European Commercial Real Estate Data Alliance (E-CREDA)

European Commercial Real Estate Data Alliance
E-CREDA 2025 Annual Conference

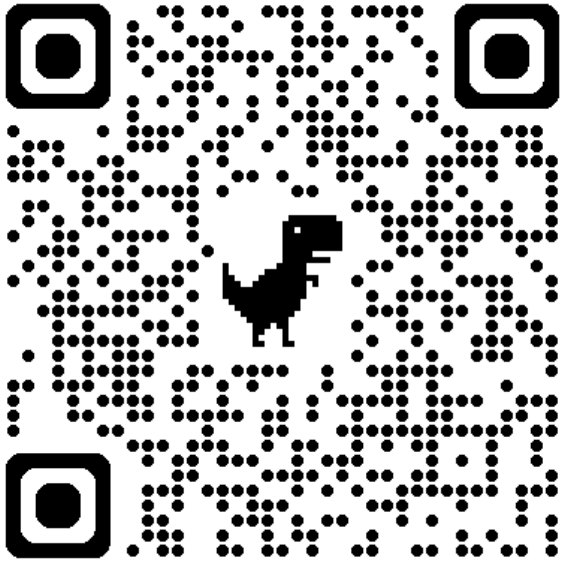
Data-driven real estate & the future of investment decisions in an uncertain world

European Commercial Real Estate Data Alliance (E-CREDA)

Farley Ishaak
The effects of sustainability on real estate transaction prices

The effects of sustainability on real estate transaction prices

Research presentation at the 2025 E-CREDA Annual Conference



Farley Ishaak

&

Hilde Remøy

The effects of sustainability on real estate transaction prices

Conclusion

The effects are both positive and negative: the relationship is complex

Motivation to study the relationship between sustainability and real estate prices

- There is a need for **more sustainable** buildings
- UN: making real estate more sustainable is the **key** to achieving **global climate goals** (Ilo, 2023)
- Yet, a major change in **market behaviour** has not been detected (Sayce & Sundberg Billy Clements, 2010)
- Limited research on how **different sustainability measures** affect **real estate values**

Our definition of sustainability

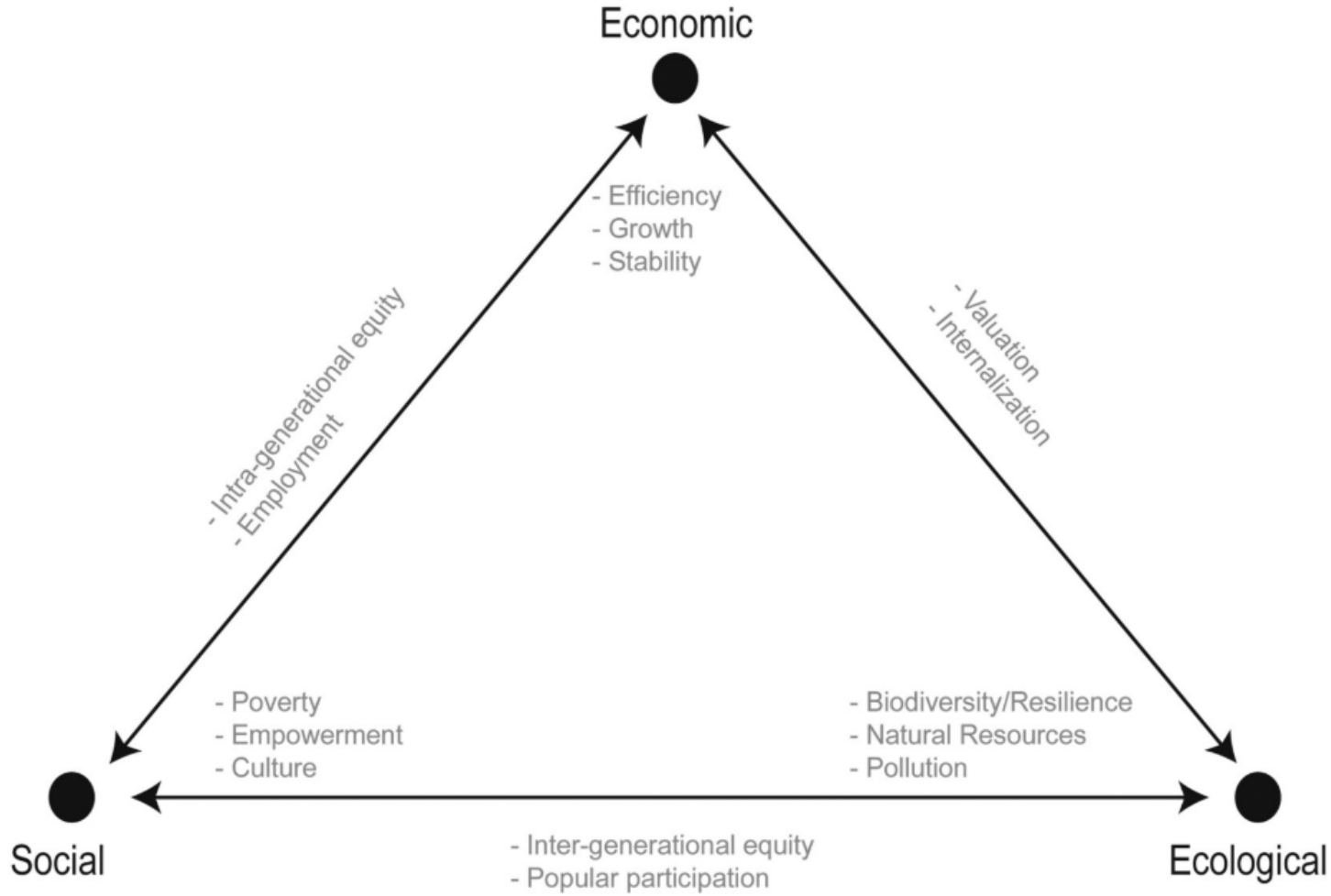
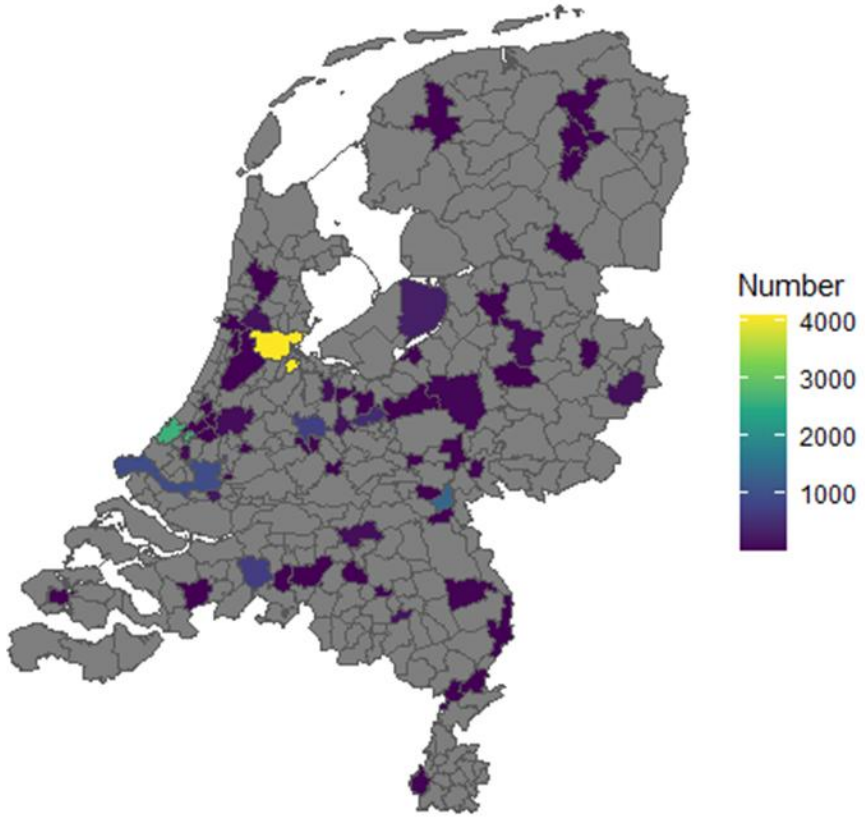


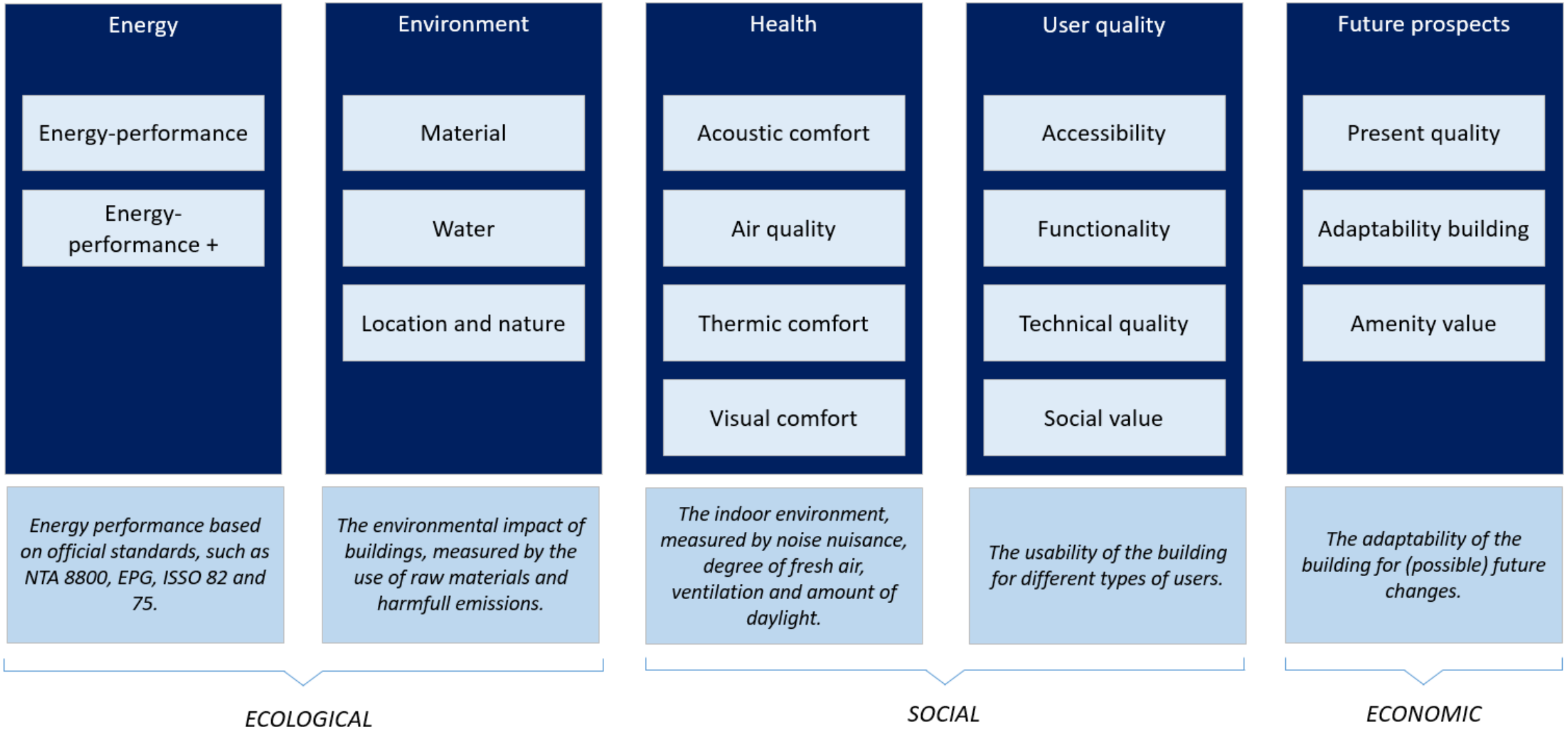
Fig. 1. Graphical representation of sustainable development. Adapted from Munasinghe (1993).

Data

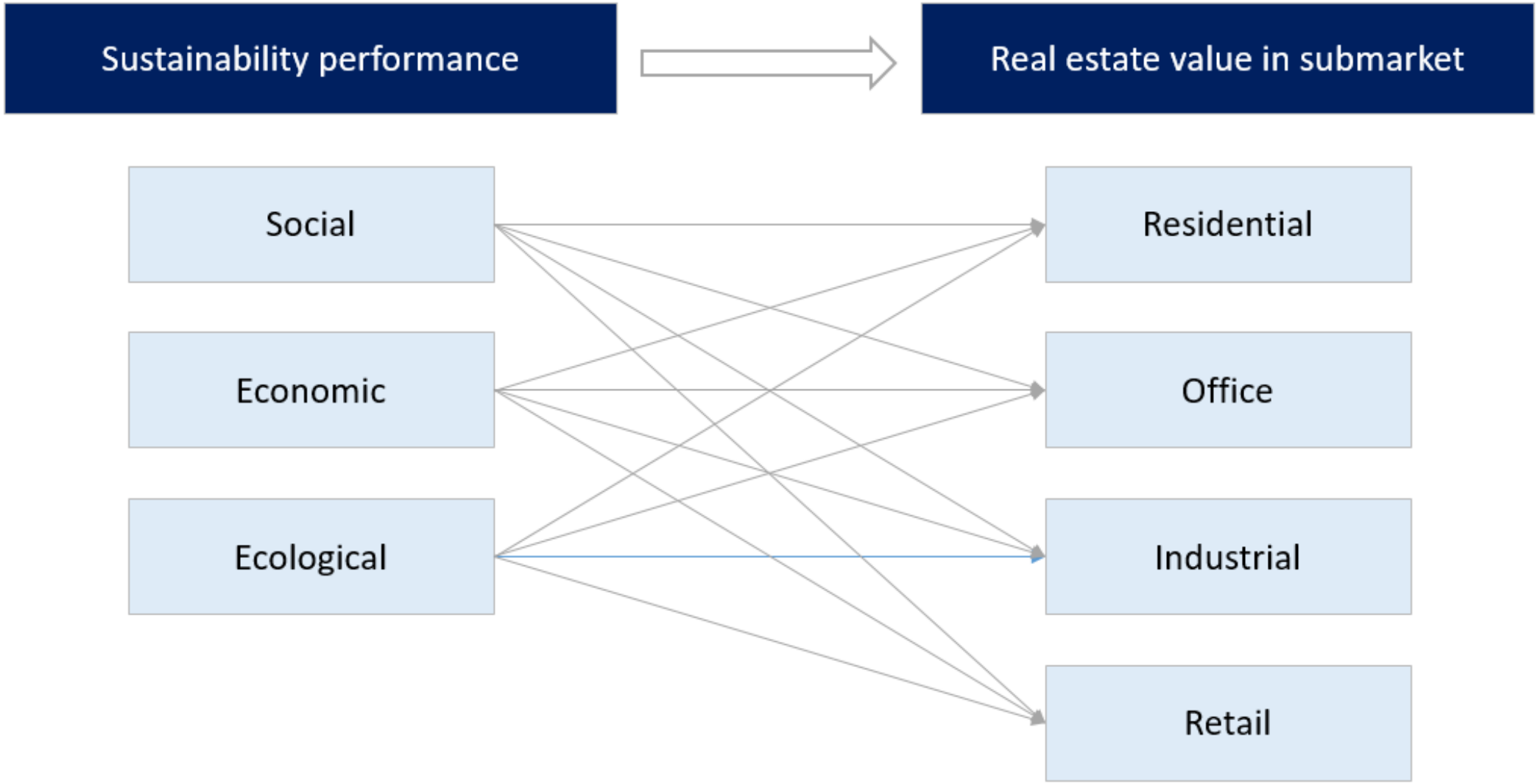
- Sustainability scores from a real estate consultancy
- Transaction prices from the Land Registry Office
- Control variables from official registers
- Total: 13,128 observations
- Range: 2008 - 2023



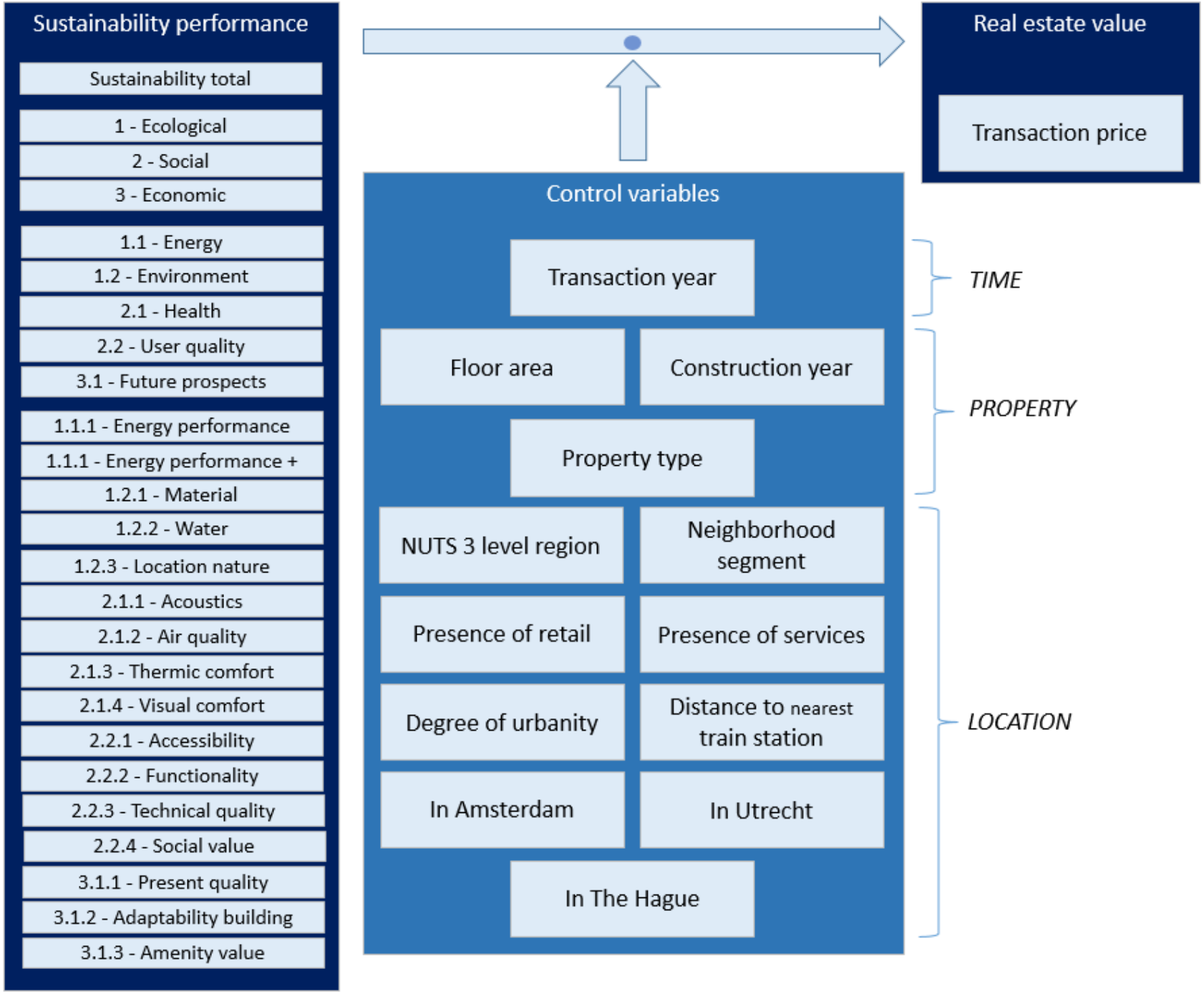
Data


Energy
Energy-performance
Energy-performance +
Environment
Material
Water
Location and nature
Health
Acoustic comfort
Air quality
Thermic comfort
Visual comfort
User quality
Accessibility
Functionality
Technical quality
Social value
Future prospects
Present quality
Adaptability building
Amenity value
Energy performance based on official standards, such as NTA 8800, EPG, ISSO 82 and 75.
The environmental impact of buildings, measured by the use of raw materials and harmfull emissions.
The indoor environment, measured by noise nuisance, degree of fresh air, ventilation and amount of daylight.
The usability of the building for different types of users.
The adaptability of the building for (possible) future changes.
ECOLOGICAL
SOCIAL
ECONOMIC

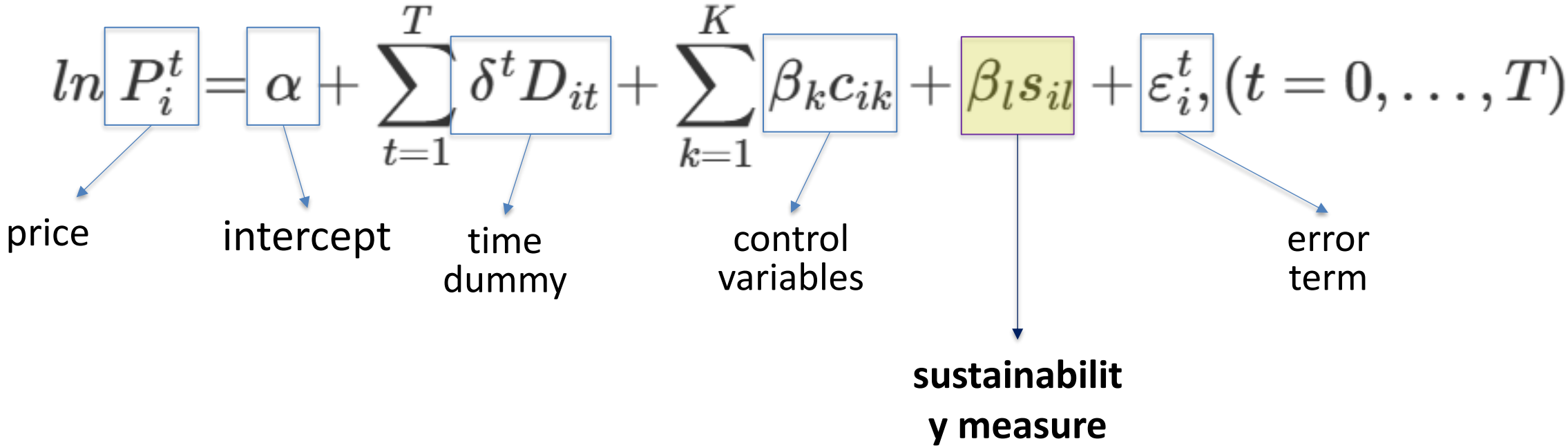
Conceptual model



Conceptual model



Initial method: regression



Follow-up method: hedonic imputation

Imputed price X (low)

$$\ln \widehat{P^t_{z,X}} = \alpha + \sum_{t=1}^{T} \delta^t D_{it} + \sum_{k=1}^{K} \beta_k c_{ik} + \beta_l s_{il} + \varepsilon_i^t, (t = 0, \ldots, T)$$

$$\ln \widehat{P^t_{z,Y}}$$

Imputed price Y (medium)

intercept

time dummy

control variables

sustainability measure

error term

Low → *medium* → *high*

Regression results: model is stable

	(1) without sustainability		(2 - 26) + sustainability scores	
	Estimate (β)+	Sign.	Estimate (β)++	Sign.
Intercept	9.3	***	8.7 : 13.2	***
Year	YES	***	YES	***
Floor surface (log)	0.4	***	0.4 : 0.4	***
Type: industry	1.6	***	-0.9 : 2.3	.
Type: community	6.0	***	2.9 : 6.7	***
Type: office	2.2	***	0.6 : 2.8	***
Type: education	2.2	***	-0.4 : 2.2	***
Type: retail	0.5	***	-1.7 : 1.1	
Type: house	1.7	***	-0.8 : 2.1	***
Type: care	2.3	***	-0.7 : 2.8	***
Construction year category	YES	***	YES	*
NUTS3 region	YES	***	YES	***
Neighborhood segment	YES	***	YES	***
Share service sector	-2.7	***	-3 : -0.3	***
Urbanity degree	-0.1	***	-0.3 : 0.1	
Distance to train station	0.0	***	0.0 : 0.1	***
In Amsterdam	-2.3	***	-3.7 : -1.9	***
In The Hague	-0.8	***	-2.4 : -0.3	***
In Utrecht	-0.4	***	-0.5 : 0.4	***
Adjusted R2	0.73		0.73 : 0.75	
BIC	17,342		16,450 : 17,303	
Number of observations	10,652		10,652	

Regression results: sustainability estimators are both positive and negative

		Medium		High	
		Estimate (β)+	Sign.	Estimate (β)+	Sign.
Sustainability total (2)		-0.8	***	-0.4	***
1	Ecological (3)	-0.9	***	-0.3	***
2	Social (4)	-0.6	***	0.0	
3	Economic (5)	-0.3	***	0.0	
1.1	Energy (6)	0.1	***	0.9	***
1.2	Environment (7)	-1.2	***	-0.7	***
2.1	Health (8)	-0.9	***	-0.3	***
2.2	User quality (9)	-0.4	***	0.3	***
3.1	Future prospects (10)	-0.3	***	0.0	
1.1.1	Energy performance (11)	0.0		0.8	***
1.1.1	Energy performance + (12)	0.2	***	0.4	***
1.2.1	Material (13)	-0.6	***	-0.3	***
1.2.2	Water (14)	-0.2	***	0.4	***
1.2.3	Location nature (15)	0.4	***	0.8	***
2.1.1	Acoustics (16)	-0.8	***	-0.4	***
2.1.2	Air quality (17)	-0.6	***	0.4	***
2.1.3	Thermic comfort (18)	0.4	***	0.6	***
2.1.4	Visual comfort (19)	-0.6	***	-0.7	***
2.2.1	Accessibility (20)	0.3	***	1.0	***
2.2.2	Functionality (21)	-0.8	***	0.3	***
2.2.3	Technical quality (22)	-0.4	***	-0.3	***
2.2.4	Social value (23)	0.2	***	0.4	***
3.1.1	Present quality (24)	0.3	***	0.6	***
3.1.2	Adaptability building (25)	-0.1	**	0.2	***
3.1.3	Amenity value (26)	-1.3	***	-0.7	***

Imputation results from **low** to **medium**: sustainability mainly shows a negative relationship

		Residential	Office	Industry	Retail
Sustainability total		-3.68 (0.13)	-2.38 (0.50)	-4.52 (.)	-7.01 (1.67)
1	Ecological	-3.63 (0.16)	-2.28 (0.31)	-5.06 (.)	-5.27 (1.3)
2	Social	-2.94 (0.22)	-1.97 (0.31)	-2.31 (.)	-6.63 (1.66)
3	Economic	-2.05 (0.27)	-1.62 (0.39)	-1.4 (.)	-1.57 (0.88)
1.1	Energy	0.89 (0.23)	0.52 (0.14)	2.89 (.)	3.17 (1.35)
1.2	Environment	-3.77 (0.24)	-2.91 (0.31)	-2.83 (.)	-3.76 (0.86)
2.1	Health	-2.48 (0.09)	-1.17 (0.25)	-2.05 (.)	-5.99 (1.12)
2.2	User quality	-2.94 (0.40)	-6.29 (2.11)	-2.22 (.)	-3.48 (0.86)
3.1	Future prospects	-2.05 (0.34)	-1.62 (0.39)	-1.4 (.)	-1.57 (1.46)
1.1.1	Energy performance	-0.12 (0.10)	-0.09 (0.08)	-0.31 (.)	-0.33 (0.32)
1.1.1	Energy performance +	1.18 (0.29)	0.75 (0.24)	. (.)	2.39 (1.84)
1.2.1	Material	-1.2 (0.10)	-4.85 (0.93)	-2.41 (.)	0 (1.33)
1.2.2	Water	-4.93 (1.07)	-0.37 (0.06)	-0.87 (.)	-0.6 (0.09)
1.2.3	Location nature	1.86 (0.34)	0.92 (0.23)	27.11 (.)	1.26 (0.24)
2.1.1	Acoustics	-1.26 (0.10)	-0.28 (0.07)	. (.)	-1.31 (0.21)
2.1.2	Air quality	-1.91 (0.27)	-1.62 (0.58)	-1.03 (.)	-8.19 (11.67)
2.1.3	Thermic comfort	2.74 (0.58)	0.86 (0.47)	1.09 (.)	3.27 (1.39)
2.1.4	Visual comfort	-1.41 (0.09)	-2.55 (0.21)	-5.4 (.)	-2.46 (1.33)
2.2.1	Accessibility	1.28 (0.26)	1.46 (0.40)	. (.)	3.62 (0.69)
2.2.2	Functionality	-13.54 (0.77)	-4.65 (1.57)	-9.52 (.)	-6.42 (1.53)
2.2.3	Technical quality	-0.99 (0.09)	-0.74 (0.10)	. (.)	-2.07 (0.53)
2.2.4	Social value	2.14 (0.79)	1.64 (1.47)	0.33 (.)	1.29 (0.47)
3.1.1	Present quality	0.78 (0.15)	0.5 (0.11)	1.05 (.)	5.05 (2.53)
3.1.2	Adaptability building	-0.83 (0.35)	-2.31 (1.58)	-1.01 (.)	-1.34 (0.64)
3.1.3	Amenity value	-6.17 (0.32)	-3.24 (0.19)	-2.62 (.)	-11.96 (5.04)

Imputation results from **medium** to **high**: sustainability mainly shows a positive relationship

		Residential	Office	Industry	Retail
Sustainability total		4.56 (0.84)	17.31 (16.16)	1.2 (.)	62.62 (24.15)
1	Ecological	8.41 (0.70)	10.3 (3.21)	2.62 (.)	27.4 (1.57)
2	Social	14 (2.02)	19.22 (6.47)	2.68 (.)	7.02 (.)
3	Economic	3.8 (0.61)	19.25 (.)	4.77 (.)	10.2 (1.98)
1.1	Energy	4.6 (0.86)	15.28 (6.32)	2.54 (.)	86.1 (63.47)
1.2	Environment	4.97 (0.64)	7.37 (3.44)	4.51 (.)	8.4 (1.15)
2.1	Health	6 (1.16)	31.17 (14.78)	1.37 (.)	39.88 (6.35)
2.2	User quality	13.17 (2.57)	10.18 (5.03)	4.4 (.)	11.32 (.)
3.1	Future prospects	3.8 (1.23)	19.25 (.)	4.77 (.)	10.2 (2.11)
1.1.1	Energy performance	4.94 (0.58)	11.73 (3.16)	2.39 (.)	16.51 (.)
1.1.1	Energy performance +	1.32 (0.36)	1.62 (0.44)	. (.)	3.54 (0.72)
1.2.1	Material	1.9 (0.23)	1.67 (0.52)	2.08 (.)	2.63 (0.78)
1.2.2	Water	8.25 (0.90)	8.71 (2.38)	1.31 (.)	16.93 (3.07)
1.2.3	Location nature	3.8 (0.77)	3.7 (1.25)	0.69 (.)	21.38 (7.39)
2.1.1	Acoustics	2.94 (0.38)	3.67 (1.15)	. (.)	. (.)
2.1.2	Air quality	23.64 (2.75)	16.17 (4.63)	1.86 (.)	39.99 (13.74)
2.1.3	Thermic comfort	1.46 (0.46)	2.47 (0.57)	0.7 (.)	2.8 (0.94)
2.1.4	Visual comfort	-0.31 (0.30)	-0.45 (0.45)	-0.3 (.)	-1.01 (1.99)
2.2.1	Accessibility	3.24 (0.63)	4.2 (1.03)	. (.)	14.74 (.)
2.2.2	Functionality	17.4 (1.09)	60.65 (14.27)	9.69 (.)	. (.)
2.2.3	Technical quality	. (.)	1.47 (1.35)	. (.)	2.86 (1.47)
2.2.4	Social value	3.5 (1.53)	3.06 (1.11)	. (.)	. (.)
3.1.1	Present quality	1.02 (0.45)	. (.)	1.32 (.)	1.79 (0.76)
3.1.2	Adaptability building	2.97 (0.43)	10.92 (2.01)	. (.)	6.56 (2.90)
3.1.3	Amenity value	7.26 (0.45)	32.59 (.)	7.62 (.)	14.08 (0.88)

In conclusion

- The **relationship** between sustainability performance and real estate value appears to be **complex**.
- **Energy** appears to be the most **constant** with a **positive relationship** for all property types in all scenarios.
- **Prices react negatively** on sustainability measures in the bottom segment of sustainable real estate.

Discussion

Possible explanations that require further research

- Increasing sustainability could also increase user-costs of real estate.
- Appraisers do not value sustainability – other than energy efficiency – enough. Therefore, buyers/sellers do not include this in the price.

Questions?

Dr. Farley Ishaak

Production manager *@Statistics Netherlands*

Researcher *@TU Delft*

Lecturer *@ASRE*

ff.Ishaak@cbs.nl