Special session / Regional Design: impacts on territorial governance and planning practice

Regional strategy design

– addressing transformations in multiple ways

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Abstract: Regions in the 21st century are subject to global influences which include climate change, resource scarcities, economic transitions, demographic shifts and ongoing digitalisation. If sustainability is to be achieved within this changing context, new collaborations will be required which shape these transformations more proactively. Alongside this, awareness within planning has been evolving, including the recognition that various regional design approaches can complement established planning procedures. Building on these aspects, this article investigates the option to design long-term strategies for the development of regions which are facing fundamental change. To undertake this, a process is considered which took place within a real life experimental situation over a period of four years. This process involved the testing of a new model for "regional strategy design", which required the cooperation with stakeholders from diverse institutional backgrounds. The Rhenish Mining Area (RMA) in Germany, which is characterised by rapidly changing circumstances, served as a case study. The discussion of the results reflects on the preconditions (e.g. established regional governance), outcomes (e.g. selective interventions) and the question of transferability. It can be concluded that regional strategy design has the potential to develop further as a field of activity.

Keywords: regional design, regional governance, proactive transformation, strategy making

1. Introduction

This article introduces and reflects an approach – regional strategy design – which is intended to address fundamental regional change in multiple ways. Ideas are based on the fact that regions are experiencing worldwide influences including climate change, resource scarcities, economic transitions, demographic shifts and ongoing digitalisation. The 21st century is therefore likely characterised by transformations instead of incremental changes (WBGU 2011, Randers 2012, Schneidewind 2018). In this context, the goal to achieve **sustainability** has been the consensus position of most nations worldwide since the "sustainable development goals" (SDGs, see: UN 2012). On a broad scale, regional societies have to anticipate and qualify "**proactive transformation**" processes beyond crisis management (Wirth 2019a). Within such a context, various changes within planning conceptualisation can be considered as the foundations for this article:

- At the urban and regional levels of action, demands, complexity and integrative needs are high (Albrechts 2004, Healey 2007, Albrechts 2013, Bryson *et al.* 2017), requiring **both short- and long-**

term action (Albrechts 2004, p. 743). Moreover, it is impossible to fully understand and manage interactions between society and space. In this regard, **systemic perspectives** towards regional development offer realistic ways forward. Pragmatically, questions of boundaries, context-specific methods and interventions can be determined on a context specific basis and also simultaneously to some extent (Hartman and Roo 2013, Sposito and Faggian 2013).

- Since the "communicative turn" (Healey 1992, p. 143) and "cooperative action" (Selle 1995, p. 240) in the 1990's, the ambition exists to integrate societal interests into planning procedures on a more frequent and pluralistic basis. In consequence, **multi-functional demands** beyond the scope of land use zoning have come to the fore. Also more generally, standardised planning tools have reached their limits regarding their perspectives, impacts and legitimacies in Europe and beyond (Fürst 2008, Kunzmann 2013).

- In the sense of **planning as an adaptive process** (Wiechmann 2007), **regional governance initiatives** especially have filled gaps – i.e. network cooperation between public authorities, the private sector, academia and civil society (Adamaschek 2003, Albrechts *et al.* 2003). Within regional governance, the coordination of strategic approaches and pilot projects, as opposed to area-wide planning proposals is usually at the forefront (Fürst 2003, p. 442, 2008, p. 94). If open and democratic, this includes or potentially enables **coproduction** approaches, whereby citizens and grassroots organisations take an active role (Albrechts 2013, p. 48).

- In support of regional governance initiatives, (strategic-) planning is frequently concerned with the definition of identity. Often this is combined with efforts to establish **future visions** for a region. In a few, all-too-rare, examples, such as London/UK or Hannover/DE, such visions have explicitly influenced a sustainability transformation of an inclusive and innovation friendly character (Landeshauptstadt Hannover 2011, Greater London Authority 2018).

- Sustainability challenges like climate change (SDGs No. 7, 12, 13, 15) have radical impacts and need untried solutions which must facilitate responses that are both fundamental and explorative in nature. These will require **new implementation models** at different spatial scales using common quality principles (Ganser 2006) and will frequently combine stakeholder knowledge from both practice and science (Schön 1983, Schneidewind and Wissel 2015).

Strategy making, which can be delivered in many different forms (Wiechmann 2007, 2008), has the potential to integrate various demands (Healey 2007), including those previously referred to. Strategies generally describe complex behaviour patterns to achieve long-term goals. In a regional context, strategies are established within complex institutional settings and offer reference points for stakeholder and citizen action. Strategy making can make use of **multi-methodological** working techniques like networking, scientific analyses, plan development, visioning, local implementation and reassessment (Bryson 2016). **Design** can obviously play a major role within regional strategy making processes – at least if understood as a complex and creative decision-making process between rational ambition and intuition (Schön 1983) that is apt to solve even "wicked problems" (Rittel 1973, p. 155).

Specifically considering action at the regional level, **regional design** approaches have been pursued for decades, if not centuries (Neuman and Zonneveld 2018, p. 1). Regional designing has a great diversity of facets, dimensions and performances (Förster *et al.* 2016, p. 5), but generally responds to long-term visions and development perspectives, especially when pressure for change is significant (Kempenaar and van den Brink 2018, p. 80). Often, both physical dimensions and social processes are emphasised (Neuman and Zonneveld 2018, p. 5). In regulatory terms, regional design is a non-binding supplement to the official instruments within planning systems. By addressing specific gaps e.g. limited vision-making capacity within regional planning, its

participants can act in more fundamental, better defined and more experimental ways. In line with this, the range of stakeholders involved tends to be more inclusive and more public compared to formalised planning processes (Balz *et al.* 2014, Förster *et al.* 2016, Kempenaar *et al.* 2017).

There are also examples, where initiatives have **designed regional strategies** aimed at facilitating long-term transformation processes; a theme particularly relevant for this article. In this context, the German IBA Emscher Park (1989-1999) can be regarded as a special example. Based upon a regional change vision, the initiative implemented 91 local projects. The latter included redevelopment of former industrial sites, new housing areas, technological parks for innovation-oriented enterprises and pilot projects which promoted an ecological modification of the entire regional water system (Ganser 1999a, 1999b, Projekt Ruhr GmbH 2005). Nevertheless, one of its leaders retrospectively criticised the lack of long-term impacts and suggested a more "general strategy for the economical, ecological, cultural and social development of a space" (Ganser 2006, p. 545). The relatively recent project "Metabolism of Albania" is an example that may be seen as the modest beginning of a such an approach (Brugmans *et al.* 2016).

Inspired by such examples, this article addresses the option to design long-term strategies for regional development facing and undergoing fundamental changes. To undertake this, an investigation was conducted within a real experimental situation, based upon the application of a new process model for "regional strategy design". Out of necessity, the approach reflects changing understanding of planning as previously described, to become instead: systemic and multi-functional in orientation, process based and collaborative in character, involved in transformative visioning and also partially responsible for facilitating implementation. In the discussion, preconditions, outcomes and transferability are considered, before final conclusions regarding the potential future of regional strategy design are outlined.

2. Method

For the investigation, the Rhenish Mining Area (RMA) in the state of North Rhine-Westphalia in Germany served as a case study. The region is experiencing a sudden transformation process, due to the accelerated cessation of mining activity and the wider need to develop new spatial, economic and technological futures (Wirth 2019b). With a focus on selected topics of regional significance, the author designed a strategy for the RMA over a period of approximately four-years (2014-2018).

The design process took place in a real experimental situation. Activities were not only geared towards evaluating scientific evidence, but also towards finding solutions to societal interests and needs (Schneidewind and Singer-Brodowski 2014, p. 126). In this case, it meant the author's own design activity (Pedgley 2007) operating in tandem with the input of other individuals. This role occurred simultaneously both as a research associate at the faculty of architecture (RWTH Aachen University) and as a project manager within a special regional governance initiative dedicated to innovation-oriented projects for the RMA (Zukunftsagentur Rheinisches Revier - ZRR). This resulted in a joint role for the author in two different tasks:

1. In the context of scientific activity, the primary goal was to extract findings, i.e. which outcomes design interventions can produce under certain preconditions in order to guide transformation processes within a region. Responsibilities also included teaching of design studios (architecture / urban design), which were organised in an exploratory manner as part of the investigation.

2. Within practice, the task initially consisted of designing thematic strategies for regional development. Later, the initiation of site-based concepts and operations, would lead on, to potential delivery of clear added value for the region.

The real experimental investigation brought various institutional groups into interaction (see Figure 1). This involved participants from both science and practice:

- 18 key stakeholders in three discussion workshops on the future of the RMA
- Experts / stakeholders from economy, research and policy fields (between 5 and >100 people, depending on topic)
- 8 practitioners in a changing team of regional development (ZRR GmbH)
- 1 research assistant (geography & resource management) at the university
- 38 architecture / urban planning students in design studios

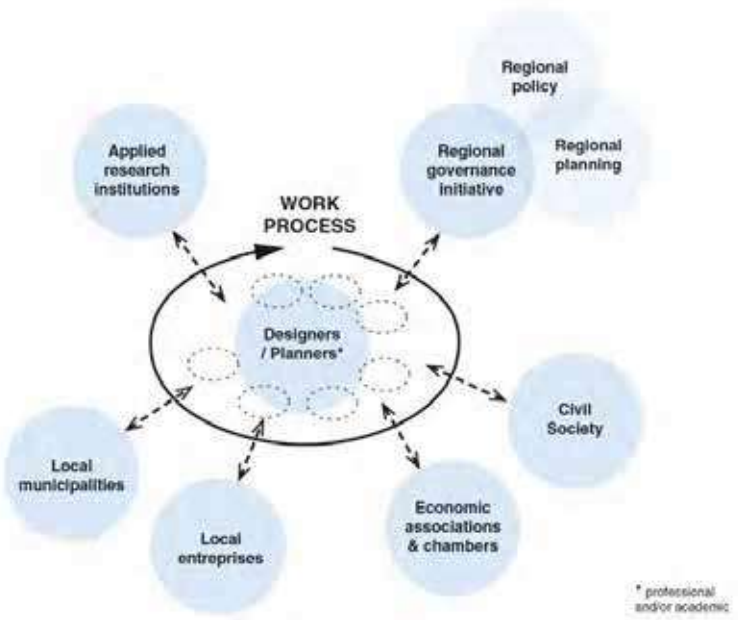

Figure 1: Institutional setting for the real experimental investigation (source: own).

In order to structure the work process, the author tested a new process model for "regional strategy design" (see Figure 2). The model resulted from a criteria-based comparison of six existing models. The latter originated from discourses related to regional governance (Kühn 2008, Bryson 2011), urban metabolism (Oswald and Baccini 2003, Heck 2008) and regional design (Stremke 2010, Brugmans *et al.* 2016). The model for regional strategy design suggests interrelated work sections, which can be understood as building blocks towards a complex strategy. Depending upon the application context, modifications, additions or reductions have to be considered independently on each occasion. Activities within the various work sections can be conducted simultaneously and through partly interactive processes, rather than through use of a traditional linear model. Therefore, linkages and timing were deliberately not specified, at the beginning of the real experimental investigation.

Work of a mainly analytical character was conducted mainly in the scientific sphere and supported by discussions with stakeholders. After the initial activities towards a regional vision (in this case via a series of three events), emphasis was placed upon a second phase with practical activities such as networking within the regional governance institution. Here, actions were considered in more detail, were consolidated and also partially implemented.

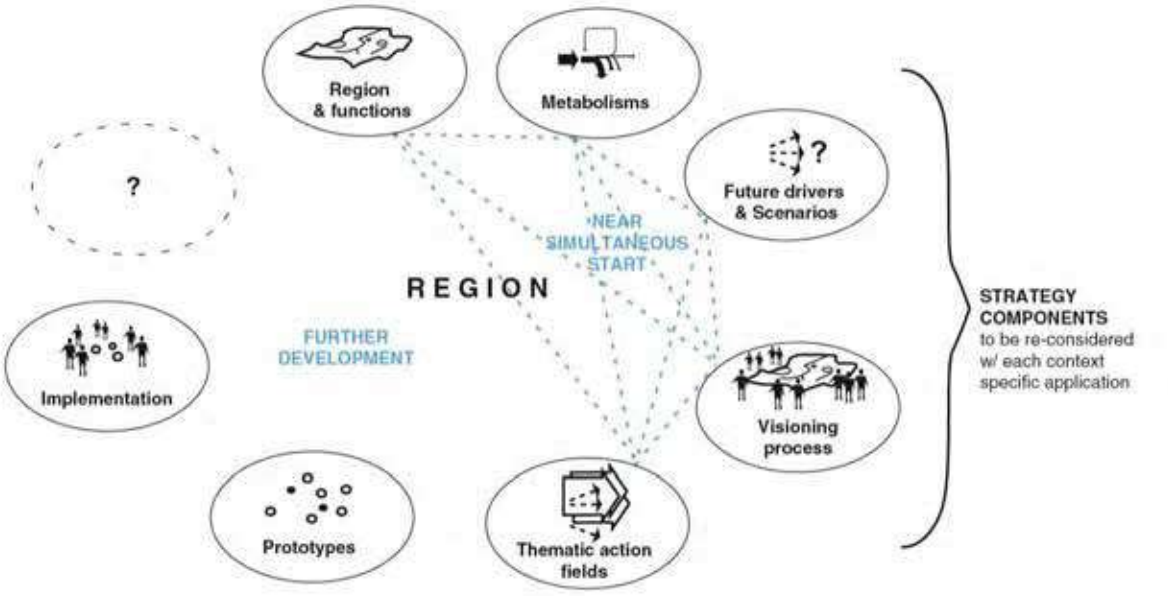

Figure 2: Institutional setting for the real experimental investigation (source: own).

3. Real experimental investigation

This main part of the article reflects the multi-year design process and the resultant experience gained within each work section of the model. Outputs arising from the process, including place-specific results, are also described, in order to provide the reader with tangible examples. However most details regarding these specific results are stated in a further and more comprehensive text (Wirth 2019a).

3.1 Region & functions

In this work section, the space of the region was analysed and key institutions/industries with spatial influence were identified by the author. Later, systematic consideration was given to how far basic socio-ecological needs (e.g. employment, food, recreation or biodiversity) were fulfilled within the region and how far certain assets (e.g. university locations or good soils) were existent. With regards to such questions, a functional analysis was carried out, which concluded with identification of regional strengths and weaknesses. The process started with data-based analysis at university (studies, reports, maps, statistics), then featured visioning with stakeholders (see 3.4) until finally, details were expanded during internal discussions at the ZRR.

The study area is shared by six administrative districts between the cities of Aachen, Cologne, Düsseldorf and Mönchengladbach. An active lignite mining industry is still located in the centre of the Region, although it does not solely dominate the area. About 2.1 million inhabitants live in 64 cities and municipalities (IRR 2014). Overall, various energy and resource-intensive industries such as chemical production, construction, metal, paper and wood processing are active in the region. Regarding land cover, the area consists primarily of fertile loess soils that are used by industrial agricultural enterprises (IRR 2016).

A major **strength** which appeared is that the region is spatially and economically diverse in comparison with other industrial regions in Europe. Moreover, special sites are available for new working and living concepts, including large areas that are being rehabilitated following mining cessation. Advanced knowledge is especially

present in technology-related sectors, e.g. engineering. In the context of a global knowledge economy, the region benefits from prestigious research locations. Finally, albeit still at a purely aspirational level, there is future potential to create a lake type landscape that can evolve following mining activity once open pits are flooded. The core area, the actual RMA, could therefore change in the future from hinterland to become a special destination.

Regarding its **weaknesses**, the study area still represents a region that is largely based upon the consumption of finite resources. In addition to lignite mining, most other industries still act predominantly as linear economic systems. This is associated with negative externalities: CO_2 emissions in the region are high, gravel and sand pits can be found throughout the landscape, nitrate pollution in groundwater and air is problematic, there is low biodiversity within agricultural areas, and aquifers which have been drained for mining now require artificial irrigation to sustain and recreate wetlands. Finally, as far as cultural factors are concerned, the negative effects caused by landscape destruction and relocation/resettlement (also as the result of mining), are obvious and have created considerable controversy for decades.

3.2 Metabolisms

In this work section, metabolic flow analyses were conducted with the help of a research assistant (geography & resource management) at the university. This detailed assessment of inputs, outputs, emissions and sinks for natural resources allowed the development of a variety of conclusions towards creation of a transformative strategy, e.g. one that could lead to a renewable energy supply for the region and/or to circular production patterns for certain industries. With respect to analysis, literature and data were just as important as the exchange of information between experts from statistical agencies and economic sectors. Three out of four investigated metabolisms revealed an acute need for action in the region.

The **energy** system at a state level is facing enormous challenges in view of the nationwide climate protection targets (above 80% CO_2 reduction compared to 1990). This is even truer for the RMA region. The analysis of energy flows demonstrated the great potential for future efficiency measures, which was also confirmed by energy experts. It became clear, that the growth of renewables alone cannot ensure future energy supply and effective climate protection alone.

In **construction** it was revealed that only a small proportion of the raw materials used annually can be substituted by secondary raw materials. A full circular economy is not possible if current consumption patterns continue. Nevertheless, many raw materials still land unnecessarily on landfills or in backfilling. Where recycling still takes place, there is a significant devaluation of the material, since it is only used for earthworks and road construction.

Consideration of the **agricultural** sector could only be made provisionally, due to lack of adequate data. Nevertheless, the high nitrogen excess appears significant. Reduced and more efficient fertilisation is therefore required to minimise excessive inputs of nutrients into ground- and surface waters by agriculture. The small amount of artificial irrigation shows that agriculture has only been irrigated to a very limited extent.

Water resources were still abundant at the time of the investigation. The analysis however, supported by a discussion at the regional water authority, showed potential water issues. With the end of draining currently resulting from mining operations, the hydrological system will fundamentally change (rising groundwater / lakes). Probably this will be barely noticeable for industry and households. However, climate change impacts might require a systematic irrigation of agriculture in the future, which would eventually take a significant toll on the regional water budget.

3.3 Future drivers - scenarios

In this work section the author dealt explicitly with the question of which long-term developments could take place in the region. For this purpose, future influences were examined based on forecasts / literature, often from beyond the regional scale. Scenarios were then derived, which were amended by stakeholders in two workshops. The scenarios illustrated fictive situations in the future with textual and visual narratives, in order to facilitate orientation for the design of the overall strategy.

As explained earlier, the area of the RMA is a versatile cultural space, however it is still characterised by multiple linear economies and their associated negative impacts. Quite obviously this stood partly in contrast to many of the key challenges in the 21st century which were analysed and included:

- climate change
- scarcity of resources
- limited land availability
- rising social inequalities
- economic change
- digitalisation

Hence it became obvious, that the region will undergo a fundamental transformation over the coming decades that will occur across economic sectors and land uses – i.e. well beyond perceived structural change effects due to the end of lignite mining. Subsequently, three future scenario narratives were sketched out. Each of the scenarios described a different speed and intensity of transformation in the RMA until the year 2050. In the "extremely negative scenario" the region reacts too slowly and too defensively to external drivers. The "ambitious scenario" describes the impact more or less of the established policy direction towards more resource efficient and regenerative lifestyles. The "extremely positive scenario" involves the possibility of disruptive innovations (e.g. new energy technologies) and as yet unforeseen, paradigm shifts leading towards a region characterised by rapid material cycles, abundance and an accelerated emergence and urbanisation of the lakes.

3.4 Visioning process

Drawing on information from the work sections described previously, three in-depth stakeholder discussions dedicated to visioning were organised. In this case only about ten regional stakeholders per discussion were involved, although, ideally, this would have included broader participation / coproduction. Within the overall vision, individuals involved also agreed upon theme-related core competencies that should be mobilised in first steps towards a transformative strategy. The potential spatial impacts of the individual stakeholder types were quite different. In terms of interests represented, stakeholders with mainly economic goals (e.g. job creation) as well as those with more environmentally motivated intentions (e.g. climate protection) exchanged thoughts and positions. By using input presentations as starting points, the author also shaped the discussion process in order to steer the positions of stakeholders in a common direction.

Representatives of mining and agriculture had a direct spatial influence on large parts of the region. Both mining and agriculture also provided a significant number of jobs. At the time of the talks, about 20,000 people were directly and indirectly employed by the mining company. The latter was also engaged in regional development

initiatives, for example through the sale of real estate, the support of projects by the municipalities and expert contributions to update procedures regarding state and regional plans. As a result, there were certain interdependencies between mining companies and regional development initiatives. The actors from research and civil society had rather indirect impact upon regional space, in the form of research contracts or initiation and support of public projects.

Figure 3: During one of the stakeholder workshops (Photo: F. Lohrberg/RWTH Aachen)

The discussions sometimes revealed competing interests in land resources, in particular between agriculture (acreage), mining companies (open pit mines) and economic development (e.g. development of new business parks). The actors with more environmental interests were able to influence the discussions on future regional development comprehensibly through special transformative knowledge. For example, entrepreneurial opportunities in the region in terms of renewable energy, biomass or nutrient management were exemplified. Also climate change consequences and the need for action towards climate protection were sometimes aggressively promoted, in order to exemplify the need for proactive change in the region (see Figure 4).

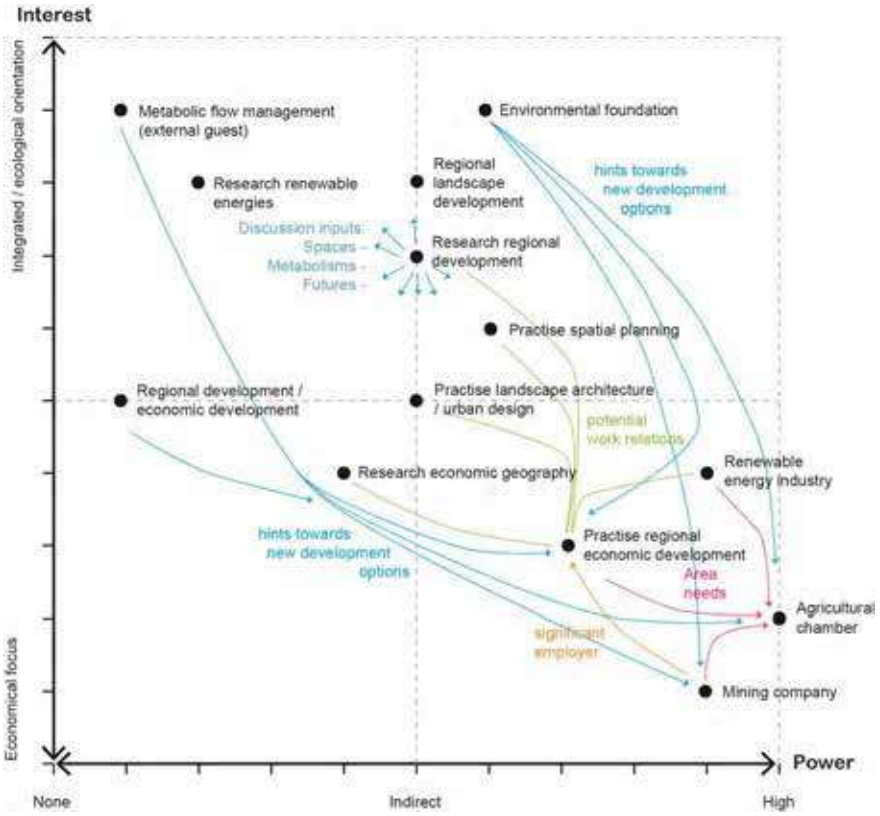

Figure 4: Power-Interest-Grid (inspired by Freeman 1984) showing different influence possibilities and interests of regional stakeholder types in the RMA.

Although the mix of stakeholders in the discussions was quite diverse and even controversial, the group achieved a consensus of a common long-term vision. Instead of giving free rein to de-industrialisation, one could steer a proactive reorganisation process that was mobilising the RMA as an "area of opportunity for a future industrialisation" with explicit orientation along ecological sustainability goals and a public re-qualification of space. To follow this vision, outstanding knowledge resources within the region were identified including those which were:

- specialised in energy supply for generations, increasingly also renewable energy
- continuing key industrial production with a wide range of industries including chemistry, metal, construction/building and paper/wood
- high-performance agricultural enterprises benefitting from a mild climate, fertile loess soils and proximity to regional sales markets and metropolitan areas such as the Ruhr area
- planning / realising landscape change on a large scale (recultivation, translocation, redesigned highways, watercourses and lakes in the future)
- many renowned universities and research institutions as potential contributors to regional development

3.5 Thematic action fields

In this section, the author designed thematic action fields (Figure 5) in cooperation with associated stakeholders. Based upon the outputs of the common visioning process, the work was carried out at the interface of university and regional development practice. One workshop or more with theme-related stakeholders was held per action field (with one exception). Overall, not only were immediate regional interests decisive; in addition, democratically legitimised policy decisions at state, federal or global level were incorporated (e.g. climate protection goals) within the discussions. Finally, each thematic action field included a vision, goals, courses of action and an overview of relevant stakeholder groups. The fields became flexibly oriented to all scenarios, but were still meant to steer away from the unwanted negative scenario. In retrospective however, the scenarios had a rather small, at best inspirational influence here.

The work took place up until year 3 of the 4 year research period. It was understood provisionally, to be the precursor of a longer and more comprehensive decision-making process in the future of regional development. During this first step, four thematic action fields were conceived.

1. **Regional power plant**

   The entire region transforms from a fossil fuel consumer and energy exporter into a horizontal power plant that interlinks and controls decentralised producers, utilities and users in technically and spatially new ways.

2. **Circular building economy**

   The region establishes itself as a pilot area for circular economy, especially in the construction sector. New value creation effects arise through a cluster approach between deconstruction, recycling, building material production, planning and construction.

3. Food region

The region evolves from a standard agricultural producer (high yield per hectare with low environmental regulations) to a versatile food region with new cultivars and high-quality production, allowing for a more diverse landscape to develop.

4. Regional open space system ‘lakes’

In stages, a multifunctional open space system improves public access, recreational opportunities and landscape quality in the core area of the region (opencast mines, recultivation and surrounding areas) and future lakes can be already spatially incorporated decades before their final emergence.

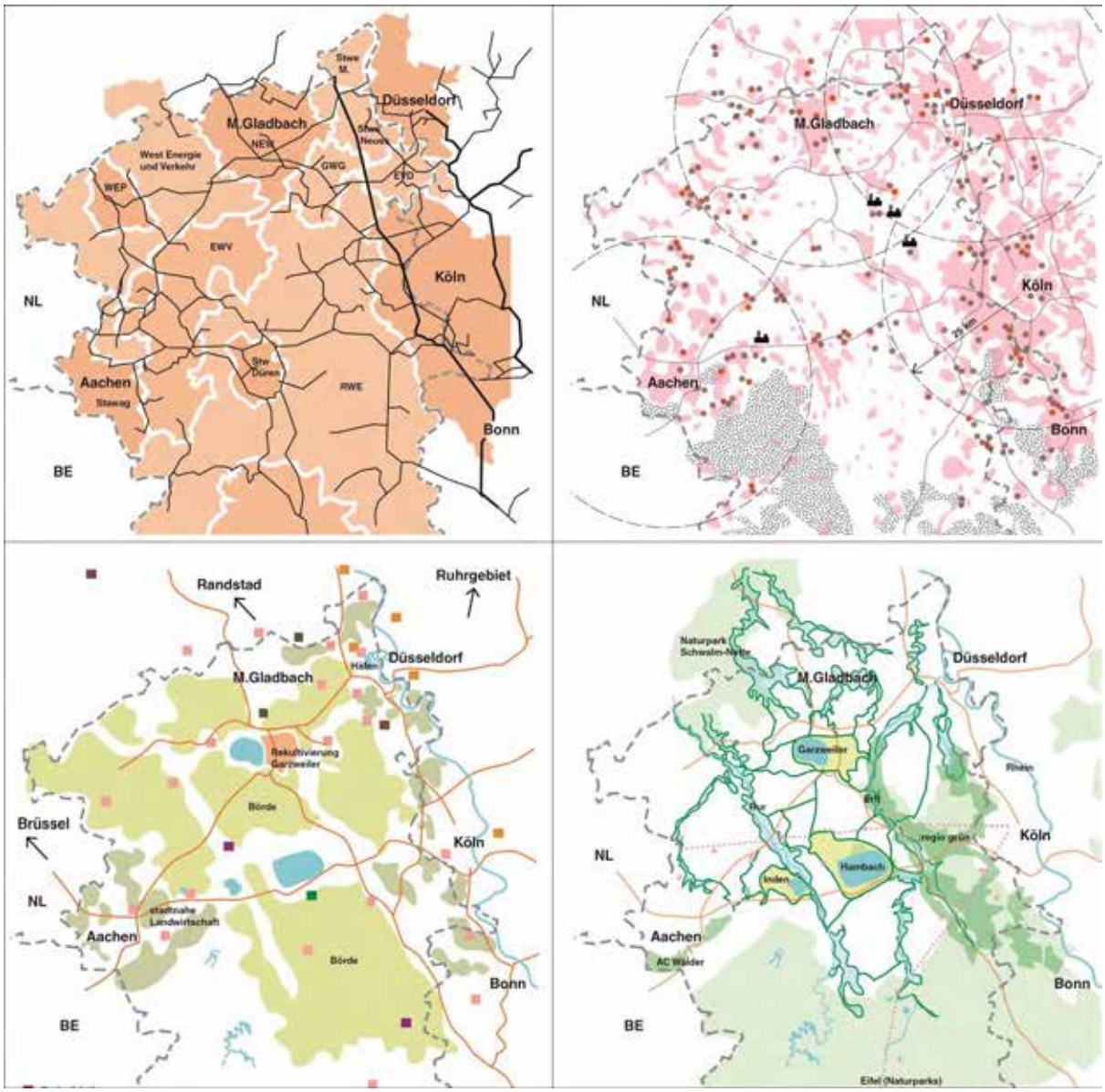

Figure 5: Close-ups of regional maps that were made at university to support the four thematic action fields with strategic considerations.

3.6 Prototypes

In order to direct the thematic action fields towards an actual spatial impact in the future, regional prototypes were designed (Figure 6). In many cases, these already included reference to specific areas or sites. The prototypes 4, 5, 6, 7 and 9 were created in design projects within the context of architectural teaching at university, usually involving a few experts from the region. The other prototypes were conceived outside academia in stakeholder workshops with a more creative orientation. Coproduction via community workshops etc. did not occur, however in principle it would have been feasible with more resources and inputs. Prototype 8 drew upon a best practise example.

A total of nine prototypes were conceived:

1. The **multifunctional energy area** describes the systemic and spatial transformation of energy infrastructure by connecting the networks of electricity, gas and heat with each other and producing renewable energy across different landuses. This included a list of pilot activities and sites from the example of one municipality.

2. The **industrial energy park** demonstrates the application of the same principle, but at the scale of an industrial area including mixed uses.

3. On site of the **circulative building center**, new products are made from building waste. The focus is on applications that have not yet taken place in the state e.g. recycled concrete from the deconstruction of lignite power plants.

4. The **circulative demonstration building** is a prototype to fully preserve the material value after a building's life-cycle by reuse and recycling. Before and after deconstruction, the space can be used as a business incubator for the region.

5. Building on its former use as a power plant, the **industrial redevelopment park** gears towards companies in the renewable energy sector that share common infrastructure, energy, material flows and information.

6. The **food strip** is a startup area that offers land and infrastructure for innovative agricultural businesses, specifically those that are tailored towards regional diversification and sustainability criteria. Each company has 2 hectares of land at its disposal.

7. The **bioeconomy-park** is a place for value-added partnerships in agribusiness, which strive for an integrated production of food, raw materials and energy. A central component is a biorefinery on site.

8. The **open space corridors** feature mainly in the context of the thematic action field that gears towards a regional open space system. The open-cast mines are not expected to become lakes until 2030/2045, but can be embedded within a spatial structure beforehand.

9. Three recultivation areas in the RMA emerge as '**newland'** and need integrated planning. In a first step, visions were developed with students and stakeholders (municipalities, civil society foundation and the mining company). Further needs of society would need to be taken into consideration.

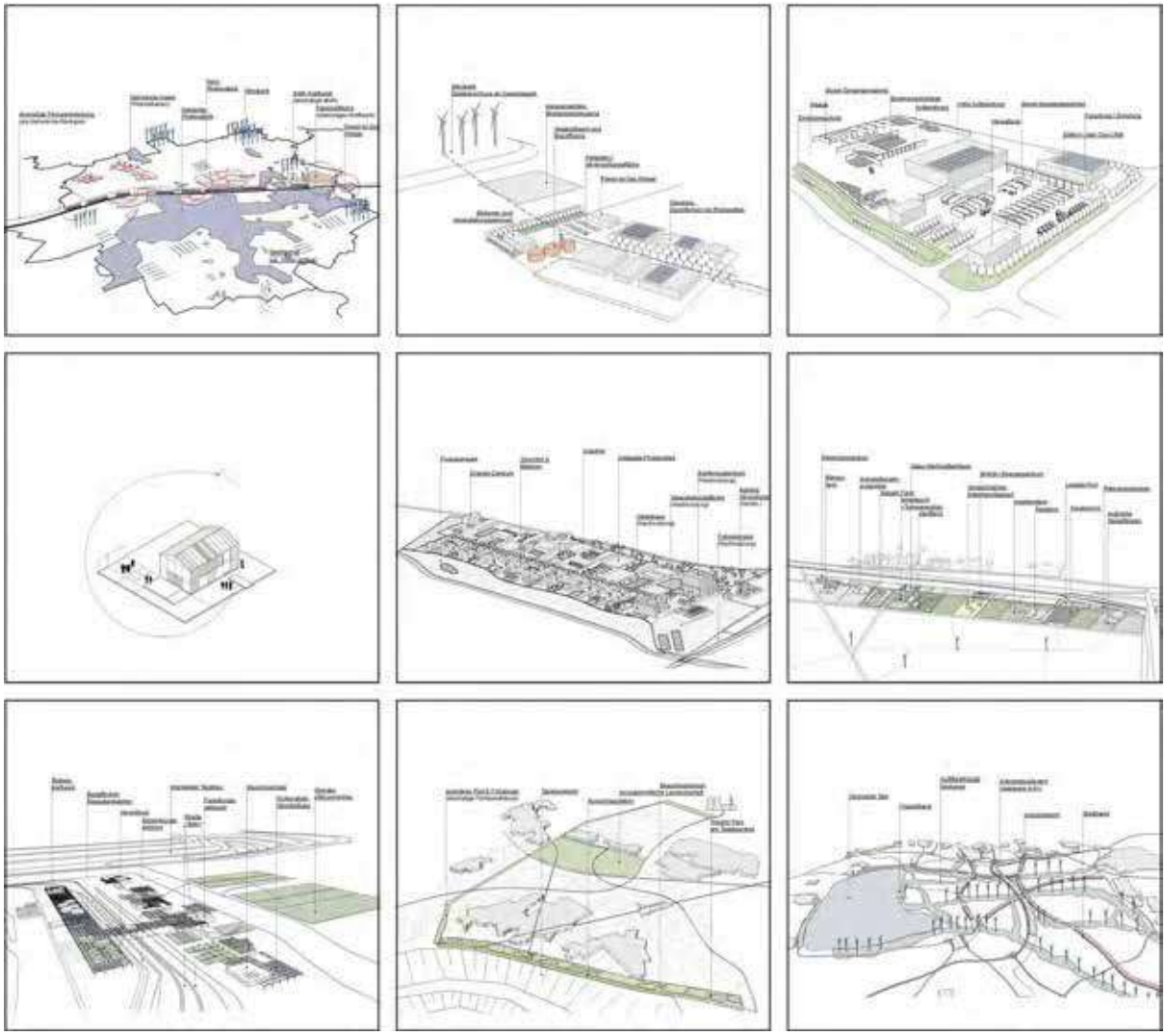

Figure 6: Visual overview of the nine exemplary prototypes.

3.7 Implementation

In this section, implementations of the overall strategy, the thematic action fields and/or the prototypes were tested out. Some of the prototypes could be followed up through network activities and more detailed concepts towards spatial realisation. Depending on how the entire regional governance process will continue (i.e. beyond the scope of the experimental investigation presented in this paper), there is potential for project bids and/or project calls based upon the thematic action fields or certain prototypes.

Complete implementation of the **overall strategy** was not carried out in practice at the regional governance agency. There was a shortage of human and time resources, and the focus of the steering board / shareholders within the initiative was upon starting quick project calls based on public funding options, in order to achieve results within a short time and within a certain critical mass.

The author also attempted further implementations of the **individual thematic action fields** in practice. This was carried out for each topic with different level of input. The effectiveness can only be perceived in qualitative ways through achieving certain milestones:

- A stimulating transdisciplinary workshop, albeit with no further identifiable effects during the time of the investigation, was organised within the strategy field "regional power plant".

- Going further, a comprehensive three-year development project with the author as project manager, was carried out early on in the field of a "circular building economy". Here the implementation could be advanced the furthest. Three of the prototypes could be conceptualised further (see prototypes 3, 4, 5) and stakeholders interested in implementation began the first collaborations. The pilot production and use of recycled concrete in the entire production of a building was initiated, and a strategic follow-project was successfully developed (Wirth and Zabek 2018).

- The thematic action field "food region" was not pursued until further notice, because both the author's expertise and the approval of the chamber of agriculture (as the most relevant stakeholder) were both lacking. Established production patterns were seen as offering little potential for change. However after investigation, a project for the realisation of an agricultural startup site was launched, including interested stakeholders from agriculture and civil society (RWTH Aachen 2019).

- Based upon the initial common ideas arising from the visioning process in the stakeholder discussions, the author brought the concept of an "open space system of 'lakes'" into a regional development workshop, where the idea was developed further. In follow up steps, a professional planning team was commissioned to develop the first planning proposals - both for exemplary implementation projects and the more detailed conceptual work for a regional open space system (IRR 2017).

4. Discussion

How can long-term strategies be designed for the development of regions which face fundamental change? The application demonstrated that it is necessary to interrelate different work sections with each other on a somewhat flexible basis and to include feed-back loops. As expected, design is not conducted in a linear way towards a complex strategy (Figure 7).

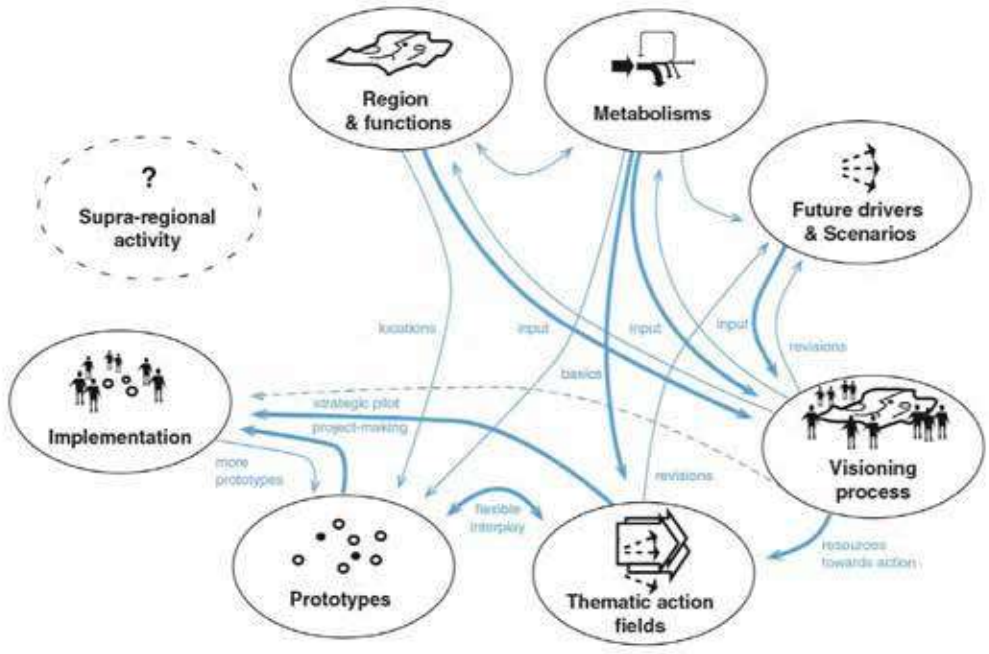

Figure 7: The model applied in the example of the real experimental investigation.

Findings regarding the **preconditions** for conducting regional strategy design can be derived from reflecting upon both the entire design process and its single work sections:

1. **Established regional governance (co-operation or directly embedded).** The multi-year interaction with a regional governance organisation (Zukunftsagentur Rheinisches Revier) and its steering mechanisms proved itself to be effective. Insider knowledge, data, political legitimacy and contacts with the regional stakeholders (business, public authorities, research and civil society) were found here. However, a disadvantage of conducting regional strategy design in the context of regional governance organisations is that these organisations may have a predetermination towards certain results, e.g. in the case of the investigation into new commercial areas.

2. **Functional challenges for society that require collaboration.** The entire strategy design process could only be initiated in response to a requirement for urgent functional challenges, e.g. the need to transform the entire regional energy system, or to enable the compensation of job losses. On this basis, it was possible to expand the range of topics with a view to other functions such as provision of quality food in the region. A more open and democratic process for analysis and later visioning would have been desirable. This should involve the broader public instead of only key stakeholders.

3. **Monetary budgets and workforce.** Initial ambitions and expectations could not always be matched in the process, due to limited resources. The author had to rely on efficient networking, own project acquisition and often voluntary contributions. It would have been more effective with an entire team coordinating regional strategy making. This may be difficult to realise in many parts of Europe and beyond.

4. **Political climate towards change.** Political support for regional governance in recognition of the functional challenges, including support for regional strategy design was crucial. Ultimately as well, the different political motivations of relevant groups of actors was decisive.

5. **Time to act despite urgency.** Despite the need to produce concrete and also short-term results, four years were needed to design the strategy in its multiple dimensions. This stands in contrast to the initiation of a regional development process with rather open / less defined project bids.

6. **Expert knowhow (theme-related knowledge & data).** The intensive need of technical expertise was particularly significant (e.g. forecasts or new technologies regarding energy/reuse/recycling). This also included the possibility of using analytical methods (e.g. metabolic flow analysis) and the availability of particular data (e.g. statistics or GIS data).

7. **Special design skills.** A situational decision-making process between rational ambition and intuition had to be conducted. By definition, this can be the case with any kind of design. A high level of generalist orientation was specifically needed whilst cross sector knowledge was adopted and combined into new solutions. Also, designing the regional strategy required a certain level of expertise in adaptive process management (complexity of different working fields / interrelated activities). Finally, the author had to operate in a mediator capacity between conflicting individual interests, but specifically with a view to long-term sustainability challenges and associated supra-regional policy objectives. An example for this was (inter-)national climate protection goals with democratic legitimation at different spatial scales. Discussions in this context overcame controversy through brainstorming together to determine win-win solutions, instead of fundamental policy debates on fossil vs. renewable energy.

With regards to the **outcomes** of the investigation, the nature of the process model also formed the basis of the results. Nevertheless, more precise observations became possible after application:

1. **Strategy.** A strategy with transformative, i.e. long term orientation, was developed. The strategy is rather complex and is adaptive in its logic. Changes in one of its work sections (e.g. need for more / additional thematic action fields) do not necessarily result in a collapse of the entire concept.

2. **Processual vision, instead of (merely) spatial vision.** The manifold analyses and discussions led to a vision that generally describes a successive and open transformation process of a generative and enabling character, as opposed to a static spatial vision as presented in "the" plan.

3. **Goals, based on multiple scenarios, but targeted appropriately.** Based on multiple future scenarios, thematic goals were set (e.g. model region for circular economy). However, it was agreed with the involvement of stakeholders to navigate towards desirable scenarios, which often coincided with political goals at national level (e.g. climate protection). In retrospect, scenarios were considered less important by stakeholders, compared to the level initially assumed by the author.

4. **New and / or strengthened stakeholder networks for change.** In designing the thematic action fields, a pragmatic synthesis of win-win ideas, institutional responsibilities, and technological progress was sought. This resulted occasionally in a key role of the author as a communicator, while collective work processes within the region were taking place. For developing two of the thematic action fields further (circular economy, regional open space system), the design process helped to initiate new regional stakeholder networks.

5. **Selected projects with explicit strategic focus.** Work on the prototypes led to a rather small selection of models, i.e. potential projects (buildings, work neighbourhoods, infrastructures or larger areas with multiple land uses). For some examples, it was demonstrated that committed individuals can lead such models towards implementation (e.g. circulative building centre). Additionally, project calls in regional development which lead to prototypes with similar thematic orientation would offer potential.

6. **Spatial impact?** Apart from one built pilot project (see 3.7), this aspect remains aspirational and can only be evaluated in the future.

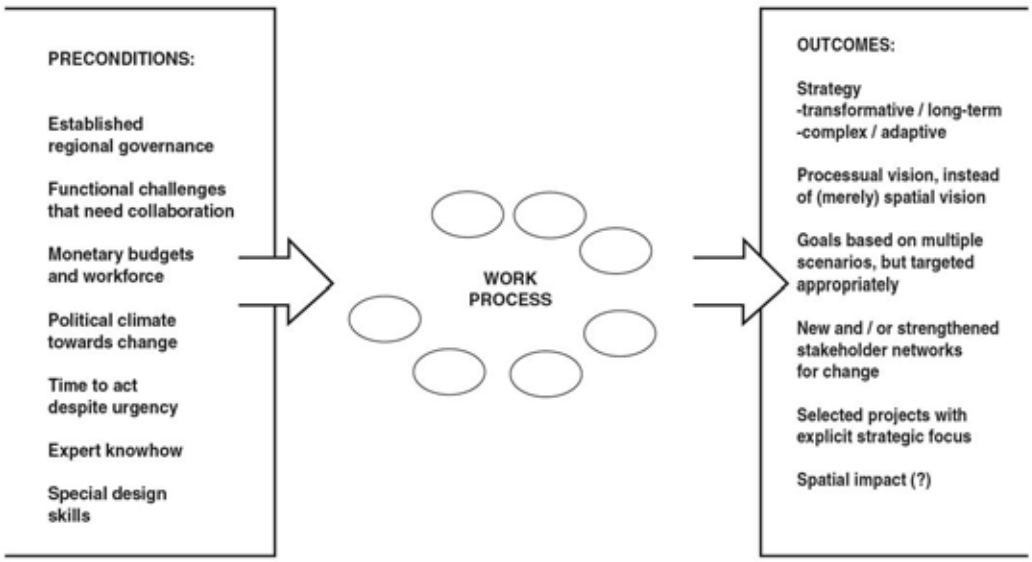

Figure 8: Preconditions and outcomes of regional strategy design, according to the investigation.

The investigation presented in this article has been based on applying a specific process model in the context of a specific case study region. Therefore, the transferability of the findings is not fully guaranteed. Even if a situation matches the described preconditions of the investigation, there may be certain significant variations. For example, regional governance initiatives can take various forms and pursue entirely different goals. There may be examples that do not harmonize with regional strategy design at all. Additionally, in other regions, the influence of the spatial planning system may be more relevant. For the RMA example, the regional planning authorities were not in a position to conduct fundamental strategic work regarding its future. As a result, potential contributions to the process were considered somewhat limited by the author, and only one informal interview took place. In other regions however, this situation may be different, which could alter the entire process and the possible outcome of regional strategy design.

It can also be assumed that other regions might benefit from a modified approach with emphasis upon different work sections, compared with the model introduced by this article. For example, there may be examples of regions that already have pilot projects underway even though there is no overarching regional vision with transformative orientation. Conversely, there may be regions that already have a vision, however no further models and steps towards implementation have been made.

5. Conclusion

How can long-term strategies be designed for the development of regions facing fundamental change? Based upon the example in the investigation and other quite obvious transformative challenges worldwide, regional strategy design has obvious chances to become an emerging field of activity. Apart from using multidisciplinary methodologies, an important precondition is a direct cooperation with regional governance initiatives or other effective steering mechanisms. Moreover, urgent functional challenges, sufficient resources, political support, longer timeframes (of several years) and specific knowledge – including that of the designers / planners – are needed. Overall, regional strategy design requires intensive networking and teamwork.

A strength of regional strategy design is its potential to involve regional stakeholder interests, specialised areas of science and practice in a creative integration process. The latter merges ideas, selects priorities, develops new models and is already partially functioning on a project-specific level. Regional strategy design undoubtedly has a transdisciplinary orientation, and management characteristics. At the same time, it continues to be shaped by the traditional design disciplines such as architecture, landscape architecture and urban design.

A critical point from a practical perspective is the potential predetermination of regional governance mechanisms, which may limit the basic potential of design as an explorative decision making process. This issue leads to academic discourses related to path dependencies, path change and political ecology. From a scholarly perspective, the transferability of the findings remains in question and could be the subject of further research. This could mean further application of the process model in other regions, or comparative case study analysis. Some historical precedents and pioneering examples with similar characteristics exist, and these could provide valuable lessons and a pool of expertise for taking the concept further.

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