

PAPER • OPEN ACCESS

New building portfolio – assessment model for sustainable and future-proof company-owned building stocks

To cite this article: 2020 *IOP Conf. Ser.: Earth Environ. Sci.* **588** 022061

View the [article online](#) for updates and enhancements.

You may also like

- [Solving portfolio selection problems with minimum transaction lots based on conditional-value-at-risk](#)
E.P. Setiawan and D. Rosadi
- [The application of genetic algorithm optimization on quadratic investment portfolio without a risk-free asset under Value-at-Risk](#)
Sukono, S. Supian, H. Napitupulu et al.
- [An application of almost marginal conditional stochastic dominance \(AMCSD\) on forming efficient portfolios](#)
Isnandar Slamet, Siska Mardiana Putri Carissa and Hasih Pratiwi



The Electrochemical Society
Advancing solid state & electrochemical science & technology

241st ECS Meeting

May 29 – June 2, 2022 Vancouver • BC • Canada

Abstract submission deadline: Dec 3, 2021

Connect. Engage. Champion. Empower. Accelerate.
We move science forward



Submit your abstract



New building portfolio – assessment model for sustainable and future-proof company-owned building stocks

Abstract. An essential task for residential property companies to maintain their long-term viability is to secure the future rentability/marketability of their buildings. On top of that, they should also be willing to take on more responsibility for the environment and society to contribute to sustainable development. Both tasks are closely interlinked. The question that arises is how and with which tools residential property companies should control the further development of their building stocks in order to meet these requirements. Residential property companies use tools for the analysis and management of their existing building portfolio. Models that link location characteristics and building performance with rental success provide one approach. In the context of using methodological approaches such as cause-effect relationships, scoring methods and regression analysis, the paper discusses how dependencies between megatrends, rental success, location characteristic and property performance can be better modelled. The paper also attempts to introduce additional indicators that are directly related to sustainable development objectives. The result is a concept that supports the advancement of portfolio analysis methods, which both integrates additional sustainability aspects and takes into account a dynamically changing environment (shift in values towards sustainability, political framework conditions, climate change). In particular, the paper presents the interdependencies between external environment and location / building on the one hand, and location and building on the other. By modelling the correlation between the impact of the respective megatrend and the underlying portfolio assessment, the model can support portfolio managers of residential property companies in their work. Results can serve as an early warning indicator and form the basis for recommendations for action regarding the portfolio strategy.

1. Introduction

Companies in the property and real estate sector are currently facing new challenges as a result of climate change, the change in values and the resulting changes in user needs as well as demographic change. These are referred to as megatrends [1] and, when applied to the real estate sector, lead to fundamental changes in the requirements placed on buildings and locations. Managing the opportunities and risks arising from megatrends plays a decisive role in the management of the company's own building stocks (portfolio), however, with regard to sustainability issues, such opportunities and risks have not, so far, been given adequate consideration in classical instruments for controlling the development of building stocks [2]. In the following, a concept for the further development of tools for portfolio analysis based on a two-dimensional matrix including the dimensions location characteristic and building performance is presented. This matrix, integrates additional sustainability aspects, while also allows the consideration of a dynamically changing environment (shift in values towards sustainability, political framework conditions and climate change). In particular, the interdependencies between environment and location/object on the one hand, and location and object on the other, are presented and discussed. There are direct references to the global sustainable development goals SDG 11 (sustainable cities and communities), 12 (responsible consumption and production), and 13 (climate action).



2. Proposals for the further development of portfolio management

Real estate portfolio management tools can support decision makers in the strategic orientation of the company. According to Wellner (2003), the main task of the real estate portfolio manager is to secure long-term value in connection with the future rentability and marketability of the entire property portfolio [3]. This infers the necessity to actively manage large property portfolios. However, the instruments themselves must also be updated and adapted to the current requirements arising from the goals of sustainable development and, in particular, climate protection.

2.1. Qualitative portfolio management as a starting point

In the real estate industry, in addition to mathematical-statistical approaches to portfolio management based on Markowitz's portfolio selection theory [4], a large number of qualitative approaches have been developed over time. On the foundation of strategic corporate planning, qualitative instruments, in particular Boston Consulting Group's (BCG) market share/market growth portfolio and McKinsey's market attractiveness/business strength portfolio, were transferred to the real estate industry. A characteristic attribute of qualitative portfolio models is the representation of the respective correlation in a two-dimensional matrix. In this way, the interdependencies of two dimensions can be visualized. Kook and Sydow (2010) went one step further and integrated a third dimension: rental success [5].

The instruments used so far in practice have only taken into consideration aspects relating to sustainability in a limited number of cases. Schleich (2012), for example, provides an initial methodological approach to show real estate investors strategies for integrating sustainability aspects into their corporate strategy and management processes [6].

2.2. Proposal for the integration of additional location and building aspects

Analysing and assessing existing properties serves as the base for target-oriented management and further development of real estate portfolios. In the interest of future-oriented corporate development, building stocks must be constantly monitored to determine whether and at what level current and future requirements are already being fulfilled or can be fulfilled in the future.

In the following concept proposed by the present authors (Figure 1), the qualitative assessment of the individual properties within the building portfolio is based on a two-dimensional matrix along the dimensions "location characteristics" and "building performance", taking into consideration a changing environment. The assessment of the dimension "location characteristics" includes "micro-location" and "land quality". The characteristics of the dimension "building performance" are subdivided into the two subcategories "building quality" and "quality of residential living". They document a snapshot of the building's condition and, in addition, reflect essential characteristics that influence current and future rentability and marketability from the user/tenant perspective. The property analysis using traditional instruments is usually based on the TEGoVA property rating framework published in October 2003 by the European umbrella organisation of national property valuation organisations [7].

The integration of sustainability aspects into the property analysis proposed by the present authors aims to identify those qualities and characteristics of a property which may influence its risk assessment in the future and which so far have not - or only inadequately - been taken into consideration in traditional analyses. In addition to the object characteristics that are usually already considered in practice, the aspects listed in Table 1 should also be considered in future.

In addition to defining the characteristics to be valued for each portfolio dimension, the concept of the portfolio model presented here includes a valuation scale for each characteristic as well as a weighting on which the characteristics are based. The latter can be individually adjusted depending on the portfolio strategy selected and the effects of the megatrends in the submarkets.

The traditional and additional location and building characteristics (Table 1) are used in the development of the new catalogue of characteristics for both dimensions.

Table 1: Additional sustainability aspects taking into consideration megatrends.

Sustainability aspect and sub-aspect			Megatrend*
location	micro-location	consequences of climate change at the location	(A)
		proximity to public transport / alternative traffic concepts (shared mobility)	(B) / (C)
characteristics	land quality	solar radiation (e.g. for solar power generation)	(B)
		land conditions (e.g. rainwater infiltration, heat pump)	(B)
		access to renewable energy (e.g. local heating / district heating) / charging station	(B) / (C)
building performance	building-quality	resilience to the consequences of climate change	(A)
		summer heat protection	(A)
		energetic state	(A) / (B)
	quality of residential living	thermal comfort	(A) / (B)
		indoor air quality	(B)
		accessibility	(B)
		flexibility of the floor plan / utilization neutrality of the rooms	(B)
	image (energy efficiency / climate neutrality / sustainability certifications)	(B)	
	individual feeling of safety	(B)	

Notes:

* (A) ecological trend, (B) sociological trend, (C) technological trend

See also figure 1.

Taking into consideration possible correlations and the changing importance of characteristics in response to megatrends, the respective weighting factors are dynamically adjusted. Thus, the predictable consequences of the already occurring climate change at the respective location lead to demands on technical quality – shown here on the resilience of the buildings' construction and on the quality of summer thermal protection – as well as to an increased relative importance of these property quality characteristics. In addition, the shift in values towards sustainability leads to an increasing demand for proximity to public transport (changed mobility behaviour) as well as a stronger focus on a building's image. The latter is represented by the underlying energy efficiency, the climate neutrality of the building or the existence of a sustainability certificate (growing environmental awareness). Depending on the structure of the characteristics catalogue and taking into consideration the company's own portfolio strategy, further correlations between dimensions must be considered, particularly when looking at the weighting. A dynamic weighting with a correction factor prevents a strong negative expression from being equalised by other positive expressions.

The result of the qualitative two-dimensional object analysis (sum of the point values in the dimensions "location characteristics" and "building characteristics") is subsequently transformed into a matrix point, whereby the diameter of the circle represents the level of the current market value, determined by the capitalized earnings value. This is based on a statement regarding the expected rental income. General recommendations for action (standard strategies) which support the portfolio optimisation process can be derived from the properties' respective matrix positions. Examples are "deep energy retrofit" and/or "energy-efficient renovation".

In a final step, the results can now be combined on individual object levels to form a portfolio position. During the aggregation, instead of the arithmetic mean of the individual positions the authors use the market value-weighted average to ensure that the analysis also takes into account the significance of the individual properties within the overall portfolio regarding the influence of sustainable risk characteristics [8].

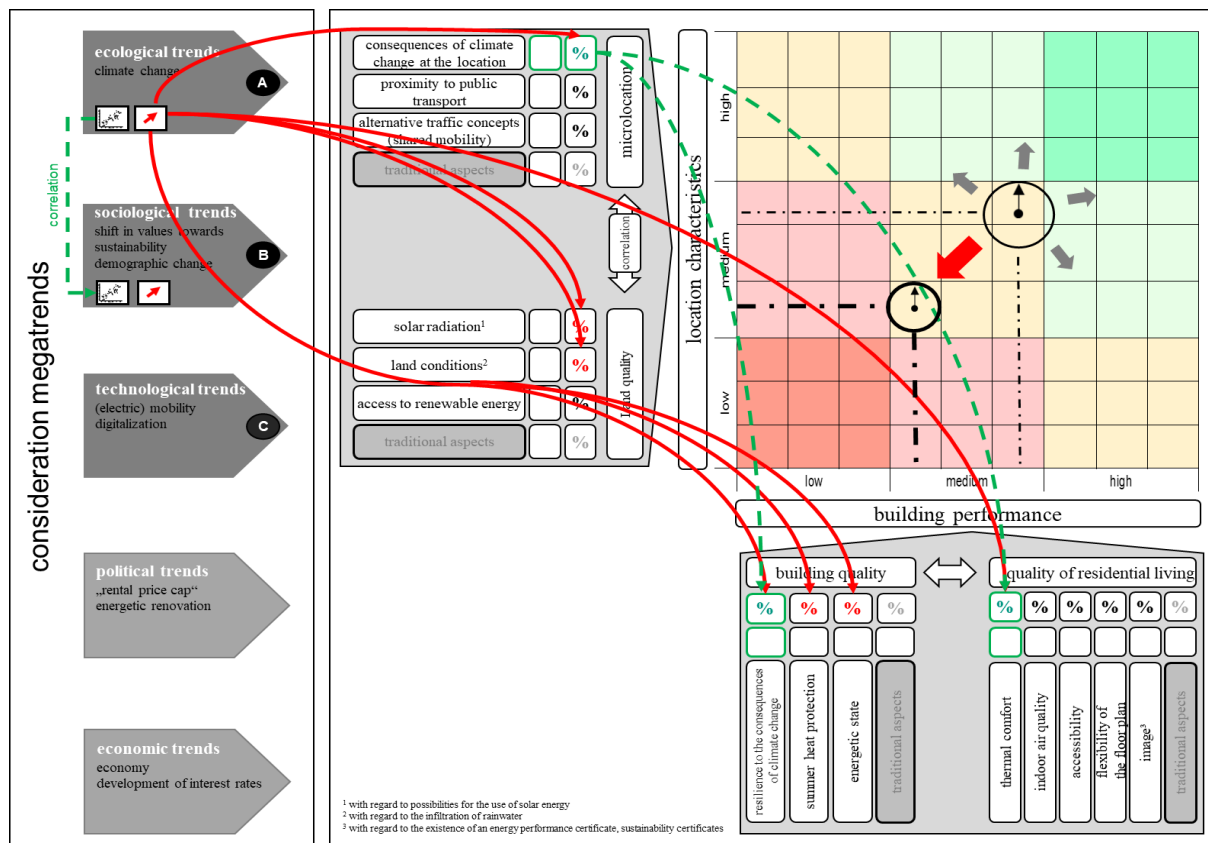


Figure 1. Integration of sustainability aspects into a two-dimensional portfolio model taking into consideration megatrends.

3. Conclusion

The model developed (Figure 1) shows a portfolio analysis and portfolio management tool with improved information value regarding the long-term opportunity/risk profile of building stocks. It can support residential property companies in the sustainable development of their portfolios and thus contributes to achieving the objectives of SDGs 11 (sustainable cities and communities), 12 (responsible consumption and production), and 13 (climate action).

References

- [1] Naisbitt J, Abrudene P 1982 *Megatrends: Ten New Directions Transforming our Lives*. (New York)
- [2] Rohde C 2011 *Integration von Nachhaltigkeitsaspekten in Prozesse des immobilienwirtschaftlichen Risikomanagements* (Karlsruhe: Karlsruhe Institute of Technologie) p13
- [3] Wellner K 2003 *Entwicklung eines Immobilien-Portfolio-Management-Systems: Zur Optimierung von Rendite-Risiko-Profilen diversifizierter Immobilien Portfolios* (Leipzig: Universität Leipzig) p36
- [4] Markowitz H 1952 *Portfolio-Selection* (Journal of Finance vol 7) pp 77-91
- [5] Kook H, Sydow M 2010 Strategisches Portfoliomanagement in der Immobilienwirtschaft: ein Leitfaden für Theorie und Praxis vol 2 (Hamburg: Hammonia) pp 42-47
- [6] Schleich H 2012 *Sustainable Property Portfolio Management – With Special Consideration of Energy Efficiency Improvements in the Property Portfolio Stock* (Regensburg: Universität Regensburg)
- [7] The European Group of Valuers' Associations (TEGoVA) 2003 *European Property and Market Rating: A Valuer's Guide* London
- [8] Bone-Winkel S et al. 2016 *Immobilienökonomie I* vol5 (Berlin: De Gruyter) pp 749-758