

A topographic map with contour lines is shown, overlaid with a grid of thin white lines. Several thick black lines are drawn across the map, representing architectural or structural elements. The map is set against a dark background with a grid pattern.

DESIGN-RELATED RESEARCH IN LANDSCAPE ARCHITECTURE

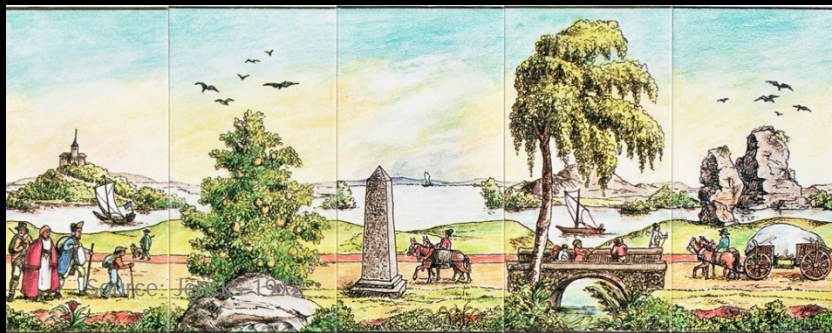
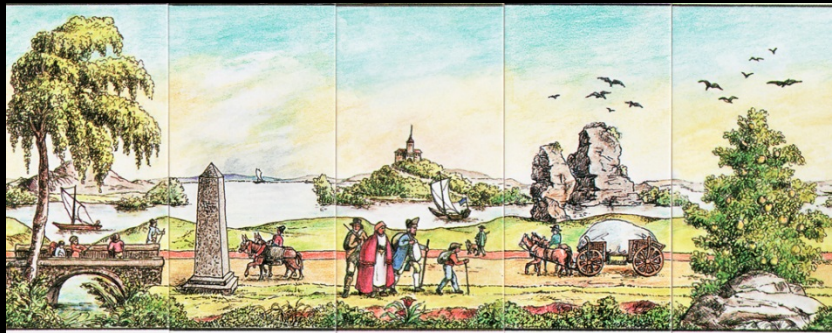
Steffen Nijhuis

Delft University of Technology | Faculty of Architecture
June 2013

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Landscape as composition

We can consider the landscape as a **composition of physical, biological and cultural elements** in relation to ecologic, social and economic parameters

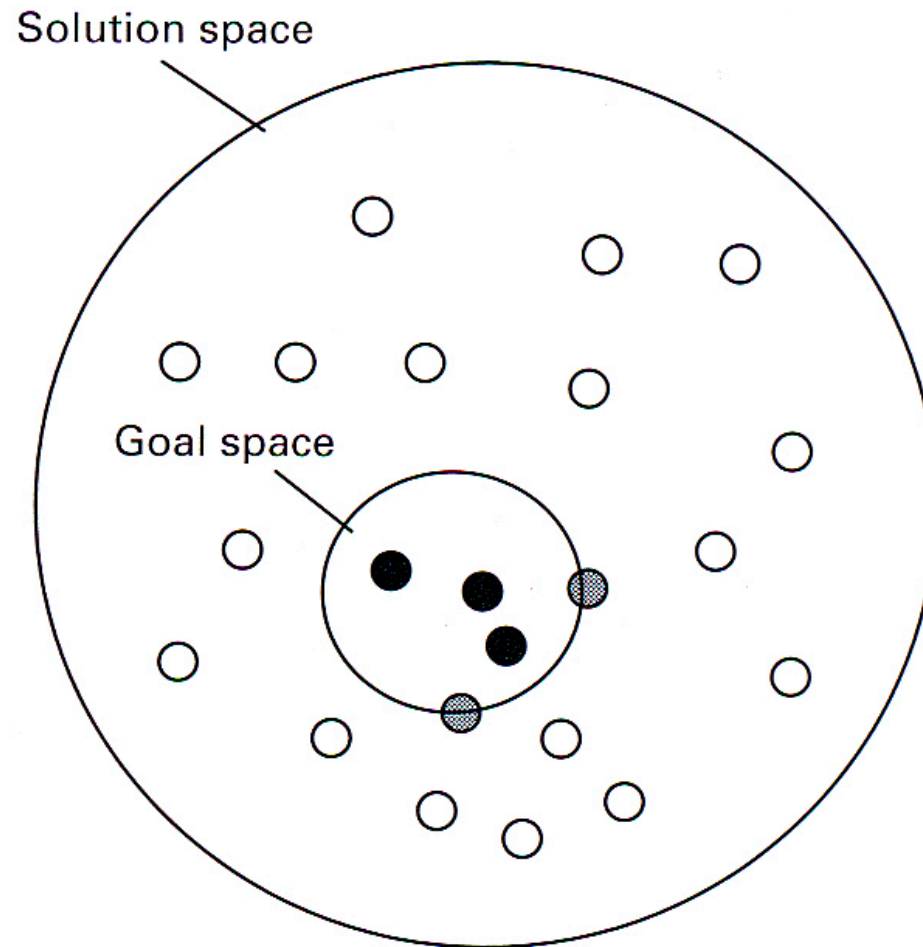


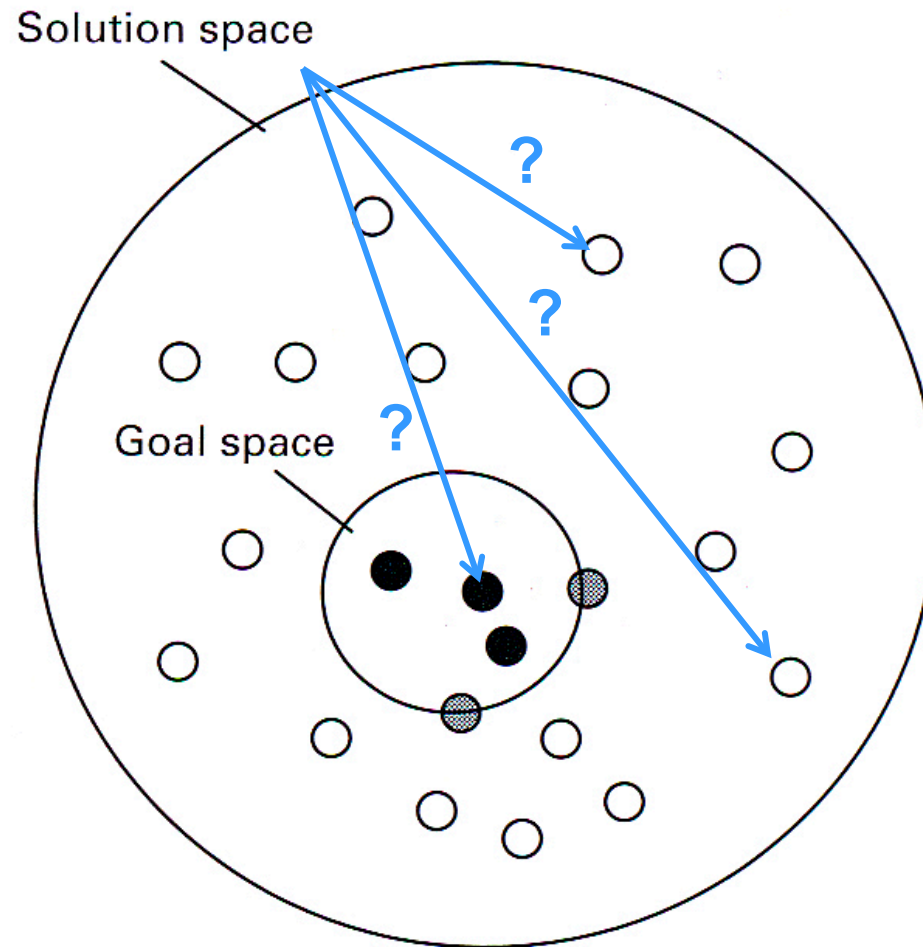
Endless possibilities to model the landscape:

- Methodology is important in this respect
- and also the 'properties of the procedure'
- and of course: 'the proof is in the pudding'

The Endless Landscape (myriorama), 1830
1.686.553.615.927.922.354.187.720 possible combinations (24 cards)

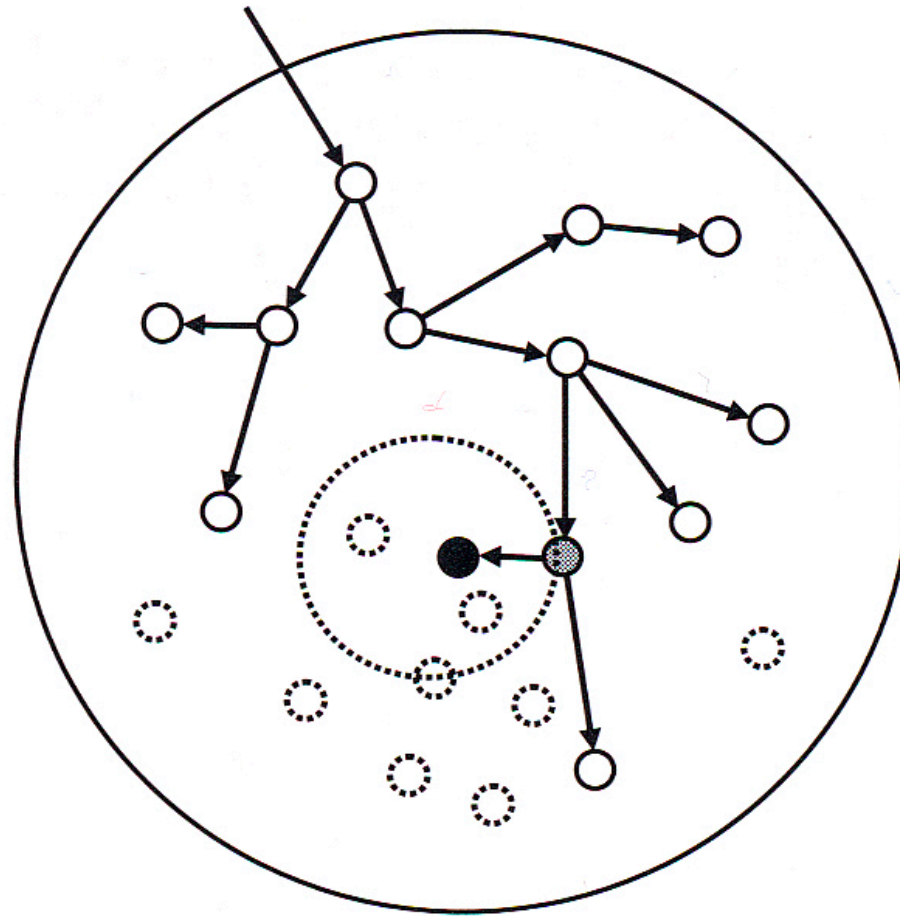
Design-based research





Random solutions or lack of argumentation

Design-based research

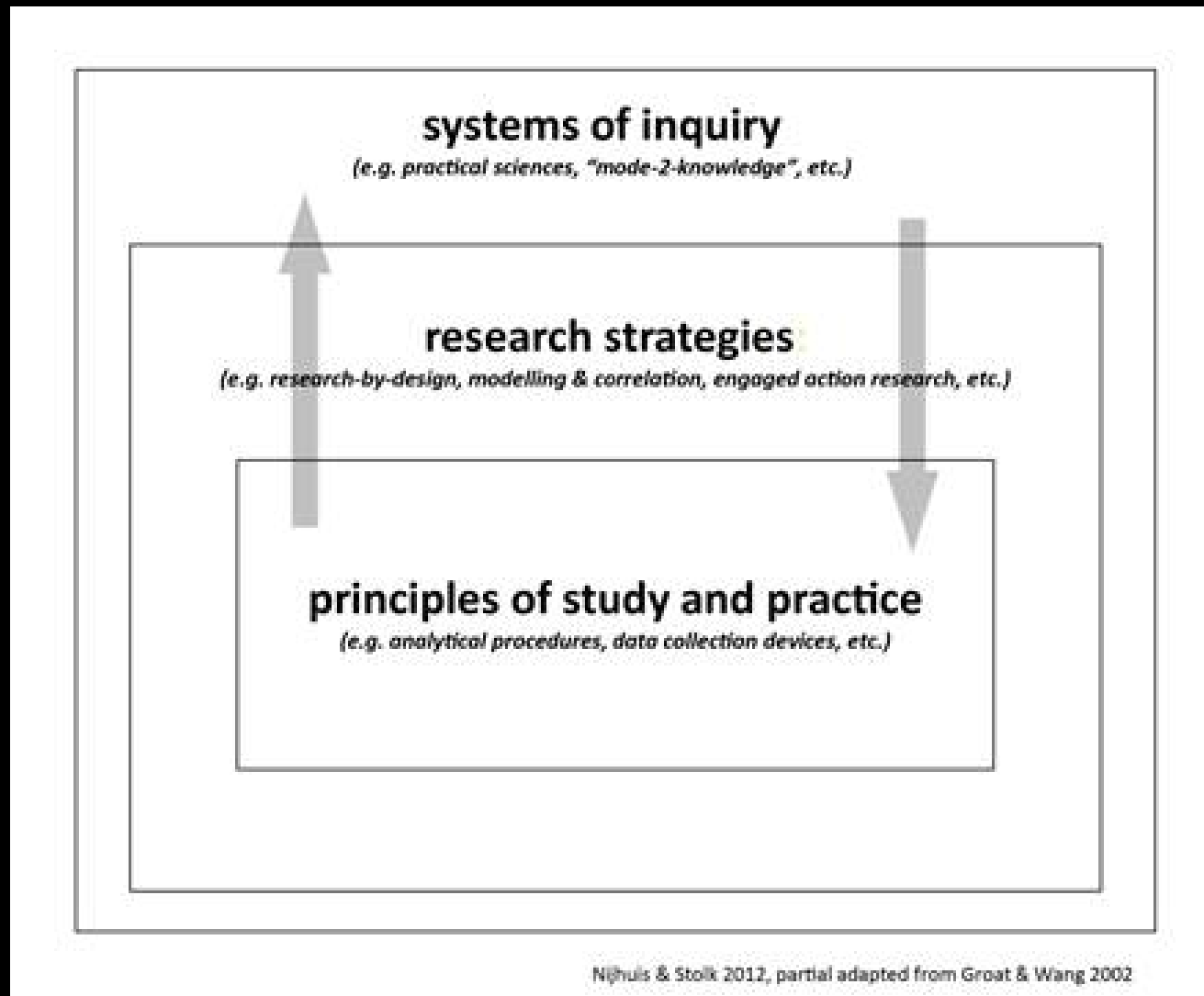


Methodology = intended to make this search more effective

Methodology = a study of method: description, explanation and valuation

Introduction of a research strategy that systematically combines design research and research-by-design into a coherent research methodology for landscape architectonic design

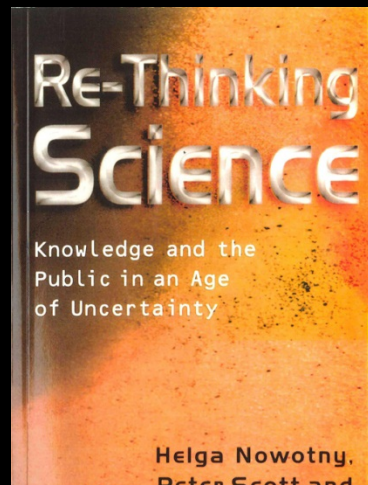
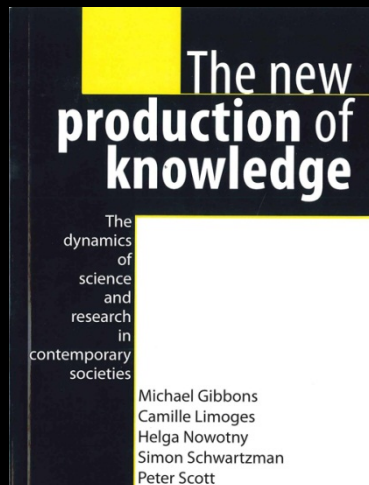
It offers an alternative view on the relation between Research and design by combining them in a strategy for knowledge-based design



Context-driven, problem-focussed and interdisciplinary research:

research carried out in context of application, arising from the very work of problem solving and not governed by the paradigms of traditional disciplines of knowledge: formal, physical, life, social and behavioural sciences (mode 1 knowledge)

Validity question is not **“is it true”**, but **“does it work”**



Source: Nijhuis 2012,
Nowotny et al 2001, Gibbons
et al 1994, Klaasen 2004

The design-based research as described is a process of abduction, an investigation on **‘what might be’**, using verifiable knowledge derived from analysis of suitable precedents.

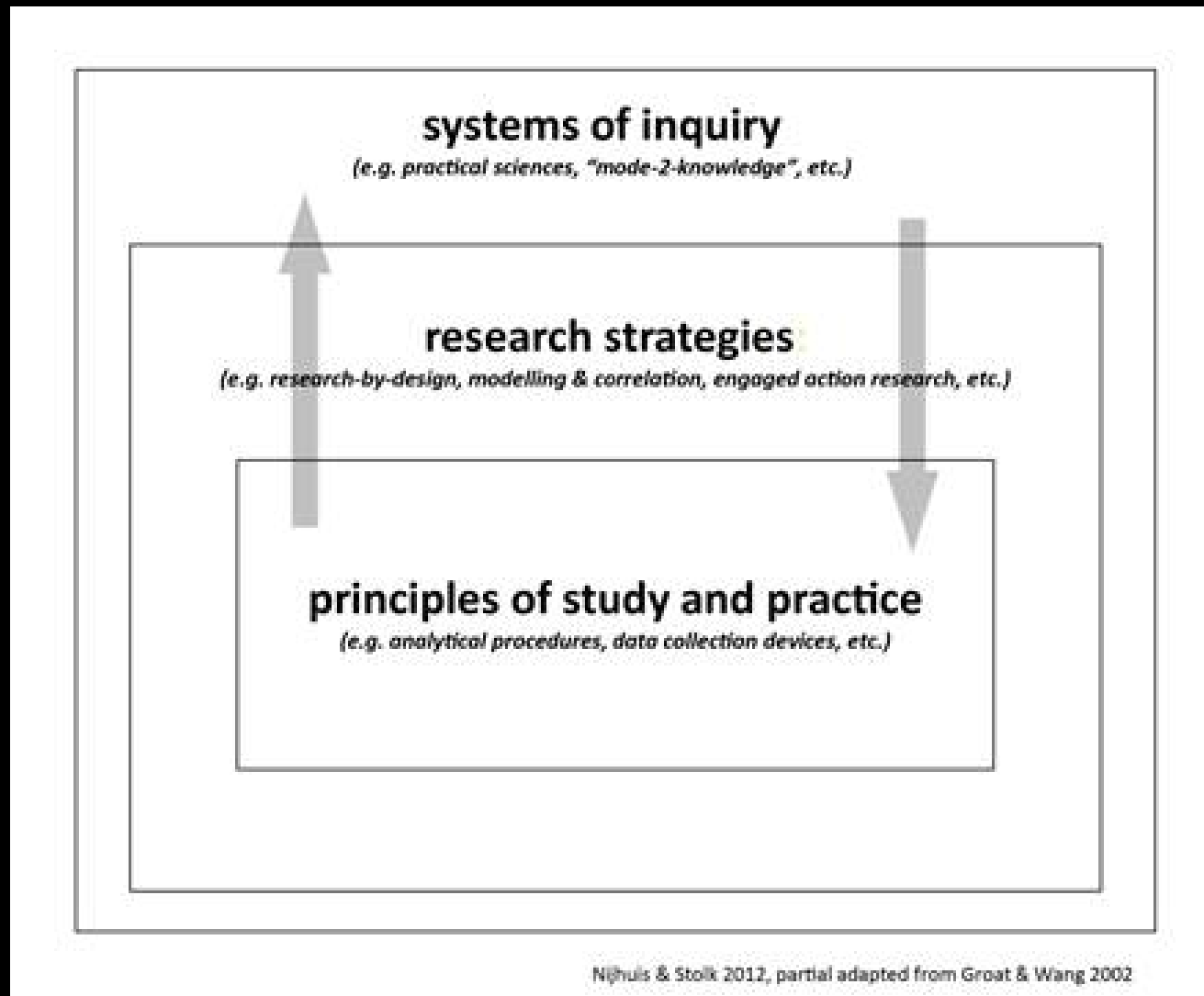
Systematic exploration to increase the understanding of the relationships between the world as it is and the possibility of what it might become

General research criteria :

- truth value (internal validity or credibility),
- applicability (external validity or generalisability),
- consistency (reliability, stability, or dependability),
- transparency (objectivity),

Body of knowledge in landscape architecture is embedded in:

- **design theories:** objectives and principles
- **process of design:** design strategies and tactics
- **products of design:** compositions and their representations



- **descriptive strategies** : direct observation, social surveys
- **modelling and correlation strategies** : descriptive and synthetic models, simulations
- **experimental strategies**: preference studies
- **classification schemes**: typology, taxonomy
- **interpretative strategies**: discourse analysis, formal analysis
- **evaluation and diagnosis**: parameters and norms, landscape assessment
- **engaged action research**: participatory action research
- **projective design**: design experiments, design operations
- **logical systems**: pattern language, space syntax

Design as research strategy



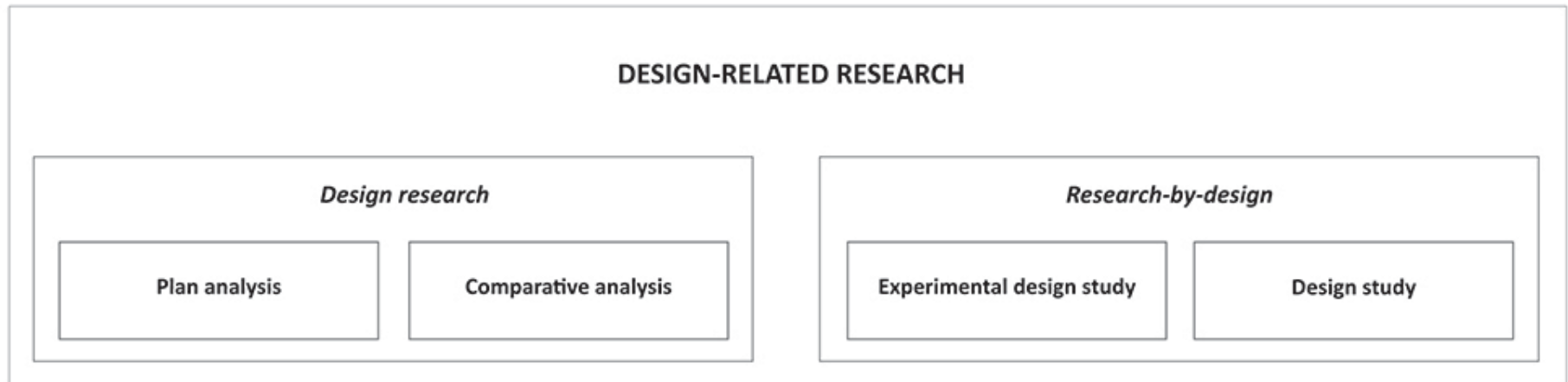
Nijhuis et al. 2012; Frayling, 1993; Duchhart, 2011

Three possible combinations of research and design:

- (1) Research feeds the design process with the ultimate objective to improve the quality of the designed object and increase its credibility: **research-based-design**
- (2) designs (or the process of designing) are used as a vehicle to make spatial problems visual and spatial ('framing') and to generate solutions: **design-based-research**
- (3) research undertaken on existing designs as a knowledge basis for future design: **design research-based-design**

Design research-based-design

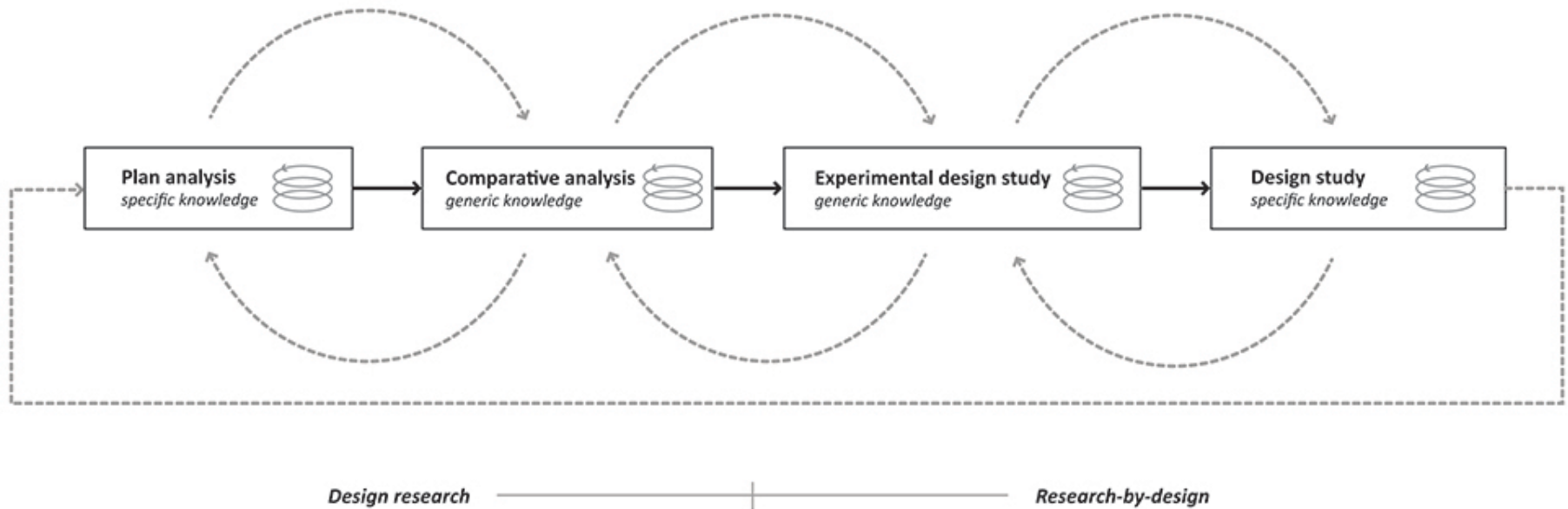
Adapted from: Steenbergen, et al. 2008; De Jong, et al. 2001



Design research (**analysis of existing designs or precedents**) and research by design (**formulation of new designs**) can be understood as **variable relationships between object and context**

Design research-based-design

Nijhuis & Bobbink 2012

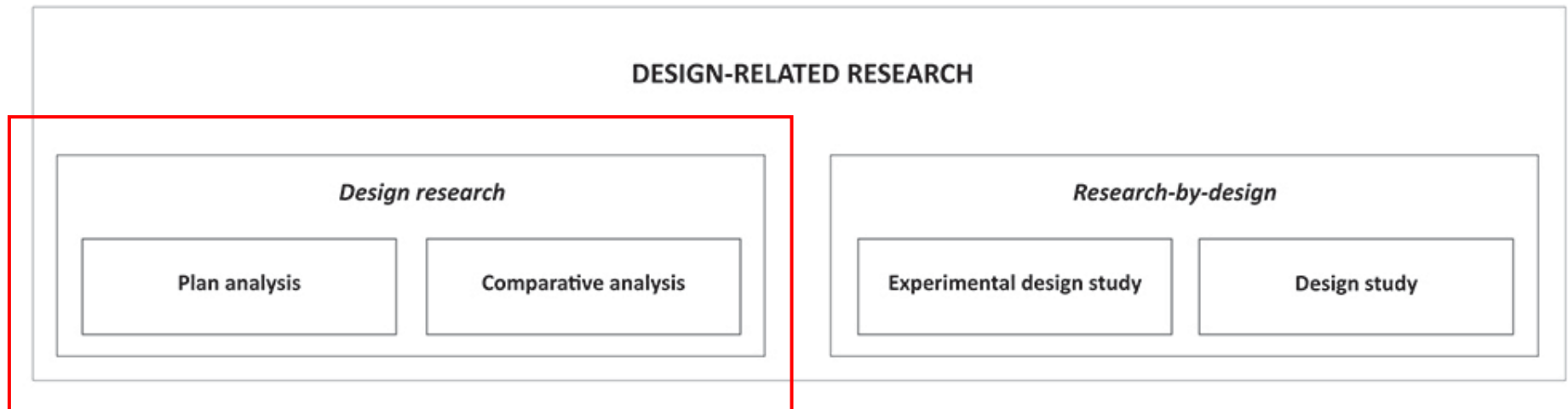


Heuristics (way to find) lead to new discoveries and inventions by taking a methodical approach

Design research in landscape architecture

Analysis, simulation and evaluation:

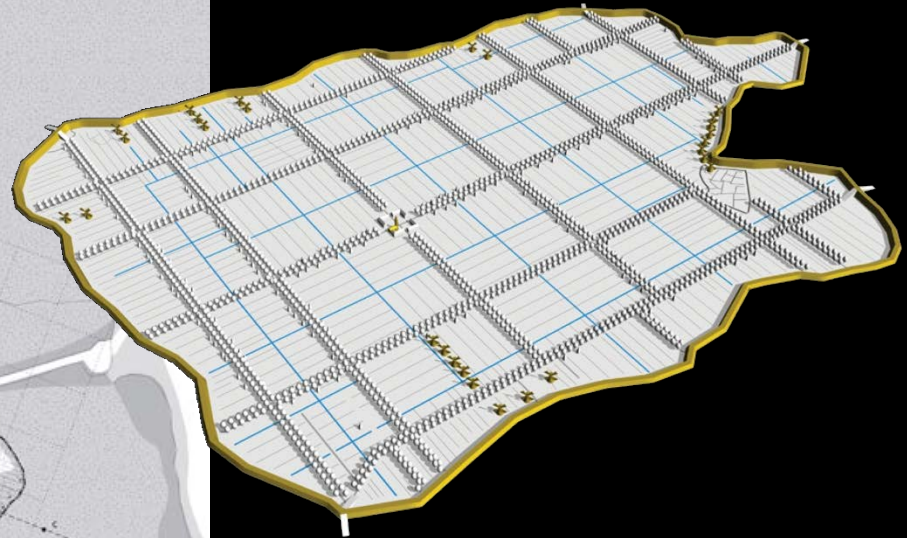
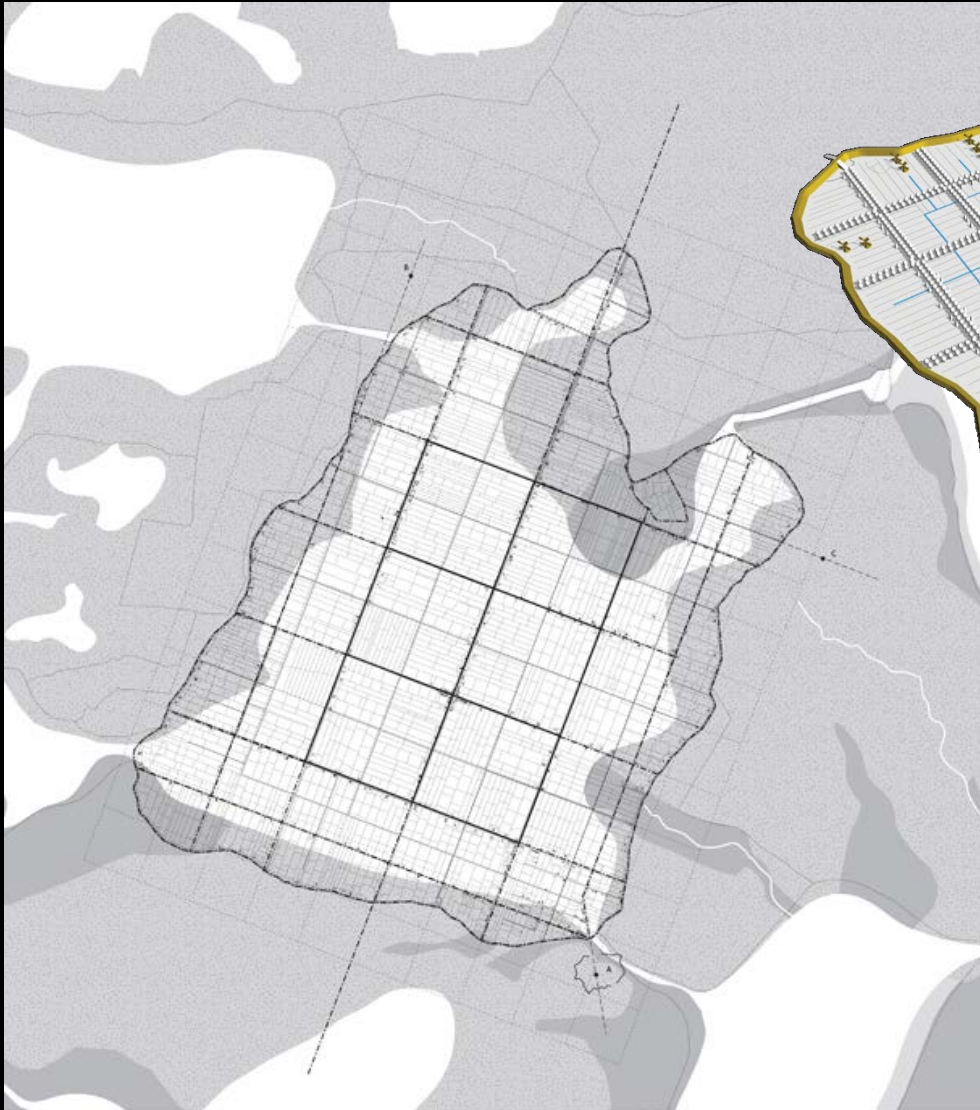
inter-subjective, verifiable, reliable en practical applicable. This implies grounded and transferable methods and techniques



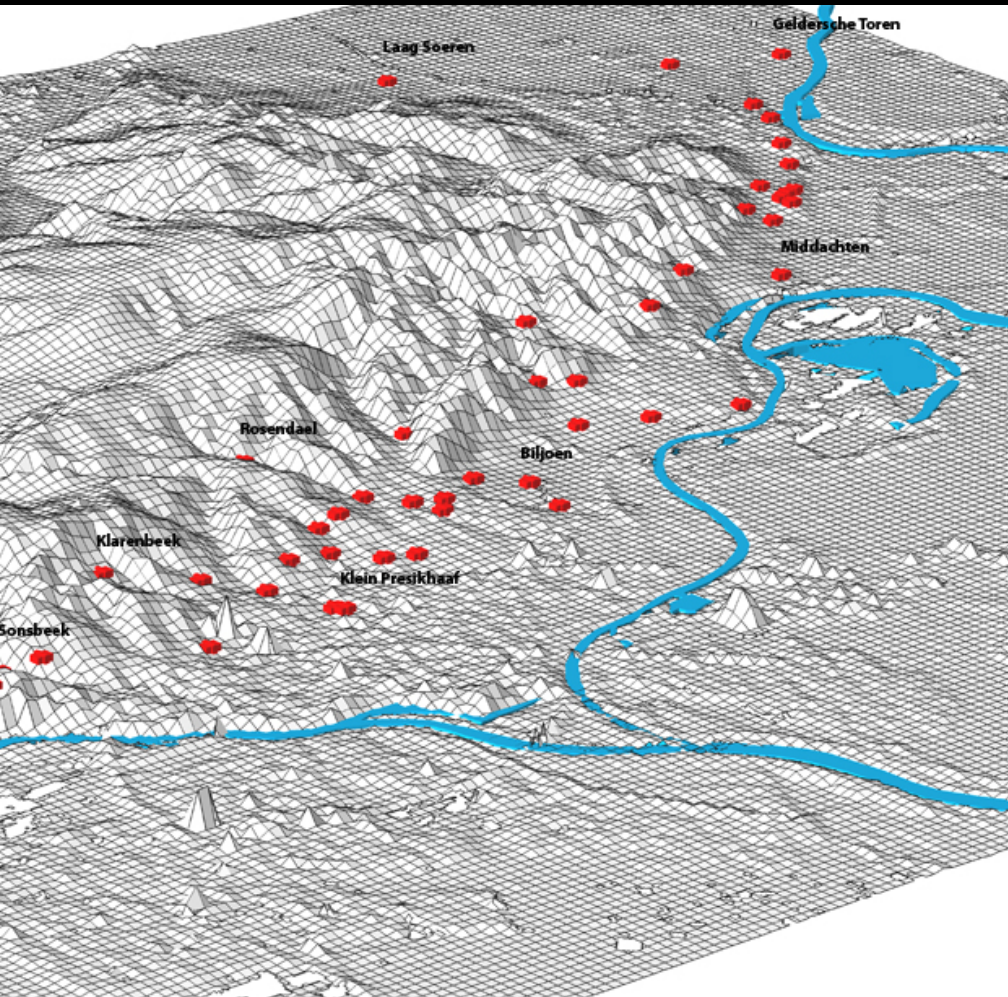
Analysis of a landscape architectonic design in such a way that you can creatively use the insights you have acquired in a new design. The drawings plays a crucial role to distinguish different 'layers' in the design. The **basic form, spatial form, metaphorical form** and the **form of the programme**. These four aspects are the most general concepts that lay out the relation between the various aspects of the architectonic form and its perception in a systematic way.

Analysis of polderscapes

Geometric patterns in lake-bed polder the Beemster

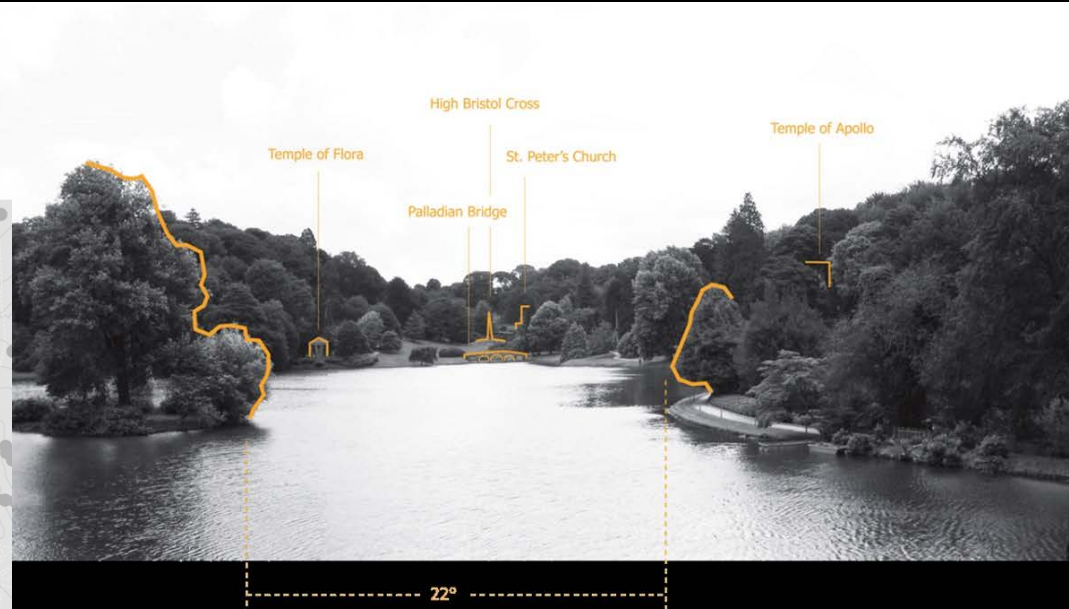


Analysis of an estate landscape



Position and orientation estates Veluwe-Oost, the Netherlands

Analysis of visual attributes



	Viewpoint 1	Viewpoint 2	Viewpoint 3	Viewpoint 4	Viewpoint 5	Viewpoint 6	Viewpoint 7	Mean	Std.dev.
	Temple of Flora	St. Peters Pump	Grotto	Cottage	Pantheon	Temple of Apollo	Bristol High Cross		
maximum angular extend of the view (degrees)	53	x	67	43	62	86	36	57.83	17.97
optimum angular extend of the view (degrees)	28	x	31	28	22	32	24	27.50	3.89
angular extend between foci	14	x	23	12	13 (30°)	60	12	22.33	18.92
maximum distance viewpoint - focal point (metres)	368	1440**	318	497	494	3120**	478	431.00	82.57
minimum distance viewpoint - focal point (metres)	306	x	343	305	324	320	90	281.33	94.76

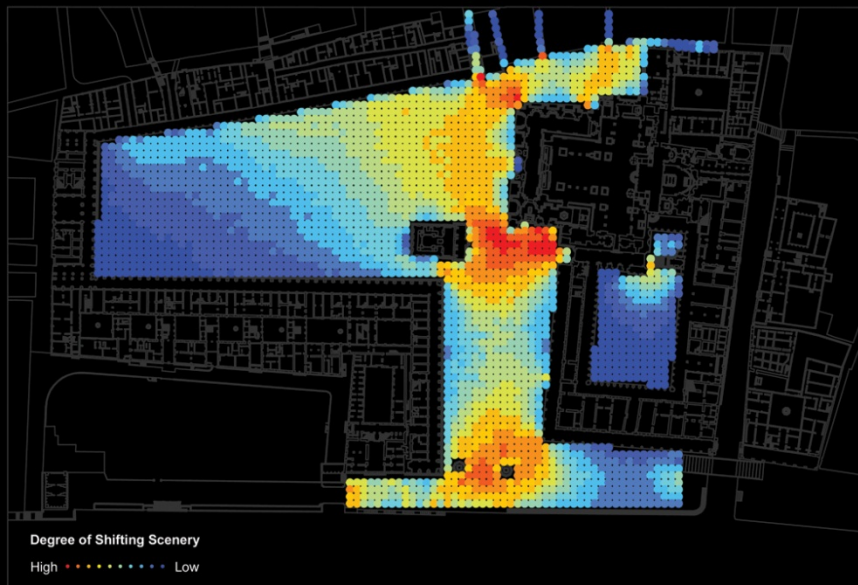
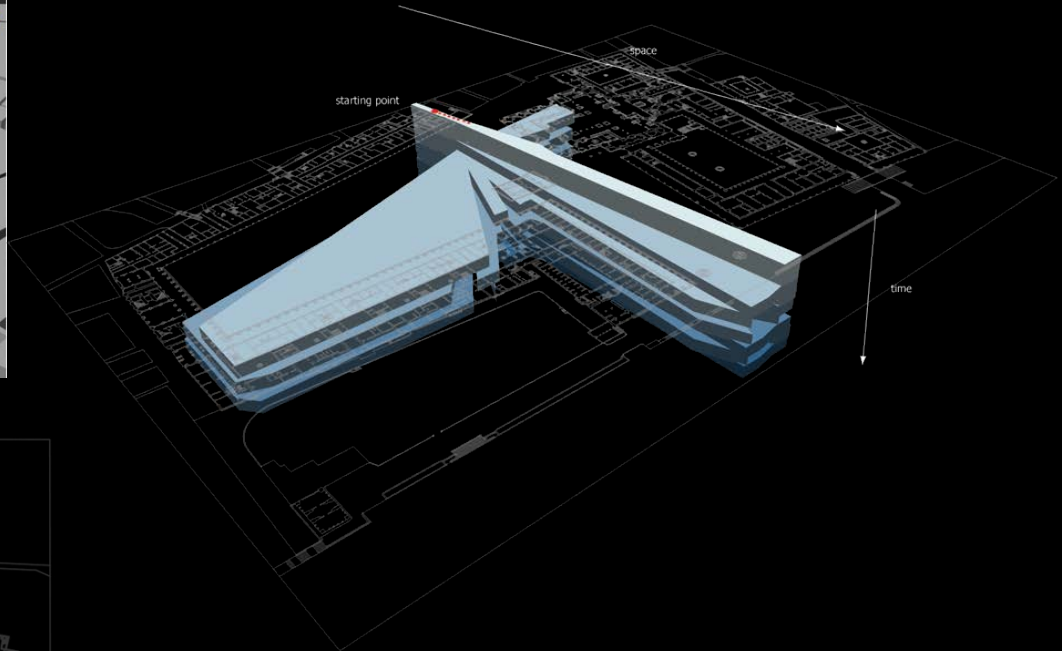
measurements based on calculated viewsheds, decimal figures converted to an integer

* incl. Temple of Apollo

** outside the valley garden

3D visibility analysis (eye-level)
Stourhead landscape park

Analysis of space relationships

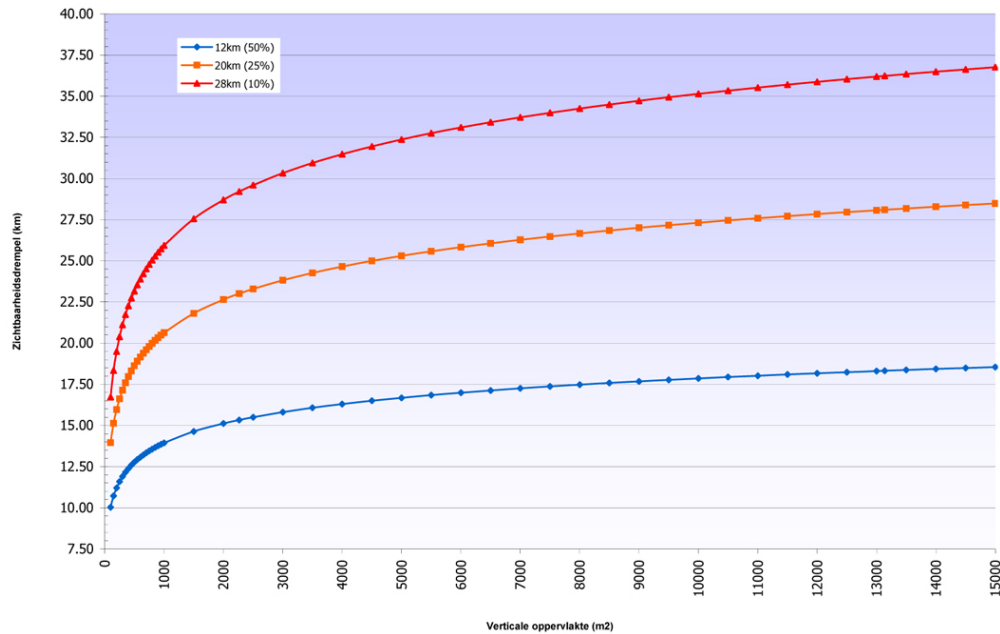


Exploring the architectonic quality of
Piazza San Marco, Venice

Simulation of visibility

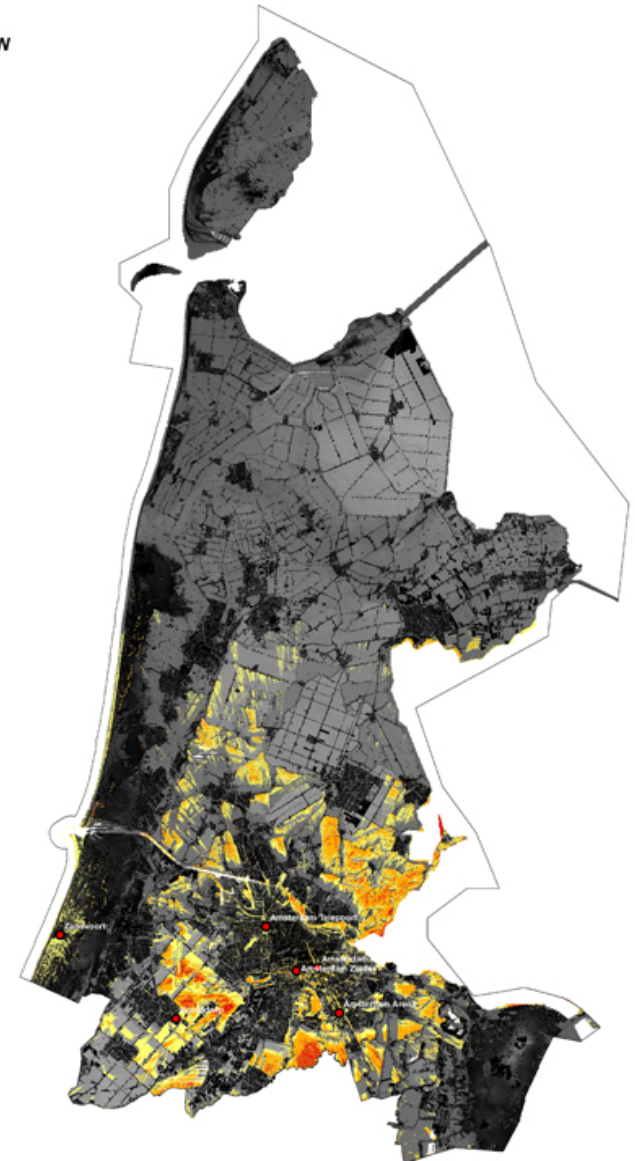
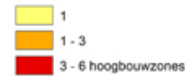
External factors: visual urbanisation:
High-rise, city edges, wind turbines, etc.

Zichtbaarheid van objecten (verhouding ≤ 5 ; contrast $> 2\%$) bij
klaarlichte dag onder verschillende atmosferische omstandigheden

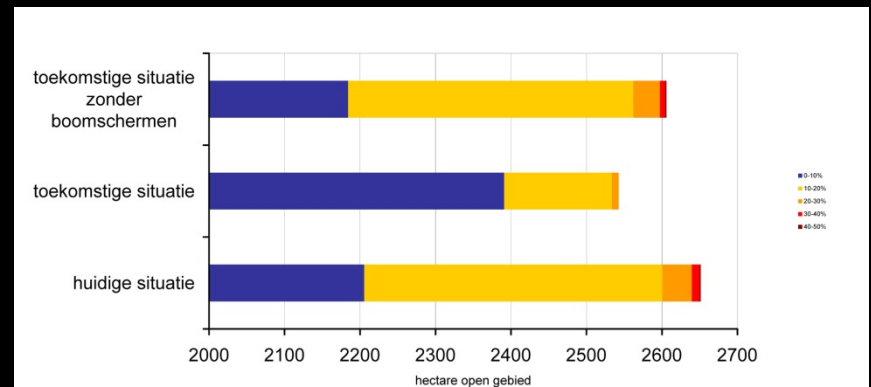
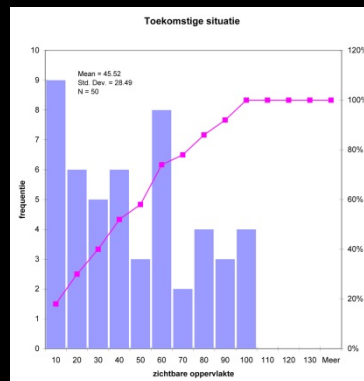
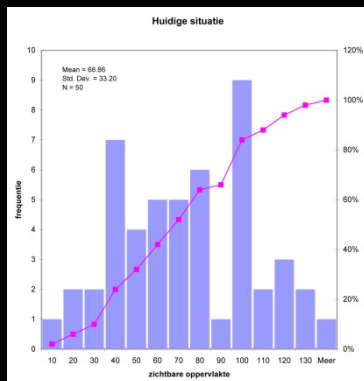
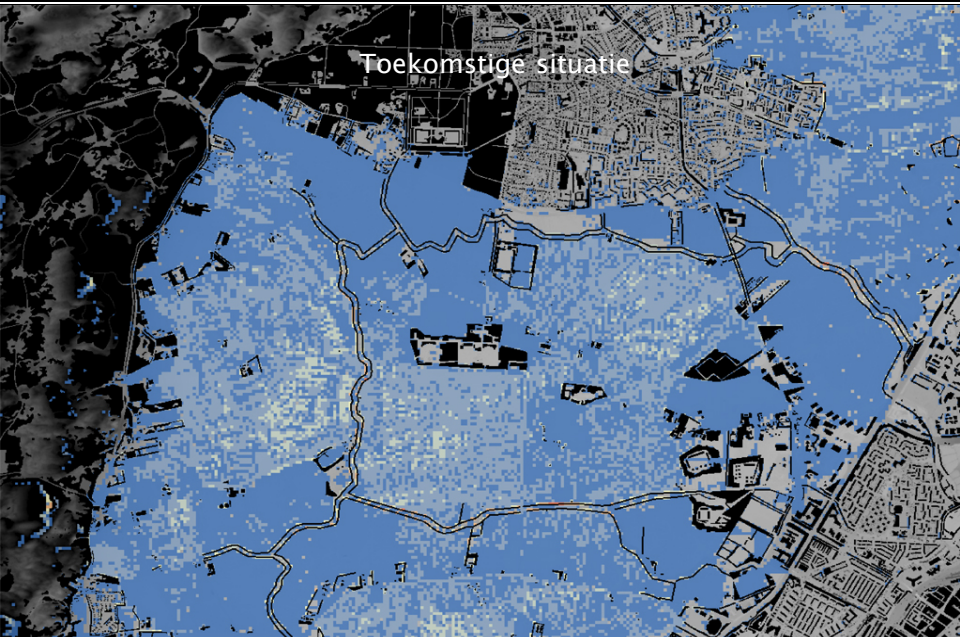
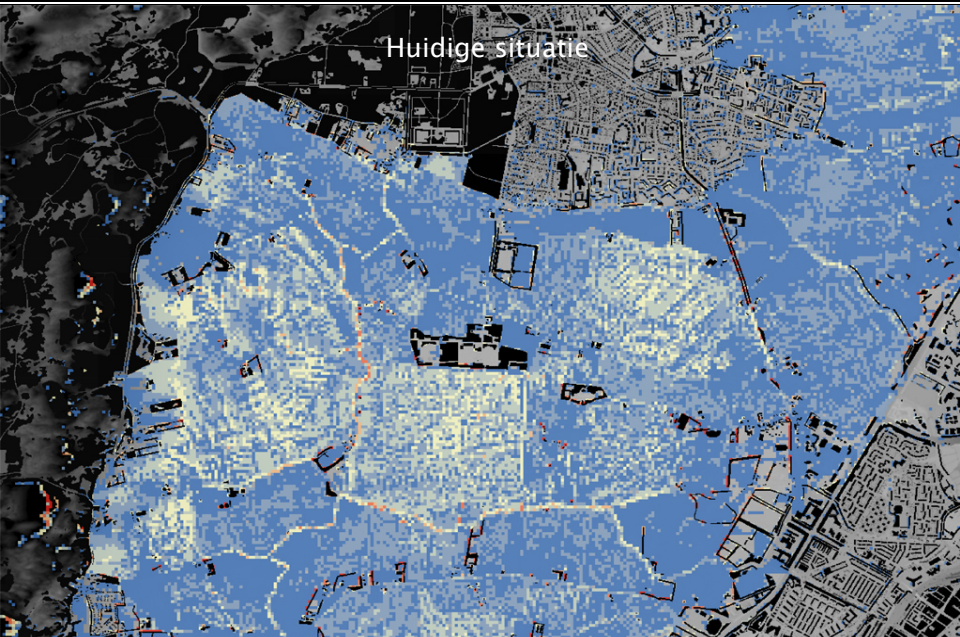


ZICHTBAARHEID HOOGBOUW

Bron: TU Delft, Leerstoel Landschapsarchitectuur



Evaluation: change of visual character



Visual impact analysis of a landscape development plan

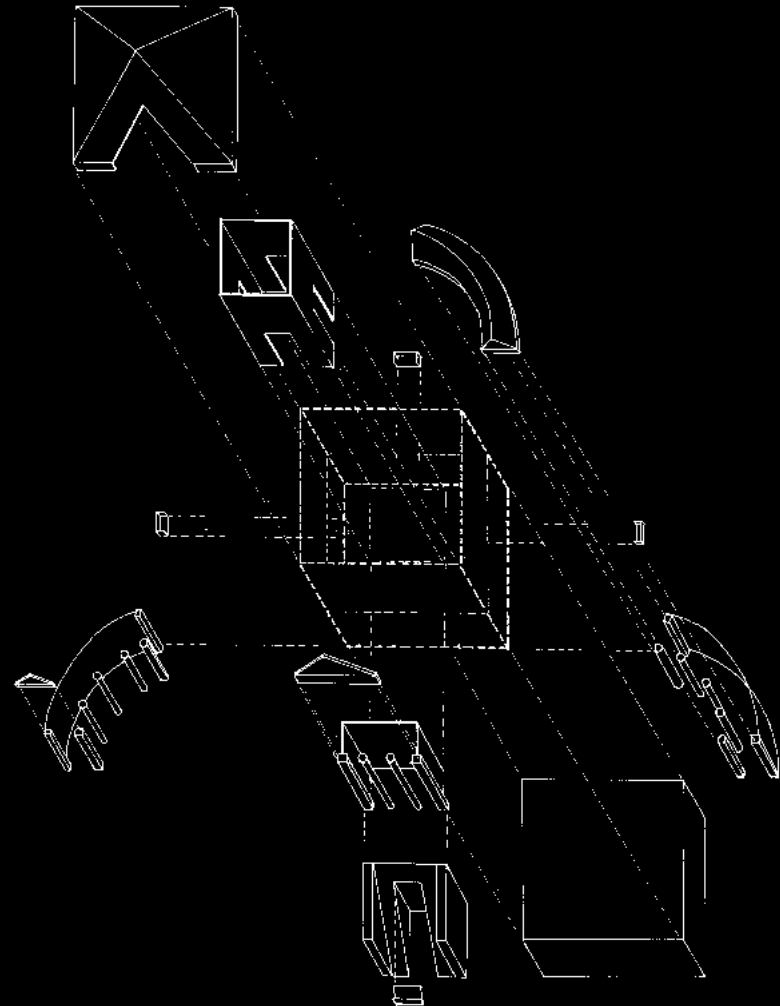
In typological research we **compare compositions** in order to make formal schemes and design aspects visible in their relation to the social and cultural problem posed. The type is to be regarded as a scheme which is derived from **reducing the whole of formal variants to a common basic form**. Three different aspects are distinguished that make meaningful comparisons of designs possible: the **composition elements**, the **composition scheme** and the **transformation of the type**.

Composition elements

Analysis of standard forms in an Italian Renaissance villa of Palladio

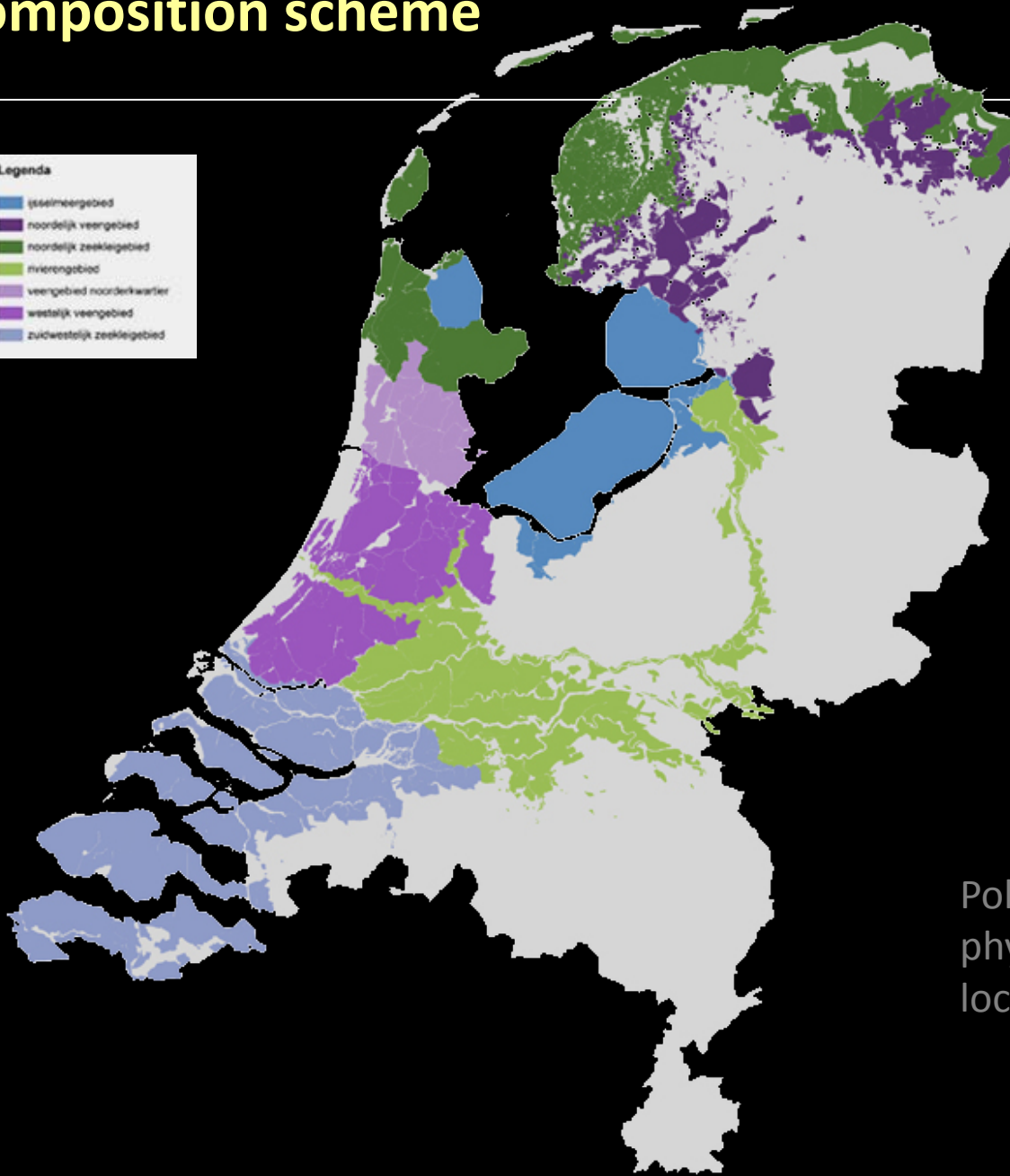
Location: Italy
Date: 15th century

Drawing: P. van der Ree, G. Smienk

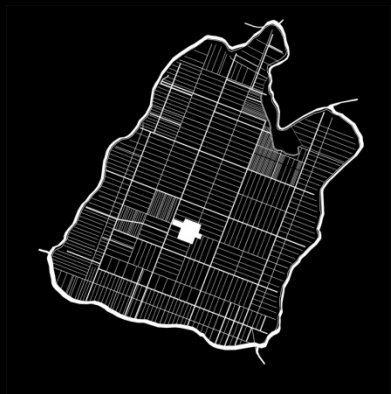


Source: Steenbergen, et al. 2008

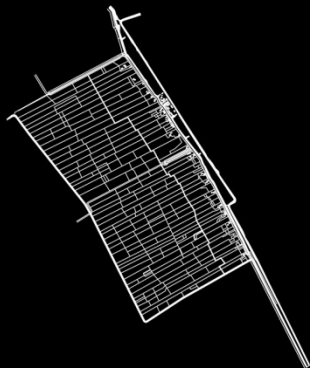
Composition scheme



Polder typology based on
physical-geographic
location



Beemster



Kockengen



Het Bildt



Polder Borssele



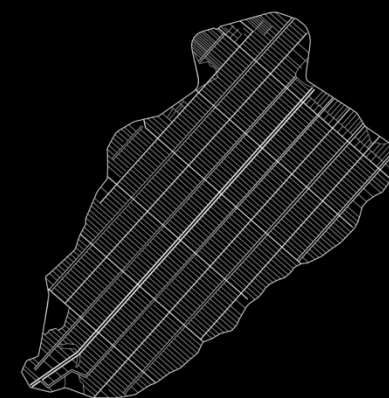
Polder Biesbosch



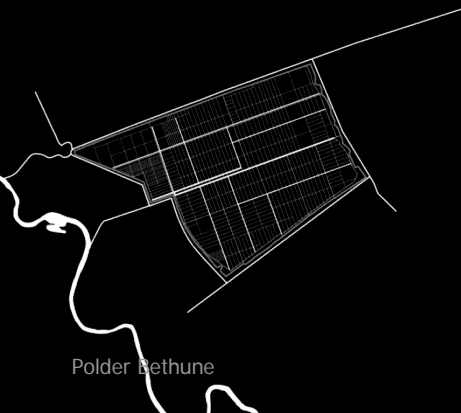
Noordoostpolder



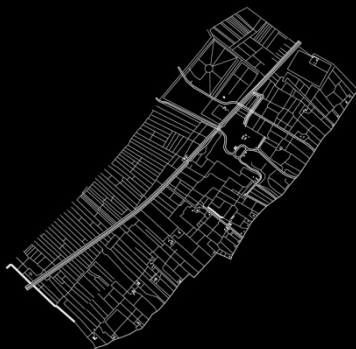
Mastenbroek



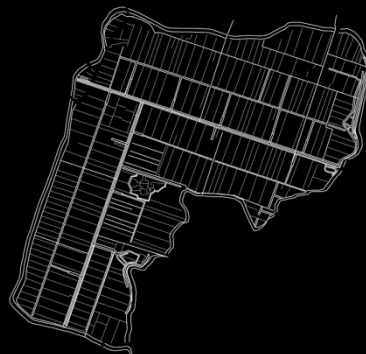
Haarlemmermeer



Polder Bethune



Duivenvoordse polder



Schermer



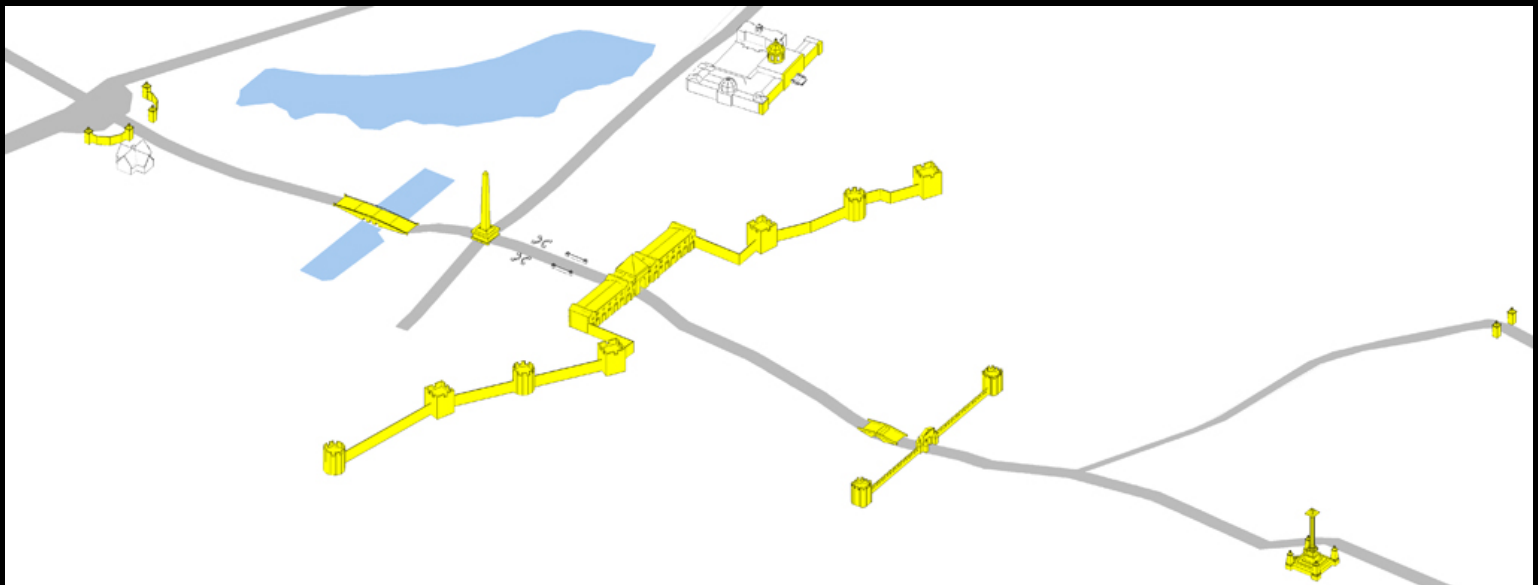
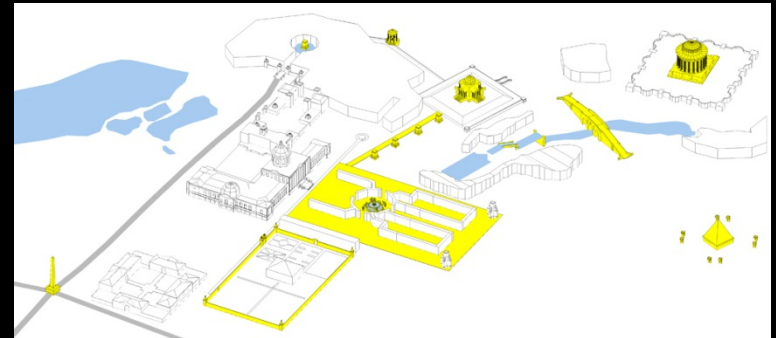
Tzumerpolder

Composition scheme

Analysis of the composition scheme of Castle Howard, an English landscape garden

Location: Castle Howard, York
Date: 1714-1770

Drawing: J. van der Zwart

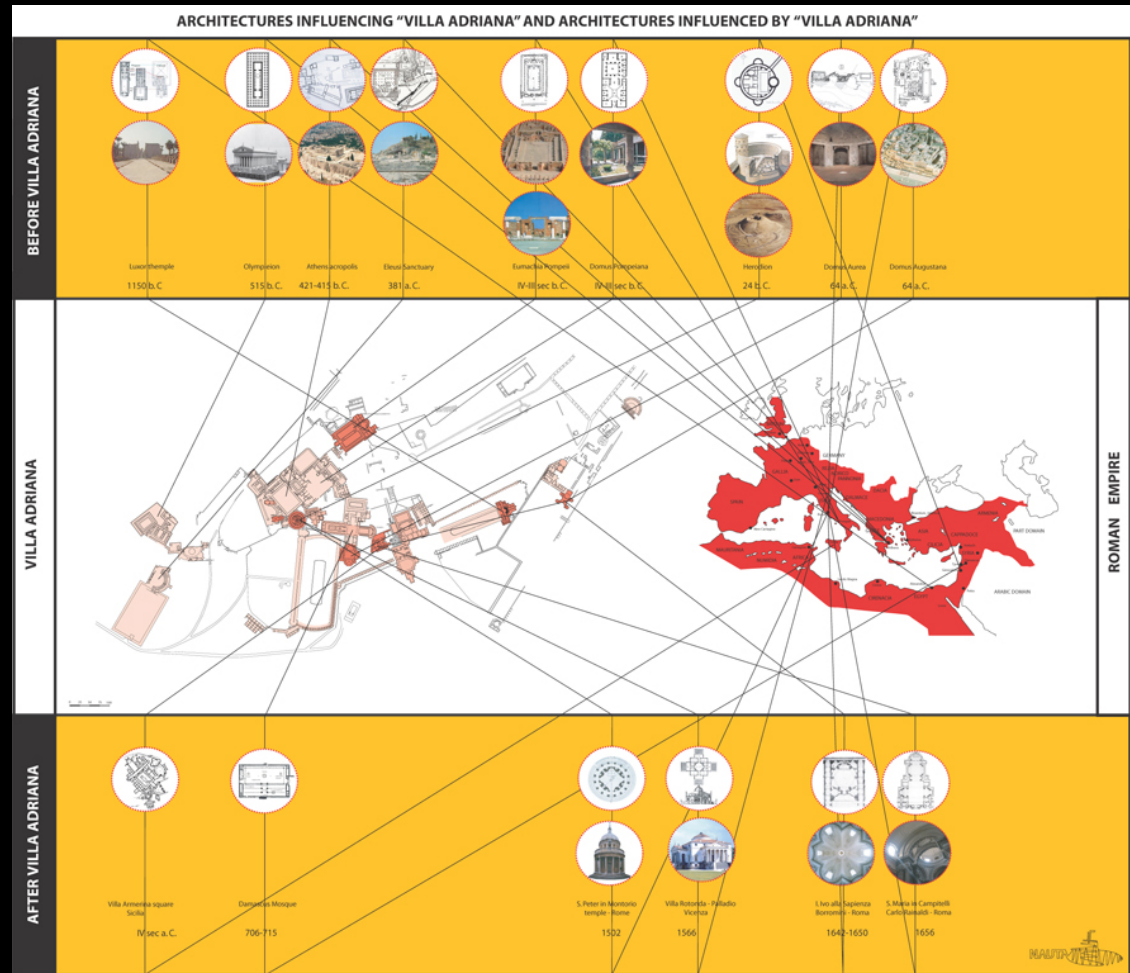


Transformation of the type

Comparative analysis of Hadrian's Villa and elements from classic and baroque architecture

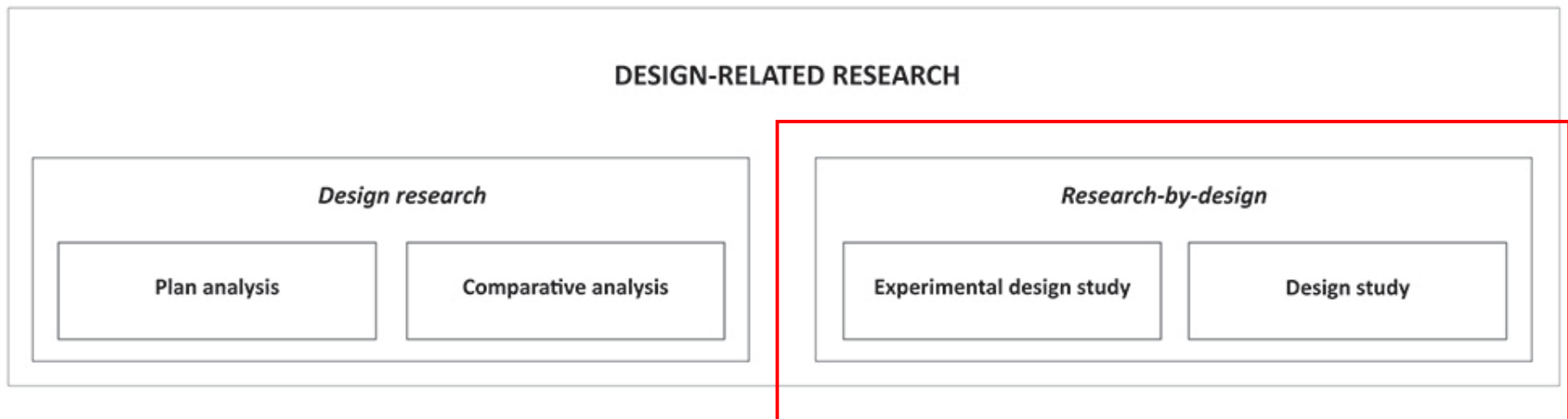
Location: Villa Hadriana, Tivoli
Date: 118-138

Drawing: M. Scarciglia



Modelling the future:

knowledge based design (design research) of place, space image and program resulting in a landscape composition



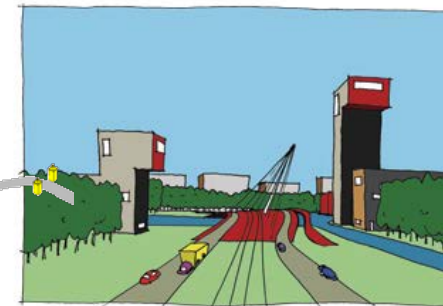
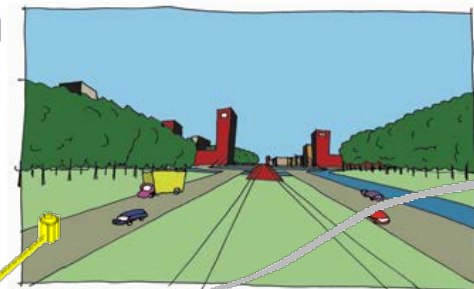
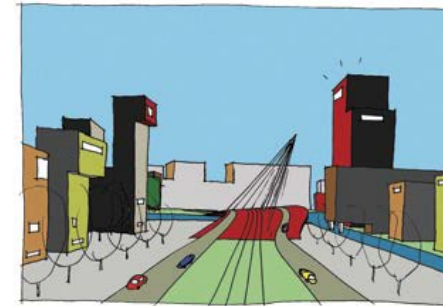
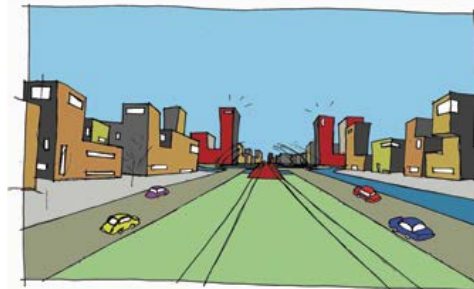
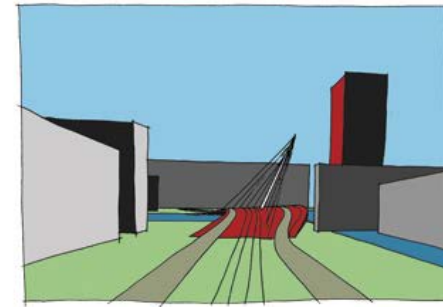
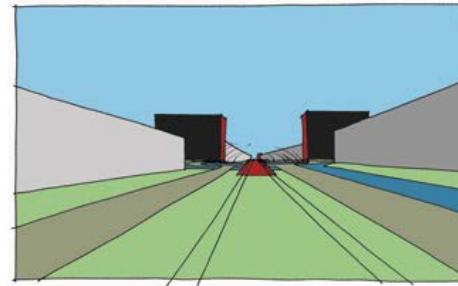
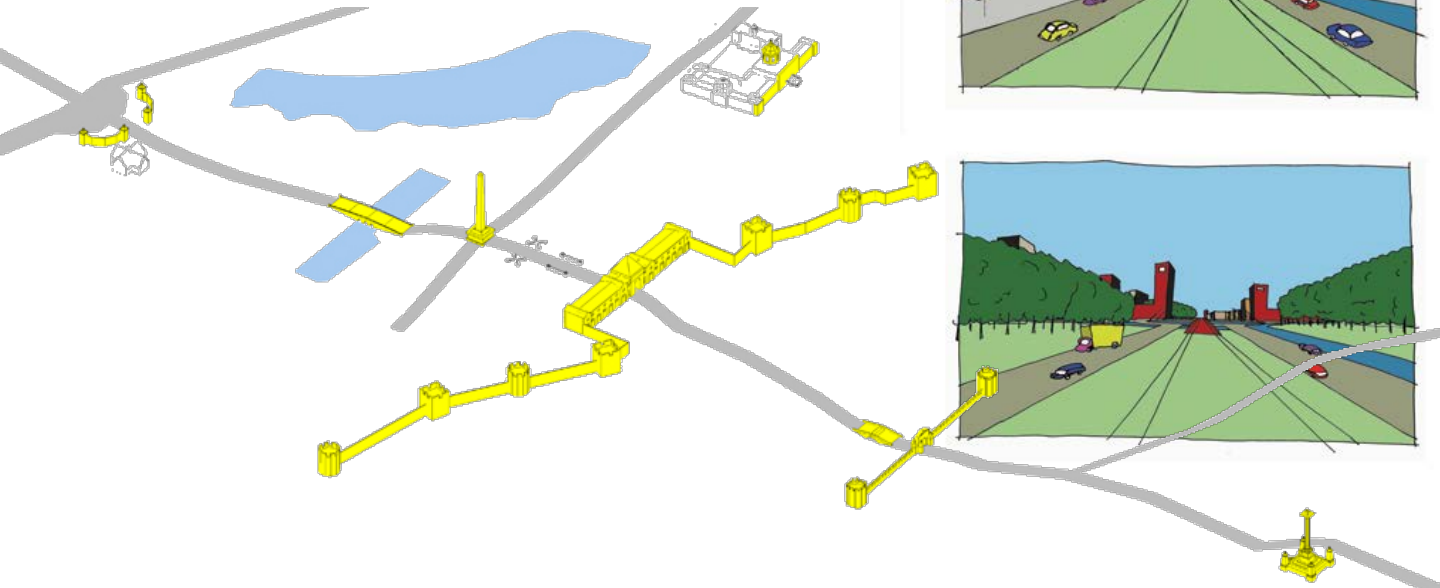
An experiment consists of **taking composition elements**, or a **composition scheme**, from a chosen example and **applying** them in the **situation involved** . By analysing the internal rules of this composition and taking them as the basis for a critical consideration of the problem, one can **discover how a new design-in-the-making relates to the known examples**. The examples selected must be suitable to serve as models in order to deal with the chosen theme.

Transformation of the type

Experimental transformation of an approach drive (Great Avenue at Castle Howard) to a park in a 20th century Dutch Garden suburb

Location: C. Lelylaan, Amsterdam Sloterpas
Date: 1934-2002

Drawing: D. Majdandzic



Source: Steenbergen, et al. 2008

Transformation of the topography



Experimental montage of a park system in the Randstad-Holland

Location: Randstad Holland

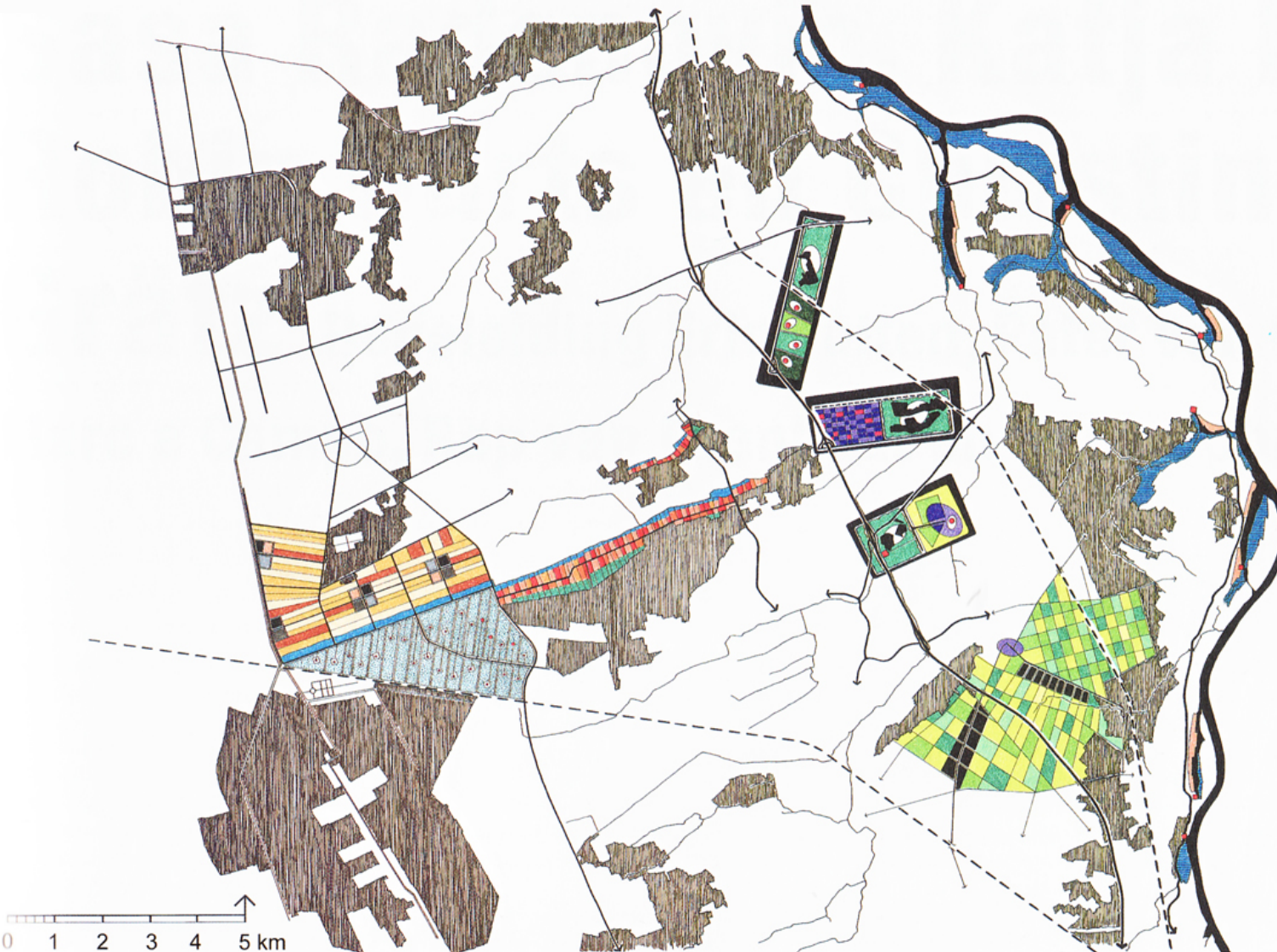
Date: 2002

Drawing: R. Wysk

Experimental design aims at making an integral spatial proposal.

In preparing an experimental design, **systematic use is made of plan analysis, typological research and goal-oriented design experiments**. Design thus becomes a **form of heuristic research**, geared to exploring a **possible or predictable future** and the **methodical discovery** of the **right composition**.

De derde ontginning?



Uitsneden van west naar oost:



Toekomstgebied intensieve veehouderij met gecentreerde collectieve voorzieningen



Renteniersparadijs Peelvenen met een rijke variatie aan woningtypen en bouwwijzen



Horster woningbouw tussen beek en boszoom, tuinbeheer is bosbeheer of natuurbeheer



Drie nieuwe knooppunten tussen A73 en spoor als uitbreiding van de zandputten

- noord: institutenlandschap Oirlo
- midden: werklanschap Castenray
- zuid: themapark bij Horst



Toekomstgebied boom- en sierteelt met gecentreerde collectieve voorzieningen



Kastelen en overstromingsgebied met aanlandings- en pleisterplaatsen voor de toer- en recreatievaart over de Maas

Design study



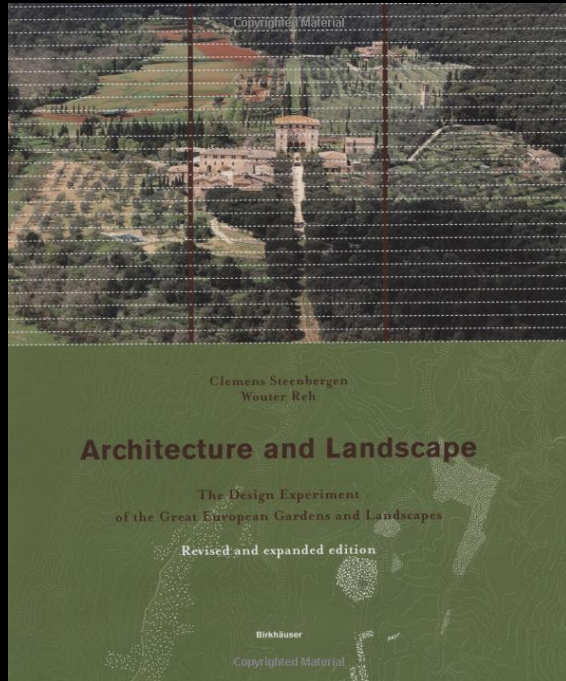
Ioannis Tsoukalas, Mai Yoshitake, Robert Mayr, fall 2009

Research strategy that systematically combines **design research** and **research-by-design** into a coherent research methodology for landscape architectonic design

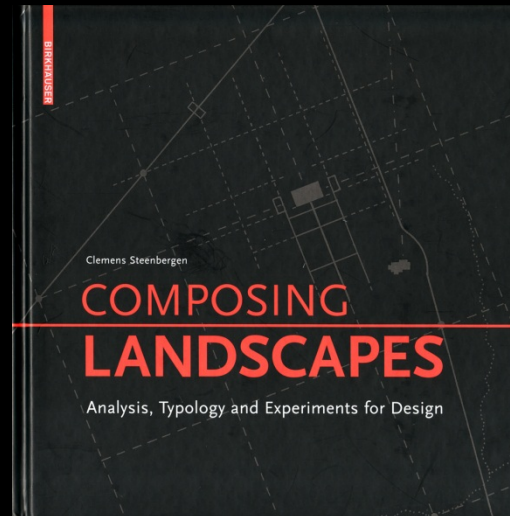
Design research is an indispensable step in research by design. Together they constitute a **heuristic approach for knowledge based and creative design**.

This implies **systematic use of plan analysis, typological research and goal-oriented design experiments** geared to **exploring a probable or predictable future and the methodical discovery of the right composition**.

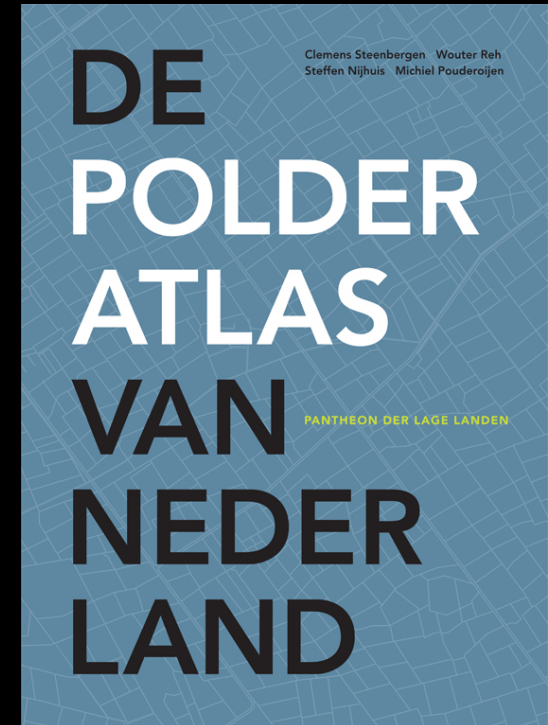
Further reading



C.M. Steenbergen & W. Reh, 2003



C.M. Steenbergen, S. Meeks & S.Nijhuis, 2008



C.M. Steenbergen, W. Reh, S.Nijhuis & M.T. Pouderoijen, 2009