

Designing A Comprehensive Indicator System For An Evidence-Based Spatial Planning System Integration In Fringe Regions Of The EU: A South Balkan Case Study

Stefan Lazarevski

Faculty of Architecture and Planning, Institute of Spatial Planning, TU Wien
lazarevski@tajfa.mk

Rudolf Giffinger

Faculty of Architecture and Planning, Institute of Spatial Planning, TU Wien
rudolf.giffinger@tuwien.ac.at

Abstract

Integration of spatial planning systems across the EU's fringe regions is often challenged by institutional asymmetry, fragmented governance, and uneven territorial capacities. These conditions hinder the development of coherent evaluation tools capable of capturing the complexity and evolving nature of integration processes in such contexts.

This paper proposes a methodological framework that combines theoretical insights from territorial capital with a time- and process-sensitive evaluation logic. Inspired by the conceptual modelling techniques, the framework aims to assess spatial planning integration by linking contextual conditions, institutional dynamics, and cooperative processes. The South Balkan region is used as a contextual reference to guide framework development, offering illustrative territorial and institutional complexities, without serving as an empirical test site.

The approach is intended to support flexible, multiscalar, and temporally aware assessments of integration efforts, especially in regions where formal alignment may not reflect substantive cooperation or institutional readiness. By reframing spatial planning system integration as a dynamic and relational process, the framework offers an adaptable tool for future empirical research and policy evaluation in territorially diverse European regions.

Keywords: Spatial Planning System Integration, Territorial Capital, Indicator System, EU's Fringe Regions

1.Introduction

Integration of spatial planning systems is often seen as a complex, yet critical challenge in achieving meaningful territorial cohesion. During the late XX century and especially since the turn of this century, conditions for urban and regional development have been changing dramatically for countries and cities in Central, and more recently in Southeastern Europe. The process of integration has created new settings for capital flow, mobility of labour forces, and exchange of goods and services, consequently triggering new potentials and problems. Fuelled by the increasing globalization of economic activities, the pressure of competition between countries and cities/regions has grown significantly thus making it crucial force in shaping the development paths of territories.

These problems seem to be even more intense in the EU's fringe regions. The territories in question are often characterized by complex socio-economic conditions, deep historical and cultural legacies, specific technological dynamics, and diverse governance structures, all of which are reflected in the regional territorial capital. Therefore, understanding the interplay of these tangible and intangible elements within the unique local contexts, together with accurate assessment of the extent and impact of Europeanisation processes on the planning systems, becomes fundamental for defining paths towards sustainable territorial development, grounded in the integration and cohesion.

However, conventional methodologies that provide frameworks for understanding and leveraging regional assets seem to face significant hurdles in these dynamic environments. The concept of "territorial capital" (TC), notably advanced by Roberto Camagni, has played a critical role in categorizing the diverse assets. Coming from an economic perspective Camagni (2007, 2008) discussed the term in a comprehensive way, introducing different types of territorial capital and essentially paving the way for further research. As Moretta (2021, p. 104) notes, "The originality of this concept lies on the fact that, for the first time, the attention focuses on the analysis of a certain place in a more holistic and comprehensive way, considering a wider set of tangible and intangible assets located in it".

Yet, applying such frameworks to the EU fringe regions, especially those encompassing mixed membership statuses, reveal several gaps, either from a contextual or structural perspective. The discussion of these gaps, asks for a new methodological approach, one that will enable an indicator system in support of an evidence-based spatial planning system integration. Therefore, the aim of this research is to address these limitations by providing a structured, adaptable, and solution-oriented methodology of identifying the relevant components as assets of the TC in the fringe regions and suggesting more dynamic understanding of how territorial potential is activated, leveraged, and transformed through policy interventions and governance processes.

Methodologically, this involves critically engaging with the concept of territorial capital but augmenting it with a process-oriented approach capable of capturing dynamics, evaluating performance, and informing adaptive strategies. We propose integrating the diagnostic strengths of TC taxonomies with evaluative and dynamic framework of Input-Output-Outcome-Process (IOOP). This combination provides complementarity in a way where understanding the existing capital will provide context for policy design, while the IOOP model will allow evaluation of how effectively, specific policies mobilize or enhance that capital to achieve desired outcomes. The IOOP framework formalizes the pathways that are supported by the assets and resources (Inputs), then are activated through governance mechanisms and institutional practices (Processes), will lead to tangible short-term results (Outputs) and, ultimately, will provide long-term transformations (Outcomes).

The primary geographical focus of this study is the South Balkan region, selected for its representative complexities, commonly found in the EU's fringe areas characterized by mixed membership, diverse developmental trajectories, and significant integration challenges. Here, it is worth noting that the paper develops a comprehensive indicator system, where the proposed case-study plays the role of contextual anchor - a reference that helps inform the structure and logic of the proposed system. However, it does not report on the application or findings of this framework, which will be the focus of future empirical work.

2. Conceptual Framework and Methodology

2.1. Territorial capital: challenges

The concept of territorial capital (TC) closely tied to debates of urban competitiveness (Begg, 1999; Boddy & Parkinson, 2004) and integration policies, was introduced by the OECD (2001) and further developed by Camagni (2007, 2008). It highlights the role of endogenous assets alongside exogenous factors in unlocking development potentials. To systematize these assets, Camagni proposes a taxonomy based on two axes: rivalry (private, impure or club, and public goods) and materiality (tangible, mixed, and intangible). This approach, eventually results in a 3x3 matrix of nine types of capital, all contributing to local competitiveness and, if accumulated positively, to sustainable development. At its corners, within the so-called "traditional square", the matrix identifies the following capital forms: private fixed capital (tangible, high rivalry), natural/cultural resources and infrastructure (tangible, low rivalry), human capital (intangible, high rivalry), and collective action (intangible, low rivalry). The remaining five types of capital, form an "innovative cross" in the matrix center, including proprietary networks, university spin-offs, agglomeration economies, relational capital, and governance networks. Within this taxonomy, the relational capital and cooperation networks highlight the social and policy-driven dimension of TC, thus emphasizing place-specific qualities and comparative advantages that go beyond purely functional assets.

However, applying the territorial capital (TC) methodological approach directly to EU fringe regions for assessment purposes reveals significant limitations, broadly falling into two categories: contextual and structural challenges. The first, come from misalignment between the framework and socio-political, economic, and cultural realities of the EU fringe regions, while the latter, stem from the internal design and operational limitations, particularly in its application to diverse and data-scarce contexts.

Over the years, contextual criticism has challenged Camagni's framework for being too static and failing to capture the dynamic evolution of territorial capital in response to global shifts like digitalization, migration, or climate change (Rodríguez-Pose, 2018), specifically for the regions experiencing rapid socio-economic transitions (e.g. EU integration processes). Some have found the taxonomy's Eurocentric bias, rooted in Western institutional models, to overlook the unique historical and cultural contexts of non-EU states, where informal institutions and power dynamics play significant roles (Marques & Morgan, 2018) and the economic crisis that ensued, have exposed even further the persistent pattern of uneven development which has plagued the European Union (EU).

In this context, TC taxonomy appears to be irresponsive to the effects and underdeveloped roles of institutions in these states, primarily in regard to the institutional quality, trust, and governance capacity. These are vaguely categorized, limiting the framework's ability to address the complex institutional landscapes of fringe regions, where alignment with EU standards is a priority for candidate countries (Cojanu & Robu, 2019). Namely, Camagni's framework assumes harmonious mobilization of territorial assets, underestimating political conflicts and power asymmetries, deep ethnic divisions and contested borders within and between territories (Rodríguez-Pose, 2013). In the fringe regions for example the governance capacities significantly differ between EU members and candidates, consequently leading to oversimplifying the challenges of cross-border cooperation and resource allocation (Medeiros et al., 2024).

Camagni's taxonomy has been confronted in structural terms too. Pike et al. (2016) discuss the empirical application challenges posed by blending of physical, human, relational, and institutional assets, which often result in blurred boundaries. Terms like "social capital" and "relational capital" lack rigorous operational definitions, complicating their measurement in diverse contexts such as the South Balkans, where trust and cooperation vary significantly across borders (Storper, 2005). Finally, the largely normative nature of the taxonomy, offering few concrete indicators for measuring territorial capital across regions (Affuso & Camagni, 2010) is emphasized as critical gap in these fringe regions, where data availability is inconsistent, and comparable metrics are essential for evidence-based policymaking.

In response to these challenges, aforementioned scholars have expanded their research on the dynamics of the regional development processes and relational dependencies. For instance, Storper (2005) highlights relational assets and untraded dependencies, through a context-specific, path-dependent lens; Boschma and Martin (2010) emphasize historical trajectories and local capabilities in their "evolutionary economic geography"; and Rodríguez-Pose (2018) introduces the "Geography of Discontent", linking underdevelopment to inequality, discontent and governance failures. Martin and Sunley (2015) focus on institutional thickness and fit, addressing Camagni's underdeveloped treatment of institutions; Faludi (2010) and Davoudi (2003) promote polycentric development as an alternative to agglomeration models, aligning territorial capital with spatial planning and providing a policy-oriented lens to operationalize assets like infrastructure and relational networks. Barca (2008) stresses place-based, participatory approaches that operationalize territorial capital through stakeholders engagement; Moulaert et al. (2013) explore community driven solutions, Capello et al. (2009) offer frameworks for fringe-regions innovation ecosystems, and Servillo (2010) investigates governance innovation – all enhancing Camagni's model with tools for institutional alignment, collaboration, and policy relevance.

The extensive engagement of scholars with Camagni's territorial capital taxonomy (Camagni, 2007, 2008, 2009) affirms its status as cornerstone in regional development, offering multidimensional lens to classify, both tangible and intangible assets that drive territorial competitiveness and cohesion. However, all these takes on Camagni's taxonomy have limited application to complex contexts, such as the EU fringe regions. As Morretta (2021) argues, the taxonomy's strength lies in its integrative approach, which combines endogenous and exogenous forces to enhance local resources and improve well-being. The framework successfully moves beyond the limitations of purely top-down strategies that overlook local dynamics, while avoiding the narrow scope of bottom-up approaches focusing solely on local actors. However, its effectiveness relies on more nuanced and context-sensitive application of the taxonomy or as Morretta's observes: "... territories are endowed with different local actors and types of tangible and intangible resources of variable quantity and quality. Although both types of resources are important in determining and shaping the territorial characteristics and potential of a certain place, intangible forms of capital such as governance, innovation, networking and entrepreneurship are crucial to release this potential and trigger the process of endogenous development" (Morretta, 2021, p. 111).

2.2. Structural support of evidence-based indicator system

The discussion above, clearly underlines that, designing a comprehensive indicator system for spatial integration in EU fringe regions requires more than a static mapping of territorial assets; it demands a dynamic, adaptive, and politically sensitive framework capable of capturing the evolving, contested, and multilayered nature of territorial development. In contrast to specific and narrow conceptual frameworks, such as Storper's relational assets, Boschma and Martin's evolutionary economic geography, Rodríguez-Pose's geography of discontent, and Barca's place-based development, this study will focus on the Input-Output-Outcome-Process (IOOP) model, as operationally complete and strategically more flexible approach.

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Grounded to some extent in the Logic-Model Theory (Kellogg, 2004; Wholey, 1979) and Program Theory (Chen, 2012; Rogers, 2008; Weiss, 1995), Figueiredo et al. (2018) in the OECD document titled as "Indicators for Resilient Cities" provided one of the first major application of the so-called IOOP model in European urban policy evaluation. While the traditional logic models are often linear and do not provide feedback loops for policy evaluation, the program theory prioritizes causal and contextual logic, but when it comes to practical adaptation, it lacks operational and policy-focused loops. The IOOP model (Figueiredo et al., 2018) aligns with Logic models by using the same categories: inputs, processes (as activities), outputs, and outcomes as core components, tailoring them into a framework, specific for territorial policy in complex, multi-scalar contexts. It also draws from Program Theory's outcome orientation and iterative evaluation but formalizes a more operational, policy-oriented structure. The strong practical applicability of this model has been acknowledged by many scholars including Giffinger and Kramar (2023) who developed an indicator system of distinct components for liveable cities, and in his later work, Giffinger (2024) expands the IOOP model with learning processes by adopting a phase-specific, processual approach.

Drawing from the literature review and driven by an overarching objective to address the complexities of spatial planning system integration in the EU's fringe regions, we argue that combining Camagni et al.'s TC taxonomy (2007, 2008) and Figueiredo et al. (2018) IOOP model will provide structural framework for building comprehensive indicator system. This framework isn't driven by the compatibility of the two methodological approaches, rather by their complementarity, as they answer different questions. Camagni et al. focus on the statics of potential (territorial assets) while Figueiredo et al. focus on dynamics of intervention, as input describing the policy performance. Understanding the territorial capital provides the context for designing relevant policies and evaluating those policies could show how effectively that capital is being leveraged or enhanced to achieve direct outputs and ultimately, as outcomes of policy interventions. In other words, the complementarity of these models lays not in its common denominator, rather in what each doesn't primarily focus on:

- **Gap from Policy Evaluation Perspective:** The Figueiredo et al. (2018) approach, while evaluating a policy, might not explicitly account for the underlying territorial context defined by its specific mix of territorial capital. The success or failure of a policy (it forms of its output) can be heavily influenced by the pre-existing territorial capital (e.g. a skills policy will have different outcomes in a region independent of its initial level of human capital). Hence, this framework measures policy results but doesn't inherently diagnose the underlying territorial conditions that shape those results.
- **Gap from Territorial Capital Perspective:** Camagni's taxonomy provides a rich diagnosis of a territory's assets and potentials (which are outcome of former development) but doesn't inherently evaluate how specific policies are mobilizing, utilizing, or changing that territorial capital. It describes the potential but doesn't measure the effectiveness of actions taken to leverage it. We know what capital exists, but not necessarily how well certain policy is using or building the corresponding types of capital.

Table 1: Key differences

FEATURE	FIGUEIREDO ET AL. (2018) (policy evaluation)	CAMAGNI (territorial capital)
WHAT IT LOOKS AT	A specific policy or program	A territory (region, city)
MAIN GOAL	Evaluate policy performance/impact	Diagnose territorial potential/assets
FRAMEWORK	Performance Measurement Logic Chain	Asset Taxonomy / Classification
NATURE	Evaluative (How did X perform?)	Diagnostic (What does Y possess?)
ELEMENTS	Inputs, Process, Outputs, Outcomes	Types of Capital (Human, Social...)

Figueiredo's emphasis on feedback loops and adaptive cycles provides a crucial upgrade of Camagni's TC taxonomy. Evolutionary economic geography adds an important temporal dimension, but adaptation often appears organic rather than structured. In the IOOP model, feedback from Outcomes provides necessary information for the reassessment of Inputs and Processes, thus creating an explicit mechanism for learning and reconfiguration.

In the context of the EU's fringe regions, where fragmented histories, contested borders, and uneven economic transitions define spatial dynamics, designing a robust indicator system for spatial integration demands an approach that captures not only territorial assets, but also ways these assets are activated and transformed through policies. As a result, conceptualization of these policies is directly rooted in the outcomes of the feedback loops, provided by the IOOP model.

Table 2: Complementarity of Camagni's taxonomy and Figueiredo et al. IOOP methodology

ASPECT	CAMAGNI'S TAXONOMY	ENHANCED BY IOOP	WHY CRITICAL FOR FRINGE REGIONS
CORE LOGIC	Static typology of territorial capital	Dynamic sequencing (Input - Output - Outcome-Process)	Fringe regions need dynamic assessment of activation, not just listing assets
RELATIONAL ASSETS HANDLING	Acknowledged but not operationalized	Focuses on relational activation mechanisms	Detects failures to mobilize existing tangible networks and infrastructures
GOVERNANCE EVALUATION	Implicit, general	Explicit assessment of processes and capacities	Identifies governance gaps, common in politically fragmented fringe regions
CONTEXT ADAPTABILITY	Assumes stable institutional contexts	Includes feedback loops, adaptive to shocks	Captures rapid socio-political and economic changes typical of fringe areas
PLAN VS OUTCOME MEASUREMENT	Largely descriptive	Tracks discrepancies between plans and outcomes	Exposes implementation bottlenecks, crucial where planning often underdelivers
INSTITUTIONAL SENSITIVITY	Eurocentric stability bias	Sensitive to hybrid, informal, evolving institutions	Suitable for fragile, mixed-governance settings of fringe regions
MULTI-LEVEL, CROSS-BORDER FIT	Territory	Accommodates multi-scalar, cross-border dynamics	Fits the transnational, cross-border realities of EU peripheries

2.3. Identifying key territorial dimension for SPSI in EU's fringe regions

In the ever-evolving landscape of European spatial governance, the notion of spatial planning system integration (SPSI) has become increasingly central. As the European Union has expanded eastward and southward, it has incorporated a broader array of political traditions, institutional cultures, and territorial challenges, only to instigate re-definition of the term integration. In the theoretical discourse, the act of spatial planning system integration refers to the processes and mechanisms aimed at enhancing coherence, coordination, and cooperation between distinct spatial planning systems across different administrative levels (vertical integration) and policy sectors (horizontal integration) (Davoudi & Strange, 2008; Stead, 2014; Stead & Meijers, 2009). This book examines spatial planning at different places throughout the British Isles. Six illustrative case studies of practice examine which conceptions of space and place have been articulated, presented and visualized through the production of spatial strategies. Ranging from a large conurbation (London). Yet, the realities of integration differ substantially between EU core regions, endowed with mature planning institutions and dense territorial capital

and fringe regions, where fragmented governance, asymmetrical institutional capacity, and geopolitical tensions frequently complicate integration efforts. While in both cases, the ultimate goal is to create a more harmonized and synergistic approach to territorial governance that transcends administrative borders (Moulaert et al., 2010), we observe key differences in the properties of these two types of regions. By employing previously established methodology as a guiding analytical framework, we will explore how different forms of capital, condition the nature and success of spatial planning system integration. The main objective is to identify the key component(s) for successful SPSI in EU's fringe regions.

In contrast to the EU core regions, which often exhibit high relational capital in form of well-positioned logistical and economic networks, EU's fringe regions, particularly those along the eastern and southeastern peripheries face a distinctly different reality. Here, SPSI efforts contend with historical legacies of centralized governance, weak planning institutions, limited policy coherence, and geopolitical fragmentation. Examples include the Western Balkans, and to some extent already integrated parts of Eastern Europe and Baltic states, which exhibit fragmented and underdeveloped territorial capital, resulting in weak spatial planning integration. Furthermore, centralized governance legacies, limited administrative capacities, and sectoral fragmentation constrain institutional capital and cross-border coordination (Nienaber & Wille, 2020). The results of the ESPON COMPASS project (2018) find that many of these systems are "proto-conformative" or "erroneously performative" planning systems, in which policies exist in formal documentation, but are weakly implemented in practice and often subordinated to investor interests. Path dependency, rooted in professional and institutional inertia, further hampers reform (Dąbrowski & Piskorek, 2018), while market-led development with weak public oversight defines the "neo-performative model" common in the areas (Berisha et al., 2021).

Economic capital remains central to integration, yet disparities in infrastructure and investment undermine planning capacity, especially in the EU's fringe, cross-border regions (Perkmann, 2003), which is why Jakubowski (Jakubowski, 2020) stresses that gaps in physical infrastructure demand tailored, place-specific policies. In addition, the limited market access weakens relational capital, thus hindering the implementation of strategic visions (Zonneveld, 2005), which escalates the necessity of data harmonization and infrastructure systems for effective cross-border planning (Frank et al., 2017). Finally, as Perkmann (2003) notes, low social capital, driven by historical divisions, weak trust, and fragile regional identities further obstructs cooperation, which underscores the importance of fostering shared identity and trust.

All of these shortcomings across different components of the territorial capital in the fringe regions greatly impede the integration of spatial planning systems and therefore addressing them efficiently requires targeted interventions. But what actually constitutes effective spatial planning system integration and what are the key territorial dimensions? Literature review, shows that scholars seem to agree on several key properties:

- **Policy Coherence:** Alignment of strategic objectives, policies, and instruments across different planning systems and levels (Stead, 2014; Stead & Meijers, 2009);
- **Inter-administrative Cooperation:** Established formal and informal mechanisms for joint working, communication, and decision-making between planning authorities (Zonneveld & Stead, 2024);
- **Shared Territorial Vision:** A collectively agreed-upon understanding and set of goals for the future development of the shared territory (ESPON, 2018);
- **Harmonization of Frameworks:** Efforts to align legal, regulatory, and procedural aspects of planning systems to facilitate joint action, though full harmonization is often complex and not always the primary goal (Janin Rivolin, 2008);
- **Joint Implementation and Monitoring:** Collaborative execution of planning strategies and projects, supported by shared monitoring and evaluation systems (Waterhout, 2008);
- **Adaptive Capacity:** The ability of the integrated system to learn from experience and adapt to changing socio-economic, environmental, and political contexts (Healey, 2006).

While, SPSI relies on synergy among various forms of territorial capital, the aforementioned properties of effective spatial planning system integration are intrinsically linked more to certain types of territorial capital, mostly: Relational Capital, Institutional Capital, Cooperation Networks & Governance, Social Capital and Human Capital.

Camagni et al. define relational capital as “bilateral and multilateral linkages” rooted in trust, shared values, and the ability for cooperation and collective action (2011, p. 5). As a key form of intellectual capital, its intangible and flexible nature makes it crucial in navigating diverse planning cultures, especially in cross-border contexts (Nienaber & Wille, 2020; Purkarthofer, 2018). Its “club good” nature means that benefits are shared mainly among active participants, underscoring the value in joint planning efforts, where cooperation yields both direct and wider regional benefits. In fringe regions, relational capital helps overcome cognitive and cultural gaps, promotes socio-cultural integration and enables knowledge sharing (Camagni et al., 2011; Fogarsi, 2024). Unlike human capital, which is rivalrous and private, relational capital enables transformation of potential into effective cooperation and by doing so it addresses Boschma’s “proximity puzzle” (Boschma, 2005). Thus, while social capital reflects the slow-building trust of a community, relational capital centres on active, strategic linkages between actors.

Institutional capital is also essential for SPSI, particularly in cross-border regions, where fragmented governance hinders spatial collaboration (Nelles & Durand, 2014) the number of cross-border cooperation structures in Europe has exploded owing to political and financial support by the European Union aimed at encouraging cohesion and developing peripheral regions. These policies are part of processes of de-bordering and political rescaling that have profoundly affected cross-border areas by creating new institutional territories and political structures. The purpose of this paper is to study the institutional history of cross-border metropolitan governance in Europe through the comparison of two of the most advanced cross-border metropolitan regions: Lille and Luxembourg. This paper asks how these cross-border structures have developed and changed. What can their patterns of institutional evolution contribute to understanding governance in other cross-border regions? Are these new spaces evidence of political rescaling? This paper presents and redefines cross-border governance as a cyclical and a long-term process and also explores the challenges that these partnerships face in becoming functionally effective and autonomous policy actors. Ultimately, we find that there is no replicable ideal of cross-border governance and that even long-standing partnerships are in a period of exploration and reinvention. Establishing a competitive and coherent cross-border metropolitan region is ambitious and complex, and it necessitates the coordination of policies at multiple scales and across institutionally diverse territories. This project requires the modification and/or construction of new institutional and legal frameworks. This reorientation of political attention has resulted in a reconceptualization of political space but not the empowerment of new political actors, indicating that the process of rescaling may be a work in progress.”

“container-title”: “European Urban and Regional Studies”, “DOI”: “10.1177/0969776411431103”, “issue”: “1”, “page”: “104-122”, “title”: “Political rescaling and metropolitan governance in cross-border regions: comparing the cross-border metropolitan areas of Lille and Luxembourg”, “volume”: “21”, “author”: [{“family”: “Nelles”, “given”: “Jen”}, {“family”: “Durand”, “given”: “Frédéric”}], “issued”: {“date-parts”: [“2014”]}}, “schema”: “https://github.com/citation-style-language/schema/raw/master/csl-citation.json” . Although Camagni’s taxonomy doesn’t list it as separate entity, institutional capital intersects with both social and cultural capital, blending tangible infrastructure with intangible norms and governance “software” (Giffinger et al., 2007). Institutions function as public goods but face limitations in light of different scales of legal harmonization and Europeanization. This means that institutional capital can create enabling frameworks, yet it does not ensure stakeholder action or capacity. In fact, it is often determined by the political will and bureaucratic rigidity (Camagni, 2019; Jakubowski, 2020). Thus, formal structures alone are insufficient without strong relational dynamics and adaptive governance practices.

Considering the discussion above, while we recognize that SPSI is a multifaceted process influenced by a variety of territorial capitals, we underscore the prevalent comparative importance and favourability of relational capital. Its ability to activate and sustain mechanisms of cooperation, particularly in fragmented and asymmetric governance environments, alongside its embeddedness in trust-based linkages, joint action, and shared learning proves that the relational capital is the most context-sensitive and policy-relevant component of territorial capital for enabling meaningful spatial integration. Therefore, in the following section, we turn to explore how relational capital can be systematically integrated into the IOOP model, enabling us to assess not only the presence of territorial assets, but also their activation through strategic cooperation, collective competence, and adaptive planning practices.

2.4. Integrating Relational Capital into the IOOP model for SPSI

In order to provide operational completeness, embedded feedback mechanisms, and capacity for theoretical integration we will implement the Input-Output-Outcome-Process model, thus enabling more coherent integration policy evaluation. By doing so, we align with Giffinger and Kramar's path-oriented approach, which considers "the urban dynamics over time and therefore provides evidence on specific transformation processes" and their recommendation that designing a comprehensive indicator system should be "based on a place-based and process-orientated understanding of urban development, which can be expressed by appropriate indices for measurable trends" (Giffinger & Kramar, 2023, pp. 45, 50).

In the context of EU's fringe regions, this means understanding the temporal dynamics of relational capital, or how trust, cooperation, and institutional embeddedness emerge and evolve. Therefore, our first challenge will be to map the relational capital across the four stages in this model and try to identify how relationships are built, operationalized, tested, and matured throughout the integration process in spatial planning or governance. Emphasizing the importance of policies when designing indicators, comes from the following objectives: creating goal-oriented framework, providing effective policy discussion, supporting comprehensive evaluation, delivering evidence-based recommendation and encouraging meaningful, stakeholder engagement. Consequently, full integration of the relational capital into the IOOP model necessitates discussion over what should be addressed by the selected indicators, what should be acknowledged and what should be measured.

The Input phase lays the relational foundation for cooperation by building trust, aligning norms, and identifying stakeholders (including underrepresented groups like: local authorities, civil society, cross-border institutions). Early recognition of asymmetries in power dynamics, resources, and knowledge is essential to prevent dominance by stronger actors later. Understanding divergent governance cultures, harmonizing planning terminologies, and comparing legal frameworks and policy cycles supports conceptual alignment. It is during this phase that acknowledgement of past cooperation or conflicts will inform setting realistic agenda and joint visioning.

The Output phase shifts to tangible deliverables: strategies, agreements, instruments to name a few, that reflect coordination across sectors (horizontal) and governance levels (vertical). Outputs gain legitimacy when embedded in laws or administrative procedures, which in later stages should be accompanied by clear implementation plans (timelines, funding, responsibilities). These must reflect local socio-economic realities and include feedback loops for monitoring and revision, ensuring adaptability. In contrast, outputs that are technically sound but socially or institutionally fragile indicate that the system remains fragmented under the surface.

The Outcome phase demonstrates the transformative value of the entire process. As noted by Figueiredo et al. (2018), this is where the maturity of relational capital is assessed via policy changes, service improvements, or greater territorial cohesion. Indicators of success include formalized cross-border institutions, aligned procedures, and joint governance bodies. Spillover effects, like regional synergies or transferable planning models signal systemic change. Additionally, signs of healthy trust, stakeholder engagement, and public satisfaction confirm that integration is continuing beyond project cycles.

Finally, the Process phase tests the authenticity of collaboration. As Healey (2006) describes, planning is an "arena" where actors negotiate and coordinate. It is only foreseeable that relational capital will be activated through joint decision-making, adaptability, and conflict resolution, whereas symmetrical power dynamics, mutual accountability, and inclusion of smaller actors reveal the depth of cooperation. This phase depends on strong human and institutional capital: facilitators, secretariats, and support structures, all important to sustain momentum and resilience.

Table 3: Indicator properties per stages of IOOP model

<i>IOOP Stage</i>	<i>What Should Be Addressed</i>	<i>What Should Be Acknowledged</i>	<i>What Should Be Provided / Measured</i>
INPUT	- Identify actors, mandates, and willingness - Build trust foundations - Mobilize shared resources	- Power asymmetries - Trust gaps - Lack of shared vision or institutional continuity	- Stakeholder mapping - Shared intent statements - Initial trust scores - Cross-border legal/financial provisions - Baseline network connectivity
OUTPUT	- Generate co-produced outputs - Institutionalize learning and procedures - Ensure shared ownership	- Imbalance in workload or influence - Superficial or symbolic outputs	- Number and quality of co-produced plans - Legal standing of outputs - Follow-through rate on commitments - Process quality reflected in outputs
OUTCOME	- Institutionalize cooperation culture - Sustain long-term relationships - Support mutual learning	- Political turnover - Fragile institutional memory - Risk of "project fatigue"	- Long-term policy alignment - Survival of partnerships - Stakeholder satisfaction trends - Adaptive capacity - Indicators of spatial cohesion and trust continuity
PROCESS	- Enable coordination platforms - Align decision-making practices - Ensure transparency and inclusivity	- Informal leadership and champions - Conflicting routines or vocabularies - Participation fatigue	- Frequency and diversity of joint meetings - Equitable participation metrics - Joint task forces - Conflict resolution practices - Decision autonomy and reciprocity

Understanding each of the phases of the IOOP model in regard to the relational capital, provides us with means to address its main components: cooperation capability, collective action capability and collective competence. Here, we utilize the following understanding of the components: Cooperation capability – the ability of actors to engage, communicate, and maintain relationships, Collective action capability – the capacity to coordinate and act jointly toward shared objectives and Collective competence – the shared knowledge, routines, and skills enabling effective joint problem-solving and adaptation. These components could be connected to particular phases of the IOOP model. Cooperation capability is most crucial in the Input and Process stages, as without it, partnerships lack trust and fail to activate; Collective action capability peaks in the Process and Output stages, when entities must act jointly and Collective competence becomes visible in Output and Outcome phase, as it reflects whether knowledge, routines, and learning are institutionalized. However, this categorization is very tentative, as the components are interdependent, not isolated; they are iteratively evolving across all IOOP phases and reinforce themselves over time through feedback loops. For example, key identifier of cooperation capability is trust-building, which starts in input phase, but is continually tested and reinforced in Process, Output, and only proves sustainable in the Outcome phase; collective action capability begins as coordination attempts in process phase, but its real expression is in joint delivery (Output) and long-term policy embedding (Outcome); and collective competence emerges from shared learning and experience, which is built in the Process and Output phase, but has its maturity reflected in the Outcome phase. This is why rather than exact mapping of the components at certain stage of the IOOP process, we should trace their development and expression across time.

Table 4: Relational capital components integration in IOOP model

RC Component	INPUT (effort)	PROCESS (action)	OUTPUT (efficiency)	OUTCOME (effectiveness)
Cooperation Capability	Build trust	Sustain dialogue	Coordinate authorship	Institutionalize trust
	Align visions	Encourage openness	Ensure shared visibility	Measure stakeholder confidence
Collective Action Capability	Define shared intent	Coordinate tasks	Deliver together	Sustain cooperation
	Negotiate roles	Resolve conflicts	Monitor contribution balance	Enable continuity of actions
Collective Competence	Recognize skills	Share knowledge	Co-produce strategies	Adapt policies
	Identify learning needs	Create joint procedures	Document learning	Embed learning into governance culture

3. Multilayered system of relational capital and indicators

Building on the preceding discussion and methodological framework, the next step is to identify indicators linked to key components of relational capital relevant for Spatial Planning System Integration (SPSI). Here, we underline that indicator selection is context-sensitive, differentiating core EU regions, which can rely on outcome-oriented indicators, from the fringe regions, which benefit from indicators measuring input and processes.

Considering the fringe-specific pre-conditions, it becomes evident that a comprehensive indicator system for evaluating SPSI should be grounded in a multi-layered conceptual structure that runs across the IOOP Cycle. At its foundation, the system must be built upon place-dependent factors that reflect the unique spatial, institutional, socio-economic, legal, and cultural characteristics of each region. This makes them cross-cutting as they influence all four IOOP phases. While they are mainly anchored in the Input phase, where they describe the foundational conditions but their effects are most visible in the Output and Outcome phase. In essence, these factors provide the structural core that ensures any policy development process is territorially anchored, context-sensitive, and capable of addressing the real conditions and constraints of a given region.

The use of policy-oriented concepts as the organizing logic, indicators should be designed to assess fundamental goals of spatial planning integration, such as institutional coherence, subsidiarity, alignment of planning instruments, stakeholder participation, and governance efficiency. The indicators for this layer of our system, define the normative orientation of the planning system which makes them valuable for establishing the preconditions and guiding principles. As expected, they are mainly located in the Input phase of the IOOP Cycle, although some indicators like stakeholders' engagement could indicate results in Process and Output phase too. Indicators based on these concepts help evaluate readiness and capacity, they reflect the strategic cognition of actors, in terms of how they understand integration, what they prioritize, and what they perceive as barriers or enablers. Nevertheless, though framed around normative policy objectives, these types of indicators must be reflective to the specificities of place, allowing the system to maintain both, comparability and local relevance. Misplacing the indicators for policy-oriented concepts into the output or process phase, exposes a risk of treating the guiding values as results, which inverts the logic of a policy design.

Finally, to operationalize and evaluate the development of SPSI over time, the system must adopt a path-oriented framework. Such a framework enables the analysis of trajectories, institutional learning, and cumulative capacities through all stages of the IOOP model. However, the key indicators for this framework are primarily anchored in the Outcome phase because there, they capture the cumulative, long-term, and emergent effects of integration. This dimension of our system, consequently ensures that the SPSI is evaluated as a dynamic and historically contingent process, not just a snapshot of plans or actions.

In sum, the integration of place-dependency as the structural core, policy-oriented concepts as the design framework, and path-orientation as the temporal-evaluative logic provides us with a comprehensive system of relevant indicators evaluation of spatial planning system integration in EU's fringe regions.

Having established the structural framework of the system and indicator relevancy filters, the next step is to run the system across the three dynamic components of relational capital: cooperation capability, collective action capability, collective competence.

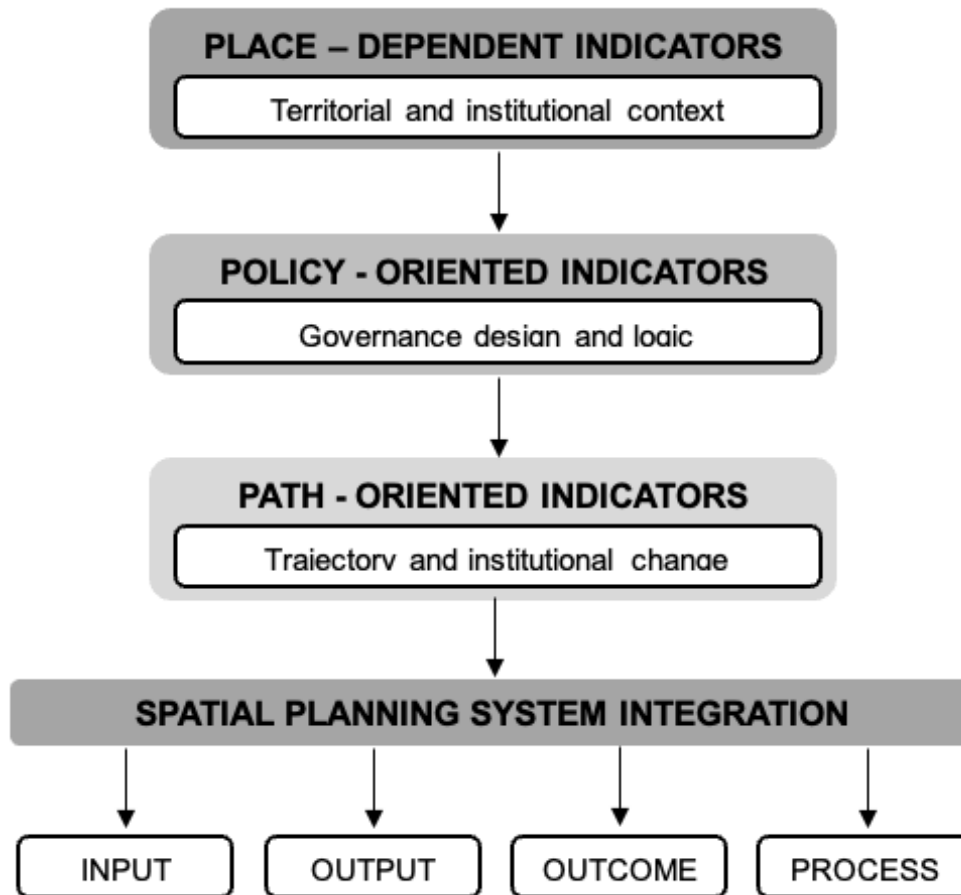


Figure 1: Indicator relevancy filters

The relationship between these components vis-à-vis indicator types and the IOOP phases is mostly horizontal and cross-cutting, although some relational capital indicators are inherently phase-dependent, meaning they are not strictly independent and interact with all phases. Accordingly, we adopt the understanding of this relationship as cross-phase and interactive, dependent on two analytical dimensions and one sequential. This means that relational capital can be analysed as transversal dimension: it is activated in the Process phase, shaped in Input, reflected in Output and Evaluated in Outcome phase. Indicator types (place-dependent, policy-oriented and path oriented) as diagnostic lens, shape the temporal logic, that is they organize how we observe relational capital, not when it happens; and finally, the IOOP model gives structure to systemic change, from conditions to coordination to outputs and implications.

In Table 5, we provide graphic interpretation of Indicator relevancy for each component of relational capital per particular phase within the IOOP model. The different shades of colour, along with descriptions above, indicate the analytical role and relevance of each indicator type within the IOOP model. The values (strong, cross-cutting and not applicable) help clarify how each indicator is used in evaluating SPSI and where it holds the most analytical weight. So, when certain indicator is anchored then it is directly connected to its relevancy, meaning it is fully applicable, and designed to measure variables or dynamics specific to that phase. For example, place-dependent indicators are anchored in the Input phase, because they measure initial conditions like institutional maturity, legal structure, or governance asymmetry, whereas the path-oriented indicators are anchored in the Outcome phase, because they assess trajectory, learning, and long-term change, which are only visible over time. The cross-cutting indicators provide interpretive insights, helping to understand, contextualize, or explain variations in that

phase. In this case, the place-dependent indicators are cross-cutting in the Output phase, as they help explain why some regions produce better-integrated plans or agreements than others, based on territorial conditions but they don't measure the outputs themselves. Similarly, the policy-oriented indicators are cross-cutting in the Outcome phase because they help interpret whether governance design influences long-term results but they're not designed to measure impact over time. Finally, when indicators are marked as "not applicable" or "not yet observable", then they are inapplicable in that particular phase, usually because the conditions they measure, don't exist yet. In this case, we cannot apply path-oriented indicators in the Input phase because there hasn't been any time or activity yet to observe change or evolution. The different shades, tentatively indicate the indicator importance in this particular phase.

Table 5: Indicator relevancy for each component per stage

IOOP Phase	Relational Capital	Place-dependent Indicators	Policy-oriented Indicators	Path-oriented Indicators
	Component			
INPUT	Cooperation capability	Strong importance (anchored) Defines regional preconditions for cooperation	Strong importance (anchored) Design of institutional cooperation mechanisms	Not applicable Requires time-based data
	Collective action capability	Strong importance Maps asymmetries and capacity gaps	Strong importance Assesses subsidiarity and alignment	Not yet observable
	Collective competence	Strong importance Institutional maturity and knowledge base	Strong importance Evaluates the system's readiness to learn	Not yet observable
PROCESS	Cooperation capability	Cross-cutting (interpretative) Explains ease/difficulty of cooperation	Relevant importance Assesses participatory and procedural norms	Emerging importance Early signals of trust or coordination evolution
	Collective action capability	Cross-cutting Explains coordination feasibility	Relevant importance Joint mechanisms and decision-making structures	Emerging importance Initial changes in coordination dynamics
	Collective competence	Cross-cutting Explains variation in learning speed	Relevant importance Procedural adaptability	Emerging importance Learning-in-action
OUTPUT	Cooperation capability	Cross-cutting Explains variability in output quality	Moderate importance Embedded collaboration tools	Visible importance Institutionalization of cooperation over time
	Collective action capability	Cross-cutting Explains delivery variation	Moderate importance Output relevance to joint goals	Visible importance Depth of coordination output (e.g., cross-sector plans)
	Collective competence	Cross-cutting Explains technical and strategic output quality	Moderate importance Responsiveness of tools and institutions	Visible importance Adaptation based on implementation feedback
OUTCOME	Cooperation capability	Cross-cutting (moderate) Long-term enabling conditions	Cross-cutting (moderate) Explains outcome durability	Strong importance (anchored) Trust durability, embedded norms
	Collective action capability	Cross-cutting (moderate) Explains long-term coordination success/failure	Cross-cutting (moderate) Gaps in governance design affecting delivery	Strong importance Expanded joint implementation capacity
	Collective competence	Cross-cutting (moderate) Explains differences in outcome sustainability	Cross-cutting (moderate) Effectiveness of institutional learning structures	Strong importance Institutional learning, policy adaptation, system change

We believe that the proposed tri-layered indicator system offers a comprehensive and adaptive framework for evaluating Spatial Planning System Integration (SPSI), especially in complex, EU's fringe contexts. By integrating place-dependence, policy orientation, and path-dependence, the indicator system reflects territorial diversity, institutional logic, and long-term transformation. Its design supports evidence-based learning, strategic adaptation, and feedback loops, which are key elements for building an explicitly resilient planning system. Finally, being tested by the components of relational capital, throughout different stages of the IOOP model, allows the framework to be more time-sensitive and process-aware.

4. Discussion

The main objective of this paper is to design a methodological framework for evaluating Spatial Planning System Integration (SPSI) in EU fringe regions. The main outcome is a tri-layered indicator system, that combines Camagni's territorial capital taxonomy with the IOOP (Input-Output-Outcome-Process) model, that addresses a critical gap in current spatial planning literature: the lack of operational tools capable of systematically evaluating integration efforts in structurally weaker and politically diverse European regions. Rather than focusing narrowly on outcomes or institutional forms, the proposed system allows for process-aware, time-sensitive, and territorially grounded assessment. The analytical strength of the system lies in its capability to enable evaluators to move beyond static measures of policy alignment, and instead to trace the evolution of spatial integration as a dynamic interaction between territorial resources, institutional processes, governance culture, and cooperation mechanisms.

Although the South Balkan region is referenced throughout the text, this paper does not provide empirical findings instead, the region serves as a contextual anchor - a reference frame that helps inform the structure and logic of the proposed system. The multitude of different planning environments in this region reflect the challenges faced by similar EU fringe regions, including: historical legacies of centralized planning, fragmented and asymmetrical administrative structures, and uneven EU integration. Therefore, the design process of the indicator system was informed by the spatial and institutional properties of this area, thus ensuring that the framework would be relevant, grounded, and sensitive to real-world constraints, without being limited by the specifics of a single case.

During the development of the indicator system, a notable methodological insight emerged: its potential for diagnostic reversibility. Originally designed to evaluate SPSI from inputs to outcomes or starting with the presence of enabling conditions and tracking their transformation into cooperative practices and strategic results, the model was found to also function effectively in reverse. This is especially relevant in contexts where spatial planning outputs appear formally aligned with EU objectives, but lack systemic grounding in territorial capital, institutional continuity, or cooperative capacity. This is why, when designing the system, our focus was turned towards the indicators capturing key dimensions of relational capital: relational capabilities, collective action capabilities, and collective competence, whose observation from regional context was informative and not of empirical nature. Ultimately, they signaled the type of questions that this framework is designed to provoke in future studies: Are planning outputs anchored in shared diagnostics and institutional memory? Are relational processes maintained beyond individual projects and/or funding cycles? Are integration practices embedded in legal and organizational routines? These questions demonstrate how the framework functions, not only as an evaluative tool, but also as a diagnostic lens for deeper institutional reflection.

Finally, similar to any other conceptual framework, the proposed indicator system has its own limitations. The effectiveness of the system depends on the availability and quality of data, particularly concerning the intangible forms of capital such as trust, cooperation, and institutional behaviour. What is more, some indicators will have to rely on proxies or qualitative assessments, which potentially could affect standardization and comparability. When it comes to the IOOP model's complexity, it may also require simplification in regions with low planning maturity or limited administrative capacity. Therefore, any future research should prioritize empirical testing, beginning in the South Balkans and extending to other EU fringe regions such as the Baltic states and Eastern borderlands. This would help evaluate the system's scalability, adaptability, and diagnostic precision, while refining indicators for diverse territorial contexts. In cases where institutional readiness is limited, simplified applications or pilot testing could support incremental uptake. Additionally, future work might expand the framework to include indicators on digital planning, resilience, and cross-sectoral integration, enhancing its relevance for emerging policy challenges.

5. Conclusion

This paper presents a novel and adaptable framework for evaluating Spatial Planning System Integration (SPSI), developed through a tri-layered indicator system rooted in Camagni's territorial capital taxonomy and structured via the IOOP (Input-Output-Outcome-Process) model. The system integrates three interrelated layers: place-dependency as the structural core, policy-orientation as the design logic, and path-orientation as the temporal-evaluative dimension. These are filtered through the dynamic dimensions of relational capital to produce a context- and time-sensitive, process-aware, and stage-reversible tool for assessing integration, especially in EU's fringe regions, where systemic coordination remains a challenge.

Rather than offering a case-based analysis, the study uses the South Balkan region as a contextual anchor, with the explicit objective not to demonstrate results, but to ensure the system's relevance to the complexities commonly found in EU fringe territories. In doing so, the territorial and institutional diversity of the region in question was leveraged to reinforce the framework's potential for broader application.

In this paper we emphasize the relational dynamics, institutional coordination, and temporal progression, so that we can provide framework that moves beyond conventional, output-focused evaluation methods. By doing so, we rely on multidimensional territorial indicators and diagnostic reversibility which in our view deepens the understanding of the systemic drivers and constraints that influence the spatial development processes. As a result, the paper contributes to academic discourse and policy practice, by addressing a long-standing methodological gap in European spatial governance.

At the end, three key takeaways emerge from this work. First, effective SPSI evaluation requires frameworks that incorporate relational, institutional, and procedural dimensions, not just static outcomes. Second, the system's diagnostic reversibility provides a powerful tool to assess whether formal planning outputs are truly supported by or result of meaningful cooperation and systemic readiness. Third, while the conceptual framework of the indicator system is theoretically strong, future empirical testing and iterative adaptation will depend on data quality and availability.

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