General Theory of Change

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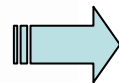
Change at a Political Level

R1. Splitting existing State → two States

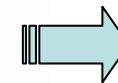R2. Convert existing State → new State with same borders

R3. Merging State with existing State → State with larger area

1709 → 1789 → 1822

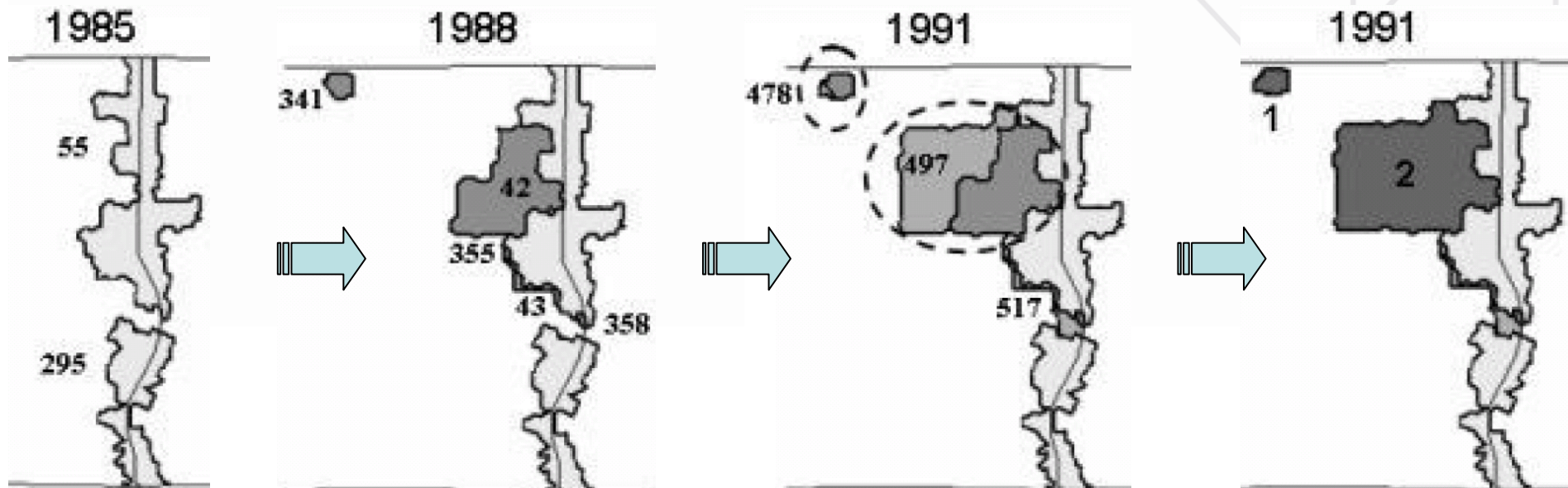# Change in Land Use / Deforestation

ER1: Object along road occupation
→ not merged with other objects

ER2: Two adjacent small lot objects
→ merged + new object is small lot

ER3: Small lot < 50 ha adjacent to land concentration object
→ merged with it + result is land concentration object

The Aim

We have:

- changes in many domains
- domain-specific theories of change
- influencing factors → cause change

We want:

- find common principles of change across different domains

→**general theory of change**

The Project

1. Select several domains
2. Domain-Specific Theories of Change
3. Analogical Comparison
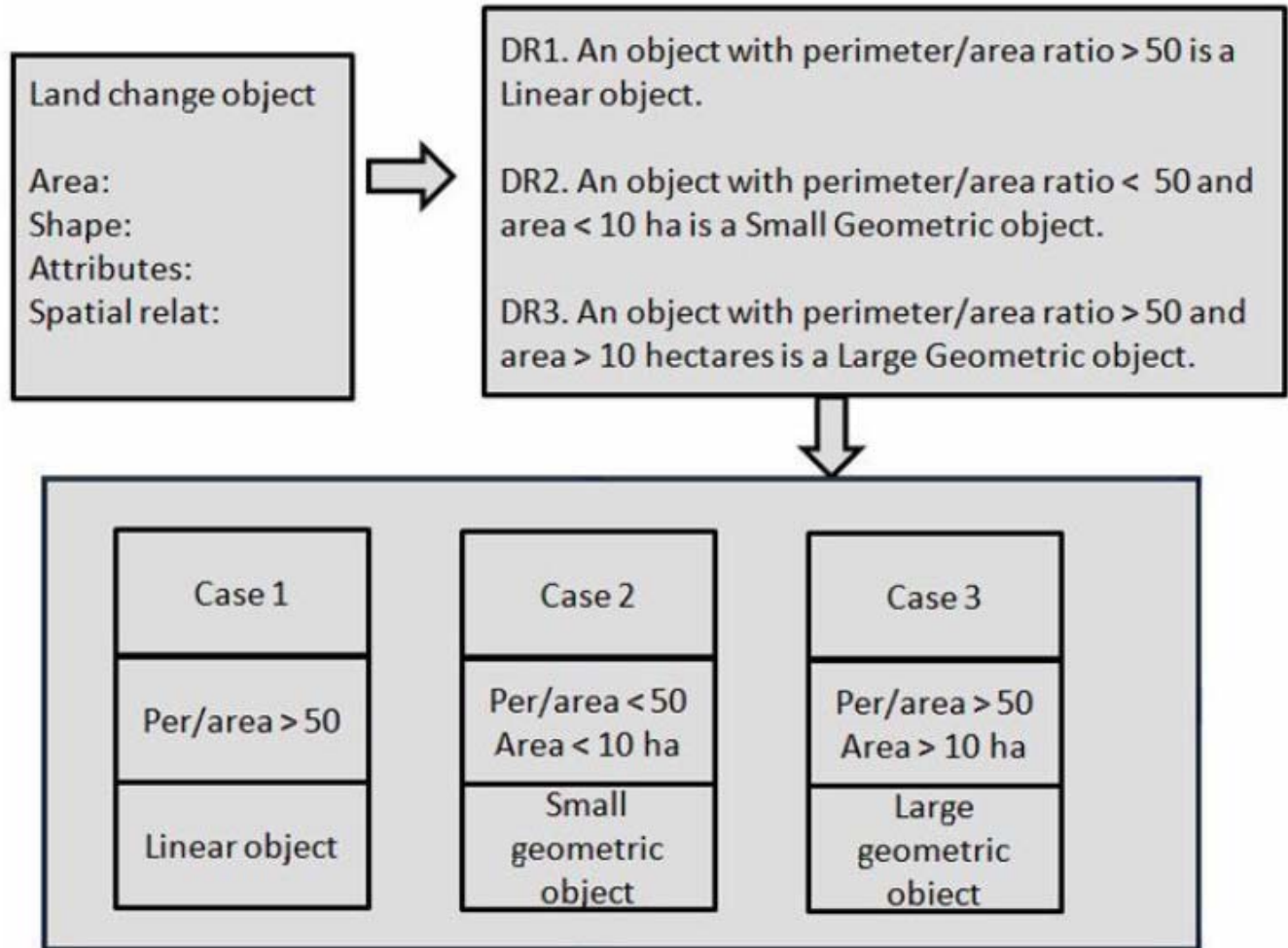4. Develop General Theory of Change

The Project

1. Select several domains
   - political change in Brazil
   - political change in Germany 19th century
   - land change objects in Amazonia
   - land change in urban area in Germany
   - ???
2. Domain-Specific Theories of Change
3. Analogical Comparison
4. Develop General Theory of Change

The Project

1. Select several domains

2. Domain-Specific Theories of Change
   - knowledge acquisition via unstructured interviews
   - description rules
   - evolution rules

3. Analogical Comparison

4. Develop General Theory of Change

The Project

Description Rules

Land change object

Area:
Shape:
Attributes:
Spatial relat:

DR1. An object with perimeter/area ratio > 50 is a Linear object.

DR2. An object with perimeter/area ratio < 50 and area < 10 ha is a Small Geometric object.

DR3. An object with perimeter/area ratio > 50 and area > 10 hectares is a Large Geometric object.

Case 1	Case 2	Case 3
Per/area > 50	Per/area < 50 Area < 10 ha	Per/area > 50 Area > 10 ha
Linear object	Small geometric object	Large geometric obiect

The Project

Evolution Rules

Evolution
Land change objects

Type1:
Type2:
Spatial relat:

ER1. A Small Geometric object that touches a Large Geometric object is merged with the Large Geometric object.

ER2. Two adjacent Small Geometric objects are merged.

ER3. Two Linear objects that are adjacent are not merged

Case 1	Case 2	Case 3
Large Geometric Large Geometric Touch	Small Geometric Small Geometric Adjacency	Linear Linear Adjacency
Merge Large Geometric	Merge Small Geometric	Not Merge

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The Project

1. Select several domains

2. Domain-Specific Theories of Change

3. Analogical Comparison

   - compare description / evolution rules across domains

   - find common structural patterns

   - construct domain-independent description / evolution rules

4. Develop General Theory of Change

The Project

Evolution rules from two domains:

land change:

A small lot < 50 ha
adjacent to
a land concentration object
→
merged with it and
the result is a land
concentration object

political change:

A country with strong military
adjacent to
a land with weak military
→
conquers it and
incorporates it into its territory

The Project

Evolution rules from two domains:

land change:

A small lot < 50 ha
adjacent to
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A country with strong military
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general change pattern:

A dominant object adjacent to a weak object
→
dominant object takes over weak object and
the result is one object

land change:

A small lot < 50 ha
adjacent to
a land concentration object
→
merged with it and
the result is a land
concentration object

political change:

A country with strong military
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Analogy Model *HDTP*

analogy = structural comparison of source & target

source domain

description rules

evolution rules

target domain

description rules

evolution rules

Analogy Model *HDTP*

generalization

general description rules

general evolution rules

anti-unification   anti-unification

source domain

description rules

evolution rules

target domain

description rules

evolution rules
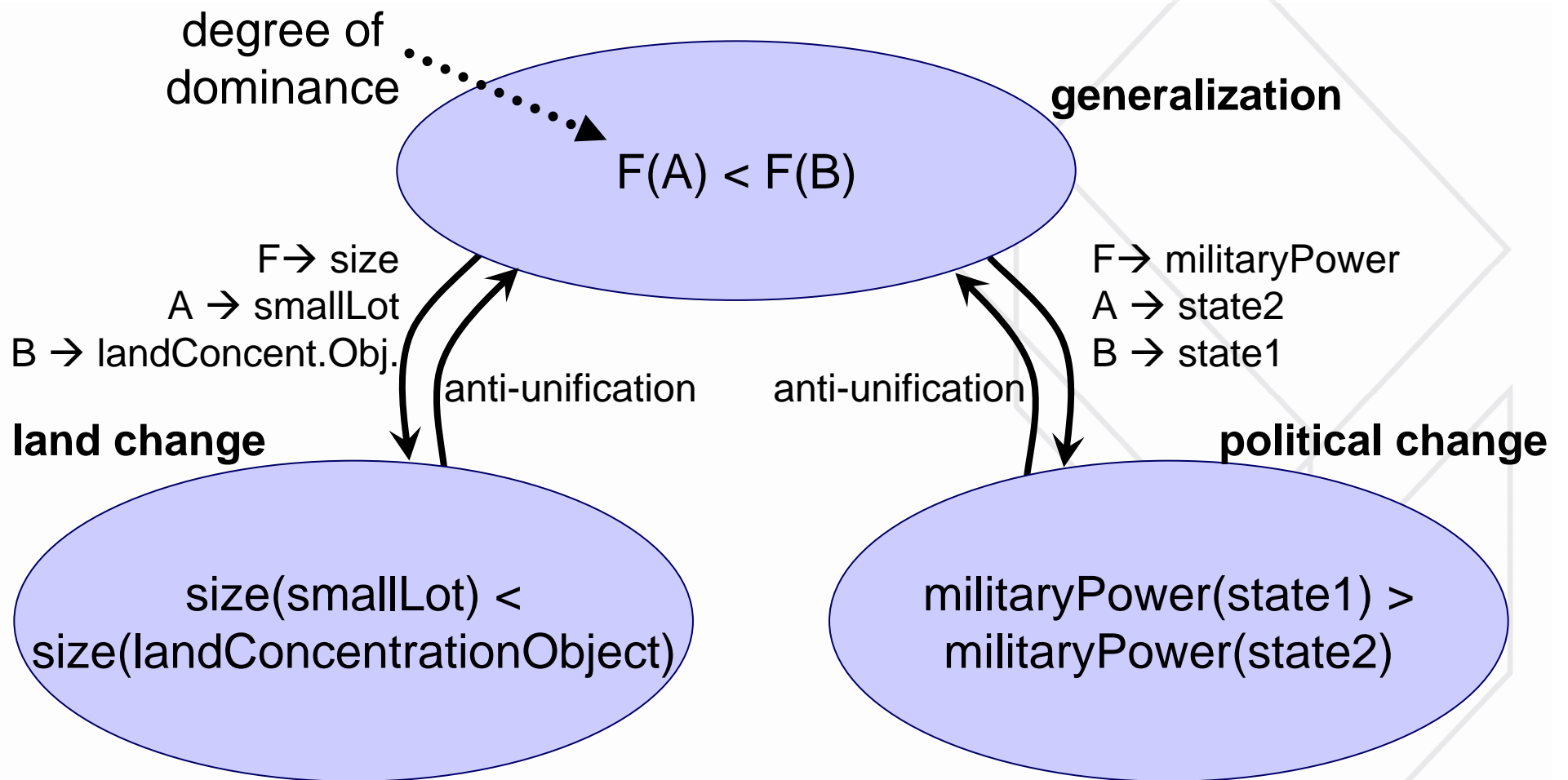
The Project

1. Select several domains
2. Domain-Specific Theories of Change
3. Analogical Comparison
4. Develop General Theory of Change
   - set of change operators?
   - set of types or attributes?