

Title: AI-Assisted Narrative Exploration: Generative AI as a Methodological Tool for Regional Development

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Extended Abstract: (1350 words without references, 1980 words including references)

In recent years, the rapid diffusion of artificial intelligence (AI) has become a key driver of economic and societal change. In particular, the emergence of generative AI over the last years has introduced powerful new tools that are increasingly applied in various domains and sectors, reshaping business models, employment structures and learning processes (Bandi et al., 2023; Fui-Hoon Nah et al., 2023). While the economic implications of AI have been widely discussed, its epistemic and methodological implications for regional research and regional development practice remain underexplored.

At the same time, economics and economic geography have witnessed a growing interest in narratives over the last decade (Benner, 2024; Holtfort, 2025; Roos & Reccius, 2024; Shiller, 2017). Narratives, understood as socially shared sense-making stories about economically relevant topics, connect events, actors and action in meaningful way in specific regional contexts (Roos & Reccius, 2024; Sotarauta & Grillitsch, 2023). They are closely linked to the perception of regional identity (Roessler, 2024) and condition what development paths are thinkable and plausible. Narratives are characterized by situatedness, temporal sequencing, worldmaking and world disruption and what it's like (Herman, 2009, p. 9). As such, it becomes clear that narratives can constrain or enlarge imagination and a shared vision about the future of a region by fostering fatalistic, delegative, defensive or transformative thinking. Morgan and Stapleford (2023, p. 402) argue, that narratives bridge what is known with what might be possible, thereby functioning as a reasoning device between "as is" and "as if".

In addition to these developments, critique in mainstream economic geography emerged, that it puts a strong emphasis on path dependency, lock-in aspects, the reproduction of certain visions of history, thereby marginalizing or excluding alternative

futures, (Gong, 2024). Although regions today face pressing transformation challenges such as climate change, demographic shifts or increasing social inequality, conceptual and empirical engagement with future-making practices remains limited (Gong, 2024, pp. 292). Furthermore, the literature on “geographies of the impossible” calls for research practices that suspend taken-for-granted assumptions and explore utopian as well as dystopian spatial futures in order to expand the horizon of the possible (Pohl, 2024).

Despite the rapid diffusion of generative AI, its enabling and constraining effects in the context of regional development have scarcely been examined, particularly from a narrative perspective. Existing applications of generative AI in spatial contexts are predominantly located in urban planning and design (Fistola & La Rocca, 2025; Jiang et al., 2025; Moreno-Ibarra et al., 2024; Rane, 2023; Von Brackel-Schmidt et al., 2024). In addition to that several approaches exist to use and integrate computational methods, in particular Natural Language Processing (NLP) and pattern recognition and apply them to study human-centered settings (Gauthier & Wallace, 2022; Nelson, 2020; Schäfer & Hase, 2023). However, systematic methodological integration into regional research and future-making processes remains largely unexplored.

This contribution addresses these gaps by developing a structured framework for AI-assisted narrative diagnosis and narrative design in two structurally challenged German regions: Lusatia and the Ruhr Area. Both cases provide a comparative logic as regions confronted with structural transformation under different temporal conditions.

Lusatia, located in south-east Brandenburg and north-east Saxony, is a traditional lignite mining region undergoing currently an accelerated transition due to Germany’s coal phase-out policy (BMW, 2019). The region is forced to find new regional leitmotifs, narrative and planning imaginaries to manage the politically induced abrupt turnaround to a post-carbon region and future (Lange & Bürkner, 2026). At the same time, research highlights the persistence of dominant narratives and an aversion to transformation (Roessler, 2024, p. 413).

The Ruhr Area, located in North Rhine-Westphalia represents one of Germany’s long-term industrial restructuring regions. Historically shaped by coal mining and steel production, the Ruhr Area experienced progressive decline of heavy industry from the 1960s onward. Although diversification and regional redevelopment strategies have generated new impulses over the last decades, structural challenges persist (Asprogerakas & Mountanea, 2020). Industrial heritage sites such as Zollverein or Landschaftspark Duisburg Nord serve as powerful symbolic anchors for narratives emphasizing industrial pride and working-class identity (Berkenbosch et al., 2022). Simultaneously, strategic regional documents increasingly emphasize digitalization, culture, creativity and knowledge, green industry and science-based entrepreneurship (Regionalverband Ruhr, 2023). Both regions thus exhibit tensions between established and emerging regional development narratives.

At the core of the contribution is the methodological conception of generative AI as a structured analytical instrument for narrative diagnosis and design and its application to the two regions for testing. Using GPT-5.2, the application proceeds in three interrelated steps: narrative mapping, narrative recombination, and counterfactual narrative generation. It aims for the exploration of alternative regional futures, while critically reflecting on its opportunities and limits. Therefore, GPT-5.2 is used as a structured analytical instrument within a clearly bounded corpus.

First, narrative mapping aims to systematically extract dominant and marginalized storylines from a bounded corpus of various regional sources consisting of e.g. regional development strategies, funding applications, political speeches or media content. Instead of just summarizing, structured prompting guides GPT-5.2 to decompose narratives document-by-document along predefined analytical dimensions, including core problem diagnosis, solution logic, key actors, implicit assumptions, temporal orientation, representations of past and future, metaphors, framing devices, outside-in perspective, inside-out perspective or specific geographical characteristics. The outputs are subsequently synthesized to produce a structured narrative map for each region. To enhance stability and reproducibility, multiple iterations are conducted using relatively low sampling parameters¹ (temperature 0.2–0.4; top-p 0.8–0.9), thereby prioritizing faithful extraction over creative variation.

Second, bounded narrative recombination seeks to generate adjacent possible futures grounded in empirically identified narrative elements. Drawing on the narrative map and complementary regional data (e.g., sectoral structure, employment, demographics, institutional assets), GPT-4o is further prompted to recombine marginalized storylines with dominant frames. The objective is to construct plausible alternative development pathways that remain regionally anchored and grounded in the provided corpus while introducing structural shifts through new actor constellations, institutional arrangements and temporal sequences.

Third, plausibility is deliberately stretched and anchored counterfactual narrative generation is enforced within bounded constraints. Prompts may remove a dominant assumption, alter one or more structural parameters or invert a prevailing problem framing while maintaining regional specificity. Also at this point, several iterations are run to increase creative variation. Higher sampling parameters (temperature 0.5–0.8; top-p 0.9–1.0) are employed to increase variation and surface unlikely combinations. This step aims to break narrative inertia and expose suppressed or overlooked possibilities without detaching from contextual grounding.

In a subsequent critical assessment, the overall application framework as well as the generated narratives are evaluated with regard to plausibility, transformative potential,

¹ Low sampling parameters (e.g. Amin & Schuller, 2024; Renze, 2024) were used for narrative extraction to enhance stability and reproducibility, while higher values were applied in counterfactual generation to expand narrative variation within corpus constraints.

and normative implications. Particular attention is paid to risks that can be specifically ascribed to the use of generative AI, such as amplification of dominant discourses, hallucinated coherence, or implicit normative bias embedded in model training data. Overall, generative AI is meant to be a reflexive “sparring partner” for regional development not a prognosticator or mentalist. Therefore, in a final step the findings are analyzed and critically evaluated vis-à-vis their usefulness for regional development and future-making practices.

Conceptually, the contribution argues that generative AI can function as a reflexive epistemic device in regional development. Rather than replacing human agency, it can systematically expand the imaginative space within which regional actors deliberate about possible futures. By operationalizing narrative variation and recombination under controlled conditions, generative AI allows researchers and practitioners to experiment with alternative configurations of meaning, temporality and agency in ways that remain grounded in empirical material.

Overall, this contribution advances the understanding of AI-assisted narrative co-creation in different regional development contexts and proposes a structured methodological approach for integrating generative AI into regional research and future-making practices. It thereby enriches the digital methodological toolbox of regional science as well as the conceptual debate on how alternative futures can be systematically explored.

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