 2015). Sharing covers a range of objects such as shared workstations (Brown *et al.*, 2010), workspace and databases (Kallio *et al.*, 2015).

The analysis identified (9c) a solution where one office element is given to compensate the loss of another in workplace transformation. For example, personalisation of workspace (Brunia and Hartjes-Gosselink, 2009; Bennett *et al.*, 2010; Too and Harvey, 2012), personal control over the office environment (Roper and Beard, 2006; Appel-Meulenbroek *et al.*, 2011; Haynes, 2012) and freedom to choose where to work (Warren *et al.*, 2007; Cole *et al.*, 2014; Rothe *et al.*, 2012) are typical examples of compensation.

The fit between work processes and workplace layout is highlighted in the literature (9d). The workplace layout aims to support the work processes of the employees (Appel-Meulenbroek *et al.*, 2011; Haynes, 2012; Heeroma *et al.*, 2012; Bull and Brown, 2012; Petrulaitiene and Jylhä, 2015) and the different work modes and roles (Venezia and Allee, 2007; Greene and Myerson, 2011).

Due to the changing employee working modus at the office, the perception of noise is changing. For example, team work is preferred over solo work and increasingly employees work in networks. Therefore, sounds and noises from the collaboration change the soundscape in the workplace. For example, Rasila and Jylhä (2015) found that employees see that office noise has negative, neutral and positive aspects. Similarly, Chigot (2005) stated that the dilemma between privacy and disruptions is interesting:

In regards of the requirements put presently on offices to support collective processes and knowledge spreading, it is surprising to see that interaction and collective performance are not more used as dependant variables when it comes to the effects of sound. After all, office work is intimately related to the capacity of organising and managing people towards common goals, mostly at a specific setting.

Technology is increasingly harnessed in the workplace (Gibson and Luck, 2006; Szarejko and Trocka-Leszczynska, 2007; Morgan and Anthony, 2008), and wireless technology has become a common requirement, a must-be service in the workplace (9f). According to Morgan and Anthony (2008), more than two-thirds of corporations have sought “to increase flexibility and effectiveness for their employees through the use of wireless technology”. The rapid change continues and according to Tay and Liow (2006), CRE managers need to find a way to accommodate technological changes also in the future. Despite the recognised importance of technology in workplaces, CRE research has not adopted an active role in the development.

The identified paradigm changes

Based on the nine identified patches, two common nominators, i.e. new paradigms, are found and presented in Table IV.

The first new paradigm in CRE research presents the shift from cost minimisation to value delivery. The value delivery does not only mean solving current problems but also ways to capture the future value and prevent future problems. This change is embodied on the strategic and operational levels. On the strategic level, CRE is seen as a strategic asset that delivers value. The value as a holistic concept is generally accepted. In the literature, three value deliveries are highlighted: productivity enhancements, flexibility requirements and sustainability. The performance of the deliveries is increasingly measured and followed through the KPIs on the corporate level, not solely through the KPIs on the CRE level. On an operational level, the CRE function has been found to be professionalised and more holistic value delivery is found to require coordination with other functions (such as HR and ICT). In addition, future value delivery is ensured and future problems are avoided by looking for the potential in the new geographical areas, ensuring flexibility in commitments and physical buildings, and avoiding the problems that the short-term view, for example in contracts, might cause.

The second new paradigm captures the shift from buildings to people. In this paradigm, buildings represent the traditional way of thinking, seeing CRE as a physical object, e.g. delivering a building or workspace as a transaction. The shift to people highlights the aim to provide value-in-use, to serve users, i.e. employees, in their activities and to provide a fit between the user demand and real estate, including the behavioural environment. In CRE research, this value is not provided by delivering more square metres. The value is delivered through solutions such as personalisation, adjustment possibilities and freedom to choose by individuals, or as sharing and technological solutions implemented on individual or team level. However, based on the literature, value capturing is not straightforward: to simply deliver a new workspace is not enough, but employees need to change and adapt their work practices and behaviour to capture value.

Conclusions

Due to the constant changes in corporate business and business environment, CRE portfolios are aligned to make sure that changing business needs are supported. In this paper, a systematic literature study covering the years 2005-2015 was conducted to identify the major developments that have contributed to changed paradigms in CRE research. Considering the relatively short history of CRE as a research discipline, where the pioneering publications were published late 1980 and early 1990 (Veale, 1989; Nourse and

Development	From cost minimisation to value delivery	From buildings to people Individual	Teams
<i>1. Developments in positioning real estate in corporations in CRE research</i>			
1a Besides a cost element, positioning CRE as a strategic asset	x		
1b Real estate management in corporations has professionalised	x		
1c CRE related decisions are found to communicate more with HR and ICT	x		
<i>2. Development in the value delivery approach in CRE research</i>			
2a From optimising to value delivery	x	x	x
2b From economic value to holistic value perception	x	x	x
<i>3. Development in performance indicators in CRE research</i>			
3a From cost measurements to measuring also contribution to corporations' objectives	x		
<i>4. Development from cost oriented to costs and productivity oriented CRE management research</i>			
4a To use less and less office space	x		
4b To promote new ways of working and invest in the quality of workplaces	x	x	x
4c Geographical redistribution of corporate offices between developed and emerging countries	x		
<i>5. Developments in outsourcing in CRE research</i>			
5a Search of alternatives	x		
<i>6. Developments in sustainability approach in CRE research</i>			
6a Alongside the environmental aspect, social and economic aspects are gaining more attention	x		
6b To neglect sustainability is no longer an option	x		
6c Time perspective from short period to the life-cycle of the building	x		
<i>7. Developments in flexibility requirements in CRE research</i>			
7a Consolidation of flexibility as a standard demand in contracts and commitment	x		
7b Consolidation of flexibility as a standard demand in the physical office environment	x	x	x
7c Emergence of flexibility as a standard demand for employees in terms of time and location		x	x
<i>8. Development to promote team and networking over solo working in CRE research</i>			
8a Teams over individuals			x
8b Working in networks			x
<i>9. Developments in the workplace management in CRE research</i>			
9a From ergonomics to human behaviour		x	
9b From owning to sharing			x
9c Establishing an idea to trade the lost office elements in workplace transformations for another office element		x	
9d Finding a fit between work processes and workplace layouts			x
9e The perception of office noise has started to change		x	x
9f The increased harnessing of technology in workplace		x	x

Table IV.
The new paradigm in
the CRE research

Roulac, 1993; Joroff *et al.*, 1993), the study period covers a period when a great body of knowledge is published.

The analysis of 99 papers identified nine developments in CRE literature: these are developments:

- (1) in the position real estate in corporations;
- (2) in the value delivery approach;
- (3) in performance indicators;
- (4) from cost oriented to costs and productivity oriented;
- (5) in outsourcing;
- (6) in sustainability approach;
- (7) in flexibility requirements;
- (8) to promote teams and networks over solo working; and
- (9) in the workplace management.

Based on the identified changes, two new paradigms in CRE research were revealed. The first new paradigm refers to the shift from cost minimisation to value delivery. The value delivery focusses on ways to capture the future value and prevent future problems. The second paradigm refers to the shifting focus from buildings to people. In this paradigm, buildings represent the traditional focus on real estate, e.g. to deliver a building or workspace as a transaction. The shift to people highlights the aim to provide value-in-use to serve users, i.e. employees in their activities, and to provide a fit between the user demand and CRE including the behavioural environment.

For practitioners, this paper offers a possibility to develop their RE strategies by reflecting their current practices with the identified developments and paradigms in the CRE literature. This paper suggests to conduct a similar research in practice to compare the underlying paradigms. In addition, reflections from other fields, for example, from HR and ITC, would foster theorisation of value delivery in the field of CRE. A platform is needed to develop, test and verify the existing CRE models and frameworks. For example, more research is needed to understand to what extent value can be delivered on the strategic level if the value delivery on the operational level fails. Also, more multidisciplinary research is required, for example, including engineers, architects, psychologists, anthropologists and occupational health experts, to deliver theory of the use-value of workplaces.

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