Appraisal of Market Uncertainties for Contaminated Sites

Stephan Bartke | Helmholtz Centre for Environmental Research – UFZ

Purpose & approach

- This poster introduces an innovative method to assess **value reductions due to risks** associated with (previously) contaminated properties to improve effective management of contaminated sites. This method shall advance the understanding of the **impacts of contamination on market value** and hence liability, creditworthiness, insurability and market demand.
- Approaches are reviewed that account for market value deductions due to uncertainties caused by the complex nature of impaired sites. Based on a literature review, expert interviews, and a nationwide survey among German professional appraisers a **risk scoring methodology** has been elaborated, presented, and validated applying a case study approach.

Findings

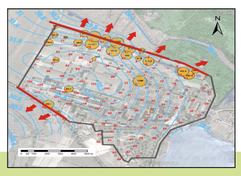
- The rehabilitation and reuse of contaminated sites carries many risks and uncertainties impacting market demand for (previously) impaired land. Even though accounting for perceived uncertainties is a legally approved best practice of appraisal in the US and European countries, no widely accepted appraisal methodology has prevailed so far.
- The risk scoring methodology introduced concludes that areas being properly decontaminated on average still have a depressed market value of 12.25%. **Factors such as location, time and feasibility of passing on risks can be combined in an algorithm to determine absolute value reduction due to perceived uncertainties** for a specific property to be appraised.

Understanding mercantile effects

- Which of these two **cars** would you rather buy?

Construction in:	2005	2005
Kilometrage:	80.000 km	80.000 km
Previous owner:	1 (born in 1960)	1 (born in 1960)
Accident-free:	Yes	No
Cost of repair:	0.00 €	7,500 € (estimated)
Cash price:	15,000 €	7,500 €
	15,000 €	**= 15,000 € ?**

- … which of these two **properties** would you rather buy?

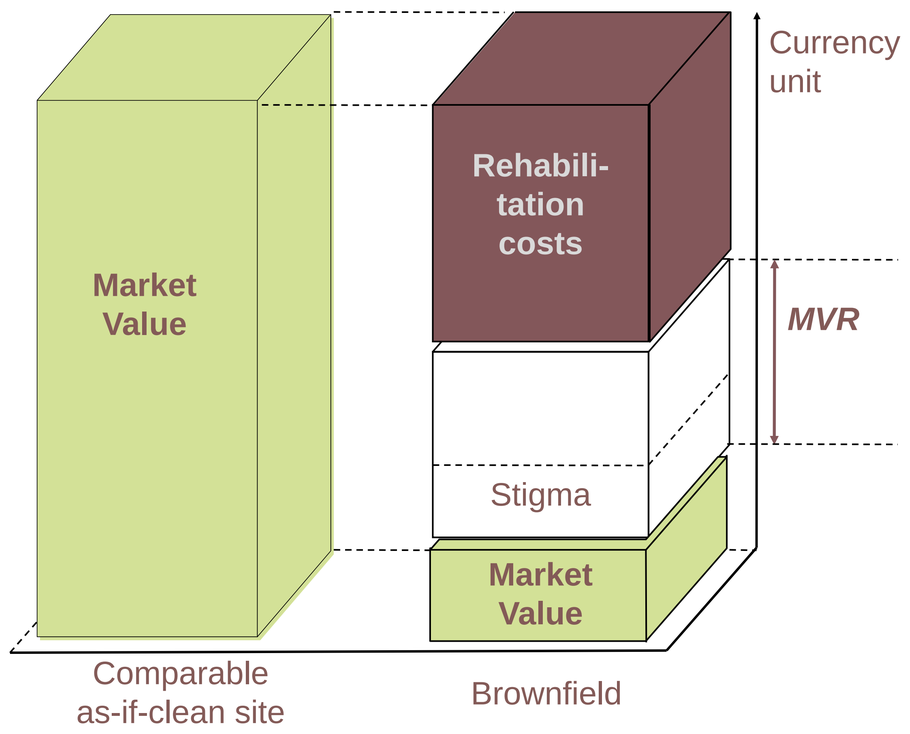


Former Usage:	Green field	Military
Area:	120 ha	120 ha
Contamination:	No	Yes (BTX, CHC, TPH)
Remediation cost:	0.00 €	27.5 Mio € (estimated)
Infrastruture cost:	0.00 €	42.5 Mio € (estimated)
Cash price:	80.0 Mio €	10.0 Mio €
	80.0 Mio €	**= 80.0 Mio € ?**

- … **mercantile effects** are due to perceived uncertainties

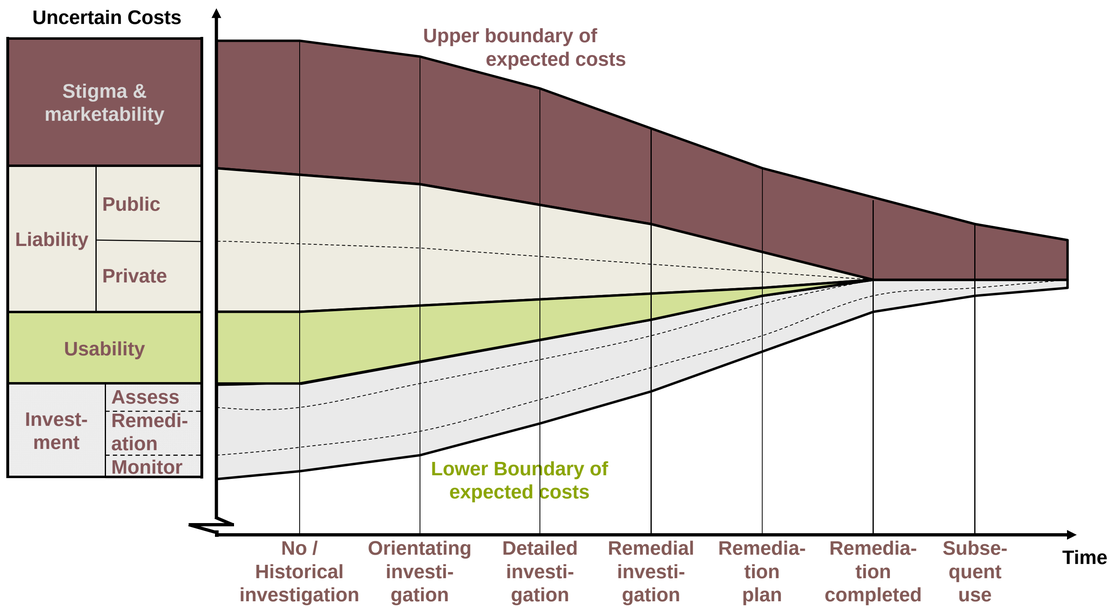
Mercantile Value Reduction (MVR)

- **Mercantile Value Reduction (MVR) equals the difference between the market value of an comparable as-if-clean site and the market value of the contaminated site minus expected rehabilitation costs:**



MVR determining uncertainties

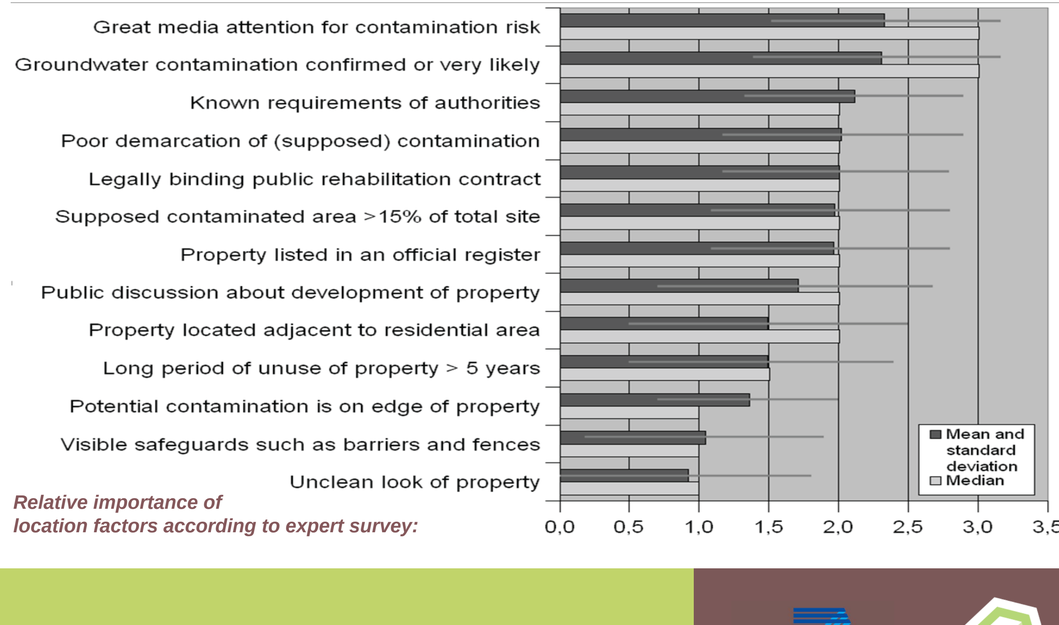
- **Stigma** (irrational fear of negative impacts even after proper clean-up) and marketability risks (long holding periods and/or higher marketing costs)
- **Usability** risks imposed by additional precautionary measures and clean-up limits due to disproportional costs
- Risks of **liability** under civil and private law, the latter existing regardless of the intended use (hazard defense requires precautionary actions)
- **Investment** risks related to intended higher value type of use & uncertain extra costs (e.g. for disposal of polluted but non-hazardous materials)



MVR assessment

- A **novel and comprehensible assessment method** of market-perceived uncertainties for (previously) polluted sites is introduced in Bartke (2011). Its application deepens the understanding for the valuation of risks associated with (previously) contaminated land, thereby provoking a reduction of liability and increase of creditworthiness and market demand.
- Three factors to calculate MVR:
  - Local factors → F_L,
  - Informational factors (time) → F_T,
  - Risk passing-on factors → F_R

$$MVR_{abs} = \overbrace{\underbrace{\left(\sum_{l=1}^{13}\left(I_l * m_l * g_{I_o}\right)\right)}_{F_L} * \underbrace{\left(\sum_{t=1}^{2} g_{I_{t_i}} - 1\right)}_{F_T} * \underbrace{g_{I_r}}_{F_R}}^{MVR} * V_{AC}$$



Relative importance of location factors according to expert survey:

Acknowledgement

This work was co-funded by the German Federal Ministry of Education and Research (BMBF) within the research priority programme REFINA in the SINBRA project (contract no. 0330757C): www.sinbra.de | cf. www.timbre-project.eu

References

Bartke, S. (2011): Valuation of Market Uncertainties for Contaminated Land, *International Journal for Strategic Property Management* 15(4), 356-378.

Contact

Stephan Bartke | Department of Economics | Helmholtz Centre for Environmental Research UFZ
Permoserstraße 15 | 04318 Leipzig | Germany || stephan.bartke@ufz.de | www.timbre-project.eu

This work was co-funded by the European Commission's Seventh Framework Programme within the TIMBRE project (contract no. 265364)