Corporate real estate management and companies' success

Citation for published version (APA):

Pfnuer, A., Seger, J., & Appel-Meulenbroek, R. (2021). Corporate real estate management and companies' success: empirical evidence for a conceptual framework. *Journal of Corporate Real Estate*, 23(4), 243-262. <https://doi.org/10.1108/JCRE-12-2019-0051>

Document license:

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DOI:

[10.1108/JCRE-12-2019-0051](https://doi.org/10.1108/JCRE-12-2019-0051)

Document status and date:

Published: 27/04/2021

Document Version:

Publisher's PDF, also known as Version of Record (includes final page, issue and volume numbers)

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
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Corporate real estate management and companies' success: empirical evidence for a conceptual framework

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Received 10 December 2019
Revised 20 August 2020
29 December 2020
12 February 2021
Accepted 15 February 2021

Abstract

Purpose – The purpose of this study is to explain the contribution of Corporate Real Estate Management (CREM) to corporate success and to substantiate it empirically. However, no empirically tested holistic concept classifies and explains the different success contributions of CREM in their mechanisms of action and organisational levels.

Design/methodology/approach – This study develops a holistic two-dimensional model from existing literature to explain the relationship between CREM decisions and business success, and then tests it empirically using multidimensional data scaling from a telephone company survey (CATI) of 59 CREM managers sampled from the 200 largest German companies.

Findings – The created theoretical model holistically explains CREM success and existence as part of a non-property company, with specific performance drivers on specific organisational levels. The empirical data confirm that both dimensions of the model and, thus the measurement concept for modelling the CREM contribution to business success is robust across sectors and company/portfolio size in Germany.

Originality/value – The empirical confirmation of the conceptual model of CREM success provides novel support for the institutionalisation of the CREM function in companies and the holistic classification of different CREM research directions.

Keywords CREM concept, Property management, Multidimensional scaling, Corporate real estate finance, CREM organisation, CREM performance, CREM model

Paper type Research paper

1. Problem

Corporate real estate management (CREM) must justify its existence as a supportive function in the company by contributing to the company's success. Therefore, knowledge of the mechanisms that CREM should trigger to improve corporate success is existential for any CREM department or researcher. There is broad agreement on the substantially high potential of CREM to support corporate success. However, opinions differ on what

The authors would like to thank the German Property Federation ZIA for making the empirical study financially possible.

Journal of Corporate Real Estate
Vol. 23 No. 4, 2021
pp. 243-262
© Emerald Publishing Limited
1463-001X
DOI 10.1108/JCRE-12-2019-0051

comprises “success.” From the perspective of the workplace research community, the main proven contributions are increases in work productivity, employee satisfaction and employee health (Appel-Meulenbroeck *et al.*, 2018). From the real estate finance community’s point of view, CREM’s contributions are primarily based on financial success such as shareholder value (Brounen and Eichholtz, 2005), whereas for the construction and facility management community, CREM success primarily involves reducing life cycle costs and/or CO₂ emissions (Hartmann, 2011). A closer look at CREM success also suggests that it is not only about the three effects, but especially about how they are perceived. It is relevant through whose eyes success is measured and judged. In the Chief Financial Officer’s view, for example, measures that contribute to greater employee well-being at the workplace are perhaps merely unnecessary high investments, whereas the human resources department could find it essential.

The discussion of CREM’s contribution to success has a direct impact on the definition of CREM’s internal goals and the institutionalisation of CREM in the company. Therefore, CREM strategy, organisation and control should also be indirectly derived from the success mechanisms between CREM and corporate success. For example, decisions on which board of directors segment is responsible for CREM and whether the CREM area is managed as a cost or profit centre are, in many cases, significantly influenced by the success effects attributed to CREM by the decision-maker. The efficiency of every substantial CREM decision, whether on institutional organisational structures or on the provision of real estate properties, can only be assessed considering the expected contributions to profits.

In addition to the question of the institutionalisation of CREM, the realistic depiction of CREM success also determines the budget allocated by the company for the provision of real estate resources and, thus, the dimensioning of CREM. If success mechanisms are neglected in the evaluation of CREM success, then the results are often insufficient resources for the CREM team. A lack of resources then quickly leads to a downward spiral of the effectiveness of a company’s operational real estate management. Numerous empirical studies show that in corporate practice, CREM success is often reduced either to minimising property provision costs or to user satisfaction (Pfnür, 2014). Overall, it can, therefore, be assumed that CREM success is systematically underestimated.

There are many theoretical and empirical contributions in the most diverse lines of development of CREM within its specific mechanisms. Nonetheless, systematic reviews of CREM literature (Engelen *et al.*, 2019) show that even decisions within one of the mechanisms regularly have numerous different effects on success for different cases. Thus, it is conceivable that super-additive and counteracting effects of the different mechanisms of action for CREM regarding corporate success exist. One example is the widespread competition for success between investment costs, user satisfaction and property value development (Kämpf-Dern and Pfnür, 2014). So far, there is a lack of meta-studies that take a holistic view of CREM’s contribution to success and, importantly, also test the networked interactions of individual success mechanisms. Therefore, this study takes a first step towards closing this research gap. Firstly, it clarifies which relationships have been identified in the literature between CREM and corporate success and how these different relationships can be arranged conceptually in a holistic model. This model is not new in all its components. Rather, the innovation consists in explaining and measuring the individual CREM functions and their value contribution in a holistic model that includes detailed success parameters and distinguishes internal organisational levels. Next, it is examined whether such a conceptual model can be confirmed by empirical validation. Section 2 explains the mechanisms and the meaning of success in more detail.

2. Impact of real estate on the success of three different economic transformation processes of companies

First, the term “success” must be clarified. How “successfully” the result of a decision is evaluated fundamentally depends on the objectives pursued and the corresponding behaviour of the decision-maker. Concerning CREM, the definition of clear behavioural assumptions is not very simple. Kämpf-Dern *et al.* (2013) show that depending on the importance of property in the company’s economic transformation process, management decisions are characterised by different behaviour. They assume that the following three different behavioural assumptions can apply to corporate real estate (CRE) decision-makers (Figure 1).

Real estate is the output of a *production process* or a service process in the construction and real estate industry (“Produce” in Figure 1). From a CRE point of view, these services are partly provided by the company itself, but can also be purchased on the market. The target figure “profit” is defined differently by CREM than by external suppliers. While suppliers maximise profit parameters, such as the contribution margin from the products, a rationally acting CREM achieves its profit by minimising the supply costs for its own company.

Using real estate as an *operating resource* in the service provision process is probably its original meaning in CREM (Silverman and Zeckhauser, 1983). The goal is to maximise the cost–benefit ratio, but it is methodologically and empirically difficult to fully capture the different economic effects on different levels and units of the organisation. Studies have shown many different user outcomes flowing from decisions about the physical workplace and its management is influenced by many different aspects of CRE and its management (Jensen and Van der Voordt, 2016; Appel-Meulenbroeck *et al.*, 2018).

The high capital intensity of real estate implies that real estate can also have a high *financial significance* for corporates. This applies, in particular, to the real estate ownership of companies. Studies on listed firms in the USA and Germany show that the book values of real estate account for approximately 20% of market capitalisation (UBS 2005 cited by

Figure 1.
Real estate in three different economic transformation processes

Source: Kämpf-Dern *et al.* (2013)

Pfnür, 2014 [1]; Chaney *et al.*, 2012), although some studies also emphasise that there are large differences across industry sectors (Brounen and Eichholtz, 2005). Corporates are thus among the major real estate investors on the real estate market. In such situations, fluctuations in the value development of the properties influence the profit, risk and liquidity ratios of corporates. The same applies to the tax burden on companies.

Due to its nature, every property fulfils these three economic functions as an economic good at the same time. Efficiency criteria must therefore be applied to real estate decisions from all three perspectives. The degree of freedom in making decisions is reduced accordingly. Each property decision can be made only once, so the significance of the property in its three different functions must be clarified beforehand. This naturally results in conflicts of objectives, which is CREM's most important task to solve. Kämpf-Dern and Pfnür (2014) show that CREM does not have "one best model," but only a "best fit" depending on the target weights of the three perspectives. Empirical studies from the USA and Europe (Hartmann *et al.*, 2007a) on the relative importance of the success of the three CRE functions for corporate success support these theoretical considerations.

The decomposition of the three different perspectives of CREM profit contributions for the company allows the complete recognition of all success effects. However, decisions will be rather more difficult than easier to make if the effects of success compete with each other. Such competing success effects of the individual CREM performance mechanisms become clear when taking a closer look at the details of the three respective mechanisms.

2.1 Mechanism I USE: operating performance of corporate real estate management

The purpose of non-property companies having real assets is to use them as a resource in the service and/or product creation process. These considerations are inseparable from the resource-based view of the firm (Penrose, 1959; Barney, 1991); the success and the *raison d'être* of a company can be explained by its unique resources. Pfnür (2002) shows that a company's real estate resources can also be a source of a long-lasting, the inimitable competitive advantage and that resource decisions in general and real estate in particular can significantly impact both the benefits and costs for users. These benefits are also referred to as use values (Appel-Meulenbroek and Haynes, 2014). These use values of CREM differ according to the hierarchical levels of an organisation (described by Lynch and Cross [1992]). The hierarchical levels can be described as normative, strategic, tactical and short-term level. At the normative level, the CREM contributes to success by supporting corporate vision at the overall organisational level. At the strategic level, real estate-related decisions can open up potential for success while at the tactical and short-term level the focus lies on individual activities and the employee. There are numerous other studies discussing the benefit–cost relation of real estate assets at different levels of decision-making from the organisation as a whole to the individual employees of a company. The authors of such contributions may not explicitly mention these hierarchical levels of the companies, but implicitly they use them as well (Lindholm *et al.*, 2006 for a similar classification). Tables 1–3 detail the user-related value of CREM and show selected literature that supports them. The relationships are summarised systematically in Figure 2.

2.2 Mechanism II PRODUCE: real estate performance of corporate real estate management

Real estate performance measures the performance of economic tasks in the provision of real estate, including planning, production, operation and exploitation. This is where the real estate success resulting directly from CREM's activities is measured and is also referred to as "exchange value" (Appel-Meulenbroek and Haynes, 2014). Table 4 systematises the interdependencies in detail and cites selected literature.

2.3 Mechanism III INVEST: financial performance of corporate real estate management

Due to its high capital intensity, real estate ownership has a considerable influence on the financial management of the company, which is why real estate investments by corporates always require a valuation from the corporate finance perspective (Liow and Nappi-Choulet, 2008). Table 5 systematises the interdependencies in detail and cites selected literature.

The CREM impacts presented in the three mechanisms are evaluated by stakeholders based on their individual preferences. Strategic impact mechanisms of CREM, such as corporate identity measures, often have a long time horizon before achieving measurable success. Examples from corporate practice show that individual stakeholder groups rate short-term successes relatively higher. This evaluation of CREM success by stakeholders has so far been discussed primarily in the context of shareholder value management (Booth, 1999; Lindholm *et al.*, 2006), however, that concept only measures value from the provision

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CREM value in. . .	Description	Lit. sources (examples)
Corporate identity value of CREM	Real estate acts as an instrument of environmental design impacting the corporate identity and brand of the company	Appel-Meulenbroek <i>et al.</i> (2010)

Table 1.
Normative value
contribution of
CREM

CREM value in. . .	Description	Lit. sources (examples)
Creating and enhancing strategic opportunities	CREM could be a strategic enabler whether in response to strategic driving forces (Tregoe and Zimmerman, 1980) or in creating competitive advantages (Porter, 1985). To this end, corporate and real estate strategies must be aligned The real estate assets owned or occupied by an organisation provide the opportunity to embrace the sustainability agenda. Through the effective management of buildings over their life cycle, building occupiers can reduce the negative impact that their buildings have on the environment, improve the impact that their buildings have on social well-being and provide economic benefits to the business through reduced maintenance and refurbishment costs	Nourse and Roulac (1993), Roulac (1999), Lindholm and Leväinen (2006), Scheffer <i>et al.</i> (2006), Lindholm (2008), Liow and Nappi- Choulet (2008), Gibler and Lindholm (2012), Appel- Meulenbroek and Haynes (2014) Hodges and Sekula (2013), Falkenbach <i>et al.</i> (2010), Brown <i>et al.</i> (2010)
Creating strategic flexibility	The forms of provision (rent/ ownership) influence the degree of flexibility in realigning with the changing business environment	Gibson and Lizieri (2000), Appel- Meulenbroek <i>et al.</i> (2019), Verhoeff <i>et al.</i> (2014)
Reinforcing employer branding	Companies increase their attractiveness in the war-for-talent by targeted site selection, attractive architecture, appealing office concepts and a range of additional services	Khanna <i>et al.</i> (2013)

Table 2.
Strategic value of
CREM

Table 3.
Tactical and short-term value of CREM

CREM value in . . .	Description	Lit. sources (examples)
Enhancing collaboration on process and workplace level	Real estate interventions can increase or hinder collaboration and other interactive processes. Following the argumentation of Roulac (1999) , real estate and its location play a fundamental role in the value chain	Bradley (2001) , De Vries et al. (2008) , Roulac (1999)
Enhancing the innovation capabilities	The spatial design of the work environment can support or hinder innovative processes such as creative thinking and knowledge sharing	Appel-Meulenbroeck et al. (2017) , Davis et al. (2009)
Enhancing labour productivity	The physical organisation of work has a significant impact on labour productivity. Several studies have empirically shown that CRE design could impact employee productivity by 5%–15%	Pfnür and Weiland (2010) , Abdou and Lorsch (1994a, 1994b) , Clements-Croome and Li (1997) , Roelofsens (2002)
Enhancing individual well-being, engagement and motivation	Job performance at the workplace depends on many physical environmental factors impacting several different outcomes besides productivity and satisfaction. Appel-Meulenbroeck et al. (2018) show the complexity of causal relationships and that research is only just beginning. Recently, interest in well-being and engagement has risen, which correlates with satisfaction and productivity (Bakker and Demerouti, 2008)	Appel-Meulenbroeck et al. (2018) , Bakker and Demerouti (2008) , Engelen et al. (2019)
Enhancing employee satisfaction with the workplace	Abundant evidence for effects of specific physical work environment characteristics on employee satisfaction with CRE has been provided. CRE has become a major corporate real estate strategy in practice (Jensen, 2010)	Kim and de Dear (2013) , Bodin-Danielsson and Bodin (2008) , Budie et al. (2019)

Figure 2.
Causalities between real estate resources and operating performance (from strategic to operative)

Table 4.
Real estate
performance of
CREM

CREM value in. . .	Description	Lit. sources (examples)
Real estate value performance	Pfnür and Armonat (2004) and Louko (2004) show that in the past, corporates with their own real estate recorded high increases in value at times; however, as Mansfield and Pinder (2008) state: "It is clear that the depreciation of value is a function of two distinct negative processes: physical deterioration and obsolescence," which come with age. Brounen and Eichholtz (2005) and Hartmann <i>et al.</i> (2007a) see the fact that non-property companies worldwide are reducing their real estate assets as an indication that they also see efficiency disadvantages compared with the market in terms of the performance of their own real estate management. There appears to be an increase in profitability for stockholders if CRE is sold (Glascock, Davidson and Sirmans, 1991). Buildings that are easier to adapt and suitable for different types of users are easier to sell and for a better price than more specialised buildings (Nourse and Roulac, 1993)	Louko (2004), Pfnür and Armonat (2004), Brounen and Eichholtz (2005), Hartmann <i>et al.</i> (2007a), Glascock <i>et al.</i> (1991)
Optimising occupancy costs	Lindholm (2008) attributes CRE's contribution to the company's success to the reduction of real estate costs. Sourcing has a major influence on the costs incurred in CREM. The real estate costs can be divided into fixed (e.g. mortgage, taxes) and flexible costs (e.g. maintenance and energy). Both are influenced by the building's materials, the location and structural aspects. Layout choices are also relevant because open layouts show lower refurbishing costs and faster moves of departments (Van der Voordt, 2004). The installation type can have a significant effect on energy costs (Todesco, 1998). However, CRE costs have been significantly related to overall company turnover and profit (Cooke <i>et al.</i> , 2019)	Heyden (2005), Lindholm (2008), Pfnür (2014), Van der Voordt (2004), Todesco (1998), Cooke <i>et al.</i> (2019)

of real estate (PRODUCE). Regarding operating performance (USE), there are few approaches that can quantitatively account for the mostly qualitative success of operating performance in shareholder value. Finally, financial performance influences the level of shareholder value through the financing structure and its influence on the overall corporate financing. All three interdependencies between CRE and shareholder value converge at the top management level (Figure 3).

The following empirical analysis provides a deeper insight into the developed model and, finally, to confirm its validity.

3. Methodology of the empirical validation

A comparative assessment of the three mechanisms must be based on richer data than just balance sheet and capital market data and spread over the diversity of all mechanisms. Therefore, direct questioning of the responsible decision-makers seemed particularly

Table 5.
Financial
performance of
CREM

CREM value in. . .	Description	Lit. sources (examples)
Optimising the capital structure	<p>Due to the capital intensity of CRE, ownership decisions and the associated choice between debt and equity have a significant influence on the capital structure (Bosch-Badia <i>et al.</i>, 2017). The capital structure correlates both with the property assets owned and with the company's performance (Du and Ma, 2012). The positive correlation between ownership and increased leverage can be explained, for example, by the collateral effect of real estate (Gan, 2007; Chaney <i>et al.</i>, 2012; Cvijanovic, 2014). According to this, the lendability of CRE can reduce debt costs and increase the capacity to raise capital. The positive effect of property-related changes in the capital structure can also be explained by tax advantages and in relation to possible bankruptcy costs (Bosch-Badia <i>et al.</i>, 2017). Accordingly, an optimal ownership strategy that takes capital structure into account can influence capital market performance (Du and Ma, 2012).</p> <p>Brounen and Eichholtz (2005) demonstrate a negative correlation between ownership intensity and business risk, depending on the company's sector. Seiler <i>et al.</i> (2001) find no evidence that owner-intensive companies experience diversification advantages. The diversification potential of real estate property strongly depends on the extent to which companies are already diversified elsewhere (Du <i>et al.</i>, 2014). If involved conglomerates are highly divergent, then the immobility-related diversification effects are significantly lower. Du and Ma (2012) also note that real estate ownership has a stronger diversifying effect for companies with a lower proportion of debt capital.</p> <p>Various studies conclude that the risk-adjusted capital costs of companies rise with growing real estate assets (Liw, 2004; Brounen and Eichholtz, 2005). Rising risk costs are identified as the reason for higher capital costs (Tuzel, 2010; Liow, 2010; Ling <i>et al.</i>, 2012; Rochdi, 2015). Deng and Gyorko (1999) attribute this effect to inefficiencies resulting from the mixing of real estate ownership and use. They also argue that large real estate assets dilute the risk profile of the core business of non-property companies. As a result, investors are becoming more uncertain about performance. Risk costs will rise.</p> <p>Liw and Nappi-Choulet (2008) argue that investments in CRE, for example, can lead to a mismatch between corporate cash flow (liquidity) and corporate liabilities. However, whether owner-intensive companies are less liquid depends on the conditions of local real estate markets. Thus, the factors of stability of value and saleability have a decisive influence on liquidity (Golan, 1999).</p> <p>Provided the real estate markets are liquid, CRE ownership can secure liquidity during recessions or when a company is in financial difficulties (Bryan, 2003). In times of positive business development, the release of capital tied up in CRE can serve to finance the necessary investments to exploit growth potential (Du <i>et al.</i>, 2014).</p>	<p>Gan (2007), Tuzel (2010), Chaney <i>et al.</i> (2012), Du and Ma (2012), Cvijanovic (2014), Zhao and Sing (2014), Bosch-Badia <i>et al.</i> (2017), Mao (2017)</p> <p>Seiler <i>et al.</i> (2001), Liow (2004), Brounen and Eichholtz (2005), Tuzel (2010), Liow (2010), Ling <i>et al.</i> (2012), Du and Ma (2012), Du <i>et al.</i> (2014), Rochdi (2015)</p> <p>Golan (1999), Bryan (2003), Liow and Nappi-Choulet (2008), Du <i>et al.</i> (2014)</p>
Optimising corporate risk and the risk premium on the cost of capital		
Optimising the liquidity

Figure 3.
Framework for the three mechanisms of CREM performance

suitable for their assessment of the significance of the three mechanisms. The selection of participants was limited to CREM decision-makers of large German companies (> 10,000 employees) as they would manage substantial amounts of CRE. Those responsible for CREM were identified and interviewed in October/November 2018 during a 30-minute computer assisted telephone interview (CATI) using a structured questionnaire. A total of 196 companies were contacted by the market research institute Forsa. Reduced by random sample-neutral failures, and the net population was 156 companies. At the end, 59 complete interviews were conducted (response rate = 38%). The sample was positively tested with the usual tests for representativeness for the population. The distribution of companies and their space uses are as shown in [Figure 4](#).

The performance drivers from the literature review and numerous control variables, such as the economic sector, number of employees, the success of the company, the size of real estate holdings, their distribution among the types of real estate use and their regional distribution, were surveyed. A report of the results with the research strategy and the questionnaire is available for download on the internet. (Note by the authors: For reasons of anonymity of the authors, we will only add the link here once the contribution has passed the review process.) The importance of the performance mechanisms was questioned on a Likert scale of 1 to 6 (1 as highest value). After a lengthy theoretical consideration with the help of market research experts and initial tests in the population with different scales, it was concluded that a six-point Likert scale led to the best results to achieve a sharpened differentiation as to whether a CREM goal is important or not. Simultaneously, a six-point scale is comparatively broad and correspondingly strongly differentiating.

To confirm or deny the separation of the effects of CREM in the different mechanisms, the data set was analysed using multidimensional scaling (MDS) ([Kruskal and Wish, 1984](#)). MDS is a suitable method for this as it can cluster performance drivers in a multidimensional space. MDS allows the positioning of performance drivers, as derived earlier, according to their relative importance in multidimensional space. In comparison to traditional cluster models, it is not about the clustering of test persons, but about the relative

Figure 4.
Industry and space
use distribution of the
sample

distance of the performance drivers to each other. In this way, the empirical data can be used to test which performance drivers can be aggregated to consistent mechanisms and, thus, confirm whether the model derived above is supported. The result of the MDS is a reflection of the perception of the CREM performance drivers by management. For reasons of simplification, it should be possible to map the perceptual space in as few dimensions as possible. The application of the MDS method therefore starts with the determination of the number of dimensions at which the model exhibits the highest quality (Kruskal, 1964) to find the optimal solution between closeness to reality and complexity of the analysis in two-dimensional space. The Elbow criterion shows that in the case of the data available here, a two-dimensional solution leads to the best result (Figure 5).

The absolute stress-I value of the two-dimensional solution is 0.08 and, thus, below the approximated limit value of about 0.24 expected for random variables, with a standard deviation of about 0.01. The boundary values for a two-dimensional solution with 11 items can be taken from the Spence and Ogilvie (1973) simulation tableau. This procedure allows a more differentiated evaluation of the quality than a simple comparison using the limit values proposed by Kruskal (1964). The quality criteria “Dispersion Accounted For” (D.A.F.) and “Tucker’s Coefficient of Congruence” with values of 0.99 and 1.00 also indicated a good solution.

SPSS was used as software to generate similarity matrices, with the Euclidean distance serving as a measure. Subsequently, MDS solutions were generated using the SPSS-PROXSCAL module.

Figure 5.
Stress values of
different dimensions
(Elbow criterion)

4. Empirical results

4.1 Univariate analysis

A first descriptive evaluation of the data shows the relative importance of the CREM's performance drivers (Table 6). The number of cases (n) for each variable varies due to missing values.

When interpreting the results, it first becomes apparent that labour productivity, employer branding and enabling collaboration/processes are the most important performance drivers for the CREM decision-makers (lowest mean values). These are all drivers from the field of operating performance. The average rank of 2.38 (s.d. = 0.53) for all drivers in operating performance is higher as well than that of 2.77 (s.d. = 0.98) for real estate performance and 3.36 (s.d. = 1.1) for financial performance. Thus, the results show that the user function currently outweighs the corporate finance function according to surveyed German CREM executives. The contribution to success made by their role as real estate producers lies in between regarding its importance but closer to the importance of the user function than the finance function.

In addition, the data provide insight into whether the success impact of CREM is seen to be more short- or long-term. For the strategic–tactical–operational relevance of CREM for corporate success, the results, however, present a less clear picture. The normative relevance is ranked highest at 2.33 (s.d. = 1.04) followed by short-term with 2.69 (s.d. = 0.85), strategic with 2.70 (s.d. = 0.68) and tactical with 2.71 (s.d. = 0.72). This means that no clear pattern is currently discernible.

Finally, the perception of the importance of drivers by CREM managers might differ between industry, company size, portfolio size and structure. One could expect that companies with largely fungible office properties in metropolitan regions (e.g. from the insurance and banking sectors) attach greater importance to financial performance while companies from the manufacturing sector with a higher proportion of industrial real estate care more about operational performance. However, no significant difference between the sectors or company or portfolio sizes was present except for industry sector and liquidity (chi-square (4, $n = 56$) = 10.67, $p = 0.031$). However, in the subsequent and more detailed pairwise *post hoc* Dunn–Bonferroni test, no significant difference can be found after

Table 6.
Descriptive statistics

Mechanism	Hierarchy	Performance driver	<i>n</i>	Mean	S.D.	Variance	Total mechanism, mean (S.D./variance)
Operating performance (USE)	Normative	Corporate identity fit	59	2.32	1.04	1.08	2.38 (0.53/0.28)
	Strategic	Enabling strategic opportunities	56	2.84	0.99	0.97	
	Strategic	Enabling strategic flexibility	59	2.32	1.22	1.50	
	Strategic	Employer branding	59	2.15	0.93	0.86	2.77 (0.98/0.97)
	Tactical	Enhancing innovation	59	2.82	0.71	0.50	
	Tactical	Enabling collaboration/ processes	59	2.27	0.96	0.93	
	Short-term	Labour productivity	59	1.93	0.85	0.72	
Real estate performance (PRODUCE)	Tactical and strategic	Real estate value and occupancy costs	59	2.77	0.98	0.97	
Financial performance (INVEST)	Strategic	Capital structure and adjustment costs	57	3.54	1.27	1.61	3.36 (1.10/1.21)
	Tactical	Costs of capital risk premium	56	3.05	1.38	1.91	
	Short-term	Liquidity	56	3.54	1.54	2.36	

Bonferroni correction has been conducted. Therefore, these CREM decision-makers appear consistent in their opinion across all included control variables.

4.2 Testing the theoretical model by multidimensional scaling

The main research purpose of the study is to provide empirical proof that the relationships between CREM decisions and business success follow the pattern of the three mechanisms developed in the literature section. As a result of the MDS analysis, the performance drivers are plotted as points in the two-dimensional perception space of decision-makers as explained in Section 3. The interpretation is done by two separate approaches. First, the perception space created can be subdivided into vertical areas (Figure 6). If the performance drivers are positioned in a common area, then they are more related and, thus, could be said to form a common performance mechanism (Borg and Staufenbiel, 2007). [2] This subdivision shows that the variables can indeed be summarised in the corresponding mechanisms M1–M3. The developed theoretical framework therefore seems to be valid at this point.

In the next interpretive step, the solution space was divided into horizontal layers (Figure 7). The horizontal interpretation of the solution space indicates the hierarchical levels of the CREM performance (Figure 3). The resulting hierarchy is similar to the theoretically developed CREM performance framework. It becomes clear that the short-term and tactical drivers are centrally located and have spatial proximity to each other. In contrast, drivers with long-term effects are located in two different peripheral layers. This interpretation is supported by a closer look at the descriptive statistics of the three layers presented in Table 6. The peripheral variables have higher standard deviations on average than the more centrally located ones. The performance drivers summarised in Figure 7 as short-term and tactical have a mean of 2.650 and a standard deviation of 0.6425. The variables of the upper/lower peripheral layer have a mean value of 3.184 (s.d. = 0.874)/2.481 (s.d. = 0.744). This increased the standard deviation can be interpreted

Figure 6.
Vertical interpretation

Figure 7.
Horizontal interpretation

as uncertainty, which is particularly high in the case of long-term performance creation. This is a further confirmation of hierarchy as relevant dimension. However, the proof of the hierarchical arrangement into short- and long-term layers leaves one question unanswered: why are long-term effects divided into two layers? A possible answer to this question could be provided by the interpretation of the two axes, as explained in the following.

Another interesting aspect of the analysis of the results of an MDS is the interpretation of the meaning of the axes (Figures 6 and 7). The solution in two-dimensional space shows that dimension one separates the variables exactly into three known performance mechanisms: operating performance (M1), real estate performance (M2) and financial performance (M3). The arrangement corresponds to that of a conflict line on which the CREM objectives of operating performance and financial performance are perceived as extreme points, and the objectives of real estate performance are classified between these extremes. The theoretical model of CREM performance is also confirmed in this alternative form of interpretation.

The interpretation of the second dimension is not as simple but it is also valuable. Comparison with the average agreement values from Table 6 shows that the items are arranged along the second dimension in a weak descending order of importance. The second dimension could, therefore, be interpreted as a management issue and pressure for action. This could also answer the question raised above as to why long-term performance drivers

are divided into two horizontal layers (Figure 7). It seems that surveyed CRE managers not only distinguish between short- and long-term performance drivers. The latter are also divided into more and less important performance drivers according to their influence on the firm's success. A slightly decreasing relevance of the performance drivers from the negative to the positive value range of the ordinate can be observed. Particularly, relevant drivers such as flexibility, employer branding or corporate identity tend to be located in the lower part of the figure while less important drivers such as capital structure and adjustment costs, strategic opportunities or liquidity are located in the upper part.

5. Practical and theoretical implications

From the development and empirical validation of the framework, quite fundamental suggestions for further development of the CREM concept in theory and practice arise. Firstly, the conceptual considerations and the empirical results show that the contribution of CREM to corporate success cannot be reduced to the success of a single performance mechanism. For the scientific discussion of CREM topics, the present analysis shows that it is obviously not sufficient to measure the connection between CREM and corporate success with balance sheet and capital market data. Even the simple addition of the contributions of individual CREM performance mechanisms to corporate success does not go far enough. Rather, the complex interactions of the mechanisms must be taken into account systemically when measuring success. For the further scientific development of CREM, it follows that there is a need for more cross-reflection on the different strands of CREM success literature as described earlier. This is not intended to call into question the significance of this research in areas such as workplace, real estate corporate finance or real estate services. Rather, an important task in the future will be to continue the holistic discussion of CREM's contributions to success extended here with two dimensions and empirical support. This analysis is challenging because it requires interdisciplinary and diverse research groups to be brought together around one table.

In practice, this means that the institutionalisation of CREM in the company needs to be critically examined. It is questionable whether organisational models in which CREM responsibility is distributed among the functional areas or centralised unilaterally in one functional area can be effective against the background of these results. Rather, organisational models that consider the profit contributions from all performance mechanisms equally in all important decisions, such as portfolio investments or reorganisation of real estate management, seem more appropriate. Empirical studies on existing organisational models show that this is the exception rather than the rule (Hartmann, 2011). In particular, the splitting of central real estate responsibility into construction management, facility management, real estate financing, workplace management and other units appears counterproductive. Instead, a stronger centralisation and coordination of responsibility for success should be discussed. Irrespective of this, the operational and tactical tasks can remain distributed across the existing functional cross-section of functional areas.

Second, the results suggest placing more importance on managing the particular interests of the different internal and external stakeholders. Particularly in the case of competing contributions to success by the CREM performance mechanisms, a central CREM unit has the task of institutionalising the reconciliation of real estate interests. In practice, the CREM's self-image shifts away from the function of the provider of property management services to a central management function, that is responsible for coordinating of property management interests of the stakeholders. This also requires additional skills as real estate performance fully lies within the expertise field of CREM departments; however,

for operating and financial performance, it is necessary to synchronise with other business functions (e.g. human resources, finance, marketing and sales) to deliver success. The effect of CRE(M) on the organisation's output is indirect for these mechanisms; therefore, as predicted by the resource-based management view, coordination is essential to achieve synergy.

This empirical study is time-related, and the relative weighting of CREM's contributions to success through the different performance mechanisms might change significantly in the future. In the past, comparable empirical studies from Germany confirmed this dynamic. In 1998, German CREM managers still rated real estate performance (reduction of property use costs) as the most important contribution to CREM's success (Pfnür, 1998); however, financial performance gained the upper hand at the turn of the millennium (Pfnür and Hedden, 2002). Since the financial and economic crisis, the focus has been on operating performance (Pfnür and Weiland, 2010). German CREM currently mostly value labour productivity, employer branding and enabling collaboration/processes as outcomes of the CREM decisions they make. This might be typical for the German market. Several studies in other countries have consistently found that reducing real estate costs is the most important goal/strategy of CRE managers (Gibler *et al.*, 2010; De Vries *et al.*, 2008). Ultimately, only an international longitudinal analysis can clarify how the target priorities in CREM are shifting and why this is the case.

6. Limitations and future research

This research has limitations, for example, no longitudinal data were used, only the CRE managers of the companies were interviewed (not all stakeholders) and the study was limited to large companies in Germany. These results could differ significantly in different economic strata and different parts of the world; thus, further research is recommended on these aspects. There are also limitations to the available research results concerning the further scientific processing of the data. In particular, the CREM's contribution to success, especially in times of structural change in companies, comes about in close cooperation with other corporate divisions that have not been surveyed here. These are on the one hand the users, but also the human resources and IT departments. To obtain a complete picture of the effectiveness of CREM in a company, cross-departmental research designs will have to be increasingly used in the future.

The analysis of the various literature strands on the connection between CREM and corporate success has revealed a complex picture when looking at it all together. The empirical confirmation of the model in all its complexity shows the interdisciplinary nature of CREM in companies. A reduction of CREM's goals, structures and processes solely to financial, user-oriented or real estate performance-based aspects appears to lead to inefficient solutions. Future research should measure actual corporate successes to confirm this.

Generally, CREM's contribution to success is not only determined by the strategies and measures for the three mechanisms by those responsible in CREM, but also by stakeholders in the CREM environment (Dyllick, 1992). The results of the literature review imply that perhaps the most important challenge for CREM could be to solve the conflict of interest of the various stakeholders. The above references to empirical works show that over time there can be considerable differences in the weights of the different performance mechanisms and there may also be regional differences. In Germany, sector, company size and portfolio composition do not appear to provide an explanation for the weights of the different performance contributions of the CREM respondents; however, this might be different in

other regions. Finally, the complexity of the model developed here confirms the insight that there can be no one best model for CREM, only one best fit.

Notes

1. This ratio naturally depends on the market cycles of the capital and real estate markets. The year 2005 was deliberately chosen as the year before the financial and economic crisis, when both markets had comparatively average conditions.
2. To simplify interpretation, the spanned space was rotated.

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