EMIL MAZÚR'S GEOGRAPHICAL THOUGHT: BETWEEN ALLOCHTHONOUS INFLUENCES, PARAUTOCHTHONOUS ADAPTATIONS, AND AUTOCHTHONOUS CONTRIBUTIONS

René MATLOVIČ[A*], Vladimír IRA[B], Ján OŤAHEĽ[C], Mikuláš HUBA[D]

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A* Institute of Geography, Slovak Academy of Sciences, Bratislava, Slovakia
https://orcid.org/0000-0002-8935-6462, geogmatl@savba.sk (corresponding author)

B Slovak Academy of Sciences, Institute of Geography, Bratislava, Slovakia;
Department of Geography, University of South Bohemia, České Budějovice, Czechia
https://orcid.org/0000-0001-5530-865X, geogira@savba.sk

C Slovak Academy of Sciences, Institute of Geography, Bratislava, Slovakia;
University of Presov, Department of Geography, Slovakia
https://orcid.org/0000-0002-8680-846X, geogotah@savba.sk

D Slovak Academy of Sciences, Institute of Geography, Bratislava, Slovakia;
SPECTRA Center of Excellence EU, Comenius University, Bratislava, Slovakia
https://orcid.org/0000-0002-9395-9960, geoghuba@savba.sk

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Abstract
This article analyses the geographical thought of Emil Mazúr (1925–1990), one of the most important figures in Slovak geography during the second half of the 20th century. Through intertextual and genealogical analysis, it explores how Mazúr critically received allochthonous influences, such as systems theory, cybernetics, the quantitative revolution, Soviet constructive geography and German axiomatics, and transformed them into autochthonous contributions, including landscape syntheses, the category of space, the axiomatisation of geography and the concept of landscape potential. This paper pursues several objectives. First, at the theoretical – methodological level, we aim to develop a methodology for identifying and analysing autochthonous and allochthonous determinants, and their mutual interference, in the study of geographical thought development. This framework should also include a procedure for identifying the developmental trajectories of a given author's thinking. Empirically, we aim to uncover and interpret the evolution of Mazúr's geographical thought by analysing a corpus of texts for which he was the lead or sole author. Particular attention is devoted to identifying autochthonous and allochthonous influences and their mutual interactions, culminating in a synthesis that demonstrates how these influences were transformed into original concepts within Slovak geography, and the implications for contemporary disciplinary discourse (epistemological, methodological and institutional) within the Slovak geographical school.

Key words
Allochthonous inspirations, autochthonous contributions, axiomatisation, Emil Mazúr, geographical thought, history of geography, intertextuality, landscape synthesis, parautochthonity, Slovak geography.

INTRODUCTION

Emil Mazúr (1925–1990) is one of the most significant figures of Slovak and Czechoslovak geography in the second half of the twentieth century. His life and work have been documented repeatedly and fairly comprehensively on multiple occasions (see, for example, Czudek 1990; Drdoš 1985; Huba 2010; Jakál 2006; Kvitkovič 1985, 1990, 1997, 2006; Lukniš 1975). Mazúr came to scientific maturity during a period of transformation in the disciplinary framework of geography. Czechoslovak geography was substantially influenced by the Soviet geographical school, as did other geographical traditions across the Eastern Bloc. Meanwhile, in global geographical thought, the Hettner– Hartshorne chorological conception was displaced by the theoretical–particularly quantitative (Golledge 2008, p. 39) – revolution which began above all in Anglo-American geography (Burton 1963). The paradigm of geography as a spatial science gradually took root within individual national schools (Matlovič & Matlovičová 2015). Rather than responding passively to these contexts, Mazúr adopted, reinterpreted and transformed imported impulses into concepts that became an integral part of the foundations of the Bratislava school of landscape syntheses (Mazúr, Drdoš & Urbánek 1983; Ira et al. 2020, p. 400).

The centenary of his birth in 2025 provides a timely opportunity to shift focus from inventory-style recapitulations to a more systematic genealogical analysis of his contributions to geographical thought. Existing contributions to the history of Slovak geography and of geographical thought are predominantly review-based. While they summarise periods, thematic domains, and institutional contexts, yet only rarely proceed to a deeper interpretation of how global currents were received in the domestic milieu and how they were conceptualised (Drdoš & Oťaheľ 2006; Král & Kondracki 1951; Hromádka 1955; Lukniš 1983; Ira & Lacika 2009; Matlovič & Matlovičová 2015, 2020). In this paper, our aim is to bridge the gap between descriptive historiography and analytical genealogical interpretation. This will contribute to a more precise conceptual delineation of Mazúr's legacy for contemporary geography.

We approach Mazúr's oeuvre as a "classic text" in the sense of Keighren et al. (2012, p. 299), i. e. a text capable of engaging in productive dialogue with the current state of the discipline and generating reflection within theoretical–methodological debates. Unlike canonical texts that have lost their performative currency, Mazúr's work retains the capacity to stimulate new interpretations, above all through examining of the interference between allochthonous inspirations and

autochthonous contributions. We thereby trace the genealogy of his geographical thought at the intersection of national and international contexts, in a continuity running from detailed analysis to a synthesis.

OBJECTIVES

This paper pursues several aims. First, at the theoretical–methodological level, we aim to develop a methodology for identifying and analysing autochthonous and allochthonous conditionings and their interference in studies of the development of geographical thought. This will include a procedure for identifying the deve-lopmental tendencies in an author's work. Empirically, aim is to uncover and interpret the evolution of Mazúr's geographical thought by analysing the corpus of texts for which he served as lead or sole author. Particular attention is devoted to identifying the allochthonous and autochthonous influences culminating in a synthesis demonstrating how these impulses were transformed into original concepts within Slovak geography and the implications for contemporary disci-plinary discourse (epistemological, methodological, and institutional) within the Slovak geographical school.

THEORETICAL FRAMEWORK

Allochthony, autochthony, and parautochthony in geographical thought

In this study, we define an allochthonous element of geographical thought as a conceptual, methodological, or theoretical component that originates outside Slovak geography. This could be from another scientific discipline, another national geographical school, a philosophical orientation, a methodological approach, or in the work of a particular author or institution. And which is taken over, It is than adapted or transformed into Slovak geographical thought. We designate the process by which it enters the structure of geographical thought and is reformatted as 'transfer'. This process cannot be conceived one-dimensional: its forms and intensities fluctuate according to the extent to which the given import is reflected upon, contextualised, and adjusted within geographical discourse.

The most basic form is direct adoption, which can manifest as either mechanical transfer – often involving the uncritical adoption of terms, techniques, or models without adequate consideration of their limitations – or adoption in a more limited sense, whereby a foreign concept is accepted with minimal modifications, albeit with potential implications for a new theoretical framework or methodological procedure. A higher stage is critical adaptation, where the uptake is accompanied by an explicit awareness of the boundaries of the imported element and its adjustment to the needs of geographical thought. The most complex form is transformative adaptation, involving creative remoulding, reconceptualisation, or hybridisation, where shifts in meaning occur and elements from several disciplines

are synthesised into new conceptual frameworks. Of particular note is meta-adaptation, which uses the philosophy of science and metatheoretical reflection to evaluate the developmental trajectory, and rejection. At the opposite pole is rejection, which represents a deliberate distancing from unsuitable imports. This typology of transfers allows us to progress from diagnosis (identifying the mode of entry) categorisation (assigning it to an appropriate class), to synthesis (reconstructing the mechanisms by which allochthonous impulses become integral components of a geographical thought) and to implications for the stability or innovation of the disciplinary framework.

Alongside allochthonous influences, we examine the autochthonous elements of geographical thought: ideas, concepts, terminological innovations, and methodological approaches that emerged endogenously within the intellectual milieu of the domestic geographical school as part of the broader Czechoslovak geographical tradition. We construe autochthonous elements as the product of tradition, local experience and the discipline's specific developmental conditions. They constitute an internal source of originality, enabling geography to articulate a response to the needs of its milieu while determining the boundaries and modes of reception, adaptation and transformation of external impulses. The interaction between the autochthonous and the allochthonous therefore creates a dynamic field of tension and resonance, at the intersection of which an original profile of geographical thought emerges – ranging from configurations closer to international paradigmatic frameworks, through critically mediated modifications, to variants more firmly anchored in national or local tradition. This developmental trajectory – from uptake, through adaptation, to synthesis – simultaneously maps the extent to which external impulses can become domesticated and function as load-bearing components. This developmental trajectory, from uptake through adaptation to synthesis, simultaneously illustrates the extent to which external impulses can be domesticated and function as integral components of domestic conceptualization.

If we consider the concepts of autochthony and allochthony as a spectrum of origins and rootedness rather than as a strict binary, we can also incorporate the idea of parautochthony. Originally employed in taphonomy and structural geology to describe partially displaced yet locally re- deposited locally (Callender, Powell, Staff, & Davies, 1992), the term can be transposed into the epistemological study of geographical thought. In this metatheoretical sense, parautochthony designates a conceptual or methodological element that entered geographical discourse from outside its domestic intellectual milieu – thus being allochthonous in origin – but that was subsequently adapted, re-contextualised and domesticated to the extent that subject to deep adaptation, re-contextualisation, and domestication, until it came to be perceived as an integral and "native" component of the local scientific tradition.

This shift from a rigid dichotomy of allochthony and autochthony toward a graded spectrum is consistent with broader theories of travelling and translated ideas in the humanities and social is sciences. Said (1983) argued that theories never travel unchanged: as they move between contexts, they are rearticulated according to the demands and constraints of receiving culture. Similarly, the cultural transfer framework of Espagne and Werner (1988) emphasises that cross-disciplinary or cross-national transfers are never neutral transmissions but rather transformative appropriations that combine the imported and the indigenous. From this perspective, parautochthony denotes precisely this inter-mediate state of conceptual hybridisation, where imported ideas are not passively adopted or fully indigenous, but are instead creatively adapted to fit the cognitive and institutional landscape of a semi-peripheral scientific culture (Livingstone, 2003).

In the context of geographical thought, particularly in small or semi-peripheral academic traditions, such parautochthonous formations are crucial. They demonstrate that intellectual dependency and originality are not mutually exclusive but co-constitutive. As Burke (2007) notes in his study of cultural translation, the act of translating ideas across contexts always implies interpretative agency; local scholars are reformulators, not mere recipients of imported paradigms. Hence, parautochthony captures the dialectic by which a foreign theoretical impulse, once critically mediated and selectively assimilated, becomes indistinguishable from domestic epistemic patterns.

Furthermore, this concept aligns with Geschiere's (2009) and Zenker's (2011) analyses of autochthony as a discourse of belonging and boundary-making. Just as claims to autochthony in socio-political contexts serve to stabilise identities amid global circulations, claims of intellectual autochthony within a discipline perform similar functions of legitimation and differentiation. The category of parautochthony thus introduces a mediating zone within this discursive field, acknowledging the hybrid nature of local scientific identities formed through the continuous oscillation between external influence and internal reinvention.

In summary, the parautochthonous represents not a compromise, but rather productive tension: an epistemic formation that is born from transfer, yet becomes indigenous through reflection, translation, and contextual negotiation. This allows us to map the layered processes through peripheral and semi-peripheral sciences, such as Slovak or broader Central European geography, transform external paradigms into integral components of their own theoretical frameworks. Therefore, recognising parautochthony offers a metatheoretical tool for analysing the domestication of knowledge and the formation of hybrid intellectual genealogies across scales and traditions.

Intertextuality in the Study of the Development of Geographical Thought

The study is based on a broader hermeneutic–analytical framework with metatheoretical ambition. This framework allows meanings to be interpreted and their structural, genealogical and contextual linkages analysed in a single, continuous procedure. Our fundamental point of departure is the concept of intertextuality, understood as an instrument for examining relations among texts. Its developmental lineage extends from literary theory to contemporary social-science research.

J. Kristeva emphasises that "tout texte se construit comme une mosaïque de citations, tout texte est absorption et transformation d'un autre texte" (Kristeva, 1980, pp. 66–67), a statement that, in our context, can be interpreted as the idea that every text is formed as a mosaic of citations and simultaneously as a transformation of other texts simultaneously. Meaning is therefore never established in isolation, but always at the intersection of interferences with earlier or concurrent discourses, in a dynamic ranging from absorption through to reinterpretation and conceptual transposition.

N. Fairclough builds on this idea, arguing that "intertextuality is a matter of how texts draw upon, and transform, other texts" and that "intertextual relations are essential to the constitution of discourse, because any discourse is always constituted by a complex of past discursive practices" (Fairclough, 1992, pp. 84–85). Scientific discourse cannot therefore be conceived as the autonomous production of knowledge, but rather as a network of interlinked practices with historical memory. Within this network, new texts enter into explicit and implicit intertextual relations, and often adopt categories, concepts, and methodological frameworks through transfer without direct citation. This process that oscillates between mechanical borrowing through critical adaptation to transformative hybridisation.

G. Genette further differentiates this issue in Palimpsests: Literature in the Second Degree, noting that "any text is hypertext, derived from a preexistent hypotext through processes of transformation or imitation" (Genette, 1997, pp. 5–7). Hypertextuality – as a relationship of derivation and remodelling – proves especially useful for evaluating conceptual continuity in geographical thought. recent works connect with earlier ones not only through direct references, but also through changes in the meaning of categories, reworked methodological principles, and the creation of new typologies within existing frameworks.

Based on this, the present study combines content analysis with intertextual–contextual analysis. Our focus is on identifying allochthonous inspirations (external influences) and autochthonous contributions (endogenous innovations), which we then reconstruct genealogically by analysing the intertextual links among the texts in the reviewed corpus. This step validated the adequacy of the corpus text selection, as well as to identifying pairs exhibiting strong to very strong intertex-

tual connections. The subsequent intertextual analysis focused on the content was conducted with a differentiated degree of detail proportional to the intensity identified in each pair. This methodological procedure culminated in a synthesis that situated the examined texts within a broader context. This enabled us to identify developmental tendencies in Emil Mazúr's geographical thought.

Intertextual analysis is a method with a strong metatheoretical focus, identifying explicitly cited and implicitly adopted authors to reconstruct the textual and discursive networks which the examined text. This enables us to grasp its conceptual delineation. It must be understood at the intersection of intertextual interferences and transfers. In keeping with the Kristevan thesis (Kristeva, 1980, p. 66), this approach does not merely take the form of an inventory of sources. Rather, it progresses from diagnosing origins to categorising the functions of references, such as providing argumentative support, offering a critical counterpoint, legitimising the author's position and serving as a source of the author's own conception.

An important extension of this perspective is genealogical reconstruction, which is based on Foucault's archaeology of knowledge (Foucault, 1969) and genealogy of knowledge (Foucault, 1971). This shifts the analytical focus from cumulative continuity to diagnosing discontinuities, reorderings and shifts in concepts, including their rhetorical and institutional functions. In keeping with Foucault's view that "Genealogy examines how the multiplicity of events has been welded into an apparent necessity, while revealing contingency and discontinuity in history" (Foucault, 1971, p. 154), genealogical reconstruction does not trace a linear trajectory. Instead, it segments the material into typologies of ruptures, re-articulations, and hybridisations. This enables us to progress proceed from the descriptive mapping of intertextual linkages and the analytical classification of their intensity and function, to a synthesising interpretation of the mechanisms by which the conceptual framework of the corpus under scrutiny is formed and transformed.

When applied to the history of geographical thought, this method proves productive as it enables the intertextual analysis of sources to be linked with genealogical reconstruction of regimes of knowledge at the intersection of intellectual, cultural, and institutional frameworks. D. Livingstone (1992) sets out a Foucauldian approach in analysing the development of geography, emphasising that the history of the discipline cannot be conceived as a unitary, linear, and teleological narrative. Conversely, he argues that "geography did not emerge in isolation, but within specific intellectual, cultural, and institutional contexts which shaped its content and meaning" (Livingstone, 1992, p. 5). Genealogical reconstruction, thus conceived, reveals how diverse regimes of truth, legitimation, and institutionalisation gained traction in geography and were connected within a network of power/

knowledge formations, from local practices, through to their disciplinary articulation and stabilised paradigmatic configurations.

The mutual point of contact between intertextual analysis and genealogical reconstruction is a systematic focus on relations, both between texts (e.g. intertextual interference and the transfer of categories) and between discourses and institutions. These two methodologies therefore converge on the metatheoretical thesis that knowledge is always situated and contigent on intertextual and social frameworks, from identifying sources and their functions to typologising discursive reorderings and synthesising them to enable a more precise conceptual delineation of the developmental lines of geographical thought.

Building on these reflections, we draw attention to the existing works of Matlovič & Matlovičová (2015, 2020, 2025), which trace the development of geographical thought as a network of discontinuous transformations. In this network, paradigmatic currents of global geographical thought intersect with domestic conditions and the malleability of the intellectual milieu to create interference. It is precisely at this interface that a specific constellation emerges, determining both the horizon of originality and the limits of Slovak geography. This framework also allows us to progress from diagnosing regimes of reception, through their typologisation to synthesising the developmental lines of transfer between external impulses and domestic conceptual articulation.

According to Matlovič & Matlovičová (2020), allochthony was manifested primarily in the initial reception of so-called first- and second-order discontinuities of world geographical thought: Slovak geography reflected regional discontinuity (e.g. French possibilism, the Berkeley School of Cultural Geography, the Landschaft School) as early as the 1930s, the quantitative revolution from the second half of the 1960s, and subsequently the humanistic, systems, and postmodern discontinuities. These impulses often functioned as critical "imports", received with a certain time lag and in a selective and often limited manner. Transfer within them ranged from mechanical borrowing and purposive adaptation to sporadic transformative hybridisation.

By contrast, autochtony manifested in the creation of indigenous synthesising conceptions, anchored in the specificities of the Slovak milieu and tradition. An emphasis on landscape and its structure became a load-bearing pillar of the "Bratislava School of Landscape Syntheses", within which the ambition to integrate natural and social components and to grasp geography within a systems framework was fully articulated (Matlovič & Matlovičová, 2020). E. Mazúr played a key role in this environment, from reception and adaptation to original synthesis, thereby co-determining the trajectory of domestic conceptual construction and its implications for the contemporary disciplinary discourse.

DATA AND METHODS

Based on this, we adopted the following methodological procedure: First, we defined the corpus of Mazúr's texts to be analysed. We drew on the complete bibliography of Emil Mazúr (Holická & Szöllös, 1997). The selection was narrowed primarily by genre, focusing on the category of studies and scientific articles. Our aim was to select texts of comparable length to ensure they occupies an equivalent position for subsequent textual analyses. We chose three articles published in Slovak and four in English, that addressed the development and position of geography within the system of sciences, the social relevance of geography, geographical thought, and theoretical– methodological concepts. Where the list contained multiple texts with significant content overlap (e.g. on "landscape syntheses"), we selected a single representative to minimise autocorrelation in intertextual measures. We arrived at a corpus of seven studies:

- Geography Today and Its Perspective (Mazúr, 1968)
- Súčasné a výhľadové úlohy našej geografie/ Present and perspective tasks of our geography (Mazúr, 1972)
- Geography and the Changing World (1980, co-authored with J. Drdoš and J. Urbánek)
- Kategória priestoru v geografii / The Category of Space in Geography (1982, with J. Urbánek)
- Krajinné syntézy – ich východiská a smerovanie / The Landscape Syntheses – Their Starting Points and Tendency (1983, with J. Drdoš and J. Urbánek)
- Search for Foundations (1984, with J. Urbánek)
- Landscape Ecology – Geographical Research Direction or an Interdisciplinary Research Programme? (1988, with J. Drdoš)

The selected corpus of seven works covers the decisive two decades of Mazúr's intellectual maturation (1968–1988). He entered this period with experience from his initial years as Director of the Geographical Institute of the Slovak Academy of Sciences, bearing primary responsibility for the strategic direction of geography as a scientific discipline within Slovakia, and joint responsibility for the orientation of geography within Czechoslovakia. During this period, he shifted his focus away from geomorphology towards broader questions about the nature of geography as a discipline, a shift that would remain consistent throughout the subsequent two decades. The selection illustrates the transition from his individual programmatic texts to collaborative work with Drdoš and Urbánek, and allows us to analyse the interplay of exogenous and endogenous influences over time. This provides ideal material for categorising the types of transfer and the intensity and nature of intertextual relations.

We then analysed the intensity of intertextual relations between pair of articles in the corpus. This analysis served, inter alia, to validate the suitability of the corpus selection on the basis that at least one third of the pairs would exhibit very strong or strong ties and that every pair would display at least weak linkage intensity. In discursive and intertextual methodology, our premise was that texts are studied as a 'network of references'; the criterion is not that every pair be strongly interconnected, but that a detectable, reproducible cohesion be evident among a relevant number of texts. Fairclough (1992) explicitly defines intertextuality as the way in which texts draw upon and transform other texts. We therefore assess the degree of uptake and transformation within the network rather than isolated occurrences. For a valid corpus selection, there must be a clearly coherent core rather than random, scattered linkages. If, after considering only strong and very strong ties, more than 33% of all possible pairs still have a strong linkage, this constitutes supra- threshold internal coherence, according to our assumption: the corpus is not merely a set of loosely related texts, but possesses a structural core. In this way, the corpus guarantees that a substantial proportion of pairs carry a strong intertextual signal rather than merely marginal connections.

In analysing the intensity of intertextual linkages, we focused on the extent to which later works built upon earlier ones in term of their conceptual cores, terminology and concepts, methodological frameworks, and explicit citations. The basic unit of analysis was a chronologically ordered pair of texts (newer → older). Each newer text could relate to any number of older ones, and we examined the extent to which the newer text developed, modified, or differently interpreted the ideas of the older text. With seven texts in the corpus, 21 pairs were generated.

Each pair was evaluated on four dimensions using a 0–3 scale. The anchors and weights were used: C: conceptual continuity (40%; 0: no continuity; 1: a hint of a motif; 2: development of the core with a partial shift; 3: direct development/transformation of a key idea); T: terminological–conceptual continuity (25%; 0: none; 1: individual terms; 2: a system of concepts or redefinitions; 3: an adopted/reworked terminological framework); M: methodological/structural heredity (25%; 0: none; 1: partial procedures/structure; 2: continuity with a methodological framework; 3: adoption and substantial development of a methodological model); R: explicit references (10%; 0: none; 1: general references; 2: at least one explicit citation of the older text; 3: multiple citations with a substantive discussion).

We computed a weighted score for each pair, $S = 0.4C + 0.25T + 0.25M + 0.1R$, which lay in the interval 0–3. Pairs were then ordered in descending order of the achieved score. In the case of ties, fractional ranking was used. We denoted the rank of a pair by r ($r = 1$ for the strongest relation) and normalised the intensity to an index, $I = 100 \times (N\_p + 1 - r)/N\_p$. The index of intertextual intensity was interpreted in five categories: very strong ($I \geq 80$), strong ($60 \leq I < 80$), medium ($40 \leq I < 60$), weak ($0 < I < 40$) and none ($I = 0$). The outputs of the analysis are an

N×N intensity matrix (Table 1), where the rows represent the newer texts and the columns represent the older texts, and a table of all pairs with partial values for C, T, M, R, the weighted score, the rank (r), the index (I) and the category (Table 2).

In subsequent phases, the methodological procedure consisted of a hermeneutic first reading of each text, combined with a brief summary, identification of key concepts, and the researcher's reflexive notes. This allowed us to enter the "world of the author" and provide a basis for subsequent analytical work. During the subsequent analytical phase, we conducted an intertextual analysis to identify explicit citations, paraphrases, and references to other authors, schools of thought, paradigms, and concepts. We also uncovered implicit borrowings, based on of terminology, argumentative structures, and metaphorical lenguague; and determined the provenance of each element (allochthonous or autochthonous) according to its cultural and academic context. Next, we carried out a rhetorical analysis, in which we determined the main argumentative strategies (e.g. deductive, inductive, polemical and motivational, etc.), identified metaphors, conceptual frames, and value judgements, and assigned rhetorical devices as allochthonous or autochthonous traditions based on their origin and adaptation. We then proceeded to a discursive analysis. We checked and identified the broader scientific and social discourse to which the text belongs. We checked whether the author adopteds external narratives and conceptual schemes (allochthonous) or drew on local tradition and empirical sources (autochthonous). We also noted hybridisation of the two approaches. Finally, we analysed markers, identifying lexical, syntactic, and content features of ideological anchoring and distinguishe between obligatory rhetoric of the period and an integral part of the author's conception. This multi-stage procedure enabled us to grasp the texts under examination in their full breadth.

In the third phase of the research, we conducted a comparative intertextual analysis of the texts in order to synthesise the findings in reconstructing the genealogical trajectory of Emil Mazúr's geographical thought within the analysed corpus. In particular, we focused on whether and how an earlier text influenced a later one. We identified explicit intertextual references (citations and direct mentions) and implicit ones (terminology, style, argumentative frameworks and methodological procedures). We then assessed whether the later text reproduced, developed, criticised, transformed or disputed the earlier source, considering the function of this intertextual relationship in building the argument, constructing knowledge or framing the problem.

RESULTS OF THE ANALYSES OF THE EXAMINED TEXTUAL CORPUS

Circumstances and contexts of Emil Mazúr's activity before and during the production of the texts

Proceeding from the premise of the situatedness of knowledge (Špelda, 2009, p. 89), we briefly outline the context of Emil Mazúr's activity. He was born in the settlement of Lúky near Divina in the Žilina district. The smallholding and mountainous environment of the Javorníky shaped his relationship with nature and to human living conditions. According to Kvitkovič (2006), it was the local environment and the experience of emigration led him to study geography and history. After graduating from the grammar school in Žilina, he studied at the university in Bratislava under, where he was influenced above all by Professors Jan Hromádka and Michal Lukniš, who deepened his interest in geomorphology and physical geography (Czudek, 1990, p. 161). His early work, devoted to a regional study of the Javorníky, bore traces of the influence of the French school of regional geography, as passed on to him by Hromádka. After completing his geography and history studies at Comenius University in 1950, he joined the Geographical Institute of the Slovak Academy of Sciences and Arts (SAVU) . There, under the guidance of M. Lukniš, he participated in the project of geomorphological mapping of Slovakia. During the next stage of his career (1950–1968), he established himself as a leading geomorphologist, making significant theoretical and methodological contributions. He turned his scholarly interest to the study of landform features in the Western Carpathians, especially river terraces, planation surfaces, and glacial and karst relief, linking morphological analysis with Quaternary stratigraphy and neotectonics. These investigations culminated in the monograph "*Žilinská kotlina a priľahlé pohoria*" (1963), for which he was awarded a Doctor of Sciences degree in 1965. Simultaneously, Mazúr addressed theoretical and methodological questions of geomorphological mapping. He also developed a systematics of landform types, and became a co-author of the Geomorfologická mapa ČSSR (1966) and later, together with Lukniš, he published a seminal study on the regional geomorphological division of Slovakia (Mazúr & Lukniš, 1978).

Already in the 1960s he initiated international scholarly events, such as the 1965 symposium on the Tertiary development of the Carpathians (1965) and established himself as an expert on the development of Carpathian relief in the Neogene and Quaternary periods. From 1955 he also taught at the Faculty of Natural Sciences at of Comenius University in Bratislava training the first generation of modern geomorphologists. From the late 1950s onwards, as he progressed from Deputy Director (1958) to Director (1963) of the Institute of Geography of the Slovak Academy of Sciences, his interests gradually shifted from specialised geomorphological research to broader questions of the geographical theory, methodology, and social

mission. Over time, the Geographical Institute of the Slovak Academy of Sciences began to collaborate with other geographical institutions. Initially, collaboration was bilateral. Particularly strong ties were forged with the Geographical Institute of the Czechoslovak Academy of Sciences in Brno and the Geographical Institute of the Academy of Sciences of the Soviet Union in Moscow. Research on the relief of the Western and Eastern Carpathians evolved into multilateral cooperation among geographical institutes in socialist countries, especially under the auspices of the Carpatho-Balkan Geomorphological Commission. As an organiser and representative of Slovak geography at home and abroad, Mazúr promoted the integration of physical geography, and the concept of landscape synthesis, as well as interlinking of natural and social aspects of research. In programme texts from the late1960s he already articulated the need for a prognostic and holistic approach to the discipline, thereby paving the way for the development of the Slovak school of landscape synthesis and strengthens the position of geography as a synthesising science (see Czudek, 1990; Jakál, 2006; Kvitkovič, 1985, 1990, 1997, 2006; Lukniš, 1975).

It is evident from the foregoing that this study does not aspire to comprehensively encompass the scientific results and contributions of Emil Mazúr. Our primary interest lies in the textual outputs produced at a time when Mazúr was an established researcher and the person responsible for the strategic direction of Slovak geography, stemming from his roles as Director of the Institute of Geography of the Slovak Academy of Sciences (1963–1988) and Director of the Centre for Geo- Scientific Research of the Slovak Academy of Sciences (1986–1990), as well as his other managerial and expert roles at home and abroad. These included, for example: Chair of the Scientific Collegium of the Slovak Academy of Sciences for Geology and Geography; Chair of the Slovak Association for the Protection of Nature and Landscape; Chair of the Czechoslovak Geographical Committee; Chair of the Slovak Geographical Society at the Slovak Academy of Sciences; long-standing Editor-in-Chief of Geografický časopis (1965–1989); Chair of the Carpatho-Balkan Geomorphological Commission; Chair of the IGU Working Group "Landscape Synthesis – Geoecological Foundation of Complex Landscape Management"; and official representative of Slovak (and Czechoslovak) geography at numerous events, notably at the International Geographical Congresses in Stockholm, London, Delhi, Moscow, Tokyo, and Paris (Kvitkovič, 2006).

Intensity of Intertextual Relations

The analysis of intertextual intensity confirmed the appropriateness of the examined corpus. Nine pairs of articles out of a total of 21 exhibit a strong to very strong relationship. Not a single pair displays zero intensity.

Table 1. Matrix of intertextual relationship intensities (index ranging from 0 to 100)

Newer \ Older	1968	1972	1980	1982	1983	1984	1988
1972	61.90						
1980	52.38	47.62					
1982	42.86	42.86	85.71				
1983	42.86	42.86	**80.95**	57.14			
1984	9.52	9.52	61.90	**90.48**	61.90		
1988	28.57	23.81	71.43	66.67	**100.00**	42.86	

Source: authors' own calculations

Table 2. All chronological pairs (newer → older) with scoring and index
Weighted score = C×0.4 + T×0.25 + M×0.25 + R×0.1; 0–3 scale for each criterion.

#	Pair (newer → older)	C	T	M	R	Score	r	I	Intenzity
1	1988 → 1983	3	2	3	1	2.55	1	100.00	Very strong
2	1984 → 1982	3	3	2	1	2.55	2	95.24	Very strong
3	1983 → 1980	3	2	3	1	2.55	3	90.48	Very strong
4	1982 → 1980	3	2	2	1	2.30	4	85.71	Very strong
5	1983 → 1982	2	2	3	1	2.15	5	80.95	Very strong
6	1984 → 1983	2	2	2	1	1.90	6	76.19	strong
7	1988 → 1980	2	2	2	1	1.90	7	71.43	strong
8	1988 → 1982	2	2	2	1	1.90	8	66.67	strong
9	1972 → 1968	2	2	2	1	1.90	9	61.90	strong
10	1984 → 1980	2	2	2	1	1.90	10	57.14	mediate
11	1980 → 1968	2	1	2	1	1.65	11	52.38	mediate
12	1980 → 1972	2	1	2	1	1.65	12	47.62	mediate
13	1982 → 1972	2	2	1	0	1.55	13	42.86	mediate
14	1982 → 1968	2	2	1	0	1.55	14	38.10	weak
15	1983 → 1972	2	1	2	0	1.55	15	33.33	weak
16	1983 → 1968	2	1	2	0	1.55	16	28.57	weak
17	1988 → 1984	2	1	2	0	1.55	17	23.81	weak
18	1988 → 1972	2	1	2	0	1.55	18	19.05	weak
19	1988 → 1968	2	1	2	0	1.55	19	14.29	weak
20	1984 → 1972	1	1	1	0	0.90	20	9.52	weak
21	1984 → 1968	1	1	1	0	0.90	21	4.76	weak

Source: authors' own calculations

We identified a strong intertextual relationship between five pairs of articles that collectively form a coherent narrative. The strongest relationship is in the pair 1988 → 1983, followed by 1984 → 1982, 1983 → 1980, 1982 → 1980, and 1983 → 1982. Strong relationships were also identified in

the pairs 1984 → 1983, 1988 → 1980, 1988 → 1982, and 1972 → 1968. These pairs constitute the structural core of the corpus and will form the basis of a more detailed genealogical analysis of Emil Mazúr's geographical thought. The analysis also confirmed the validity of selecting the articles for study, as the corpus exhibits sufficient internal coherence, since as many as 42.8% of the text pairs display a strong to very strong intertextual link.

Allochthonous Inspirations and Autochthonous Elements in E. Mazúr's Geographical Thought

This section presents the results of the analysis of each text in the corpus.

Geography of Today and Its Perspective (1968)

In this study, Mazúr (1968) provides a critical analysis of the state of geography in the 1960s, when the paradigmatic orientation associated with the theoretical, i.e. quantitative, revolution and the development of general systems theory was prevalent in global geographical thought. Mazúr identifies a deepening dualism between physical and economic geography, as well as excessive specialisation and fragmentation within the discipline. This leads to dispersion into narrow thematic, regional, or methodological issues, and to the predominance of analytical schemes over synthesis (Mazúr, 1968, p. 201). Concomitantly there was "emptying of the field" of regional geography, whose place was beginning s to be occupied by competing disciplines such as regional science (Mazúr, 1968, p. 205). This situation is aptly summerized by the following statement from Mazúr (1968, p. 205): "this situation led up to a skepticism to scepticism regarding as regards geography as a unitary science, to an atomization of geography to a whole series of disciplines associated with traditional-formal elements". This is, of course, connected to the stagnation of regional geography as the synthesising science of landscape and its theories. Historically speaking he argues that periods of geographical development have always been closely linked to ties with social practice and with other scholarly fields. This parallel evolution outside of geography indicates that, in order to regain relevance, the discipline must consolidate its own synthetic–theoretical approach (Mazúr, 1968). In the context of the scientific–technical revolution and growing environmental challenges, Mazúr therefore emphasises the need to transition from predominantly analytical–empirical approaches to a synthetic–theoretical line of inquiry. Accodring to him, the discipline's perspective lies in applying general systems theory and developing spatial synthesis. This would enable the geosphere

to be concieved as a dynamic physico–biotic–social system providing the scientific basis for spatial planning, regional development, and environmental management (Mazúr, 1968).

Among the allochthonous inspirations, German and American traditions predominate. From the German tradition, Mazúr draws on the classical historical line represented by A. von Humboldt and C. Ritter, whom he considers to be the founders of an inductive and teleological conception of natural unity. Mazúr situates their work within the context of Darwin's evolutionary theory, which involved a methodological shift from a descriptive interpretation of the relationship between humans and the environment to a deterministic one. He also modernises the German approach by referencing E. Neef (1967), whose work he sees as showing signs of axiomatisation and systematisation in landscape research.

American sources dominate his reflections on the contemporary methodological developments. For Mazúr F. Schaefer (1953) is, for Mazúr, the key authority who legitimises the critique of Hettner and Hartshorne and opening the way to a new paradigmatic orientation in geography. This line is developed by W. Bunge (1966), who advances spatial–structural analysis, and B. J. Berry (1964), whose concept of regional synthesis based on quantitative methods Mazúr cites as an example of systems analysis integration. He also draws on P. Haggett (1965), T. Hägerstrand (1967) – who wrote about time–space diffusion) – and R. J. Chorley (1962), who wrote about geomorphology and systems theory. Together, these authors represent the trend of the quantitative revolution trend , which Mazúr views as both challenging and a risky when methods are "mechanically borrowed". He adopts a balanced position here appreciating the benefits of mathematisation and modelling, while stressing the need to integrate them into a systemic and synthetic view of the geosphere rejecting the mechanical and epigonic uptake of techniques from mathematics and other sciences. In this context, his stance is telling: "...the studies taking over mechanically and epigonically advance of other sciences, namely prevailingly in the individual specialized branches of geography within the analytico-empirical line. Such a so called mathematization or exactization is situated in a deadlock" (Mazúr, 1968, p. 208).

A special place is occupied by authors who link geography with general systems theory. L. von Bertalanffy (1956), W. R. Ashby (1958), K. Boulding (1956), and A. D. Hall & R. E. Fagen (1956) are explicitly cited as the founders of systems methodology. According to Mazúr, the application opens, "new horizons for an integral systems approach" in geography. These references demonstrate Mazúr's perception of geography as part of a broader scientific movement towards integration and interdisciplinarity. The mosaic of allochthonous elements also includes references to the Soviet (V. A. Anučin, 1963; D. L. Armand, 1964; B. B. Rodoman, 1965), Polish (R. Domański, 1965, 1967; K. Dziewoński, 1965; S. Leszczycki, 1965; J. Kostrowicki,

1967; Z. Wysocki, 1965), and Austrian–German (H. Bobek & J. Schmithüsen, 1967) traditions. These traditions have one thing in common: the pursuit logical systematisation and methodological reflection. Mazúr interprets these as parallel currents confirming the need for a synthetic theory of geography.

Alongside the strong international anchoring of his thinking, Mazúr deliberately incorporates domestic references, thereby highlighting the contribution of Slovak geography to methodological modernisation. The works of J. Paulov (1966) and J. Urbánek (1968) demonstrate that the process of "exactisation" and the application of systems theory were also underway in Czechoslovakia. Mazúr places these references are not marginal–Mazúr places them alongside leading international figures, signalling an ambition to situate the domestic school within the international discourse. Autochthonous elements are also evident in the terminology itself, as Mazúr employs notions such as "exactisation" and "synthetic–theoretical line", which, although derived from translations of foreign concepts, became specific conceptual instruments in the Czechoslovak context. A key original contribution is the redefinition of the geography's object: the geosphere/landscape is not a mere collection of elements but rather an integral, dynamic system in which the physical, biotic, and social components form new functional–structural relationships (Mazúr, 1968, pp. 207–208). In this, Mazúr builds on the domestic tradition of landscape research in this respect, yet shifts it towards a systems ontology of geography with consequences for both theory and application (the delimitation of geosystems). This step is not merely the adoption of systems terminology; his conception of the "geosystem" as a dynamic physico–biotic–social system represents an early formulation of a domestic version of geography based on a systems approach. This approach, would become one of the programmatic pillars of the Slovak geographical school in the 1970s.

The originality of Mazúr's approach lies in his creative and critical synthesis of allochthonous impulses. Rather than citing individual authors in isolation, he weaves them into a broader narrative about the disproportion between the waves analytical–empirical and the synthetic–theoretical lines in the development of geography. In doing so, he constructs a conceptual structure that is more than the sum of borrowed ideas. This dual-line model is his own heuristic framework into which he situates particular research traditions. Rather than viewing them as isolated methodological experiments, he seeks to harmonise diverse traditions within a unified model of the analytical–empirical and synthetic–theoretical lines. Mazúr thus position himself not as a radical innovator, but rather as a strategic integrator. He views geography's social contribution as in its ability to provide a "scientific basis for the economic settlement of territories and the creation of suitable living environments" (Mazúr, 1968, p. 210).

Present and perspective tasks of our geography (1972)

In this paper, Mazúr (1972) analyses the state of Slovak geography after the Second World War and its prospects in the context of the scientific–technical revolution. Despite the development of the institutional base, methodological approaches, and an extensive knowledge databases, he underscores that geography remains socially undervalued and is often supplanted by cognate disciplines. He identifies as principal tasks, expecting geography to provide foundations for spatial planning and economic development. Mazúr also recognises the need for synthesising and prognostic research, for the construction of an adequote conceptual apparatus for the precise understanding of phenomena, and the systematic embedding of geography in public consciousness through popularisation and collaboration with practicioners. In argumentative terms, this clearly builds upon the theses of the preceding study and implicitly translates the 1968 programme into an organisational and practical register.

Among the allochthonous intertextual references, authors from the Soviet geographical school predominate. The central figure is I. P. Gerasimov, whose conception of constructive geography and emphasis on environmental issues can be seen throughout the text (Gerasimov, 1966). Other notable figures include Saushkin, Anutchin, and Markov who are recognised as proponents of a Soviet synthesising geography, focusing on the rational use of the geosphere and environmental protection. Their influential works such as "Priroda i obščestvo" (1968) and "Regional'noe razvitie i geografičeskaja sreda" (1971) are also referenced. Gerasimov's conception of constructive geography formulated by I. P. Gerasimov in the mid-1960s was based on idea, that geography should not only be descriptive but also a transformative. Its purpose was to synthesise knowledge of the geosphere and to translate it into practically applicable solutions for economic planning, urbanisation, and environmental protection. This framework was firmly anchored in Marxist– Leninist philosophy, which viewed science as an instrument of planned social management. Constructive geography thus became an ideologically privileged model – a science oriented towards practical application, forecasting, and intervention in the social and natural environment.

Mazúr explicitly aligns himself with Gerasimov's conception (Mazúr, 1972, pp. 180–181). However, he does not, follow Gerasimov mechanically. While the Soviet conception primarily offered an ideological–programmatic point of departure, Mazúr supplements it with a methodological demand for "exactisation". He argues that "in order for geography to fully meet the current demands of theory and practice, it is necessary to progress from qualitative evaluations to quantification. This is already a problem of the exactisation of geography." (Mazúr, 1972, p. 182). Yet he insists that the process of exactisation cannot consist of the mechanically borrowing of formulae from other sciences. Rather, it must be based

on geography's own conceptual and theoretical foundations and be organically bound up with the interpretation of its object of study. He writes: "it is, I believe, mistaken to understand it (exactisation) as a translation of traditional description or qualitative assessments into mathematical formulae or figures, for the most part mechanically and epigonically borrowed from other sciences. Whether the values substituted into the mathematical formulae are representative, or whether the borrowed procedure and the results derived from it stand up to confrontation with reality, is sometimes treated as immaterial." (Mazúr, 1972, p. 182). Exactness is therefore grounded in the development of a discipline-specific conceptual framework, the use of mathematical language – especially formal logic and set theory – as a universal means of defining and organising knowledge, and the construction of predictive models that facilitate the planning of the development of natural and socio-economic systems. From this perspective, constructiveness and exactisation are mutually complementary: while constructive geography sets the social goal and stresses application and engagement, exactisation provides the methodological tools in the form of quantification, modelling, and logical formalisation (Mazúr, 1972, pp. 181–182).

In addition to Soviet geography, the text also features allochthonous influences from other national schools. From the Polish tradition he draws on S. Leszczycki (1972) and on the programme document Perspektywy rozwoju badań geograficznych (1966). Leszczycki's writings and the collective programme directly correspond to Gerasimov's conception, but they also incorporatethe an institutional and organisational dimension. The Polish school was strongly oriented towards regional planning and applied geography, thus coming closer than ever to the ideal of 'constructiveness'. G. Haase & H. Lüdemann (1972), from East Germany, provide models for applied territorial research. The work of French authors and the conception of Géographie active (George et al., 1964) is significant, providing a model of an engaged, socially relevant geography. Finally, the 1965 Report on Geography (1965) from the United States is mentioned as an example of a Western diagnostic approach. Together these allochthonous sources constitute a broad ideological and methodological platform of both socialist and global science to which Mazúr appeals, so that his arguments resonate not only locally but also find support in the international discourse.

The autochthonous elements are primarily tied to the historical and institutional tradition of Slovak and Czechoslovak geography. Mazúr explicitly mentions Matej Bel as a symbolic predecessor, thereby establishing a long-term continuity of the national geographical tradition. He attributes a pivotal role in the post-war development to J. Hromádka and M. Lukniš, founders of modern Slovak geography. The Czech geographer J. Demek also features prominently, as the author of methodologically stimulating works in physical geography, as well as being the co-ordinator of the nationwide project Geografická rajonizácia ČSSR (Demek,

1966, 1968). Mazúr uses this project as an example of a useful geographical output that legitimises the discipline's presence in the state's basic research plan. Another autochthonous element is O. Bašovský's concept of the "geographisation of the sciences" (Mazúr, 1972, p. 180), which Mazúr interprets as the contemporary process by which the spatial dimension becomes integrated into other scientific disciplines. By employing this terminology, Mazúr articulates his concerns about the threat of geography being substituted by newly emergent fields (e.g. regional science), an issue he first raised in an earlier text from 1968.

Based on this, Mazúr arrives at his own conception of geography as "a discipline of spatial synthesis which may provide scientific foundations for the territorial organisation of the economy, transport, settlements and population, and above all for the protection and creation of the living environment" (Mazúr, 1972, p. 180). Mazúr's text illustrates how engaged geography emerged of in the the 1970s as a discipline seeking to transcend its perception as an "academic and outdated" science, aspiring to be directly applicable to societal planning and governance. Here, autochthonous elements secure identity and continuity, while allochthonous ones provide inspiration, authority, and modernising pressure. Together they form the basis for Mazúr's own conception–geography as a synthesising, exactising, and socially engaged science. This was not an isolated concept, but part of a collective endeavour by socialist geographical schools to transform the discipline into a synthesising, applied, and methodologically modern science.

Geography and the Changing World (1980)

Mazúr, Drdoš & Urbánek (1980) designed their study to contribute to the theme of the "rejuvenation of regional geography" at the 24th IGU Congress in Tokyo. They emphasise that the subject of geography remains the Earth's surface as a physico-biotic-social system, yet the discipline has become fragmented and synthesising approaches have stagnated due to its ambiguous definition. Consequently, geography has lost some of its social significance, with other disciplines beginning to take its place. The authors therefore call for the development of a synthetic-theoretical approach, the construction of a new theoretical-methodological foundation, and the renewal of landscape syntheses in line with contemporary scientific thinking. They suggest that systems theory, logic and interdisciplinary approaches could enable geography to play a key role in addressing human–environment relations, assessing the potential of landscapes and producing geographical diagnoses and prognoses.

In their historical reflection, they identified several allochthonous elements that proved to be dead ends. Darwinian evolutionism penetrated geography from biology in a deterministic interpretation: "under the Darwin's evolutionary thesis a new philosophical current penetrated from biology even to other sciences and

was markingly manifest also in, geography but alas in the deterministic conception" (Mazúr et al., 1980, p. 99). Although possibilism brought a corrective, but the problems persisted: "considerations of a single object and personalisation of space (region) did not permit the application of a logic analysis and experiment" (Mazúr et al., 1980, p. 99). They argue that, in both cases, these were reflective adaptations of external thought that nonetheless constrained synthesis methodologically. The allochthonous element serves as a warning against uncritically transferring biological paradigmatic frameworks into geography.

Drawing on a different source – the history of geography – the authors delineate the discipline's object. They contend that Strabo's idea of the 'earth surface as man's home' remains valid even in modern geography (Mazúr et al., 1980, p. 98). The diversity of labels (geosphere, landscape sphere, geoecosphere) indicates disagreements at the level of conceptual grasp and method, rather than a plurality of objects (Mazúr et al., 1980, p. 98).

The authors criticise the epigonic adoption of procedures from other sciences, as well the "theoretical geography" which, in their view, introduced new methodological processes and techniques without adequate theoretical integration. While the contributions of authors such as (Schaefer 1953; Bunge 1966; Berry 1964 and Davies 1966) were significant, yet the broader synthetic basis remained insufficiently developed (Mazúr et al., 1980, p. 104). By contrast, several allochthonous transfers are considered viable. These involve meta-adaptation from the philosophy of science and mathematical logic: "the transfer of philosophy of the contemporary science, in its theoretical-methodological conception, in the transfer of mathematical logics and consideration, not in the mechanical transfer of formulas and technical processes from other sciences." (Mazúr et al., 1980, pp. 104–105). This involves a shift of emphasis from copying techniques to the conceptual and formal reconfiguration of the object (the geosphere) and its systemic relations (Mazúr et al., 1980, p. 105). This supports the adoption of the general systems approach as a framework for the renewal in synthesis as it provides: "integral theoretical–methodological interpretation open… new horizons for a general systems approach" (Mazúr et al., 1980, p. 103). From this perspective, facts from various specialised disciplines should converge to solve fundamental problems of geographical reality (Mazúr et al., 1980, p. 104). Mazúr et al. (1980, p. 105) also consider parallel national and interdisciplinary syntheses (e.g. geoecology in the GDR, constructive geography in the USSR, and "complex geography" in France and the UK) to be cognate trajectories of the same need for systemic integration.

From this vantage point, the methodological priority becomes clear. Instead of mechanically importing methods, it is necessary to develop a conceptual framework, classification system, and formalisation of the geosphere based on within a precise conception (Mazúr et al., 1980, p. 104). The outcome should be

a theoretical–methodological foundation with a broad basis, capable of sustaining landscape systems and regional syntheses (Mazúr et al., 1980, pp. 103–104).

The text concludes with the authors' normative stance: the quantifactus vs. qualifactus dispute 'missed almost completely the mark', as the following statement indicates: 'The frequently cited caricature of kidnapping geography from the hands of qualifactus by quantifactus misses almost completely the mark. Should it not be kidnapped by Syntheticus?' (Mazú et al., 1980, p. 105). Geography should be carried beyond one-sided imports towards creative integration through synthesis, which is grounded in the philosophy of science, logic, and systems thinking, yet always oriented towards the specific object – the landscape as a geosystem (Mazúr et al., 1980, pp. 102– 105). The article's argument concludes that geography should remain faithful to its enduring subject matter, while responding to a changing world by incorporating critically adapted allochthonous elements that reinforce the theoretical and methodological foundation, enabling a new generation of regional landscape syntheses (Mazúr et al., 1980, pp. 98–105).

Mazúr's school's autochthonous contribution thus lies in its understanding of 'landscape synthesis' as the discipline's integrating platform. This is not a return to descriptive regional geography, but rather regional landscape synthesis at a new level, commensurate with the state of science. The authors are equally clear that, if geography fails to address the issue of landscape, society will establish a scientific apparatus under a different name. Synthesis is therefore not only a matter of identity, but also an existential necessity for the discipline. Their orientation towards synthesis is directly linked to social practice: the rapid transformation of the world through urbanisation and the acceleration of information and goods flows, as well as the 'relative shrinking of space', demands an integrative approach and an 'adequate regulatory apparatus'; otherwise, technical means could turn against humanity. They argue that the lack of a precise definition of the subject matter and the absence of a theoretical and methodological basis also explain why geography is applied less frequently in social practice, and that it is precisely landscape synthesis that will bridge this gap (Mazúr, Drdoš & Urbánek, 1980).

The Category of Space in Geography (1982)

In this work, Mazúr & Urbánek (1982) address the concept of landscape/geographical space as a fundamental category of geography. They observe that, although the concept of space is implicit in all geographical works, the field has yet to develop a clear and widely accepted definition of landscape space (Mazúr & Urbánek, 1982, p. 309). They distinguish between absolute space (the Newtonian–Euclidean tradition) and relative and relational (field and synergetic) conceptions of space. They also consider the implications of different 'schemes' (especially S. Korner's 1970 scheme of things) for our understanding of landscapes,

their components, and their relationships. They criticise the reduction of the landscape to a "sum" of isolated things, emphasising instead systemness, relationality, and interaction among landscape elements. Their aim is to conceptualise landscape space as a dynamic structured continuum with synergetic properties. They demonstrate that, when seeking an appropriate conceptual framework, it is necessary to draw upon a broad spectrum of intellectual traditions that transcend the boundaries of geography. Several allochthonous elements can be identified in their text, entering geographical thought as imported concepts, theories, or methodological inspirations.

The first of these is the discussion of absolute space, which is rooted in the Newtonian–Euclidean tradition (Reichenbach, 1957). This space is understood as a homogeneous void, independent of things: "In this classical conception, space is absolute space. It is synonymous with emptiness" (Mazúr & Urbánek, 1982, p. 310). They adopt this approach only critically, using it as a basis for comparison to demonstrate the limitations of a static, non-interactional conception of space. This import thus serves as a negative point of departure in opposition to relational conceptions.

The authors criticise the one-sided use of absolute space, which fails to consider the complexity of spatial linkages (Mazúr & Urbánek, 1982, p. 312). Their proposal of structured space as a system of systems is based on broader insights from systems theory (cf. Boulding, 1956) and synergetics (see Schmithüsen, 1976). Their critique of the classical dichotomous model of thing–space is fully warranted since this model does not reflect the landscape dynamics.

A crucial framework is provided by S. Körner (1970), who distinguished between the schemes of things, the scheme of things-in-a-field, and the scheme of fields. The authors adapt and apply this categorical progression to geographical thought: "From the scheme of things one may pass, via the scheme of things in a field, to the scheme of fields" (Mazúr & Urbánek, 1982, p. 315). In this way they employ a critical adaptation of philosophical categories that enables the transition from a static understanding to a relational and field-based conception of space. They liken these schemes to paradigms in the sense of T. Kuhn, since "the function of these schemes is close to the function of paradigms" (Mazúr & Urbánek, 1982, p. 310). This is an instance of meta-adaptation: the philosophy of science here serves to reflect on the development of geography itself.

Adopting the notions of fields and networks (Haggett, 1974; Haggett & Chorley, 1969) in the spirit of quantitative geography and spatial science, the authors argue that networks express the space- forming properties of elements. They argue that networks express the space-forming properties of elements:"space expressed by a network is a manifestation of certain properties–one might say space-forming–of a given element of the landscape" (Mazúr & Urbánek, 1982, p. 317). This concept involves the adoption of elements of hybridisation. A further distinct source of

inspiration is drawn from systems and structuralist thinking. The authors rely on the work of Schmithüsen (1976) and Neef (1967), critically transforming their geo-synergetics into an understanding of landscape space as a structured continuum: "by property we therefore understand certain relations, or more precisely 'relations between relations', i.e. a certain (synergetic) structure... These linkages may be expressed as ... networks. This set of networks is not, however, the sum of individual networks. Within each spatial area the individual areas of a network are linked by synergetic relations into a system of networks" (Mazúr & Urbánek, 1982, p. 319). This critical transformation leads to the conception of the landscape as a "system of systems". This approach is reinforced by reference to general systems theory (Boulding, 1956) and by Helmholtz's (1979) as well as Helmholtz's (1979) observation thatreflection that " the mutual relations of all the sciences have been loosened" (Mazúr & Urbánek, 1982, p. 318). Here we are dealing with a meta-adaptation of the systems philosophy of system science, which justifies rejecting reductionism and the atomisation of geography.

At the heart of the argument lie structuralist and biological influences. Piaget's structuralism enables us to perceive space as a dynamic structure, where "movement belongs among the fundamental properties of structures" (Mazúr & Urbánek, 1982, p. 320). The authors critically adapt this concept to emphasise the temporality of landscapes.

Similarly, they invoke D'Arcy Thompson, who argued that magnitude is not purely relative but "a bearer of certain properties" (Mazúr & Urbánek, 1982, p. 320). This biological significance is a vital adaptation that allows the discussion of scale and emergent properties to be transfered to geography.

Finally, while not explicitly elaborated upon, the text implicitly resonates with the Soviet school of geosystems (Sochava, 1978). The concept of a hierarchy of spatial regions and a system of systems clearly reflects Sočava's ideas. In this case, we are dealing with a reflective adaptation, since the authors develop a parallel product that maintains strong continuity with Eastern European traditions.

Mazúr & Urbánek (1982) propose an original conception rooted in the domestic context, defining landscape space as a structured continuum of spatial regions whose holistic (synergetic) properties emerge from the interaction of landscape elements. This structure is both chorological and hierarchically ordered (from lower to higher levels), and bears emergent properties specific to each level. A key contribution of the authors is the concept of monocentric spaces (spaces related to elements and their linkages), which transforms previous hitherto descriptive approaches into an operational model for explaining spatial phenomena. The authors also propose a "system of systems" as a superstructural architecture of geographical knowledge. This prvides a framework for synthesising specialised disciplines without losing local empirical anchorage (Mazúr & Urbánek, 1982, pp. 318–320). Building on domestic tradition of methodological synthesis,

these autochthonous elements transform imported field, network, and systems concepts into geography's own interpretative language, enhensing its applicative potential in spatial planning and territorial management. The result is a conceptually coherent, methodologically productive, and practically usable domestic geographic framework that links empirical landscape experience with theoretical integration across scales.

The Landscape Syntheses – Their Starting Points and Tendency (1983)

The study by Mazúr, Drdoš & Urbánek (1983) reflects on the crisis of traditional geography, calling for a theoretical and methodological renewal through a systemic, synthesising approach to the landscape. The authors argue that the landscape has become an extremely complex, dynamic physico-biotic-human system as a consequence of the scientific-technical revolution and anthropogenic change, and that this complexity surpasses the capabilities of specialised analytical approaches. According to the authors, geography is the only discipline capable of synthesis and therefore holds, in their view, an irreplaceable position in the study of the landscape, a position they defend against the expansionist ambitions of ecology and other fields. The text presents an ontological vision of the landscape accross in three stages of development (inorganic; inorganic– organic; inorganic–organic–human) and emphasises the importance of viewing the landscape as a spatio-temporal system of relations rather than as a collection of individual components. Philosophically, the text is anchored in systems thinking, relativity, and holism. The authors criticise mechanical scientism and advocate a deeper epistemological transformation of geography. Mazúr, Drdoš & Urbánek (1983) articulate the concept of landscape syntheses, marking a significant shift in the theoretical thinking in Slovak and Czechoslovak geography in the early 1980s. This shift had ramifications for geographical thought worldwide, notably through the IGU Working Group "Landscape Synthesis – Geoecological Foundation of Complex Landscape Management", chaired by Mazúr from 1980 to 1988. A defining feature of this concept is its openness to ideas from other scientific disciplines, which the authors deliberately adapt, critically transform, or reflect upon in the context of geographical thought. The allochthonous elements thus identified serve not merely as supplements but as fundamental pillars for building a new theoretical–methodological framework, not merely as supplements.

One of the most important pillars is the adoption and critical adaptation of general systems theory (Bertalanffy, 1956; Hall & Fagen, 1956; Boulding, 1956). The authors explicitly agree with the view that it is only possible "to achieve an exact unambiguous formulation of the landscape… as a spatio- temporal material system" (Mazúr, Drdoš & Urbánek, 1983, p. 7). In this vein, they redefine the concept of an element as not an en bloc geocomponent, but rather as a set of genuinely

interacting properties. This is a marked reconceptualisation that leads geographical thought beyond schematic compositional analysis towards a dynamic systems synthesis.

A closely related to this approach is the uptake of cybernetic categories. According to the authors, the relationship between humans and the landscape evolves from negative feedback loops that accelerate system dynamics: "The relationship man–landscape assumes the form of positive feedback" (Mazúr, Drdoš & Urbánek, 1983, p. 5). A key concept is synergeia, which they understand as the integrating principle of material–energetic interactions among elements (Mazúr, Drdoš & Urbánek, 1983, p. 10). These cybernetic categories are not transferred mechanically, but are critically adopted to explain the development of geographical systems.

Another pillar is the meta-adaptation of the frameworks of modern science and logic. The authors unequivocally reject the "mechanical transfer of formulae and technical procedures from other sciences" and instead argue that the point of departure "must be sought on a much broader basis, in the advance of in advancing the synthetic–theoretical line, in the adoption of the philosophy of contemporary science, its theoretical–methodological conceptions, in the transfer of mathematical logic and reasoning, not in the mechanical transfer of formulae and technical procedures from other sciences" (Mazúr, Drdoš & Urbánek, 1983, p. 6). This step highlights important aspects for the development of geography: it should be modern and precise in its conceptual construction, but not imitativ.

Considerable space is devoted to the critical adaptation of ecology. While acknowledging ecology's biocentric approach, the authors emphasise that geography conceives of the landscape as a system of compositionally equal elements. They also reject "the tendency to substitute geography with a polyhistorical ecology" (Mazúr, Drdoš & Urbánek, 1983, p. 12). In this way they clearly distinguish geography as a discipline that is not interchangeable with ecology, even though it runs parallel to it in many respects. Similarly, they disagree with Haggett (1974) and his idea of synthesis through linking ecology with economic geography. They argue that physico-geographical synthesis, they contend, cannot be replaced by reduced couplings (Mazúr, Drdoš & Urbánek, 1983, p. 12).

The reflexive dimension of the concept of landscape synthesis is represented by parallel developments in international geography, such as geoecology in the GDR (Haase & Richter, 1980), constructive geography in the USSR (Gerasimov, 1976), and the revival of regional geography in Japan (Ishida, 1980). While the authors do not adopt these approaches, they do consider them to be expressions of a universal trend towards strengthening synthetic methods, a trend to which Czechoslovak geography should also contribute.

A key autochthonous contribution is the concept of the cultural layer: a human-made 'superstructure' that is spatially defined and expands the possibili-

ties of life by increasing the capacity of the landscape, while simultaneously bearing the ambivalence of interventions. The emergence of this concept accelerates the historical 'chronology' of the landscape, explaining the qualitative leap to a human form of landscape organisation. This concept provides an operational bridge between ontology and practical landscape planning. It is the result of mutual adaptation, fundamentally altering synergeia and system dynamics: 'A cultural layer emerges... the product of the mutual adaptation of humans and the inorganic–organic landscape' (Mazúr, Drdoš & Urbánek, 1983, p. 9). This concept is the result of a combination of knowledge from physical geography, biology and the social sciences, demonstrating the creative nature of geographical synthesis.

The authors also conceptualise geological, biological and human time as different temporal dimensions that are key to understanding the differing dynamics of systems. Human time is characterised by constant acceleration, resulting in delayed responses from control mechanisms and environmental crises (Mazúr, Drdoš & Urbánek, 1983, pp. 8–9). This emphasis on chronologies represents a meta-adaptation of the philosophy of science into geographical thought, with time serving as a key category of synthesis.

The authors criticise the traditional, summative understanding of "elements" (geological substrate, climate, etc.) and propose a systemic reformulation: it is not 'blocks' that enter into interaction in the landscape system are not "blocks" but only those properties which genuinely interact. This redefinition is empirically underpinned by the creation of the map of Slovakia Geoekologické- prírodné krajinné-typy (Mazúr et al, 1977), in which system elements manifest as variables across space and hierarchies (i.e. a taxonomy of systems). This is a distinctive methodological innovation with direct implications for analysis and synthesis. In a clear yet constructive distinction from ecology, the authors define the specificity of geography, which they describe as understanding the landscape as a system of compositionally equal elements. In contrast, ecology is biocentric (Mazúr, Drdoš & Urbánek, 1983, p. 5). Through this thesis, they assert the irreplaceable value of geographical synthesis compared to other 'synthetic' approaches, such as ecology and regional science, which focus on specific aspects of the landscape. This amounts to a professionally anchored argument for geography as an integral synthesising discipline. The authors also derive the direction of landscape synthesis from two sources: practical considerations (new forms of coexistence between society and the landscape necessitate the management of the human–landscape relationship) and the intrinsic requirements of science (the limitations of specialised research). This dual-source argument links theory with domestic planning and applied practice. This conception is accompanied by the original framing of 'the landscape as home', which has two facets: certainty and vulnerability. It is also accompanied by the postulate that the human–landscape relationship takes the form of positive

feedback with societal and global dimensions. In this way, the authors transpose ethical and planning implications directly into the core of geographical theory.

Mazúr, Drdoš and Urbánek's indigenous synthetic platform is characterised by the following contributions: a rigorous, ontologically grounded definition of the landscape in the form of a triadic model); the operationalisation of the notion of the element as an interacting property, with empirical support in Slovak mapping; the introduction of the cultural layer as a key mediating concept; and a clear argument for the irreplaceability of geography as a discipline synthesising compositionally equal elements.

Mazúr, Drdoš and Urbánek's study (1983) is most productively read as articulating landscape synthesis as neither a purely autochthonous invention nor a straightforward import, but as a form of parautochthonity, as outlined earlier. This is an originally allochthonous constellation of ideas – systems theory, cybernetics, geoecology, and allied methodological currents – that have been critically adapted, domesticated and stabilised within the Slovak (Czechoslovak) intellectual milieu to the extent that they function as if native to it.

Against the backdrop of a disciplinary crisis, the authors advocate theoretical and methodological renewal through a systemic, synthesising approach to the landscape. They now conceive of landscape as an extremely complex, dynamic physico–biotic–human system that exceeds the scope of narrow analytical specialisms. While their argument retains the classic synthetic ambition of geography, yet its idiom and instruments are hybrid; they selectively translate and adapt allochthonous frameworks to local conceptual needs and empirical practice, thereby transforming them into a domesticated repertoire.

A key aspect of this parautochthonous formation is the adaptation of general systems theory (Bertalanffy, Hall & Fagen, Boulding). The landscape is redefined "as a spatio-temporal material system", and the basic unit – the element – is redefined as a set of genuinely interacting properties rather than an en bloc geocomponent. The same hybrid logic governs their cybernetic inflection: feedback and synergeia are not mec. hanically borrowed metaphors but operational devices for explaining shifts from stabilising (negative) to accelerating (positive) dynamics in human–landscape relations, not mechanically borowed mathaphors. Similarly, the meta-adaptation of modern scientific philosophy and formal logic provides a rigorous, non-epigonic conceptual language. Exactness is pursued through categories and relations rather than through the superficial "exactisation" of borrowed techniques.

The ecological dialogue is another site of parautochthonous work. While acknowledging the strengths of a biocentric approach to ecology, the authors defend the specificity of geography as a system of compositionally equal elements. They reject the idea of replacing geography with a polyhistorical ecology or reduced linkages (e.g. ecology + economic geography). Once again, external impulses are

filtered, reframed and anchored within a landscape-system ontology that serves the needs of local research and planning.

The reflexive horizon of landscape syntheses positions Czechoslovak geography alongside contemporaneous international developments – such as geoecology in the GDR, constructive geography in the USSR and the Japanese revival of regional geography – without mere imitation. These parallels are taken as evidence of a wider synthetic turn, while the domestic project is re- inscribed through localisation.

Crucially, the programme introduces autochthonising mediations, notably the concept of the cultural layer – a human-made superstructure that increases the landscape's capacity while amplifying the ambivalence of interventions. It accelerates the landscape's "chronology" and bridges the gap between ontology and practice (planning and management). Temporal stratification (geological, biological and human time) further temporalises the synthesis, explaining delayed controls and environmental crises – another example of imported philosophy (of time) transposed into a local explanatory grammar.

Methodologically, critique of summative "elements" yields a systemic reformulation, as evidenced by the map of Slovakia Geoekologické-prírodné krajinné-typy (Mazúr et al, 1977). Interacting properties vary across space and hierarchy, enabling a taxonomy of systems with direct analytic and synthetic benefits. This empirical embedding, together with institutional consolidation (the IGU Working Group chaired by Mazúr from 1980 to 1988), is precisely what converts a hybrid import into parautochthonity: a transferred assemblage that is so deeply adapted, localised, and operationalised that it is perceived and used as part of the home tradition.

Mazúr, Drdoš & Urbánek's contribution is to have engineered a domesticated synthesis comprising a rigorous, ontologically grounded definition of the landscape (triadic model), operational concept of the element as an interacting property (supported by empirical evidence in Slovak mapping), the cultural layer as a key mediating category; and a principled defence of the geography's irreplaceable role of geography in synthesising co-equal components. Landscape syntheses thereby exemplify parautochthonity: they are import-derived yet reconstituted into a distinctive, nationally anchored framework that advances both theory and practice.

Search for Foundations (1984)

E. Mazúr & J. Urbánek (1984) attempt to axiomatise geography by formulating formulation fundamental hypotheses about its object, structure and terminology. They start from the idea that the geographical universe is a hierarchically ordered system which can be understood through the categories of time and space. Time

is expressed through the chronological system (process and state), space through the chorological system (surface and region) and the synergetic system (sphere and layer). The authors emphasise that synthesising these dimensions enables landscape to be conceived as a dynamic event, in which time and space form an indivisible unity. The proposed framework is an attempt to overcome the fragmentation of the discipline and to lay the foundations of a unified, theoretically grounded geography.

They intend to transform geography from a dispersed set of specialisations to a unified, explicitly axiomatic discipline. They begin by diagnosing a lack deficit of formal foundations in empirical sciences related to geography ("Axiomatic systems are very rare in the empirical sciences…", Mazúr & Urbánek, 1984, p. 317) and explicitly state the goal of the study: "This study is intended above all to give impulsion to the axiomatization of geography." (Mazúr & Urbánek, 1984, p. 317). This meta- adaptation of the philosophy of science and of mathematics is designed to prevent the "atomisation" of knowledge and to offer a common language across geography's subdisciplines.

A key pillar of their reasoning is systems thinking. The authors explicitly posit the "hypothesis of the systems nature of the geographical universe" as the raison d'être of geography as a scientific discipline (Mazúr & Urbánek, 1984, p. 317), thereby defining the discipline as a special form of "systemforschung" (systems research). This hypothesis delineates geography as a special 'System- forschung" Mazúr & Urbánek, 1984, p. 317). This shift in perspective, informed by systems theory, frames the geographical universe as a hierarchically organised multiplicity of parts and wholes.

This systems perspective is closely linked to a fundamental reappraisal of the relationship between time and space. The authors distance themselves from the Hettnerian separation ("Hettner… separated the conceptions of time and space so that the first he added to history, the second to geography", Mazúr & Urbánek, 1984, p. 316), a concept with roots in the work of Kant (Matlovič & Matlovičová, 2015). Rather than dualism, they advocate their indissoluble coherence. They draw on a processual ontology of the "event" with reference to A. N. Whitehead (1971): "we will start from the conception 'event', which has an important position in the work of A. N. Whitehead" (Mazúr & Urbánek, 1984, p. 318). The "event"– "specific character of place through a period of time" (Mazúr & Urbánek, 1984, p. 318)–is the key bridge that unifies the spatio-temporal structure, expressesing the "four-dimensional" nature of the geographical universe (Mazúr & Urbánek, 1984, p. 318).

The authors engage in a critical dialogue with Neef (1967). They identify Neef's three axioms (planetary, chorological and landscape) as a point of departure ("three geographical axioms, Planetary…, Chorologic…, Landscape…", Mazúr & Urbánek, 1984, p. 316), but note a lack of temporalisation ("the time conception did not find a place in the axiomatic system of E. Neff", Mazúr & Urbánek, 1984,

p. 316). They therefore propose a hierarchical reordering, or and even a merging of the axioms, since "the difference … is solely in the hierarchy of space, so they could be merged into one axiom" (Mazúr & Urbánek, 1984, p. 316). This amounts to a critical transformation, adopting the scheme while reworking its design to incorporate the unity of time and space.

In oredr to express the internal order of the universe, the authors adopt the language of formal logic and set theory. Structural relations are defined through inclusion and "junction": "We will express this structure in the conceptions of logics set. The first important relationship is that of inclusion." (Mazúr & Urbánek, 1984, p. 317), and "Even the relationship junction is transitive. The hierarchical system takes place on the basis of this property…" (Mazúr & Urbánek, 1984, p. 318).

This methodological instrument translates traditional oppositions (process/state; surface/region; sphere/layer) into a unified syntax, integrating "thesis" and "antithesis" into a synthesis ("as a thesis or an antithesis they may be comprised in a synthesis", Mazúr & Urbánek, 1984, p. 318). Thus, dialectical tensions are thus resolved not eclectically but in a strictly structural manner – by means of hierarchical relations.

A third aspect of this approach is the hybridisation of geosystem traditions towards "geo- synergetics". When describing the radial (vertical) dimension of space, the authors acknowledge the continuity of their work with that of Schmithüsen (1976), Sochava (1978), Armand (1964, 1975), and Neef (1967): "We will call it the synergetic system, in linking thus to the notions of J. Schmithiisen, V. Sochava, D. Armand and E. Neff" (Mazúr & Urbánek, 1984, p. 325). The "synergetic system" enables them to capture the qualitative growth in the complexity of linkages, with a central focus on the Earth's surface (cf. Mazúr & Urbánek, 1984, pp. 324–325). Alongside the aforementioned temporal (chronological) and spatial (chorological) dimensions noted above, the resulting scheme takes the form of a three-part synthesis comprising time (hierarchically organised events), space (chorological differentiation), and synergetics (vertical integration of spheres).

The authors demonstrate the operational relevance of the scheme by highlighting subdisciplines in which the structure is particularly evident: "we draw the attention solely to two examples, where this structure is particularly expressive" (Mazúr & Urbánek, 1984, p. 321). In the context of geomorphology (Schumm & Lichty, 1965), the interlinkage of time, space, and causality emerges as a logical consequence of process hierarchisation, thereby confirming the suitability of the chosen logical–systems language (cf. Mazúr & Urbánek, 1984, p. 321).

Finally, the methodological scope of the paper is broadened through the reflective incorporation of philosophical sources on time. The authors explicitly acknowledge their affinity with Bergson's critique of "linear" time: "It is nearer to the interesting notions of Bergson." (Mazúr & Urbánek, 1984, p. 321)–thus reinforcing their own conception of centralised, hierarchically organised duration (cf. Mazúr

& Urbánek, 1984, pp. 320–321). These references are not mere additions; they serve to refine the meaning of "event" and the temporalisation of geography.

Mazúr and Urbánek thus enact a multi-layered transfer comprising: a meta-adaptation of the axiomatic method and systems theory to define the object of geography; a critical transformation of Neef's axioms by adding a temporal dimension; adopting formal tools from logic and set theory to describe hierarchies; hybridising geosystem traditions to create "synergetic system"; and the reflective adaptation of philosophical conceptions of time (Whitehead, Bergson) to create an ontology of the "event". The result is a consistent effort to reconceptualise geography as a discipline that replaces description with an axiomatically guided synthesis of spatio-temporal and vertically synergetic relations, thereby establishing a framework for theoretical advancement.

Landscape Ecology – Geographical Research Direction or an Interdisciplinary Research Programme? (1988)

E. Mazúr & J. Drdoš (1988) analyse the development and position of landscape ecology within the system of sciences. They trace its historical roots back to geography and in the concept of the ecosystem, as well as its shift away from classificatin approaches towards studying processes and the balances of material and energy flows. In the context of the "ecological crisis", they authors emphasise the importance of the concept of landscape potential, which enables the assessment of the capacity of the landscapes to fulfil social functions to be assessed and shifts research towards forecasting. They conclude that landscape ecology is both specific geographical approach and an interdisciplinary programme, the core of which remains a geographical, spatial–synthetic approach that is indispensable for addressing environmental problems on a global scale.

Mazúr and Drdoš draw upon the German and Swiss traditions of landscape research. A key figure is C. Troll, who coined the term Landschaftsökologie in 1939 and introdeced the concept of the ecotope as the basic unit of landscape differentiation. Troll's works of 1939, 1950, and 1970 are cited as fundamental points of departure for synthesying of geography and ecology. Equaly important is the East German school of E. Neef (1967), which from the 1960s elaborated landscape–ecological research as a systematic framework based on grounded on in the balance of processes within the geocomplex. Other German and Swiss authors – H. Klink (1964), H. Leser (1976), H. Langer (1970), J. Schmithüsen (1948, 1976) – fit into this line, stressing the geographical and spatial character of landscape ecology and pointing to terminological ambiguities associated with the use of the term „ecology". In the Anglophone context, reference to A. G. Tansley (1935), the creator of the concept of the ecosystem, as it provides starting point for the integration of ecology and geography. Earlier endeavours are represented by works situated

within the framework of landscape physiology, such as those – A. Guyot (1849), L. Waibel (1929, 1933), and E. Winkler (1949).

At the same time, the authors introduce original autochthonous concepts that are specific to the Slovak school of thought. The most significant of these is the notion of landscape potential. This serves as a predictive tool replacing the "obsolete" concept of the natural resource and enabeling "an integrative approach" to the landscape's long-term reproductive: "landscape potential expresses the assumption of the landscape to fulfil the functions required by humans" (Mazúr & Drdoš, 1988, p. 8). Thus this is the capacity of the landscape to meet social needs while respecting its structural limits. A second salient element is the conception of the landscape as the human home. This shifts the discourse from purely ecological balances to a humanistic and existential register. It reflects processes of denaturalisation, homogenisation, and human alienation resulting from the technicisation of the environment (Mazúr & Drdoš, 1988, p. 7).

Mazúr and Drdoš convincingly argue that landscape ecology is not a "new" external discipline, but rather a geographical approach that has critically adopted and transformed ecological and systems elements, transformed them into a spatial–functional framework, and developed them into a prognostic and applicative methodology, above all through the concept of landscape potential. "The specificity of landscape ecology is determined by its orientation to the dynamics of processes in the landscape" (Mazúr & Drdoš, 1988, p. 9), and hence by its capacity for "rational spatial organisation" in response to crises in the human–environment relationship (Mazúr & Drdoš, 1988, p. 9). The core in this synthesis, is the critical adaptation and transformation–rather than the mechanical borrowing–of allochthonous elements (ecosystem, ecotope, Landschaftshaushalt, geoecology).

They acknowledge that "landscape ecology will become self-standing formally in the future as an interdisciplinary scientific branch on environment, which essentially will be of geographical character, because without the geographical theoretico-methodological basis it is impossible to solve environmental problems, particularly in the global extent and just this is the most topical at present" (Mazúr & Drdoš, 1988, p. 9).

Interpreted through the lens of parautochthonity, Mazúr & Drdoš's (1988) work does not present landscape ecology as either a purely imported paradigm or an indigenous creation ex nihilo, but rather as an allochthonous assemblage – Troll's Landschaftsökologie and ecotope, Neef's geocomplex/process balances, and Tansley's ecosystem – that has been critically adapted, domesticated, and operationalised within the Slovak (Czechoslovak) milieu to the extent taht it functions as if it were native to it.

The parautochthonous turn is effected by a set of autochthonising mediations. The most important of these is the concept of landscape potential, a prognostic

device that replaces the sectoral notion of "natural resources" with an integrative capacity metric – "the landscape ability to fulfil the functions required by humans" within its structural limits. In doing so it translates imported systems and ecological categories into a locally usable calculus for forecasting, planning, and territorial management. A second mediator is the landscape-as-home motif, which re-centres the human condition – denaturalisation, homogenisation, and alienation in technicised environments – thereby embedding ecological accounting in a humanistic and existential register. These two procesess moves deepen localisation: theory is not merely cited but incorporated into domestic policy, vocabulary and cartographic/analytical practices.

Genealogy of E. Mazúr's Geographical Thought in the Context of the Analysed Textual Corpus Comparing Mazúr's texts from 1968 to 1988 reveals intertextual relations of varying intensity. Based on this comparison, several thematic clusters can be identified showing shifts in his thinking.

During this period, Mazúr's geographical thought evolves from an initial diagnosis of the atomisation of geography as a scientific discipline is transformed into an integrated theoretical– methodological project. His starting position is clearly defined: in the late 1960s Mazúr discusses the fragmentation of geography into specialisations, the epigonic borrowing of quantitative techniques and other procedures from related sciences, and the "emptying out" of regional geography. These theses are subsequently reiterated across his later works. However, the critique, is not a rejection of modernisation, but rather a call to progress move from the mere adoption of methods to a synthetic-theoretical approach that establishes geography within general systems theory and restores its social relevance in spatial planning, regional development, and the protection and enhancement of the environment (Mazúr, 1968). During this period, this evolves into a programme of constructive, socially engaged geography. Geography should not only describe but also transform reality, through precise tools, forecasts, and models originating from its own conceptual framework rather than from the import of other disciplines (Mazúr, 1972). Thus a first developmental trajectory emerges – from a critique of fragmentation to a programme of synthesis – together programmatic synthesis – together with a second trajectory – from quantification to exactness, in which mathematics and logic become a means, rather than an end of developing a rigorous terminology.

From this dual focus on synthesis and exactness, a re-ontologisation of the subject of geography emerges. The landscape ceases to be a summation of "blocks" of geocomponents and becomes a geosystem, indeed a "system of systems", in which it is not whole entities but their genuinely interacting properties that enter into relations. Space is no longer an absolute homogeneous backdrop; rather, it acquires a relational and field-like character, a structured continuum with synergetic linkages susceptible to formalisation (Mazúr & Urbánek, 1982).

This ontological and methodological shift constitutes a third trajectory – the transition from descriptive composition to systemness and structural relationality – which provides the foundation for new landscape syntheses. It is through these that Mazúr and his co-authors defend geography's identity through these syntheses, not by returning to the descriptive regional tradition, but constructing regional, landscape–system syntheses at the level of modern science with a precise language and formalised categories (Mazúr, Drdoš & Urbánek, 1980, 1983). In order for such a synthesis to accommodate empirical diversity, it requires a theoretical–methodological base – classification, categories and logical relations, together with openness to interdisciplinary transfers. However, these are received critically: the transfer of the philosophy of science, logic, and systems thinking is favoured over the adoption of ready-made procedures.

The temporalisation of geographical reasoning is equally crucial. Mazúr & Urbánek (1982) explicitly overcome the Hettnerian separation of time and space. This unity is mediated by the notion of the event, which captures the "specific character of place over time" and enables the chronological, chorological, and synergetic dimensions to be formalised within a single language (Mazúr & Urbánek, 1984). A fourth trajectory thus emerges: the integration of time and space. This further stabilises the axiomatic horizon of the discipline by unifying hypotheses concerning the systemic nature of the geographical universe, its hierarchisation and its language. This is designed to forestall the atomisation of knowledge and enable theoretical progress across subdisciplines. Simultaneously, temporalisation brings differing rhythms of change to the fore: geological, biological and human time provide a framework for understanding why control mechanisms lag and why the importance of forecasting and regulatory apparatuses grows (Mazúr, Drdoš & Urbánek, 1983).

Associated with these variables is a shift in which the human–landscape relationship is described using the cybernetic categories of feedback and synergeia. The cultural layer, as a product of the mutual adaptation of society and the natural environment, increases the landscape's capacity while simultaneously accelerating its dynamics and necessitating the management of spatial processes (Mazúr, Drdoš & Urbánek, 1983). Here, we encounter a fifth trajectory – from stabilising models to the dynamics of acceleration – alongside a growing demand for operational tools that bridge the gap between ontology and practice. Mazúr & Drdoš (1988) developed the concept of landscape potential along this path. This is an integrative measure of a landscape's capacity to perform desired functions within the limits of its structural possibilities. It replaces the sectoral conception of resources and offers a prognostic basis for spatial planning and territorial management (Mazúr & Drdoš, 1988). Thus, a sixth trajectory emerges – from the threat of geography being substituted by other fields, to its renewed centrality in applied practice.

If this arc is read as a coherent narrative, its logic is threefold. First, the subject matter is restored: the landscape as a dynamic geosystem in the unity of time and space. Second, a language is constructed using logical–formal and axiomatic means to describe hierarchies, relations and scales. Third, bridges to practice are built using landscape syntheses, cybernetic and synergetic concepts, and the notion of landscape potential as a prognostic and regulatory platform. Thus, Mazúr elevates geography from a state of dispersed, 'geographised' knowledge to a synthesising discipline, capable of integrating specialised insights into a unified conceptual model and providing socially relevant solutions. Over the span of two decades, the initial warning about fragmentation is thus realised in a positive project: geography as a special systems science with its own precise language that can deliver socially relevant knowledge in a time of accelerating global transformation.

CONCLUSIONS

Our research has shown that Emil Mazúr's geographical thought constitutes a coherent intellectual project in which allochthonous impulses – above all general systems theory, cybernetics, the geoecological tradition and the axiomatic tradition – converge with autochthonous innovations of the Slovak (Czechoslovak) school and are creatively reconfigured within them. An intertextual and genealogical analysis of seven key texts (1968–1988) confirmed high internal coherence of the corpus and revealed a trajectory from a programmatic critique of the fragmentation of the discipline to a considered theoretical and methodological framework that unifies the spatio- temporal and synergetic dimensions of geographical reality.

Regarding the scope and nature of allochthonous inspirations, we have demonstrated that Mazúr selectively adopted ideas from various sources, including Anglo-American spatial science, the German and East German axiomatic–geoecological tradition, Soviet constructive geography, and the philosophy of science, while rejecting the "mechanical transfer of formulae". He favoured the transfer of metatheoretical frameworks (logic and, systems thinking) over the epigonic imitation of techniques. In this sense, meta-adaptation enabled him to elevate imports to the level of geography's conceptual and structural language.

Our analysis revealed that Mazúr and his co-authors formulated a series of autochthonous contributions of significant value, including: a new definition of the landscape/geosphere as a "system of systems" with interacting elemental properties; conceptual work on space as a structured, relational, and field-like continuum; an axiomatic three-dimensional architecture (chronological, chorological, and synergetic systems) centred on the concept notion of the 'event'; the conception of landscape synthesis; the notion of a landscape "cultural layer"; and the prognostically oriented concept of "landscape potential".

In terms of the mechanisms of interference between the allochthonous and the autochthonous, we identified a sequence ranging from critical adaptation to transformative hybridisation. At the heart of this mechanism is a reconfiguration of the object of geography: from a "sum of geocomponents" to a dynamic geosystem in which time and space are connected through the events and hierarchies. External impulses are thus absorbed as building blocks of a domestic language, not as "ready-made models", and serve to reinforce the synthetic–theoretical approach that re-establishes geography's connection to social practice.

In this context, two of Mazúr's key concepts can be seen as examples of parautochthonity. Firstly, landscape syntheses emerge as a domesticated hybrids, with: system theory, cybernetics and geoecological thinking being critically refashioned and embedded within a Slovak research idiom through notions such as the event, a triadic ontology, the cultural layer and empirical anchoring in national mapping. This causes the imported repertoire to function as if it were native. Secondly, landscape ecology reconstituted parautochthonously. Troll's Landschaftsökologie, Neef's geocomplex/process balance and Tansley's ecosystem are translated into a spatial–functional grammar oriented towrads forecasting and planning using the integrative metric of landscape potential and the 'landscape-as-home' framework. In both cases, allochthonous ideas are not merely borrowed but localised, operationalised and stabilised through precise conceptual work, empirical practice and institutional consolidation. This process turns them into pillars of the Bratislava school of landscape synthesis.

With regard to the relevance of Mazúr's legacy for contemporary geography, we identify three implications. First, his stringent demand for exactness in the conceptual language is highly pertinent in an era of data explosion and modelling: logic, object ontology, and scale must precede methods. Secondly, his temporal-isation of geography – the unification of time and space – is directly applicable to research on the acceleration of socio-environmental processes (polycrisis, climate change, urban dynamics, risks). Notably, Mazúr outlined the temporalisation of geography – often discussed under the label time geography – well before the first studies of time geography appeared in Slovakia. This suggests a framework for understanding the interconnection of time and space in human and geograph-ical processes. Thirdly, the concept of "landscape potential" provides a means of evaluating territorial capacity within integrated policies (spatial planning and territorial carrying capacities).

The intertextual matrix and the ranking of intensities likewise demonstarte that the key innovations emerged gradually as part of the layered project of the Bratislava school (strong ties 1980–1984– 1988). This confirms that Mazúr was not a "solitary theorist" but an initiator of a collective programme that connected conceptual reconstruction with empirical and cartographic applications (e.g. the mapping of natural landscape units). The school of landscape synthesis thus

takes on the character of a paradigmatic configuration rather than merely a "local current". Mazúr sought to transform Slovak geography from a potentially passive, receptive periphery into an active co- producer of the international debate on the discipline's subject matter and terminology. His contribution lies less in "one grand theory" and more in architecture – in linking ontology (the landscape as a geosystem), epistemology (axiomatic and logical exactness), and practice (landscape syntheses, landscape potential). Other published assessments are thus confirmed: Mazúr was a co- founder of the scientific school of landscape synthesis (Moss 1983), an innovator in linking landscape science and social practice (Kvitkovič 2006), and that his legacy continues in environmentally oriented geography (sustainability, quality of life, landscape planning) (Huba 2010). Experience of applying landscape synthesis to selected territories (regions) provided the basis for formulating the fundamental procedures of environmental planning (Oťaheľ et al. 1997). The set of practical solutions should also include sustainable development. This principle is embedded in landscape synthesis, which advocates developing social and economic activities in accordance with the landscape's carrying capacity (Oťaheľ 1999). At a time of intensifying systemic crises in the form of polycrisis (Matlovič & Matlovičová 2024), this framework still offers a compelling call to action: to make geography synthesising, rigorous, and socially relevant.

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TOURISM RESILIENCE IN THE FACE OF COVID-19: INSIGHTS FROM ACCOMMODATION ENTERPRISES IN NORTH-WESTERN ROMANIA

Ferenc SZILÁGYI[AB*], Zoltán BUJDOSÓ[C], Pál Péter SZABÓ[D]

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A* Partium Christian University, 410209, Oradea, Romania
B Hungarian University of Agriculture and Life Sciences, 2100, Gödöllő, Hungary
https://orcid.org/0000-0001-8034-6674, ferenc.szilagyi@partium.ro (corresponding author)
C Hungarian University of Agriculture and Life Sciences, 3200, Gyöngyös, Hungary
https://orcid.org/0000-0002-5023-074X, bujdoso.zoltan@uni-mate.hu
D Eötvös Lóránd University, 1053, Budapest, Hungary
https://orcid.org/0000-0002-2140-2223, pal.szabo@ttk.elte.hu

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Abstract
Tourism, a sector of the globalised economy particularly susceptible to disruption, was severely affected by the emergence of the novel Coronavirus (SARS-CoV-2). The ability of destinations to absorb shocks and recover3 rapidly, i.e. their resilience, became a key research issue. This paper investigates the tourism sector's resilience in the historical Partium region of north-western Romania (Arad, Bihor, Maramureș, Satu Mare and Sălaj counties) between 2019 and 2023. The period under investigation encompassed pre-crisis prosperity, two pan3demic years and the immediate post-pandemic rebound, further complicated by the war in Ukraine. This study utilised a curated micro-database comprising nearly 1,000 accommodation enterprises (CAEN Rev. 2 codes 5510, 5520, 5530, 5590), complemented by official fiscal returns, to conduct a comprehensive analysis. The analysis encompassed net turnover, employment, and labour productivity alterations, delineating intraregional disparities. Furthermore, identifying factors underpinning disparate recovery trajectories was a pivotal objective. The results demonstrate several key findings: (i) a substantial 34 per cent decline in net turnover and a 9 per cent decrease in employment in 2020; (ii) a swift recovery, with 2023 turnover 50 per cent higher than the 2019 baseline, while employment remained 4 per cent lower; (iii) significant north-south variations, with Maramureș and Satu Mare exhibiting stronger growth in both firm numbers and turnover; (iv) the pivotal role of thermal resorts and mountain destinations in driving recovery; and (v) indications of structural reallocation of labour towards the Bihor metropolitan zone. The argument is that local natural assets, pre-existing tourism specialisation, and frontier position shape resilience outcomes. At the same time, the war-induced uncertainty mainly dampened growth in the immediate border zone. The policy implications of these findings underscore the necessity for

targeted support to be provided to peripheral communities, diversified product development, and cross-border collaboration in the Schengen era.

Keywords
Tourism resilience; COVID-19; accommodation enterprises; Partium; regional disparities; labour productivity.

INTRODUCTION

Tourism is an industry that reacts sharply to external shocks, whether economic crises, political conflicts or, most dramatically, public health emergencies (Szívós et al, 2024). The COVID-19 pandemic triggered an unprecedented collapse in international and domestic visitor flows. Therefore, understanding why some destinations rebound rapidly while others face prolonged difficulties is of considerable theoretical and practical importance. The concept of tourism resilience highlights this adaptive capacity and post-crisis regenerative potential.

The Partium region comprising the counties of Arad, Bihor, Maramureș, Satu Mare and Sălaj in north-western Romania offers an especially instructive case (Stupariu et al., 2022). As an external EU borderland, it combines frontier functionality with pronounced geographical, economic, and historical diversity. The study period (2019–2023) spans four distinct phases: pre-pandemic prosperity, two pandemic years (2020–2021) and the immediate rebound (2022–2023); the economic uncertainty and geopolitical repercussions of the war in Ukraine further shaped all. Additionally, the COVID-19 pandemic can be framed as part of a broader global "polycrisis" context (Matlovič & Matlovičová, 2024). This perspective recognises that the pandemic was not an isolated shock but one of several overlapping economic, geopolitical, environmental, and social crises that collectively shape regional resilience dynamics.

OBJECTIVES

The primary objective of this paper is to assess the resilience of the tourism sector operationalised through accommodation services in the Partium region during 2019–2023. Specifically, the following aspects are covered:

An overview of the performance of accommodation enterprises, highlighting changes in net turnover and employment;

The evolution of labour productivity as an efficiency indicator;

County-level spatial disparities, with special attention to frontier position, thermal-spa traditions and mountain/rural tourism potential;

The possible effects of the COVID-19 crisis, the post-COVID phase and the Ukrainian war on the tourism sector.

Addressing these aims gives rise to three fundamental research questions:

1) To what extent did the pandemic and subsequent crises unsettle the region's tourism sector?
2) How quickly and through which mechanisms were accommodation enterprises able to recover?
3) What inter-county differences emerged, and how are these linked to specific geographical and economic characteristics?

The article is organised into five main sections. The following section reviews the theoretical literature on tourism resilience, followed by a detailed presentation of the study area. Section 4 outlines the data sources, variables, and research methods. Section 5 presents the empirical results, emphasising temporal dynamics and spatial patterns. Section 6 discusses the findings, and formulates conclusions for stakeholders and policy-makers.

THEORETICAL FRAMEWORK

The popularisation of the concept of resilience is most often associated with a 1973 paper by ecologist Holling on the resilience and stability of ecological systems (Holling, 1973). After this, the term has been applied to other disciplines, including psychology and engineering. In these fields, the study focuses on the response of individuals, objects, and systems to disturbances. Consequently, resilience has been incorporated into economic geography, finding extensive utilisation among researchers due to the heterogeneous responses of regional economies to the 2008 recession (Sutton, J. et al.). The concept of regional economic resilience, as delineated in the literature, encompasses a range of definitions. However, a comprehensive overview is provided by Sutton et al. (2023), who define it as the capacity of regional economies to withstand, adapt to, or transform in the face of economic shocks and to recover from such shocks, thereby maintaining or even enhancing their pre-shock economic performance.

In this interpretation, four types of resilience are delineated: The engineering field focuses on regions' capacity to rapidly regain stability following external shocks, emphasising the rapidity of their recovery. In the ecological domain, the focus is on the ability of systems to absorb shocks and maintain their current equilibrium through minimal structural and/or functional change, emphasising system stability in the face of external disturbances. The evolutionary perspective emphasises adaptation, the capacity to adjust and the capacity to 'leap forward' in response to a shock by adapting parts of their structure and functions so that regions either maintain their current growth trajectory or develop a new, more favourable one, is termed 'transformative resilience'. In addition, regions can transform their structure and functions in response to a shock so that regions develop a more favourable growth trajectory after the shock. (Martin, R.) Sunley, P. (2020; Sutton, J. et al., 2023). In their seminal work, Sutton et al. (2023) propose

a five-dimensional framework for understanding regional economic resilience, encompassing vulnerability, resilience, adaptation, recovery, and preparedness for shocks. A region can either demonstrate resilience or recovery in the face of a shock or undergo a gradual or steady decline (Tóth, 2012).

The concept of resilience was introduced into tourism studies later than in other fields (Hall, C. M., 2017). In tourism, resilience can be conceptualised as encompassing tourists, destinations, transportation and destinations (6A). However, Hall (2017) contends that the prevailing approach has been oriented towards the resilience of destinations and communities. A literature review reveals that most tourism research adopts an engineering concept of resilience that assumes equilibrium before disturbance as its goal (Hall, 2017). This contrasts a notion of resilience that emphasises complexity and the possible multiple states in which a system can exist. Although evident in many works, authors generally do not refer to this alternative concept. According to Gonda (2022), the extant literature suggests that the concept of resilience is interpreted in a way relevant to tourism: 'the ability of a system to withstand shocks and ensure the rapid recovery of essential functions. It is, therefore, a system's defensive capacity and self-healing and self-improvement mechanisms, which are particularly important for surviving shocks that threaten the system's existence." (Gonda, 2022, p. 28). Concurrently, he posits that the concept of tourism resilience may be delineated as the capacity of a destination (in its entirety) to sustain or reinvigorate its tourist appeal, offerings, and operational framework in the aftermath of a disruptive event.

In practice, Sharma et al (2021) proposed a resilience-based framework for the industry and stated that with the help of the resilient approach from governments, market players, technology innovators, and the workforce employed in the industry, the tourism sector may end up evolving in a much more sustainable way post-pandemic. Furthermore Tegelberg and Griffin (2024) highlighted that the experiences of researched SMEs during the pandemic carry lessons for resiliency planning that align with increasingly urgent demands for decarbonization and a greening of the tourism system.

Recent shifts in geographical thought, notably influenced by metamodern perspectives, move beyond the classical division between modernist and postmodernist frameworks, emphasising instead the importance of complexity, ambiguity, and interconnectedness (Matlovič & Matlovičová, 2020; Matlovič & Matlovičová, 2025). Utilising this theoretical approach could significantly deepen our understanding of tourism resilience, enabling more refined interpretations of uncertainty, adaptation, and transformative responses within the context of overlapping global crises. Moreover, it provides fertile ground for employing new methodologies and narrative techniques, which are better suited to capturing the multifaceted and nonlinear impacts of such crises on tourism in peripheral regions.

For a broader theoretical scope, the literature highlights additional global and regional factors influencing tourism resilience. One emerging theme is the transformative role of technology, particularly artificial intelligence (AI), which is reshaping the travel industry by improving operational efficiency, optimising costs, and enhancing customer experiences (Mura & Stehlíková, 2025). Another important discourse examines the interplay between place identity, place image, and place reputation-elements crucial to strategic tourism development, which can affect how destinations recover from crises (Matlovičová, 2024). Furthermore, comparative studies from Central and Eastern Europe provide valuable context for North-Western Romania's experience. For instance, Boros and Korcsmáros (2024) investigate rural tourism along the Danube in a different regional setting, offering a comparative baseline. In contrast, Herman et al. (2022) analyse post-pandemic tourism dynamics in Bihor County, Romania – a central area within the region under study – thus providing locally specific insights. Together, these parallel findings help to situate the present results within a broader regional framework.

Accommodation and the crisis

A fundamental component of the 5A elements (attractions, accessibility, accommodation, activities and services) or 6A elements (attractions, accessibility, services, packages available, activities and ancillary services) of a destination is accommodation as a service. Conversely, this approach is regarded as the most effective method for quantifying tourism associated with a specific geographical location, as it encompasses variables such as the number of tourists registered, their respective nationalities, and the number of nights spent by each individual. Thirdly, it is a sensitive point in the system, alongside or even ahead of the number of visitors to the attraction, because in a crisis, the number of guests booked (number of nights) falls quickly. The loss of revenue due to tourists not coming to the destination can be made up for with little or no compensation (guest workers, renting, etc.). This final point renders it a pivotal tourism indicator during economic cycles and crises.

The most recent global crisis in tourism was precipitated by the emergence of the novel Coronavirus (COVID-19) pandemic and the subsequent imposition of closures and travel restrictions. This represented the most significant tourism crisis globally since the Second World War (Creţu et al., 2024). Between 2019 and 2020, global tourism GDP contracted by 48.4%, while sectoral employment declined by 20.8%. During the same interval, the European Union experienced a comparable, albeit somewhat less pronounced, downturn, with tourism GDP falling by 42.3% and employment by 14.7% (WTTC, 2024). The number of nights spent in tourist accommodation (NACE Rev. 2: hotels, holiday and other short-stay accommodation; camping grounds, recreational vehicle parks and trailer parks) fell

by 50.5% from 2.9 million in 2019 to 2020 in the EU, including a 51.7% decline in Romania. After this, a gradual recovery commenced in the EU, with the indicator only attaining the 2019 level in 2023. A comparable process occurred in Romania; however, the 2023 value remained marginally below the four-year high (Eurostat, 2024).

About the number of tourist accommodation establishments in the EU, the values for 2020 were 96.2%; for 2021, they were 97.0%; for 2022, they were 100.7%; and for 2023, they were 103.0%. Half of the Member States elected to close their accommodation completely during the pandemic or make it available only for business purposes and business travellers (Kaszás & Keller, 2022). This was a temporary closure, with several reopenings later. In contrast, Romania exhibited a consistent increase over the observed years, reaching a 140.8% growth in 2023 compared to 2019 (Eurostat, 2024). This represents the highest rate of growth among EU Member States, with a 100% increase in 2019 (8202 units), a 102.0% increase in 2020, a 131.3% increase in 2021, a 134.8% increase in 2022, and a 140.8% increase in 2023. The upward stagnation trend of the country in the years before 2019 continued and accelerated towards the end of the year due to the hotel construction wave in Romania, but mainly due to the explosion in the number of apartments and rooms available for rent for tourism purposes. During the pandemic, there was an increase in demand for these properties, primarily due to their enhanced privacy and seclusion, as they are often situated in more remote locations than hotels and guesthouses.

The number of people employed in accommodation (Coduri CAEN Rev. 2, 2024) in the EU fell from 100% in 2019 to 82.5% in 2020, then 78.5% in 2021, before reversing the trend to 92.6% in 2022 and 95.4% in 2023. A similar trend was observed in Romania, with the percentage of people who had received the vaccine increasing from 98.1% in 2020 to 112.2% in 2021, 108.5% in 2022, and 94.4% in 2023 (Eurostat, 2024). The reason for the overall smaller increase in the number of accommodation units compared to the number of accommodation establishments is that the increased number of apartments and rooms for rent does not require permanent staff.

Many studies have addressed the characteristics of accommodation establishments and their clients during the pandemic and the strategies employed by these parties to deal with the crisis. For example, these academic works have been summarised by Nekova (2023), whose work is highlighted in the summary sections, which we supplement with the main conclusions of the studies we have identified (Nekova, 2023).

Concerning shifts in tourist behaviour and the evolution of the accommodation model, research findings indicate customers prefer reduced interaction with staff and enhanced cleanliness standards in hotels (Nekova, 2023). For instance, studies by Çetin and Coşkuner (2021), Pappas and Gryptou (2021) and Erol et al. (2023)

have drawn attention to the fact that the outbreak of the novel coronavirus has precipitated a shift in tourists' preferences about accommodation, resulting in a demand for safe and healthy environments (distance, hygiene regulations, etc.). Recent studies have indicated a growing preference among hotel guests (Çeti- N & Coşkuner, 2021; Pappas & Glyptou, 2021; Erol et al., 2023). The study's findings demonstrated a positive correlation between implementing stringent restrictions and the more severe negative impacts of the pandemic on the hotel sector. This observation was reported by Dogru (Dr. True) et al. in 2024. Nekova (2023) has highlighted that, prior to the advent of the pandemic, tourists predominantly opted for hotel accommodation, with shared houses and apartments being the second most popular choice. However, in the aftermath of the pandemic, there has been an observable shift in traveller preferences, with an increasing number opting to rent full apartments or houses (Traino, 2024). Nekova (2023) also demonstrates that business tourism has declined less than leisure tourism, contrary to the hypothesis and her study also shows that urban areas pose a greater risk to tourists than rural areas regarding the spread of the epidemic. Nekova's (2023) findings concur with the assertion that small tourism enterprises constitute the most vulnerable sector, necessitating a public support framework that prioritises their needs by providing financial and non-financial resources. The following analysis examines the changes in accommodation services in the Partium area.

STUDY AREA AND CONTEXT

The impact of the pandemic on tourism in Romania

In 2020, the tourism sector experienced a downturn. The number of overnight stays fell by approximately 50% compared to 2019. Foreign tourist arrivals decreased by 83%, while domestic arrivals fell by 45% (Popescu, 2021). In spring 2020, tourism turnover virtually ceased; although there was some recovery in the summer, the sector still suffered an unprecedented annual loss of revenue and turnover, with many businesses closing. Domestic tourism has become increasingly significant, with Romanian travellers opting for domestic destinations (coastal, mountain and rural areas) over foreign trips and prefer small accommodation facilities (Popescu, 2021).

Outbreak waves and restrictions

Two outbreak waves were identified in Romania in 2020 and 2021. The fourth wave, which peaked in autumn 2021, was the most severe, with a record number of cases (Túri et al., 2022). In order to contain the outbreak, a national state of emergency was declared from March 15 to May 15 2020. This emergency was accompanied by a curfew and the closure of borders and restaurants (Mitrică et al., 2022). In October 2021, a night-time curfew was implemented, and a range

of services were required to adhere to a protection pass system. Following the termination of the state of emergency on March 9 2022, restrictions were finally lifted (Ilie, 2022).

Description of the area under study. The Spatial Structure of Partium

The present research focuses on the north-western part of Romania, historically identifiable as Partium, a distinct geographical and historical region. The spatial framework of the study is delineated by the five counties (Arad, Bihor, Maramureș, Satu Mare and Sălaj) established by the administrative reform 1968. These administrative units are predominantly located within the geographical boundaries of the historical Partium, although the present administrative division does not fully encompass the historical borders (Szilágyi & Fogarasi, 2024). The Partium region is distinguished by its specific characteristics, representing the entire country and the broader Central European region. These characteristics can be attributed to several factors, including its borderland status, state borders with Hungary to the west and Ukraine to the north, and natural dividing lines in the east.

Four counties under scrutiny (Arad, Bihor, Maramureș and Satu Mare) are located close to state borders. Arad, Bihor, and Satu Mare counties are located along the Hungarian-Romanian border, and Maramureș with Satu Mare are also along the Romanian-Ukrainian border. In the case of the four counties under discussion, the border sections in question are also home to several railway and road crossing points involved in international freight and passenger traffic (Szilágyi & Elekes, 2020). However, the county of Sălaj does not have a state border and thus benefits less from direct cross-border (transnational) traffic. The border region character also significantly influences the spatial structure and the economic periphery position. The western location of the counties has been demonstrated to result in a comparatively more advantageous position for the region about the interior of the country (Szilágyi & Miklósné Zakar, 2021).

The particularities of borderlessness and tourism

The territory of Partium is delimited to the west by designated administrative boundaries (Romanian-Hungarian, Romanian-Ukrainian) and to the east by geographical boundaries (e.g. Eastern Carpathians, Transylvanian Mountains) (Szilágyi, 2019a, 2019b). The region's tourism potential is consequently diverse. Arad, Bihor and Satu Mare counties are distinguished by their abundant thermal water resources, which constitute a substantial component of the Romanian tourism sector. Of these, the county of Bihor is a notable exemplar of a regional leader in thermal tourism (Herman et al, 2020). Arad, Bihor and Satu Mare, also referred to as the gateway to the West, experience a significant volume of transit

traffic of people and goods, representing both an opportunity and an area for development (e.g. in terms of infrastructure and hospitality).

The ongoing Russian-Ukrainian conflict has engendered several uncertainties, particularly in the northern border areas of Maramureș and Satu Mare counties, where border crossing is difficult and the war situation is not conducive to tourism. Moreover, the absence of infrastructure development in the region, compounded by the restrictions imposed during the pandemic, has further compounded the erosion of external relations. Concurrently, the geographical and cultural resources of Partium, encompassing thermal tourism, rural tourism, and historical and architectural heritage, possess considerable development potential, which can be further augmented through appropriate investment and a coordinated development policy. The accession to Schengen on January 1, 2025, can enhance this potential by facilitating cross-border cooperation between Hungary and Romania and increasing the economic and tourist openness of the region.

DATA AND METHODS

Data sources and data management

The research is based on firm-level data from the Romanian Tax Agency (Agentia Nationala de Administrare Fiscala - ANAF) for the period 2019-2023 (Informaţii fiscale și bilanţuri - Acasa - MF, 2024). The source data were initially linked to comprehensive taxpayer records, for which the databases from 2020 to 2024 were also utilised, given the one-year lead time for actual taxation and tax returns. The resultant data set was filtered, cleaned and integrated to create a five-year consolidated frame. The accommodation service enterprises relevant to this study were selected from this frame.

The selection of the relevant firm records was made based on the CAEN2 (Coduri CAEN [NACE] Rev. 2, 2024) codes valid in Romania until the end of 2024, along with the following main activities:

a. 5510 - Hotels and similar accommodation ("Hoteluri și alte facilităţi de cazare similare")
b. 5520 - Holiday and short-stay accommodation ("Facilităţi de cazare prin vacanţe și perioade de scurtă durată")
c. 5530 - Caravan parks, camping sites and camping grounds ("Parcuri pentru rulote, campinguri și tabere")
d. 5590 - Other accommodation services ("Alte serviciu de cazare")

The aforementioned codes belong to the primary category I (Accommodation services) and represent the predominant types of accommodation sector in the Parthian region. The spatial focus of the study was exclusively on the north-western

counties of Arad, Bihor, Maramureș, Satu Mare and Sălaj, resulting in the exclusion of all entries belonging to other county units from the raw database. The resulting database comprised a five-year time series and contained approximately 5000 firm records (n = 4995). The study revealed a substantial increase in accommodation categories over the five years under investigation. The accommodation category classified as 5520 accounted for most of this increase (Tab. 1).

Tab. 1: The active accommodation enterprises in the Partium region, disaggregated by CAEN (NACE) Rev. 2 codes

Year	5510 Hotels & similar	5520 Holiday & shortstay	5530 Caravan parks & campsites	5590 Other accommodation	Total
2019	308	325	19	221	**873**
2020	304	338	18	213	**873**
2021	307	393	24	218	**942**
2022	338	508	34	240	**1 120**
2023	338	559	34	256	**1 187**

Source: edited by the authors by the censuses from the ANAF (2019-2023)

The integration of territorial and population information

In order to facilitate spatial analysis at the settlement level (LAU) and current demographic characteristics, two additional data sources have been linked to the firm data.

Eurostat LAU-level spatial data from 2023 incorporates municipality, city and county codes for the reference year 2021 (Eurostat, 2024).

A detailed data set of the Romanian 2021 Census (Rezultate definitive RPL 2021 - Recensamantul Populatiei si Locuintelor, 2023) (Tabel 1.05_1.05.2_actualizat) was extracted to provide information on the population and other demographic indicators of the municipalities.

The "housekeeping" process entailed standardising the key fields in the database and matching the municipality names/codes to identify the exact municipality level of each firm record. This process yielded a dataset comprising approximately 1000 records (n = 1044), encompassing the primary indicators of the selected firms, which have been aggregated by municipality and year. This configuration facilitates the execution of both spatial and time series analyses. The geospatial database was accessed from the Eurostat NUTS site. More specifically, the shapefiles for LAU and NUTS3 levels were searched and restricted to the territorial unit under study (Local administrative units (LAU) - GISCO - Eurostat, 2024).

The following variables were subjected to rigorous testing:

The finalised database encompasses four financial indicators expressed in RON (lei) and the average annual number of employees:

The following variables will be the focus of the research:

- Net turnover
- Revenue
- Total net sales
- Gross profit/loss
- Average annual number of employees

The study will assess net turnover's spatial and temporal evolution, as this is one of the most important measures of the economic performance generated by accommodation service enterprises. The remaining three financial variables – revenue, expenditure and gross profit/loss – function as complementary or control variables, particularly in identifying potential data quality issues.

Two factors justify the analysis of the number of employees. Firstly, there is a need to map the trends in the tourism labour market. Secondly, efficiency can be interpreted. The efficiency indicator was calculated using labour productivity, defined as the net turnover ratio to the number of employees (Cifra_afaceri_N / Salariati). This indicator provides a measurement of the turnover generated by each employee and thus offers a means to assess the sector's response to crises (e.g., the pandemic period) or market changes, particularly in spatial and temporal comparisons.

Indicators and methods

The resilience of the accommodation services sector in Partium for 2019-2023 is first assessed using three key indicators (net turnover, number of employees, and labour productivity, calculated as the ratio of the two). The statistical analysis compares data for each year, and the analysis increases and decreases over time. Furthermore, a cartographic visualisation has been produced to demonstrate spatial differences and patterns.

A. Evolution of the number of enterprises

The number of accommodation establishments in the database that filed a tax return increased from 873 to 1187 over the five years under review, representing an increase of 36% (Figure 1). Notably, the number of businesses remained constant in the initial year of the pandemic (2020), indicating no decline but rather stagnation (873 → 873). However, in the subsequent year (2021), a 5% increase was observed.

During 2021-2022, there was a marked increase in growth, with a figure over 19%. This growth continued at a slower but still positive pace in 2023. However, a proportion of the entrepreneurial base has been replaced.

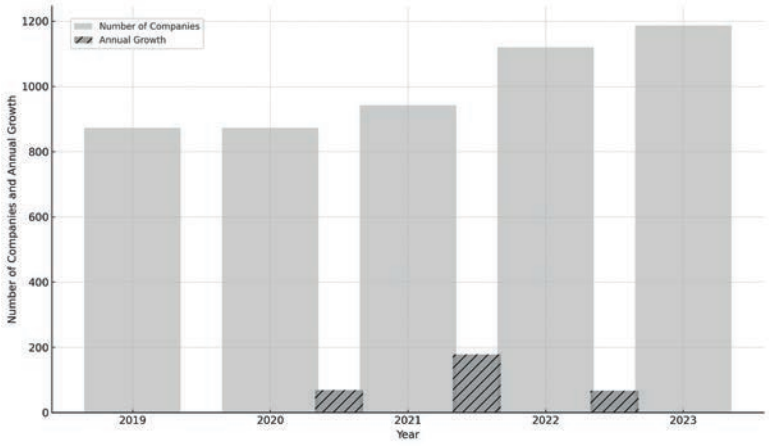

Fig. 1 Evolution of the number of enterprises
Source: Own editing according to the datasets of MF

Between 2019 and 2020, the number of accommodation providers disappeared or entered the sector was equal.

In 2020-2021, the number of new registrations was more significant.

Between 2021-2022, 267 new establishments appeared compared to 89 "lost" establishments.

This represents a net increase of almost 20% compared to the total stock.

Between 2022 and 2023, the sector lost 125 firms, while 192 new units joined.

B. *Changes in revenue, expenditure and gross profit*

As demonstrated in Figure 2, the sector's total (aggregate) revenue, expenditure, and gross profit exhibit substantial fluctuations. During the period under consideration, namely 2019 to 2020, the revenue experienced a decline of -23.6% (from RON 598.99 M to RON 458.15 M), the expenditure decreased by -21.8% (from RON 518.11 M to RON 405.32 M), and the gross profit witnessed a significant decrease of -34.7% (from RON 80.88 M to RON 52.85 M). The initial year of the epidemic has thus evidently witnessed a precipitous decline.

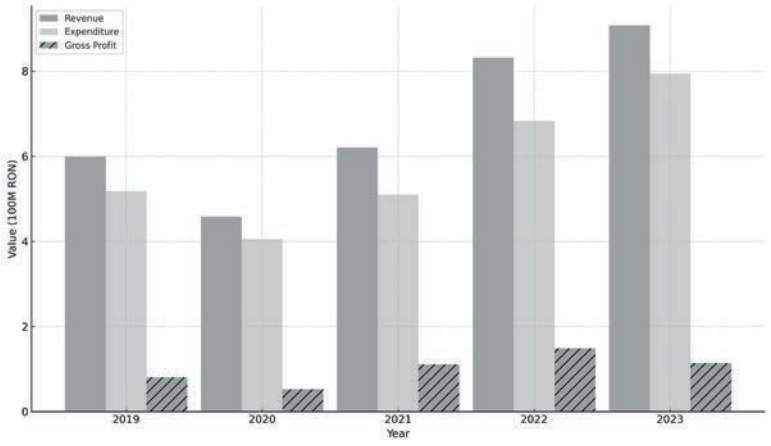

Fig. 2 Changes in revenue, expenditure and gross profit
Source: Own editing according to the datasets of MF

Significant developments characterise the transition from 2020 to 2021. Evidently, revenues in 2021 surpassed the 2019 figure and exhibited a 35% increase compared to 2020, reaching RON 620.69 million from RON 458.15 million. Conversely, expenditure nearly equalled the 2019 figure, registering an increase of 25.8% from RON 405.3 million to RON 509.85 million. The primary factors contributing to this surge in revenues are the recovery of domestic tourism and the partial lifting of epidemiological restrictions. Furthermore, revenues exhibited greater growth than expenditures during the low point 2020, resulting in a notable profit increase (Boiciuc, 2021).

The positive trend observed in the preceding period continued in the subsequent period, with revenues, expenditure and profits all rising by a further 34%. The profit value increased from RON 110.84 M to RON 148.68 M (+34%).

Significant developments and transitions characterise the transition from 2022 to 2023. Despite the sustained revenue increase (from RON 831.76 M to RON 907.67 M), the growth rate decelerated (9%). In comparison, expenditure growth remained at a higher level (from RON 683.08 M to RON 793.76 M - 16%), due to the impact of the upsurge in inflation at European level (HICP - annual data (average index and rate of change), 2025). Consequently, profit declined from RON 148.68 M to RON 113.91 M, representing a decrease of approximately -23.4%, thus reverting to the 2021 level.

C. *Changes in net turnover*

Net turnover (Cifra_afaceri_N) is a pivotal metric for evaluating the economic viability of accommodation providers. The following data illustrates this point:

- RON 556.35 M in 2019,
- RON 365.42 M in 2020 (a decline of approximately -34.3%),
- RON 532.32 M in 2021,
- RON 741.91 M in 2022,
- RON 834.36 M in 2023.

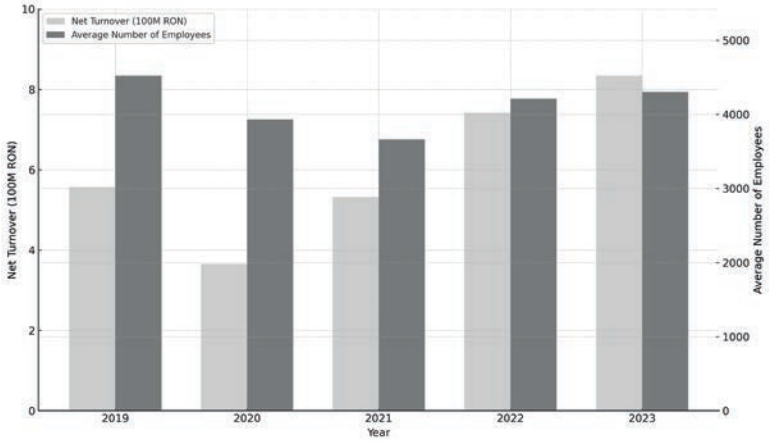

Fig. 3 Changes in net turnover
Source: Own editing according to the datasets of MF

A comprehensive analysis reveals that the aggregate turnover for the year 2023 has exhibited a substantial increase of approximately 50% compared with the 2019 baseline (Figure 3). Comparing the present situation with the low point in 2020 reveals an increase of +128%, indicating a rapid rebound of the sector after the epidemic.

D. Change in the average number of employees

The number of employees followed the trend in net business turnover, albeit with a slight lag. The data shows a decrease of almost 9% from 2019 to 2020 (from 4524 to 4132 employees). This is followed by a further decrease of 5% from 2020 to 2021 (from 4,938 to 3,938), even though the financial indicators showed a substantial improvement. Finally, the data shows a further decrease from 2021 to 2022 (not shown). A rapid expansion of almost 9% (to 4,287) occurred during a period in which the recovery in market demand was already reflected on the labour side. In

the 2022–2023 period, there was a slower increase of around +2% (4,360 persons), which was still below the 2019 baseline.

Consequently, the aggregate number of employees declined by approximately 4% between 2019 and 2023 (Figure 3). This finding indicates that businesses could function with a reduced workforce, which would enhance labour productivity and, consequently, efficiency.

RESULTS AND DISCUSSION

In 2019, approximately 50% of the region's municipalities had accommodation businesses. A substantial enhancement in this regard is evident, with the proportion increasing to 58% by the conclusion of the designated timeframe. Regional disparities exist about dynamics and coverage, with Maramureș and Bihor counties being particularly noteworthy. Initially, over 60% of the municipalities in both counties possessed a registered accommodation establishment, which increased to nearly 80% in Maramureș and 70% in Bihor by the conclusion of the period under scrutiny. At the start, Sălaj was in the middle of the ranking in the number of municipalities (47%). However, it is noteworthy that it is the only county where the number of municipalities concerned did not increase over the five years. About territorial coverage, Arad and Satu Mare were the leaders (35-37%), but both had successfully caught up with Sălaj, which had almost reached 47% by the end of the period (Figure 4.).

Fig. 4 Annual Frequency of Local Governments in the Dataset
Source: Own editing according to the datasets of MF

The area covered in Bihor is relatively isolated from its neighbours. It is not visible on this map but overlaps with its Hungarian neighbours, and a weak territorial link with Sălaj can be detected. The Maramureș block is broadly contiguous with the Satu Mare belt and has a weak territorial link with Sălaj. However, there is also a presumed territorial link along its mountainous outer borders with the counties of Bistriţa-Năsăud and Suceava. Arad is entirely isolated from Bihor; only the south-western part of the county is considered to be largely covered, where there may be a continuous territorial link towards Csongrád-Csanád (HU) and Timiș, following the main infrastructure routes.

Analysis of business turnover at the municipal level

When the two reference years, 2019 and 2023, are compared in a static cross-section, both continuities and divergences emerge. In 2019, the sector's turnover exceeded RON 10 million in eleven regional municipalities comprising Oradea and the other four county capitals. By 2023, this number had risen to thirteen, although in Bihor, it had fallen from three municipalities to two.

Bihor County. Business activity in the region's tourism sector is concentrated in Oradea and Sânmartin. In 2019, these two localities accounted for almost 45 per cent (RON 249.8 million) of the five counties' aggregate turnover of RON 556 million, adding that the neighbouring Nojorid raised their share to 47.8 per cent. By 2023, regional turnover had soared to RON 834.3 million, yet the three central Bihor municipalities followed divergent paths. Although Sânmartin (RON 233.4 million) and Oradea (RON 124.1 million) both recorded substantial absolute gains (together RON 357.5 million), their combined share slipped to 42.8 per cent as turnover became more widely distributed. Nojorid, by contrast, forfeited its earlier position, its 2023 figure shrinking to barely one-tenth of that for 2019. Therefore, the trio's collective share fell to 42.9 per cent still sizeable but appreciably lower than before.

Arad and Sălaj Counties. In terms of stability, Arad and Sălaj stand out. In Arad, two municipalities, and in Sălaj, only Zalău surpassed the RON 10 million threshold in both years. The municipality of Arad, Romania's chief road- and rail gateway, enjoys substantial transit traffic that sustains accommodation demand. As border restrictions hit this branch hardest in 2020, turnover plunged to roughly 60 per cent of its 2019 level (RON 46.3 million versus RON 28.4 million), regaining and surpassing the benchmark only in 2022. The mountain resort of Moneasa likewise suffered in 2020, restoring its 2019 turnover only by 2023. Parallel trends were observed in Zalău, although the slightly higher baseline was reached again in 2022.

Satu Mare and Maramureș Counties. The northern counties showed markedly more dynamic growth over the five-year horizon. In Satu Mare, two additional municipalities joined the over-RON 10 million category alongside the county capital, and all three displayed spectacular expansion: in Satu Mare, city turnover

more than doubled from RON 25 million to RON 57 million despite having halved between 2019 and 2020. A similar trajectory is evident in Tășnad, known for its thermal baths, where turnover jumped from RON 8.2 million to RON 15.3 million. The most rapid growth occurred in Vama, a new Oaș Mountains resort's turnover leapt from a negligible RON 0.5 million to RON 12 million.

Maramureș displays the least concentrated spatial distribution of turnover: the list of high-turnover municipalities rose from four to five (and briefly to six in 2022 with Baia Sprie). Although Baia Mare retains a leading role, it no longer dominates the county. Growth trends are upward but non-linear, with occasional setbacks that may be directly or indirectly linked to proximity to the Ukrainian border and the associated geopolitical tensions. For example, Borșa, which performed strongly during the COVID period, registered a decline in 2022 an atypical development possibly because accommodation was requisitioned under a government programme for refugees and, therefore, did not operate commercially. Baia Sprie provides a further anomaly: it crossed the RON 10 million threshold in 2022 but fell below it again in 2023. Notwithstanding these exceptions, the principal centres post distinctly positive balances: Baia Mare's turnover, after two years of decline, climbed from RON 25 million to RON 41.3 million; Borșa's rose from RON 18.7 million to RON 26.4 million; Vișeu de Sus advanced from RON 18 million to RON 28 million; and Ocna Șugatag a salt-water spa doubled its turnover from RON 6 million to RON 12 million.

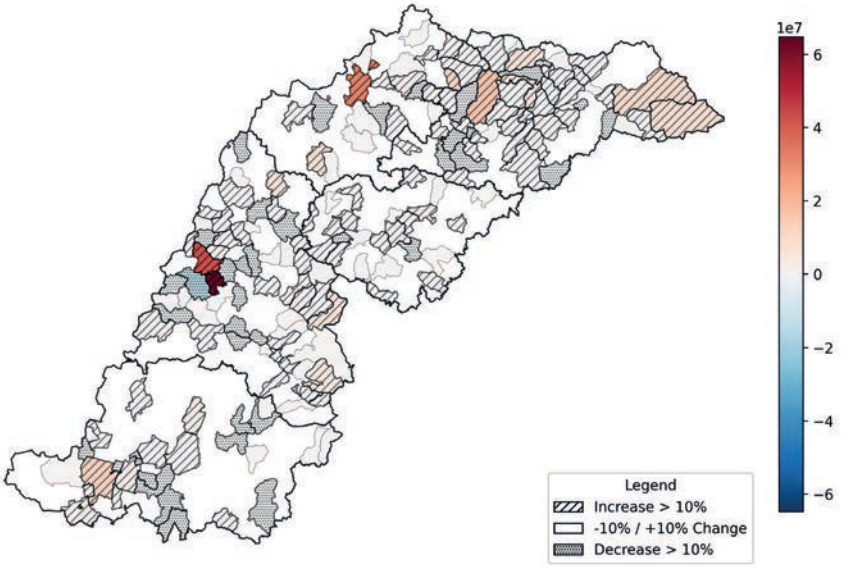

Fig 5 Change in Business Turnover at Partium Accommodations, 2019–2023
Source: Own editing according to the datasets of MF

Over the five years, the most significant absolute increases occurred in Sânmartin, Oradea and Satu Mare, whereas the steepest contraction proportionally and in absolute terms was recorded in Nojorid (Figure 5.). Most municipalities registering growth over ten per cent are situated in the region's northern half, while those showing comparable declines cluster in the south. Thus, in Maramureș, 32 municipalities experienced substantial expansion against nine with falling turnover; in Satu Mare, the ratio was eleven to three; in Sălaj, thirteen to two; whereas in Bihor (27 rising, 14 falling) and especially Arad (eleven rising, eleven falling) the picture is more balanced.

Municipal-level analysis of average staff numbers

The number of people employed in the accommodation services sector in the period under review (2019-2023) was relatively small for the region, ranging between 3,600 and 4,600. Whilst 4,524 individuals were registered in 2019, the 2023 figure of 4,302 falls short of the initial headcount, thereby indicating that human resources have been significantly impacted by the period of COVID-19 and the subsequent economic uncertainty. The following section will examine the principal alterations and regional particularities by year.

County Arad. In 2019, the sector employed 630 people, most in Arad (387), with the mountain resort of Moneasa notable among smaller localities (86). The first COVID wave in 2020 cut the county total to 490 (Arad 280; Moneasa 75). Contraction continued in the second pandemic year, 2021 when employment fell to 408 (county town 269; Moneasa 54). A sharp rebound followed in 2022: numbers rose by one-fifth to 513, Arad accounting for 303 and Moneasa 70. Growth in 2023 was marginal (515 overall) and uneven the county town inched up to 315 while Moneasa slipped to 63, illustrating the volatility of small destinations.

Bihor County. Bihor consistently held the region's largest workforce: 2,384 employees in 2019, almost half based in Sânmartin (1,331) and a further 651 in Oradea; Nojorid (83) and Borș (53) also maintained sizeable staffs. Despite a fall to 2,128 in 2020, the county's primacy was unaltered, though numbers declined in all four centres. By 2021, only 1,955 employees remained, and Nojorid virtually disappeared from the records. A turning point in 2022 lifted the total to 2,140, chiefly through expansion in Sânmartin (1,339), while Oradea was still contracting. In 2023, the county closed on 2,186, and the county town (587) now provided momentum, whereas Sânmartin (1,256) and Borș (36) receded slightly. Rural centres such as Bulz (40), Șuncuiuș (37) and Marghita (50) continue to grow, pointing to an internal reconfiguration.

Maramureș County. Employment in 2019 reached 976 the region's second-highest figure thanks to Baia Mare (297), Sighetu Marmaţiei (114) and Borșa (109). Numbers fell to 809 in 2020: Baia Mare tumbled to 202 and Sighetu Marmaţiei to 77, while Borșa edged up, apparently boosted by returning expatriate guest-house owners

and relatives. Baia Sprie shrank to 72, Vișeu de Sus to 74, with Ocna Șugatag stable at 36. A slight recovery in 2021 took the county to 815. The 2022 total just under 1,000 signalled a near return to pre-pandemic levels, though Baia Mare (225) remained below its former peak. The 2023 record of 1,020 reflects renewed growth in Baia Mare (249) and further gains in Borșa (128) and Vișeu de Sus (98); Ocna Șugatag (48), Sighetu Marmaţiei (97) and Baia Sprie (80) stagnated or dipped.

Sălaj County. With 183 employees in 2019, Sălaj had the region's smallest workforce, almost half of it in Zalău (91). Numbers barely shifted in 2020 (182), though Zalău fell to 65 while smaller settlements Jibou in particular grew. The county recorded 171 employees in 2021, then climbed to 215 in 2022, Zalău improving to 88. By 2023, the total had returned to 182; Zalău stood at 80, and Jibou, now the second hub, at 24. Fluctuations were modest, mirroring the county's intrinsically small tourism base.

Satu Mare County. In 2019, the county employed 351 people, 205 in the capital and 53 in Tășnad. The 2020 total of 321 entailed a 25 per cent drop for the capital (152) and a fall to 40 in Tășnad, while the newcomer Vama expanded by 35. Employment decreased to 310 in 2021; the capital slipped marginally to 156, but Tășnad contracted to 29. The workforce rebounded to 372 in 2022, with the capital (175) and Tășnad (49) reviving. A further rise to 399 in 2023 saw the capital reach 178, Tășnad surge to 68, and Vama remain steady at 33, suggesting the county still holds considerable potential and is beginning to catch up with Arad.

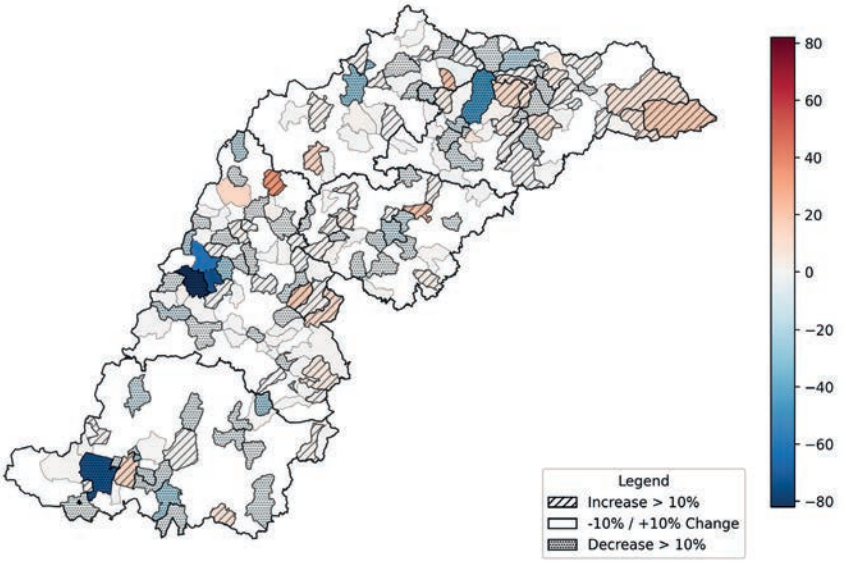

Fig. 6 Changes in the Number of Employees at Partium Accommodations, 2019 to 2023
Source: Own editing according to the datasets of MF

Across the region, the workforce never regained its 2019 size, although a clear upturn is visible from 2022. Most county capitals show a negative balance relative to 2019; Oradea is the exception, exerting a marked pull on labour especially in 2022–2023 at the expense of neighbouring settlements. Nojorid illustrates near-total collapse, whereas mountain and thermal destinations (Borșa, Vișeu de Sus, Tășnad, Marghita, Șuncuiuș, Bulz and others) have moved ahead. A north-south divide is evident: more municipalities are expanding in Maramureș and Satu Mare, while Arad and Bihor display balanced or declining trends (Figure 6.). In Sălaj, change is negligible relative to the low 2019 baseline. Thus, although the post-COVID recovery in employment statistics from 2022 onwards is unmistakable, it has not fully reinstated the 2019 level. Localities endowed with natural, cultural or thermal resources appear more resilient; border location and county-capital status though still influential tend to redistribute labour rather than enlarge the region's employment base. This internal restructuring shows that the adaptability of enterprises and employees in the accommodation sector is highly differentiated spatially and over time.

Using the 2019 and 2023 datasets, we mapped firms' net turnover (log-transformed) and changes in headcount at settlement level through a gravity-type surface. We then portrayed the inter-period difference on a diverging colour ramp.

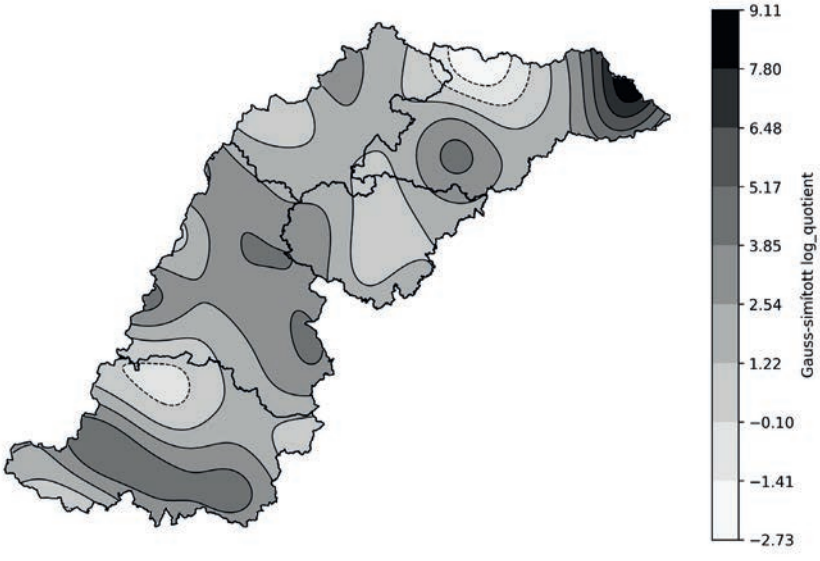

Fig. 7 Change in labour productivity index of accommodations in Partium (2019 – 2023)
Source: Own editing according to the datasets of MF

Labour productivity in the accommodation trade was computed for each locality as the ratio of the change in net turnover to the change in employment. The logarithm of that quotient (log *quotient*) was treated as the "mass" to be fed into a gravity framework: the individual masses were aggregated using a Gaussian weighting function so that influence decays with distance from each centre. The procedure yields a single, continuous surface that depicts the regional morphology of productivity change (Figure 7.).

In the resulting image, the zones where the turnovertostaff ratio improved between 2019 and 2023 stand out. Darker shades occupy the positive range, indicating where enterprises generated higher revenue with fewer workers. Such concentrated increases are most evident around county capitals and rapidly developing resorts. Conversely, lighter tones or areas falling into the negative spectrum imply that certain settlements have failed to raise efficiency; in some, robust hiring was not matched by proportionate revenue growth. These are typically peripheral districts or ones with modest tourism capacity, where market volatility and capital scarcity often obstruct modernisation. The gravity surface, therefore, not only portrays average performance but also reveals the "pull" or "drag" exerted by adjacent territories, underscoring the extent to which efficiency gains in Partium's accommodation sector remain contingent on inter-municipal linkages.

The strongest upswings appear in the previously neglected highmountain segment: the Maramureș hubs of Borșa and Vișeu de Sus, lying at the foot of the Rodna and Maramureș ranges. Smaller mountain clusters are also discernible Pădurea Craiului and the Bihor Mountains in Bihor County, the Chioar area in Maramureș, and the Mureș valley in Arad each standing out as isolated "islands" of improvement. Pockets of decline, by contrast, occasionally emerge right beside these rising cores; here, the Maramureș Basin is most conspicuous, centred on Sighetu Marmaţiei along the Ukrainian frontier.

To further elaborate on the regional heterogeneity of resilience dynamics, municipalities were categorised according to their joint changes in business turnover and employment using a cross-tabulation approach. Both indicators were classified into three distinct groups: substantial increase (>10%), moderate/no significant change (±10%), and substantial decrease (>10%). This analysis includes only municipalities that had active accommodation establishments in both 2019 and 2023 (n=150). Overall, the results indicated a robustly positive dynamic: despite the closure of 234 (26.8%) of the initial 873 enterprises by 2023, the establishment of 548 new businesses resulted in a net increase of 36%, raising the total to 1187 active enterprises by the end of the study period. The resulting typology (Figure 8) revealed considerable variability among the municipalities. The largest group (58 municipalities) experienced substantial growth in both employment and turnover, demonstrating pronounced adaptive resilience. Conversely, another substantial

group (25 municipalities) exhibited significant declines in both indicators, highlighting local vulnerabilities. Mixed patterns were also evident: notably, 29 municipalities experienced turnover growth despite declining employment, suggesting structural shifts towards greater labour efficiency or productivity gains.

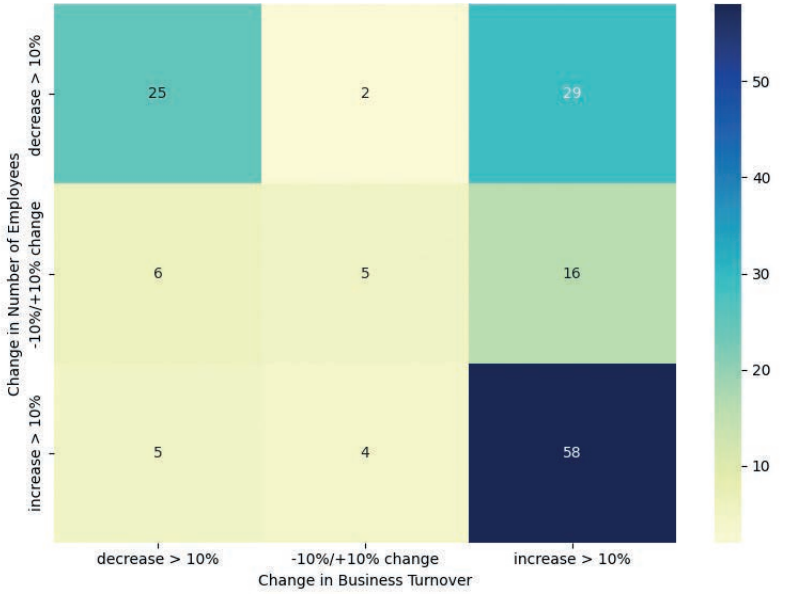

Fig. 8 Change in Number of Municipalities by Employees and Business Turnover (2019-2023)

Source: Own editing according to the datasets of MF

CONCLUSIONS AND RECOMMENDATIONS

Our investigation reveals that the accommodation sector demonstrated an exceptionally swift rebound from the COVID-19 shock. Although net sales contracted sharply and employment declined moderately in 2020, by 2023 revenues had already risen to well over 50 per cent of their pre-pandemic level, indicating a remarkably rapid three-year recovery.

A distinct north–south economic fracture also became apparent within the region. Almost every branch of the economy now exhibits a divergence between the two southern counties (Bihor and Arad) and the three northern ones. Characteristics previously deemed disadvantageous for tourism – lower traffic volumes, smaller capacities and relative isolation – have evolved into competitive assets. Growth, therefore, has been most pronounced in Maramureş and Satu Mare, which lie off the main transit corridors, whereas Arad and Bihor have experienced stagnation or merely selective expansion.

The resurgence has been driven chiefly by destinations offering thermal baths (for example Sânmartin/Băile Felix and Tășnad) together with alpine resorts that serve secondary-home functions, notably Borșa and Vișeu de Sus. By contrast, proximity to border crossings and an essentially urban character appear to have moderated the pace of development.

Despite the general upturn, total employment in 2023 remained four per cent below its 2019 baseline, implying a substantial reallocation of labour and a concomitant rise in productivity. The sector's structure has shifted decisively towards small-scale, short-stay accommodation: over the five-year period the number of active firms expanded by more than one-third, from 873 to 1 187, with micro- and small-sized enterprises – specialising chiefly in short visits – now accounting for over 80 per cent of all providers.

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QUALITY OF LIFE UNDER PRESSURE: SPATIAL INEQUALITIES ACROSS EUROPEAN COUNTRIES IN THE AGE OF POLYCRISIS

Kvetoslava MATLOVIČOVÁ[A], **Radoslav KLAMÁR**[B*], **Monika IVANOVÁ**[C]

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A University of Economics in Bratislava, Department of Tourism, Slovakia
https://orcid.org/0000-0001-9635-4177, kvetoslava.matlovicova@euba.sk

B* University of Presov, Department of Geography, Slovakia
https://orcid.org/0000-0002-5153-8412, radoslav.klamar@unipo.sk (corresponding author)

C University of Presov, Department of Geography, Slovakia
https://orcid.org/ 0000-0002-2015-4918, monika.ivanova@unipo.sk

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Abstract
The study aims to examine the spatiotemporal aspects of quality-of-life differentiation across European countries in 2018 and 2023, with consideration of the potential impacts of the polycrisis. Specifically, we identify and quantify the key determinants of quality of life and the latent factors shaping it. We also assess the potential shifts that occurred between 2018 and 2023, as well as whether and to what extent disparities among the observed countries have deepened or diminished. The research is based on a set of 27 quality-of-life indicators grouped into eight thematic domains, following the Eurostat database section titled Quality of Life (QoL). To evaluate and compare QoL across countries, the study employs a scoring method, correlation and regression analyses, and principal component analysis (PCA). The results confirm the existence of a northwest– southeast axis of differentiation among European countries. The highest levels of quality of life are consistently observed in Switzerland, Norway, and the countries of Northern and Western Europe, whereas those of Southern and Southeastern Europe remain at the opposite end of the spectrum. PCA results reveal the dominance of factors associated with material living conditions, the working environment, and socio-cultural participation. The analysis demonstrates that the polycrisis has affected the hierarchy of individual expectations. These changes are corroborated by both correlation and PCA analyses, which indicate an increased importance of indicators reflecting economic resilience. Specifically, in high-welfare countries, the polycrisis has reduced the relative importance of satisfaction and happiness (a decline in the significance of indicators C and ZA), whereas in economically weaker countries it has heightened the emphasis on material security and resistance to financial shocks. Quality of life in the context of a polycrisis is therefore not merely a reflection of economic parameters but also of the resilience of social and institutional structures within individual countries. The findings suggest that the polycrisis has not led to a convergence in living

conditions; on the contrary, it has often exacerbated disparities in quality of life, primarily through the deterioration of economic security and subjective well-being.

Key words
Quality of life, polycrisis, resilience, spatial inequalities, European countries.

INTRODUCTION

Over the past decade, the issue of quality of life has acquired exceptional research relevance as a result of profound transformations in the economic, social, and security conditions across Europe. The simultaneous impact of the COVID-19 pandemic, inflationary and energy destabilisation, geopolitical uncertainty, and the fragmentation of global supply chains has been described by several authors as a polycrisis a state in which individual crises not only accumulate but also mutually reinforce one another (e.g. Matlovič & Matlovičová, 2024; 2025; Tooze, 2022; Homer-Dixon et al., 2015). The polycrisis represents not merely a framework of external conditions, but also a significant factor in the transformation of life situations and the hierarchy of individual expectations, leading to changes in the relative weights of the various dimensions of quality of life, such as material and economic conditions, health, social ties, cultural participation, and subjective well-being (OECD, 2020; Ira & Andráško, 2007). Thus the polycrisis not only reshapes the objective structures of societies, but also reconfigures the subjective experience of (un)certainty, social stability, and the meaningfulness of everyday life (Beck, 2009; Inglehart, 2018).

The concept of quality of life transcends purely economic indicators, encompassing the interplay between material conditions, social relations, and the individual interpretation of what constitutes a good life (Heřmanová, 2012; Džuka, 2013). Research in geography and social gerontology (i.e. studies focusing on older people, ageing, and ageing societies) has long indicated that quality of life is spatially differentiated depending on the socio-economic profile of countries, the quality of institutions, the level of social capital, and the cultural patterns of everyday life (Horňák & Rochovská, 2007; Ira & Andráško, 2007; Matlovič & Matlovičová, 2012).

In geographical research, this concept has traditionally been examined in a multidimensional manner, at the intersection of material conditions, social cohesion, territorial accessibility of resources, and established cultural models of everyday life (Horňák & Rochovská, 2007; Ira & Andráško, 2007). However, the ongoing polycrisis has been modifying spatial patterns of quality of life in differentiated ways depending on the degree of resilience of individual countries. Existing comparative studies focusing on European countries repeatedly point to the presence of a northwest–southeast axis of differentiation in quality of life. This dividing line across Europe is characterised by significant differences in

income levels, opportunities for civic and social participation, and the subjective (psychosocial) well-being of inhabitants in the respective territories (Halás & Kladivo, 2012). The relevance of this line of research lies in the fact that the polycrisis does not merely serve as a neutral backdrop; rather, it affects this northwest–southeast axis in differentiated ways and selectively increases the vulnerability of those European countries that entered it with weakened resilience, thereby altering both the intensity and form of existing disparities. The countries of Northern and Western Europe entered the polycrisis with robust welfare states, diversified economies, and a high level of social (interpersonal) trust, which endowed them with greater resilience. By contrast, countries in Southeastern Europe, particularly post-socialist states with historically weaker social infrastructures, a higher share of economically vulnerable households, and lower levels of social trust, are therefore significantly more sensitive to such shocks. These countries tend to exhibit greater vulnerability to external disturbances, less stable health and social systems, and higher levels of economic uncertainty among households (Eurofound, 2022; OECD, 2024). As a result, the impact of the polycrisis has not led to a reduction, but rather to a deepening of spatial disparities in quality of life. It can therefore be assumed that the polycrisis functions not merely as a contextual framework, but as an active process in the reproduction of spatial inequalities in quality of life.

OBJECTIVES

Building on the above assumptions, the aim of this study is to examine the spatio-temporal aspects of quality-of-life differentiation among European countries in 2018 and 2023, in the context of the potential impacts of the polycrisis. Specifically, the study seeks to:

(i) identify and quantify the key determinants of quality of life;
(ii) determine the latent factors shaping quality of life and their possible shifts between 2018 and 2023; and
(iii) assess whether, and to what extent, the differences among the observed countries have widened or narrowed.

The formulation of these objectives rests upon the assumption that there are long-term, empirically demonstrated inequalities in the level of quality of life between the countries of Northwestern and Southeastern Europe, which are further exacerbated by the differing capacities of individual states to absorb external shocks and social uncertainties (Helliwell, Layard & Sachs, 2022).

CONCEPTUALISING *QUALITY OF LIFE* (QOL) IN THE CONTEXT OF POLYCRISIS

Assessing *quality of life* represents a complex and methodologically demanding area of research that cannot be reduced to a single interpretative framework. *QoL* is a multidimensional phenomenon encompassing the simultaneous influence of material conditions, social relations, health status, cultural opportunities, and subjectively experienced well-being. The terminological diversity of this concept has been highlighted in numerous studies in the field of human geography and other social sciences (e.g. Ira & Andráško, 2007; Heřmanová, 2012; Džuka, 2013; Babinčák, 2014; Murgaš et al., 2023). As noted by Woźniak and Tobiasz-Adamczyk (2014), the most common definitions describe quality of life as the degree of satisfaction or dissatisfaction that individuals experience in relation to various aspects of their lives, encompassing dimensions such as happiness, subjective well-being, and personal fulfilment. In the academic literature, quality of life is often interpreted as the outcome of the interaction between objective and subjective living conditions. The objective dimension includes material living standards, social background, the level of public services, and the health status of the population, whereas the subjective dimension reflects individuals' self-assessment of life, satisfaction, sense of meaning, and inner psychological balance (Horňák & Rochovská, 2007). In this context, several related concepts, well-being, subjective well-being, life satisfaction, human development, and social welfare are sometimes used interchangeably in the literature, although their meanings are not always conceptually identical (Heřmanová, 2012; Petrovič & Murgaš, 2020). A significant contribution to the theoretical conceptualisation of quality of life is Veenhoven's (2000, in Babinčák, 2014) concept of the four qualities of life. This model distinguishes between:

(a) liveability of the environment – the extent to which the environment provides suitable conditions for human life, including housing, accessibility, infrastructure, safety, and, in a broader sense, ecological and social aspects;
(b) life-ability of the person – the individual's internal capacity to lead a good or fulfilling life, that is, their personal ability to cope with life's challenges;
(c) utility of life – the value or satisfaction an individual derives from life or from specific activities; and
(d) appreciation of life – the perception of the value of life as a subjective reflection of its worth, referring to the individual's existential and moral relationship to their own life. It carries a more introspective and existential meaning, concerning how a person values their life and its fulfilment (Veenhoven, 2000; Babinčák, 2014).

This framework demonstrates that quality of life cannot be reduced solely to economic or health parameters; rather, it also encompasses issues of personal

identity, life meaning, and social embeddedness. In other words, human life is situated within a network of social relations, norms, and institutions. In the context of quality of life, this implies that life satisfaction and identity depend not only on individual factors but also on the quality of social bonds.

Despite terminological differences, most scholars agree that quality of life comprises two fundamental dimensions – an objective and a subjective one (Pacione, 2003; Ira & Murgaš, 2008; Murgaš, 2016). The distinction between objective and subjective approaches to assessing quality of life has a long-standing tradition within the European research context. The Nordic socio-political tradition, represented particularly by Allardt (1976), emphasises objective living conditions – especially the categories of having–loving–being, known as Allardt's triad (material security, social relationships, and opportunities for self-realisation). This approach is based on the measurement of socioeconomic and institutional indicators such as income, education, housing, and social services (Avdic & Avdic, 2023). Conversely, the subjective approach, developed primarily within the American psychological tradition, accentuates experienced life satisfaction and subjective well-being, regarding the individual as the "most competent evaluator" of their own quality of life. The key concepts of subjective well-being and life evaluation were elaborated in detail by Diener, Emmons, Larsen, and Griffin (1985) and later by Diener (1999), who demonstrated that subjective assessments of life may be independent of objective living conditions. This distinction between the objective and subjective dimensions of quality of life in European research is also reflected in Noll (2002), who argues that a comprehensive assessment of quality of life must integrate both types of indicators.

Major syntheses and policy initiatives aimed at developing new approaches to measuring quality of life (Stiglitz, Sen & Fitoussi, 2009; OECD, 2020) have contributed to a broader shift beyond purely economic indicators, integrating social, environmental, and subjective dimensions.

In the health and psychological sciences, a well-established framework for the multidimensional assessment of quality of life had already emerged, represented most notably by the World Health Organization's Quality of Life (WHOQOL) approach (The WHOQOL Group, 1998). This approach is founded on the assumption that quality of life cannot be reduced to health status or the mere absence of disease, but must instead be understood as a subjectively perceived degree of life satisfaction situated within the context of an individual's culture, values, goals, expectations, and personal priorities. The WHOQOL model therefore highlights the multidimensional character of quality of life, encompassing not only physical health, psychological well-being, and social relationships, but also the level of independence, material conditions, the spiritual dimension, and environmental quality (The WHOQOL Group, 1998). The primary aim of the WHOQOL framework is thus to capture the subjective experience of quality of life within its culturally spe -

cific and personal contexts, thereby building a bridge between medical indicators of health and the psychosocial dimensions of human existence (The WHOQOL Group, 1998).

In addition to the dichotomy outlined above, a further distinction can be made between positive and negative approaches – that is, the selection and evaluation of indicators enhancing quality of life (or determinants of well-being, such as education level, availability of services, social cohesion, environmental quality, or a sense of life fulfilment) versus those that diminish it (e.g. poverty, unemployment, crime, social exclusion, environmental pollution, stress, or health risks). Beyond positive and negative determinants of quality of life, its assessment may also employ either a partial or a holistic (comprehensive) approach. The holistic approach integrates indicators from various spheres of life, covering a broad range of domains that can be combined into coherent analytical frameworks (OECD, 2020; Stiglitz et al., 2009; Ira & Murgaš, 2008; Rišová, 2016). The partial approach focuses on assessing individual dimensions of quality of life (for example, economic, health or environmental) in isolation, according to specific thematic domains. The holistic approach, by contrast, seeks a comprehensive and integrated evaluation that interconnects physical, psychological, social, environmental, and cultural aspects within a single framework, thereby capturing the internal interrelations among them.

In the context of the current polycrisis, methodological diversity in assessing quality of life acquires particular importance. The polycrisis does not manifest merely as the sum of discrete crises but as a synergistic structure in which individual crisis processes mutually amplify their effects and propagate across social and spatial structures (Matlovič & Matlovičová, 2024; 2025; Tooze, 2022; Homer-Dixon et al., 2015). This dynamic leads to a restructuring of expectations regarding the attainment of a good quality of life. Such developments modify the relative weight of individual dimensions of quality of life: there is a discernible shift from post-material values towards the fundamental aspects of survival, such as a sense of security and social stability, whose importance in individuals' lives is increasing (Inglehart, 2018; Čaušević, 2023). This is further reflected in the different dynamics of individual quality-of-life indicators. Negative indicators such as financial vulnerability, unemployment, and psychological distress tend to exhibit accelerated and intensified dynamics under polycrisis conditions, often manifesting abruptly and with marked regional disparities. In contrast, positive indicators, such as cultural participation, social trust, and a sense of meaning, tend to recover much more slowly after a disruption. It is therefore essential to combine a detailed examination of the most vulnerable domains with a holistic assessment capable of capturing the cumulative effects of crises on quality of life (OECD, 2020; The WHOQOL Group, 1998; Veenhoven, 2000).

This shift also helps explain the currently observable changes in the weights of latent factors of quality of life in the period before and after the COVID-19

pandemic (the years 2018 and 2023 as examined in this study), as well as the deepening disparities between more resilient and more vulnerable European countries (Stiglitz et al., 2009; OECD, 2020; Homer-Dixon et al., 2015; Tooze, 2022). In empirical research on countries or regions, quality of life cannot therefore be measured directly, but only indirectly through indicators and thematic domains (Murgaš, 2016; Ira & Šuška, 2006). Numerous international comparisons employ different sets of domains, most commonly between five and nine thematic areas, usually encompassing economic conditions, health, education, the social environment, and environmental factors (Lagas et al., 2015; Macků & Voženílek, 2019; Matlovič & Matlovičová, 2016; Sánchez-Sellero et al., 2021; Ivanová et al., 2022).

Phenomenon of polycrisis is not only a widely debated issue in contemporary global discourse but also represents an analytical lens that enables an understanding of interrelated crises as a dynamic and mutually constitutive system. It is a concept that emphasises that environmental, economic, social, security and cultural disruptions do not overlap randomly but are causally interconnected and mutually reinforcing. This creates new conditions for examining and measuring quality of life, particularly in terms of the vulnerability and resilience of social systems. Recent synthesising studies published after 2023 indicate that the polycrisis functions as a framework for mapping configurational patterns of risk rather than being a one-off description of instability (Rakowski, 2025). This perspective shifts research on quality of life away from static, averaged indicators towards an exploration of the dynamics, variability, and uneven distribution of crisis impacts across populations.

In this context, it is important to highlight the sustainability dimension of quality of life, which in recent years has been conceptually linked to the framework of planetary boundaries and the so-called *doughnut logic,* that is, an understanding of well-being as a condition that can be maintained in the long term only within an ecologically safe and socially just space. This framework, developed in the work of Kate Raworth (2017), represents a synthesis of the environmental and social dimensions of development. Within this approach, sustainable quality of life is understood as a balance between the minimum social foundations that ensure dignified living conditions and the environmental limits whose transgression would disrupt the ecological stability of the planet. The space of sustainable well-being thus defined, whether expressed in terms of the *doughnut logic* or the *safe and just space* refers to a conceptual framework or range of conditions, rather than to a spatial entity in the physical-geographical sense (Raworth, 2017). The sustainability dimension of quality of life therefore provides an integrative bridge between indicators of quality of life and indicators of environmental sustainability, shifting the discussion from a purely anthropocentric towards an ecosystem-anchored evaluative framework. Recent literature on social transformation in the

era of polycrisis demonstrates that quality of life cannot be sustainable if it rests upon ecological degradation, social inequality, and dependence on unstable economic regimes. Accordingly, quality of life must be understood as a relational variable simultaneously grounded in (i) *social structures,* (repre-senting social relations, norms, rules, and mechanisms of solidarity), (ii) *collective infrastructures of care,* that is, the social mechanisms, institutions, and relations that enable people to sustain life and well-being (e.g. public services, community care, mutual aid and health and social infrastructure) and (iii) *ecological limits* (planetary boundaries), meaning the physically sustainable thresholds of our planet (Siirilä et al., 2024; Steffen et al., 2015; Rockström et al., 2009).

This connection paves the way for models of *resilient well-being* that are capable of functioning under conditions of polycrisis, rather than only after it. The concept of resilient well-being conceives quality of life as the dynamic capacity of societies to sustain dignified, meaningful, and ecologically sustainable forms of living even amid the persistent shocks associated with polycrisis (Siirilä & Salonen, 2024). This represents a shift from a static understanding of well-being towards a processual and adaptive conception of quality of life that integrates social resilience, ecological stability, and collective capacities for regeneration (Folke et al., 2016; Shrivastava & Zsolnai, 2022). Understood in this way, resilient well-being highlights the interrelationship between individual fulfilment and the resilience of socio-ecological systems, assuming that sustainable forms of well-being must be grounded within planetary boundaries and the social foundations of a dignified life (Raworth, 2017; Samuelsson et al., 2019; Béné et al., 2014).

DATA AND METHODS

The spatial scope of the research encompasses 29 European countries representing the opposing poles of the northwest–southeast axis of quality of life: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Slovakia, Spain, Sweden, and Switzerland. The selection of countries was conditioned by the availability of statistical data over the monitored period. The statistical analysis draws upon a set of 27 carefully selected indicators, aggregated into eight thematic categories, as defined within the Quality of Life section of the Eurostat database. The data were harmonised to enable comparison between the years 2018 and 2023. Specifically, these include:

A – Median income
B – At risk of poverty rate threshold
C – Life satisfaction
D – Inability to make ends meet

E – Main GDP aggregates per capita
F – Employment rates
G – Unemployment rates
H – Long-term unemployment
I – Average number of usual weekly hours of work in main job
J – Employed persons working on Saturdays as a percentage of the total employment
K – Employed persons working on Sundays as a percentage of the total employment
L – Employed persons working in the evenings as a percentage of the total employment
M – Employed persons working at nights as a percentage of the total employment
N – Life expectancy
O – Healthy life years
P – Self-perceived health
Q – Population by educational attainment level (Tertiary education)
R – Persons participating in any cultural or sport activities in the last twelve months
S – Persons getting together with family/relatives or friends every week
T – Persons getting together with family/relatives or friends once a month
U – Inability to face unexpected financial expenses
V – Arrears (mortgage or rent, utility bills or hire purchase)
W – Persons participating in formal/informal voluntary activities or active citizenship
X – Pollution, grime or other environmental problems
Y – Noise from neighbours or from the street
ZA – Overall life satisfaction
ZB – Persons being happy in the last four weeks.

In examining the above set of indicators and their impact on quality of life, three methods were employed: (i) the point method, (ii) correlation and regression analysis, and (iii) the principal component analysis (PCA) method.

The point method belongs to the category of indirect methods. The main reason for its application in this study lies in its ability to normalise a set of indicators expressed in different measurement units into a single synthetic, dimensionless measure. This form of normalisation enables the comparison of multiple regions or countries through one aggregated indicator of quality of life (Klamár et al., 2019). In the overall evaluation of quality of life as a synthetic variable, the most favourable value of each selected indicator was defined as the value that maximises its contribution to the overall assessment, regardless of whether

it is numerically higher or lower. This value was identified within the observed set of countries and adopted as the benchmark for comparison. Depending on the nature of the indicator (i.e. whether it exerted a positive or negative influence), the corresponding maximum or minimum value was determined and defined as 100 points. This benchmark subsequently served as the reference base for all further calculations, which followed the formulas below:

$$u_r = \frac{U_r}{U_{max}} . 100 \qquad \text{for positive indicators} \qquad (1)$$

$$u_r = \frac{U_{min}}{U_r} . 100 \qquad \text{for negative indicators} \qquad (2)$$

where: u_r – recalculated point value of the indicator in a given country,
U_r – actual value of the indicator in the country,
U_{max} – the maximum value of the indicator within the analysed set of countries in case of positive indicators,
U_{max} – the minimum value of the indicator within the analysed set of countries in case of negative indicators.

By assessing the point values of the selected indicators for each country and summing their scores, a quality-of-life index was obtained for the given country. The maximum achievable value of this composite index was 2,700 points.

Correlation and regression analyses were employed to determine the strength of the relationship between the monitored indicators and the resulting quality of life. The dependent variable was the quality of life, while the independent variables were the individual indicators under observation. The aim was to establish whether a relationship could be inferred between the variables and to determine the strength of this relationship. Assuming that a link exists between two variables whose strength can be expressed by their shared variability, one variable can be approximated by the other, thereby creating a regression model. The suitability of the model was verified using an analysis of variance (ANOVA) in the STATISTICA software, where the null hypothesis H_0 ("The model is not suitable for use") was tested. The F-value represented the test statistic, and its significance was determined by the p-value, indicating the lowest possible level of significance required to reject the null hypothesis. When $p \leq 0.05$, the null hypothesis was rejected at the significance level $\alpha = 0.05$. The strength of the linear relationship was assessed using Pearson's correlation coefficient (R), whose absolute values approaching 1 indicated a stronger relationship between quality of life and the respective indicator. The coefficient of determination (R^2) expressed the percentage of variability in the dependent variable that could be explained by the variability of the independent variable. The relationships among the monitored indicators were evaluated using a correlation matrix.

The principal component analysis (PCA) method, as applied in the works of Andráško (2008) and Macků and Voženílek (2019), was used to identify the factors influencing the quality of life. This method reduces the dimensionality of the dataset by transforming a large number of original variables into a smaller number of uncorrelated principal components. These components are ordered in descending order of explained variance, with the first principal component accounting for the largest share of the total variance of the original variables. The basic equation can be expressed as:

$$X = TP^T + E \quad (2)$$

(data structure + noise)

where: X – matrix of source data,
T – component score matrix,
P^T – transposed component loadings (weight) matrix,
E – residual matrix.

The appropriate number of principal components can be determined using the eigenvalue table and Cattell's scree plot. In the scree plot, significant principal components are distinguished from the less important ones (representing the lower part of the plot) by a visible drop in the curve. In practice, Kaiser's criterion is often applied, according to which components with eigenvalues greater than one are considered statistically significant. The percentage of explained variance criterion is also used to determine the optimal number of components. In the natural sciences, a higher threshold is typically required (around 95%), while in the social and human sciences, a level of approximately 60% is generally acceptable (Meloun et al., 2012).

RESULTS AND DISCUSSION

Based on the results of the point-based method (Tables 1 and 2), Norway (2018 – 1,987.2 points; 2023 – 1,904.2 points) and Switzerland (1,863.4 points and 1,826.8 points, respectively) achieved the highest overall level of quality of life in both years analysed, despite the recorded decline in their scores (–83.0 points and –36.6 points, respectively). These two countries were the only ones to exceed the threshold of 1,800 points in both years, which can be attributed to as many as 17 placements (2018) and 9 placements (2023) in the Top 5 highest-ranked countries across individual indicators in the case of Norway, and 11 and 10 such placements in the case of Switzerland. However, for Switzerland in 2023, it is also necessary to note its three placements among the Top 5 lowest-ranked countries for the indicators with the highest share of employees working on Saturdays (J), Sundays (K), and in the evening (L).

This pair of countries was complemented in 2018 by Sweden, which reached 1,920.4 points, but subsequently dropped by 187.7 points in 2023, falling to eighth place, and by the Netherlands in 2023 (1,918.9 points), which recorded a substantial increase of 137.6 points compared to 2018, the second highest increase among all countries. This rise of the Netherlands was driven by as many as 12 entries in the Top 5 best-performing countries, particularly for the indicators Life satisfaction (C), Inability to make ends meet (D), Employ-ment rates (F), Long-term unemployment (H), Inability to face unexpec-ted financial expenses (U), and Arrears (mortgage or rent; utility bills or hire purchase) (V).

The next group of countries (above 1,600 points) consisted of the Scandinavian states Denmark (1,764.9 points), Sweden (1,732.6 points), and Finland (1,642.2 points) together with the Benelux countries Luxembourg (1,746.3 points) and Belgium (1,641.9 points). This group also included other highly developed Western European countries, namely Ireland (1,738.4 points), Austria (1,651.7 points), and Germany (1,605.6 points). Countries in this tier, particularly those above the 1,700-point threshold, recorded between 4 and 8 placements in the TOP 5 best-performing countries across individual indicators, with the highest counts observed for Denmark (2018–8; 2023–8), Ireland (2018–8), and Luxembourg (2023–8).

A comparison between 2018 and 2023 reveals a decline in QoL amongst the Scandinavian countries, most notably in Finland (–97.8 points, a drop of three positions) and Denmark (–15.7 points). In Finland, the weaker performance in 2023 was associated with a higher proportion of employees working in the evening (L) and at night (M), as well as poorer outcomes in health-related indicators (O–Healthy life years; P–Self-perceived health). A moderate decline was likewise recorded for Luxembourg (–21.8 points) and Ireland (–27.0 po-ints). Among the remaining countries, Austria experienced a decrease of –73.9 points (down one place), while Germany declined by –56.2 points (down three places). The lower scores of Austria and Germany were partly due to only two and three placements, respectively, in the Top 5 best countries in 2023; in the case of Germany, however, the decline was compounded by three placements in the Top 5 worst-performing countries for the indicators Pollution, grime or other environmental problems (X), Noise from neighbours or from the street (Y), and Overall life satisfaction (ZA).

A distinct subgroup within this tier in 2023 comprised three countries of the "former Eastern Bloc" (highlighted in yellow in Tables 1 and 2), namely Poland (1,782.8 points), Lithuania (1,699.0 points), and Czechia (1,695.1 points). While Czechia experienced a decline of –53.6 points compared with 2018 (a drop of two positions), Poland recorded an increase of +125.5 points (up eight positions) and Lithuania an increase of +273.8 points (up twelve positions). Poland held a particularly notable position, achieving as many as nine placements in the Top 5, primarily for indicators associated with the lowest shares of employees working

on Saturdays (J), Sundays (K), in the evening (L), and at night (M). Lithuania exhibited a similar profile, with seven placements in the Top 5.

The third group of countries (above 1,400 points) displayed a different configuration. It consisted mainly of other "former Eastern Bloc" states such as Slovenia (1,573.1 points), Estonia (1,521.3 points), Hungary (1,493.1 points), and Croatia (1,431.7 points). Among these countries, the quality of life between 2018 and 2023 increased most markedly in Slovenia (+97.4 points, up five positions), while it declined substantially in Croatia (–104.1 points, down five positions) and Hungary (–72.0 points, also down five positions). This group was further joined by Malta (1,539.3 points) and Cyprus (1,505.5 points), which, alongside the post-socialist states, entered the EU in 2004. The only Western European country included in this tier was France, which fell into this group due to a decrease of –156.4 points in quality of life compared with 2018, corresponding to a drop of six positions in the overall ranking.

The fourth group consisted of the Southern European countries Italy (1,372.5 points), Portugal (1,342.1 points), and Spain (1,316.3 points). In comparison with 2018, the quality of life in Portugal declined by five positions (–159.3 points), while Spain recorded a drop of two positions (–57.7 points). These countries also registered a relatively high number of placements among the top five worst-performing countries, specifically 9, 6, and 7 placements, respectively. The only "former Eastern Bloc" country in this group was Slovakia (1,371.6 points), which showed only a slight increase of +13.5 points compared with 2018, yet recorded as many as 8 placements in the top five worst-performing countries.

The final group consisted almost exclusively of countries from the "former Eastern Bloc" with the lowest quality-of-life scores, namely Latvia (1,312.9 points), Bulgaria (1,291.6 points), and Romania (1,224.3 points), accompanied by Greece in the last position (1,196.5 points). The weak performance of these countries stemmed from poor outcomes across the majority of indicators. Greece and Bulgaria appeared as many as 14 and 15 times, respectively, among the top five worst-performing countries, while the remaining countries registered 10 to 12 such placements. Bulgaria displayed a somewhat specific profile, as it recorded four placements in the top five best-performing countries for indicators capturing the lowest shares of employees working on Saturdays (J), Sundays (K), in the evening (L), and at night (M), a pattern directly opposite to that observed for the highly ranked Switzerland. A further negative feature of this group is that, except for Bulgaria, all countries experienced a slight deterioration in quality of life compared with 2018, ranging from –4.7 to –21.2 points, whereas Bulgaria showed only a marginal increase of +1.0 point.

Tab. 1 Quality of Life in Selected European Countries (by Selected Indicators, 2018)

2018	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	ZA	ZB	Σ
Norway	91.7	74.4	100	81.0	71.0	96.0	57.9	53.8	90.3	48.2	45.3	27.8	45.2	98.8	96.7	60.8	92.6	100	88.7	59.4	70.6	56.6	51.8	72.4	74.1	98.8	83.3	**1 987.2**
Sweden	59.4	58.5	100	48.6	46.5	99.9	34.4	77.8	83.2	56.3	38.4	30.4	39.6	98.6	100	61.9	91.6	95.5	81.8	62.3	68.8	63.8	100	98.4	47.1	96.3	81.4	**1 920.4**
Switzerland	100	65.8	94.7	38.6	73.0	100	46.8	41.2	87.0	27.2	28.6	25.8	41.3	100	83.1	75.6	93.1	96.8	78.4	65.6	68.1	34.5	85.9	72.4	46.5	98.8	94.7	**1 863.4**
Netherlands	55.8	72.2	97.4	77.3	46.3	96.0	57.9	58.3	100	26.9	23.0	13.2	21.8	97.7	81.3	50.5	81.5	95.1	98.3	47.1	64.7	78.9	80.8	39.4	29.5	95.1	95.2	**1 781.3**
Denmark	70.0	75.6	100	48.6	52.6	93.9	43.1	70.0	91.1	52.3	35.3	26.1	42.2	96.7	83.7	55.9	80.5	95.0	62.6	80.3	55.2	34.5	30.4	77.8	44.0	96.3	87.1	**1 780.5**
Luxembourg	80.1	57.5	92.1	36.2	100	87.4	39.3	50.0	81.4	48.8	45.3	29.8	38.8	98.2	83.4	49.7	94.6	89.5	77.8	45.9	70.6	48.4	55.0	42.0	41.5	92.6	92.5	**1 768.1**
Ireland	57.9	64.4	94.7	23.6	69.3	89.8	37.9	33.3	84.1	24.8	22.9	29.6	39.6	98.1	95.3	97.9	100	83.7	80.8	51.2	37.3	26.8	41.5	96.9	85.1	100	98.8	**1 765.4**
Czechia	21.1	100	88.2	37.8	20.5	96.8	100	100	76.0	50.9	42.5	43.3	38.0	94.4	86.1	42.6	53.6	81.7	75.0	58.6	58.6	100	13.4	53.4	54.8	91.4	69.9	**1 748.7**
Finland	57.1	80.0	100	73.9	42.6	92.5	29.7	35.0	82.5	33.9	28.1	18.7	25.3	97.6	78.8	38.3	92.1	93.6	95.1	56.6	51.1	28.0	77.3	72.4	59.7	100	100	**1 740.0**
Austria	58.5	67.1	96.1	37.8	43.9	92.4	44.9	41.2	83.7	29.6	32.0	36.5	31.7	97.6	78.2	68.5	74.3	84.3	75.0	75.8	69.2	61.2	38.0	67.7	45.7	98.8	95.9	**1 725.6**
Germany	52.8	60.0	89.5	100	41.9	96.8	64.7	50.0	86.7	32.9	37.2	22.5	37.3	96.7	90.4	38.5	62.2	83.7	64.5	58.2	49.5	65.2	44.4	25.4	28.8	91.4	90.6	**1 661.8**
Poland	15.3	64.9	82.9	32.1	13.4	87.5	56.4	70.0	75.6	66.4	84.2	57.5	86.4	92.7	85.7	33.2	67.2	62.6	44.2	95.5	43.8	39.0	23.3	43.4	58.0	95.1	81.0	**1 657.3**
France	51.7	71.6	86.8	37.8	35.5	86.4	24.4	28.0	82.1	27.6	32.7	89.4	63.3	98.8	87.8	49.3	81.0	87.1	74.1	43.9	44.3	33.0	79.2	42.9	44.0	90.1	81.6	**1 654.2**
Belgium	55.1	58.5	92.1	21.0	40.7	84.5	36.7	26.9	82.3	36.5	40.0	42.4	63.3	97.5	87.1	60.8	88.9	78.4	100	33.2	56.7	49.2	15.7	43.2	45.2	93.8	92.7	**1 622.3**
Hungary	12.6	75.0	72.4	14.0	14.2	90.2	59.5	50.0	77.3	93.1	78.7	35.9	31.1	90.9	83.9	34.9	53.6	59.2	70.1	73.8	41.7	23.4	15.0	64.9	94.1	80.2	75.0	**1 565.1**
Croatia	15.3	49.7	68.4	12.1	13.1	79.0	25.9	20.6	77.3	58.7	75.0	100	100	93.3	79.0	61.5	54.3	47.2	62.0	48.0	26.3	16.1	18.2	100	100	77.8	56.9	**1 535.8**
Estonia	24.5	43.8	77.6	39.5	20.3	95.9	40.7	53.8	79.5	39.1	29.6	20.1	27.5	93.7	74.0	18.8	84.2	77.9	52.4	100	40.1	37.5	27.8	71.6	93.0	86.4	69.1	**1 518.7**
Malta	34.4	57.1	89.5	43.6	28.6	90.8	55.0	36.8	78.3	30.6	32.0	35.0	21.8	98.2	99.9	52.2	61.0	59.1	86.1	25.8	100	37.0	31.3	21.2	28.4	92.6	87.5	**1 513.9**
Portugal	21.7	55.5	71.1	12.8	20.1	91.4	31.0	21.9	76.8	100	100	44.2	67.9	97.3	80.5	20.8	55.8	71.5	82.5	32.0	40.1	45.5	31.6	48.8	34.8	82.7	63.5	**1 501.4**
Slovenia	30.8	72.2	82.9	30.4	22.2	91.4	43.1	31.8	77.9	42.4	38.1	20.6	22.6	97.3	76.2	43.0	70.9	79.8	74.8	72.5	42.0	22.1	31.3	38.4	55.9	88.9	76.1	**1 475.7**
Lithuania	16.0	41.9	68.4	30.9	16.5	94.3	35.5	35.0	78.9	49.4	50.0	42.4	73.1	90.7	79.3	14.8	89.1	69.0	48.5	95.5	28.5	29.1	20.1	37.1	54.1	79.0	58.2	**1 425.3**
Cyprus	35.7	62.3	80.3	8.2	25.4	89.6	26.2	25.9	77.9	26.0	32.7	37.2	50.0	98.9	85.4	100	97.3	61.4	72.0	11.9	28.1	13.9	6.7	64.3	40.8	87.7	71.6	**1 417.3**
Spain	34.4	44.7	82.9	16.3	26.3	81.2	14.4	10.9	81.4	26.0	26.8	21.0	31.1	99.6	93.4	48.4	84.0	67.2	86.5	34.8	38.7	31.9	25.2	62.4	47.1	90.1	67.1	**1 374.0**
Slovakia	17.3	78.7	78.9	20.2	16.8	87.8	33.8	14.9	76.6	38.8	29.4	17.8	12.7	92.4	77.1	47.8	54.3	73.8	64.7	41.0	44.1	30.3	8.9	65.6	71.4	87.7	75.2	**1 358.1**
Italy	39.2	47.3	84.2	17.5	30.1	76.4	20.8	10.8	82.3	22.7	31.4	25.6	22.6	99.5	91.8	32.1	42.5	53.6	88.2	32.8	39.6	50.0	20.1	53.8	73.4	86.4	51.0	**1 325.7**
Latvia	17.0	41.2	71.1	16.5	14.8	93.1	29.7	20.6	78.7	42.9	44.0	52.5	57.6	89.5	71.8	11.8	74.3	72.3	51.7	87.3	25.1	21.7	17.9	33.0	58.4	82.7	41.5	**1 318.8**
Bulgaria	8.3	43.6	56.6	6.4	8.5	87.8	42.3	19.4	75.4	46.3	61.5	37.8	44.2	89.5	90.4	42.2	61.2	34.6	44.7	85.2	43.3	9.4	11.8	44.7	85.1	66.7	43.5	**1 290.5**
Romania	7.6	40.9	86.8	12.7	10.7	84.7	52.4	31.8	77.1	31.0	36.4	29.0	35.2	89.9	81.6	56.5	38.3	32.0	57.7	54.5	30.3	18.2	11.5	42.6	39.8	91.4	65.1	**1 245.5**
Greece	18.3	51.9	68.4	4.5	17.0	72.1	11.4	5.6	73.1	19.3	28.6	10.9	31.1	97.7	89.8	99.1	68.4	55.4	72.9	36.1	27.6	7.0	26.8	30.7	41.5	79.0	56.9	**1 201.2**

Note:

(Green) – Top 5 best-rated countries for the given indicator

(Red) – Top 5 worst-rated countries for the given indicator

(Yellow) – Countries of the former Eastern Bloc

A–Median income, B–At risk of poverty rate threshold, C–Life satisfaction, D–Inability to make ends meet, E–Main GDP aggregates per capita, F–Employment rates, G–Unemployment rates, H–Long-term unemployment, I–Average number of usual weekly hours of work in main job, J–Employed people working on Saturdays as a percentage of the total employment, K–Employed people working on Sundays as a percentage of the total employment, L–Employed people working in the evenings as a percentage of the total employment, M–Employed people working at nights as a percentage of the total employment, N – Life expectancy, O–Healthy life years, P–Self-perceived health, Q – Population by educational attainment level (Tertiary education), R – People participating in any cultural or sport activities in the last 12 months, S–People getting together with family /relatives or friends every week, T–People getting together with family/relatives or friends once a month, U–Inability to face unexpected financial expenses, V – Arrears (mortgage or rent, utility bills or hire purchase), W–People participating in formal/informal voluntary activities or active citizenship, X–Pollution, grime or other environmental problems, Y–Noise from neighbours or from the street, ZA–Overall life satisfaction, ZB–People being happy in the last 4 weeks.

Source: Authors' own calculations based on Eurostat (2024)

Tab. 2 Quality of Life in Selected European Countries (by Selected Indicators, 2023)

2023	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	ZA	ZB	Σ
Netherlands	59.1	75.4	100	100	50.3	100	72.2	100	100	25.5	26.0	34.4	55.2	96.7	83.3	29.7	82.4	92.9	85.2	57.8	100	100	45.9	28.6	23.8	97.4	97.0	1918.9
Norway	84.4	85.2	97.4	58.6	68.4	96.3	72.2	100	91.6	18.5	16.7	39.1	40.0	97.4	96.0	48.9	89.9	93.8	79.2	70.2	65.7	32.5	100	44.2	48.6	97.4	71.8	1904.2
Switzerland	100	59.4	98.7	53.1	78.1	99.5	63.4	38.5	87.5	12.4	14.0	32.5	29.1	100	84.2	63.9	86.3	96.6	72.2	86.2	84.6	33.3	66.0	54.5	39.2	100	93.6	1826.8
Poland	20.3	70.0	85.5	44.7	16.8	93.3	92.9	62.5	78.6	45.2	55.6	92.9	94.1	92.7	88.9	29.5	71.2	65.6	60.9	83.9	61.9	51.0	9.1	59.2	72.0	97.4	87.0	1782.8
Denmark	68.5	83.1	93.4	37.8	53.3	95.6	51.0	100	93.2	27.5	20.2	35.1	40.0	96.6	79.6	54.4	76.2	98.5	55.8	94.0	68.8	33.3	25.1	57.5	42.9	96.2	87.2	1764.9
Luxembourg	96.2	52.1	89.5	77.3	100	89.6	50.0	29.4	83.4	28.1	30.5	32.9	25.0	98.3	85.8	45.1	98.1	100	76.3	54.6	66.0	29.9	54.8	44.2	22.2	93.6	93.4	1746.3
Ireland	62.0	81.7	89.5	26.6	81.1	94.7	60.5	45.5	88.3	14.0	14.3	34.2	32.0	97.4	94.0	81.9	100	85.7	70.4	75.2	46.4	24.5	19.0	55.3	67.0	97.4	100	1738.4
Sweden	55.0	60.9	97.4	48.6	43.0	98.9	33.8	31.3	82.5	21.5	16.0	43.3	34.8	98.3	94.7	41.1	89.9	85.0	58.8	98.2	72.9	38.8	51.3	84.0	62.6	96.2	93.9	1732.6
Lithuania	22.8	47.6	84.2	68.0	21.6	94.0	37.7	21.7	80.8	100	100	100	100	91.2	85.9	16.5	88.0	59.7	50.6	86.7	39.3	36.6	14.5	38.5	66.3	92.3	54.5	1699.0
Czechia	27.6	100	88.2	45.9	24.6	97.8	100	62.5	79.8	27.3	26.3	50.5	31.4	94.3	88.0	51.1	50.4	76.4	78.6	61.9	80.7	89.7	13.2	53.2	43.2	94.9	57.5	1695.1
Austria	63.5	65.8	96.1	34.0	43.6	92.5	51.0	45.5	88.0	16.4	19.2	53.6	31.4	96.2	86.8	56.5	72.1	74.1	75.1	77.1	69.7	37.7	30.5	52.5	33.5	98.7	90.8	1651.7
Finland	55.2	80.3	100	85.0	41.3	93.7	36.1	31.3	88.5	23.0	18.5	26.1	25.0	96.3	82.5	29.1	76.6	87.3	77.0	70.6	61.2	27.4	58.4	43.3	29.1	100	99.4	1642.2
Belgium	58.6	79.7	93.4	28.3	42.6	86.3	47.3	22.7	86.8	17.6	20.5	44.4	47.1	97.3	90.7	59.3	83.9	78.5	100	42.7	74.3	56.5	13.7	31.6	46.5	98.7	92.8	1641.9
Germany	53.1	68.1	89.5	54.8	41.7	97.1	83.9	50.0	90.5	21.6	26.9	34.2	34.8	95.8	87.0	41.6	62.2	94.5	71.0	63.8	45.4	31.3	39.8	25.0	26.6	89.7	85.7	1605.6
Slovenia	36.5	77.2	88.2	38.6	25.4	92.8	70.3	35.7	80.2	26.0	28.7	34.2	25.8	96.7	95.0	46.8	63.9	74.4	70.2	83.0	70.0	35.6	19.5	28.2	48.2	98.7	83.2	1573.1
Malta	38.2	59.0	89.5	30.4	31.2	97.4	74.3	62.5	81.0	13.5	13.0	34.0	16.3	98.6	100	71.3	66.1	50.5	89.7	41.7	100	45.6	22.8	12.1	21.4	94.9	84.1	1539.3
Estonia	30.5	43.6	82.9	63.0	23.5	98.3	40.6	38.5	83.8	33.9	27.2	33.5	30.2	92.9	84.5	24.3	77.3	77.3	43.6	97.7	52.3	44.8	19.5	48.8	69.8	92.3	66.6	1521.3
Cyprus	38.1	70.5	84.2	23.9	28.5	95.2	44.8	27.8	79.4	14.4	20.3	63.4	84.2	97.3	94.0	92.6	98.7	53.2	67.3	7.3	42.3	18.2	5.1	40.0	36.0	96.2	82.4	1505.5
France	48.8	63.6	84.2	21.8	34.8	89.1	35.6	27.8	84.9	13.4	17.0	68.4	42.1	98.0	91.7	50.4	80.7	72.2	66.5	72.0	54.1	26.0	30.2	26.3	31.8	91.0	75.4	1497.9
Hungary	15.0	74.8	77.6	21.5	17.3	96.6	63.4	35.7	79.8	55.9	48.1	61.2	36.4	90.7	89.2	36.5	55.2	52.0	78.2	61.5	50.5	24.1	8.9	28.8	67.0	92.3	75.1	1493.1
Croatia	19.9	50.8	75.0	25.4	16.7	84.8	42.6	23.8	79.4	23.0	26.9	52.0	33.3	92.7	85.9	70.7	53.4	48.8	66.0	44.0	38.4	20.5	7.4	100	100	91.0	59.2	1431.7
Italy	40.0	51.9	88.2	30.9	30.4	79.4	33.8	11.9	84.5	10.9	15.8	41.3	25.0	98.8	96.0	36.3	41.2	48.2	98.6	40.8	55.2	52.0	5.6	42.4	59.8	92.3	61.4	1372.5
Slovakia	18.6	68.5	76.3	16.3	19.0	92.8	44.8	13.2	79.8	24.1	20.5	30.6	14.3	92.1	81.6	48.9	55.4	53.0	73.7	41.3	54.3	29.5	10.4	72.4	77.9	93.6	68.7	1371.6
Portugal	23.9	57.6	78.9	17.0	21.3	93.4	40.0	20.0	79.4	16.5	18.9	40.9	28.6	97.2	84.2	25.5	58.2	68.6	86.8	47.7	52.1	50.0	23.6	27.5	23.3	91.0	69.9	1342.1
Spain	37.0	48.5	82.9	18.1	26.1	84.4	21.3	11.6	84.0	13.2	14.5	30.2	30.8	99.1	87.2	32.9	79.6	77.3	77.4	57.8	42.7	19.1	14.2	39.3	28.4	92.3	66.3	1316.3
Latvia	22.7	43.6	77.6	22.1	17.5	92.8	40.0	27.8	81.2	23.6	25.0	61.9	39.0	89.5	77.2	9.3	73.0	51.2	45.7	100	35.5	32.9	8.4	27.3	54.0	88.5	45.8	1312.9
Bulgaria	13.2	47.6	60.5	16.8	12.4	91.3	60.5	21.7	78.8	40.4	51.0	65.0	50.0	89.4	95.0	29.5	57.3	26.0	50.4	41.7	34.0	13.8	4.8	40.4	77.0	75.6	47.2	1291.6
Romania	13.3	46.4	92.1	17.3	14.3	82.3	46.4	22.7	78.8	21.5	30.1	33.3	29.1	90.3	84.0	57.2	34.5	29.7	60.5	51.8	34.3	18.1	7.9	35.9	34.4	98.7	59.3	1224.3
Greece	20.3	51.9	69.7	4.6	18.0	80.7	23.4	8.1	77.3	9.1	15.7	14.6	34.8	96.2	95.4	100	64.2	48.8	69.8	35.3	35.9	5.5	16.0	20.5	31.6	88.5	60.7	1196.5

Note:

(Green) – Top 5 best-rated countries for the given indicator

(Red) – Top 5 worst-rated countries for the given indicator

(Yellow) – Countries of the former Eastern Bloc

A–Median income, B–At risk of poverty rate threshold, C–Life satisfaction, D–Inability to make ends meet, E–Main GDP aggregates per capita, F–Employment rates, G–Unemployment rates, H–Long-term unemployment, I–Average number of usual weekly hours of work in main job, J–Employed people working on Saturdays as a percentage of the total employment, K–Employed people working on Sundays as a percentage of the total employment, L–Employed people working in the evenings as a percentage of the total employment, M–Employed people working at nights as a percentage of the total employment, N – Life expectancy, O–Healthy life years, P–Self-perceived health, Q – Population by educational attainment level (Tertiary education), R – People participating in any cultural or sport activities in the last 12 months, S–People getting together with family /relatives or friends every week, T–People getting together with family/relatives or friends once a month, U–Inability to face unexpected financial expenses, V – Arrears (mortgage or rent, utility bills or hire purchase), W–People participating in formal/informal voluntary activities or active citizenship, X–Pollution, grime or other environmental problems, Y–Noise from neighbours or from the street, ZA–Overall life satisfaction, ZB–People being happy in the last 4 weeks.

Source: Authors' own calculations based on Eurostat (2024)

In the next phase of the analysis, we focused on determining the strength of the relationship between the quality of life (expressed using the point method) on the one hand, and the individual indicators monitored on the other. The regression model proved to be suitable for application in almost two-thirds of the indicators analysed.

Strong correlations (0.68 and above) were observed in both periods between the quality of life and indicators reflecting material living conditions: A–median income, C–life satisfaction, and E–GDP and main components per capita. A strong correlation was also evident between quality of life and indicator R–people participating in any cultural or sport activities in the last 12 months, as well as between quality of life and indicator ZB–people being happy in the last four weeks (most of the time) or between the quality of life and indicator U–inability to face unexpected financial expenses. Conversely, very weak correlations were found (in both time horizons) between the quality of life and the following indicators: J–employed persons working on Saturdays as a percentage of total employment, K–employed persons working on Sundays as a percentage of the total employment, L–employed people working in the evenings as a percentage of total employment, M–employed people working at night as a percentage of total employment, O–healthy life years, P–self-perceived health, and Y–noise from neighbours or from the street (Table 3).

A more detailed examination of the mutual correlations among all monitored indicators revealed strong relationships between the following pairs: C–life satisfaction and ZA–overall life satisfaction (0.95 in 2018, 0.85 in 2023); V–arrears (mortgage or rent, utility bills or hire purchase) and D–inability to make ends meet (0.93 in 2018, 0.92 in 2023); F–employment rates and H–long-term unemployment (-0.78 in 2018, -0.75 in 2023); W–people participating in formal or informal voluntary activities or active citizenship and A–median income (0.70 in 2018, 0.79 in 2023); G–unemployment rate and H–long-term unemployment (0.90 in 2018, 0.80 in 2023); C–life satisfaction and ZB–people being happy in the last four weeks (most of the time) (0.83 in 2018, 0.71 in 2023); R–people participating in any cultural or sport activities in the last 12 months and A–median income (0.79 in 2018, 0.82 in 2023); A–median income and E–GDP and main components per capita (0.93 in 2018, 0.94 in 2023).

Tab. 3 Pearson's correlation coefficient between quality of life and selected indicators

Indicator	Pearson correlation coefficient (2018)	Suitability of linear regression model (2018)	Pearson correlation coefficient (2023)	Suitability of linear regression model (2023)
A	0.78	suitable	0.71	suitable
B	-0.64	suitable	-0.60	suitable
C	0.77	suitable	0.72	suitable
D	-0.69	suitable	-0.64	suitable
E	0.74	suitable	0.68	suitable
F	0.64	suitable	0.65	suitable
G	-0.50	suitable	-0.55	suitable
H	-0.65	suitable	-0.72	suitable
I	-0.67	suitable	-0.65	suitable
J	-0.24	not suitable	-0.27	not suitable
K	0.08	not suitable	0.00	not suitable
L	-0.13	not suitable	-0.22	not suitable
M	-0.18	not suitable	-0.25	not suitable
N	0.46	suitable	0.37	suitable
O	0.24	not suitable	-0.02	not suitable
P	0.16	not suitable	-0.05	not suitable
Q	0.53	suitable	0.60	suitable
R	0.82	suitable	0.78	suitable
S	0.40	suitable	0.12	not suitable
T	0.13	not suitable	0.43	suitable
U	-0.70	suitable	-0.72	suitable
V	-0.62	suitable	-0.53	suitable
W	0.69	suitable	0.64	suitable
X	-0.34	not suitable	-0.25	not suitable
Y	0.08	not suitable	0.04	not suitable
ZA	0.72	suitable	0.57	suitable
ZB	0.76	suitable	0.68	suitable

Source: Authors' own calculations based on Eurostat (2024)

From the above results, it is evident that the quality of life is largely dependent on material living conditions, the amount of time spent at work, and the ways in which this time is spent, which in turn is reflected in the perception of happiness.

The final stage involved identifying the factors that most strongly influence quality of life in the evaluated European countries. To this end, we applied the principal component method, which serves to reduce the number of variables and the overall dimensionality of the dataset. The scree plot of eigenvalues for 2018 (Figure 1) indicates that the first principal component explains 37.72% of the variance in the original variables, while the second accounts for 19.82%. A distinct inflection is visible at component number three, suggesting, according to established methodological conventions, the selection of three principal components, which together explain 65.46% of the total variance. From the perspective of the explained variance criterion, this level of explanation can be regarded as sufficient, given the social-scientific nature of the data. Kaiser's criterion of eigenvalues greater than one is not considered decisive in this case, as it would retain up to six principal components, which we regard as an overestimation.

The scree plot of eigenvalues for 2023 (Figure 2) likewise points to the presence of three main components. The first explains 33.71% of the variance in the original variables, the second 21.10%, and the third 8.98%. Together, these three components account for 63.79% of the total variance, yielding results that are broadly comparable to those obtained for 2018.

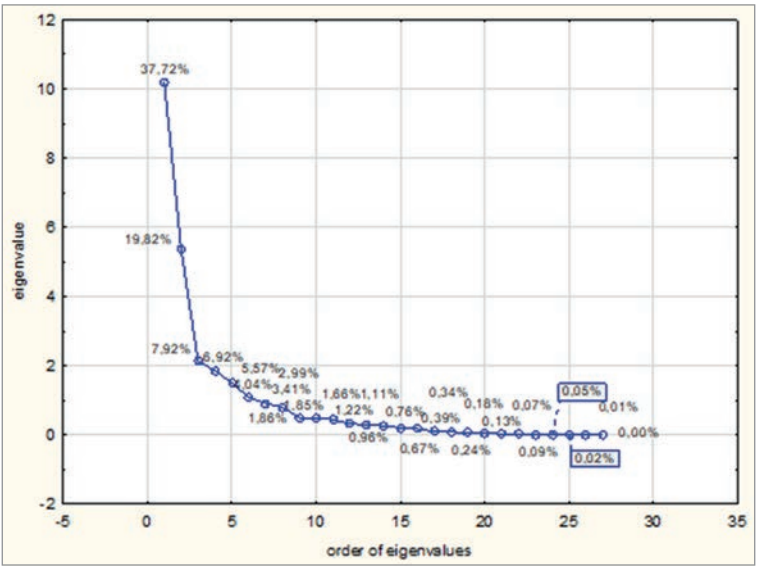

Fig. 1: Scree plot of eigenvalues (2018)
Source: Authors' own calculations based on Eurostat (2024)

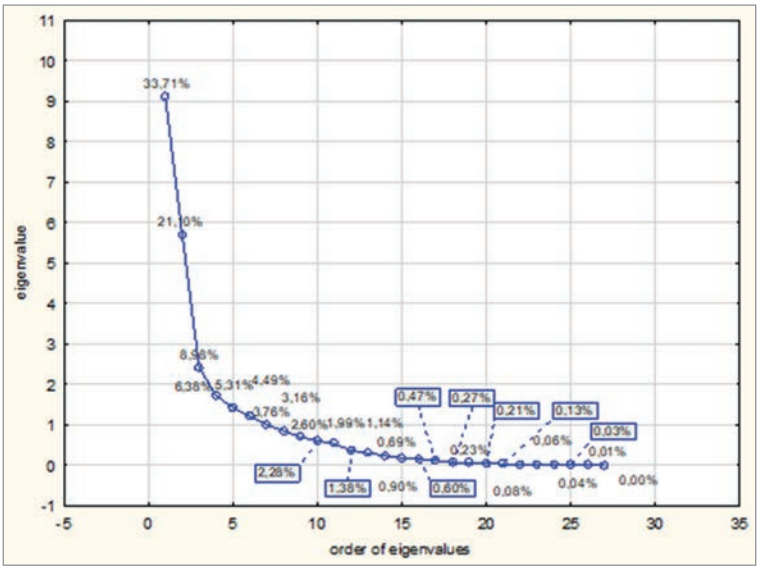

Fig. 2: Scree plot of eigenvalues (2023)
Source: Authors' own calculations based on Eurostat (2024)

The component loading graph highlights the importance of individual indicators as well as significant correlations among them. In 2018, the following indicators proved to be of major importance: C–life satisfaction, A–median income, ZA–overall life satisfaction, ZB–persons being happy in the last four weeks (most of the time), N–life expectancy, D–inability to make ends meet, H–long-term unemployment, and R–persons participating in any cultural or sport activities in the last 12 months. These indicators largely reflect the state of material living conditions. Although many of these indicators continued to play an important role in 2023 (A–median income, ZB–people being happy in the last four weeks (most of the time), C–life satisfaction, N–life expectancy, D–inability to make ends meet, H–long-term unemployment), the importance of indicators related to subjective life satisfaction (ZA–overall life satisfaction, C–life satisfaction) declined. Conversely, the indicators M–employed persons working at night as a percentage of total employment, Y–noise from neighbours or from the street, X–pollution, grime or other environmental problems, and O–healthy life years had only a negligible influence on the factors affecting quality of life in both periods analysed.

In the component loading graph for 2018 (Figure 3), several groups of mutually correlated indicators can be observed. The first group consists of the indicators A–median income, ZA–overall life satisfaction, ZB–people being happy in the last four weeks (most of the time), R–people participating in any cultural or sport

activities in the last 12 months, E–GDP per capita and main components, C–life satisfaction, W–people participating in formal/informal voluntary activities or active citizenship, and Q–population by educational attainment level. The strongest correlations were observed between the indicators ZA–overall life satisfaction and C–life satisfaction (r=0.95), and between A–median income and E–GDP per capita and main components, (r=0.93). High correlations were also evident between ZA–overall life satisfaction and ZB–persons being happy in the last four weeks (most of the time) (r=0.84), as well as between ZB–people being happy in the last four weeks (most of the time) and C–life satisfaction (r=0.83). In 2023 (Figure 4), within this group of indicators, the highest correlations were recorded between A–median income and E–GDP per capita and main components (r=0.94), ZA–overall life satisfaction and C–life satisfaction (r=0.85), and A–median income and R–persons participating in any cultural or sport activities in the last 12 months (r=0.82). The above group of indicators correlates negatively with indicators I–average number of usual weekly hours of work in main job, B–at risk of poverty rate threshold, and U–inability to face unexpected financial expenses.

In both periods under review, more pronounced correlations were also observed between the indicators G–unemployment rates and H–long-term unemployment (r=0.9 in 2018, r=0.8 in 2023), D–inability to make ends meet and V–arrears (mortgage or rent, utility bills or hire purchase) (r=0.93 in 2018, r=0.92 in 2023), and H–long-term unemployment (r=0.76 in 2018, r=0.77 in 2023). Moderate correlations were also evident between the indicators B–at risk of poverty rate threshold and U–inability to face unexpected financial expenses (r=0.58 in 2018, r=0.62 in 2023). These indicators correlate negatively with indicators C–life satisfaction, A–median income, E–GDP per capita and main components, R–persons participating in any cultural or sport activities in the last 12 months, S–persons getting together with family (relatives) or friends every week, ZA–overall life satisfaction, and ZB–persons being happy in the last four weeks (most of the time).

In the component loading graph, the indicators T–persons getting together with family (relatives) or friends once a month (negatively correlated with indicator S–persons getting together with family (relatives) or friends every week (r= -0.66 in 2018, r= -0.51 in 2023) and F–employment rates (strongly negatively correlated with indicator G – unemployment rates (r= -0.72 in 2018, r= -0.59 in 2023) appear separately. Strong correlations are also evident between the variables S–people getting together with family (relatives) or friends every week and N–life expectancy (r=0.77 in 2018, r=0.58 in 2023).

The table of factor coordinates of variables according to their respective correlations for 2018 (Table 4) shows the contribution of individual indicators to the respective factors (principal components). The table reveals that the largest contributions to the first factor are made by indicators C–life satisfac-

tion, A–median income, R–persons participating in any cultural or sport activities in the last 12 months, ZA–overall life satisfaction, ZB–people being happy in the last four weeks (most of the time), E–GDP and its main components per capita, I–average number of usual weekly hours of work in the main job, B–at-risk-of-poverty threshold, and W–people participating in formal/ informal voluntary activities or active citizenship.

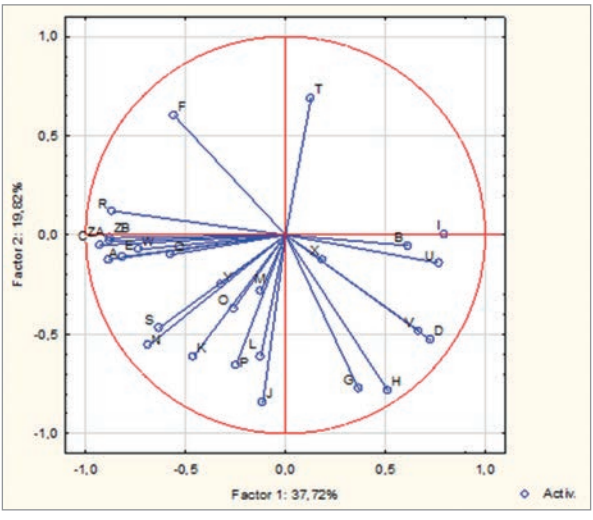

Fig. 3: Projection of variables onto the factor plane (2018)
Source: Authors' own calculations based on Eurostat (2024)

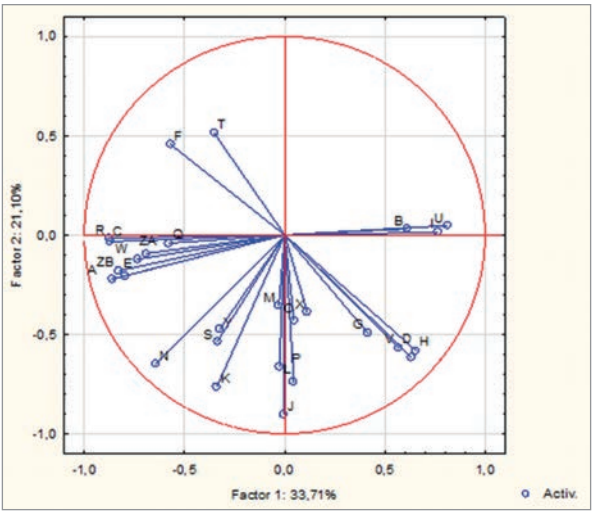

Fig. 4: Projection of variables onto the factor plane (2023)
Source: Authors' own calculations based on Eurostat (2024)

These indicators may be regarded as factor-pure, as their loadings on the remaining factors are negligible and thus reveal a distinct and unambiguous association with the first principal component. The first principal component is, however, also shaped by indicators D–inability to make ends meet, N–life expectancy, U–inability to face unexpected financial expenses, and V–arrears (mortgage or rent, utility bills, or hire purchase). Since these indicators also exhibit substantial loadings on the second or third factor, they cannot be considered strictly factor-pure.

In 2023 (Table 5), the first principal component was, similarly to the preceding period, defined by the same set of factor-pure indicators: A–median income, C–life satisfaction, E–GDP and its main components per capita, I–average number of usual weekly working hours in the main job, R–persons participating in any cultural or sports activities in the past twelve months, ZA–overall life satisfaction, and ZB–persons reporting happiness for most of the time during the last four weeks. Relative to 2018, the number of factor-impure indicators increased. Although these indicators continued to contribute substantially to the first factor, their loadings on the second or third factor were no longer negligible and, in certain cases, even exceeded their contribution to the first. The most notable among these were indicators D–inability to make ends meet, N–life expectancy, U–inability to face unexpected financial expenses, and V–arrears (mortgage or rent, utility bills, or hire purchase) observed consistently since 2003. These were accompanied by additional indicators, namely F–employment rates, H–long-term unemployment, and Q–population by educational attainment level. Furthermore, the contribution of indicator W–persons participating in formal or informal voluntary activities or in active citizenship – to the third factor increased perceptibly, indicating a gradual redistribution of variance among latent dimensions.

In light of the above, the first principal component in both examined periods may be interpreted as representing a *satisfactory working environment* one, that provides not only a sufficient and stable source of income and a sense of inner well-being, but also adequate resources for leisure and recreation through participation in cultural or sporting activities. The degree to which this environment can be considered satisfactory is reflected in the source data pertaining to the perception of quality of life. Events that unfolded between 2018 and 2023 suggest that, by 2023, the factor identified as a satisfactory working environment became more strongly associated with indicators of unemployment and long-term unemployment.

Although, in 2018, the second principal component was shaped by several indicators reflecting material living conditions, Saturday and evening work, employment, long-term unemployment, and health, only indicator J–employed persons working on Saturdays as a percentage of the total – could be considered *factor-pure*. The situation in 2023, however, exhibited a slight shift. Indicators J–employed persons working on Saturdays as a percentage of the total em-

ployment – and P–self-perceived health – could be regarded as almost factor-pure, even though the second factor was also significantly influenced by indicators relating to Sunday and evening work, inability to make ends meet, mortgage burden, employment and associated long-term unemployment, frequency of contact with family and friends, and overall life satisfaction. Taken together, these findings suggest that the second principal component in both periods can be characterised as *income earned at the expense of family, leisure, and health,* a latent dimension capturing the trade-offs inherent in the pursuit of economic stability under contemporary social and labour conditions.

Tab. 4 Factor coordinates of variables based on correlations (2018)

Variable	Factor loadings of variables derived from the correlation matrix		
(indicator)	Factor 1	Factor 2	Factor 3
A	-0.886	-0.124	-0.270
B	0.615	-0.053	-0.097
C	-0.929	-0.052	0.050
D	0.725	-0.529	-0.202
E	-0.818	-0.110	-0.284
F	-0.559	0.603	0.047
G	0.365	-0.773	-0.230
H	0.511	-0.781	-0.015
I	0.794	0.002	0.022
J	-0.114	-0.843	0.071
K	-0.461	-0.611	0.129
L	-0.124	-0.611	0.278
M	-0.123	-0.283	0.612
N	-0.686	-0.556	-0.084
O	-0.260	-0.371	-0.032
P	-0.247	-0.653	-0.357
Q	-0.577	-0.099	-0.565
R	-0.867	0.121	-0.131
S	-0.635	-0.469	0.137
T	0.127	0.690	-0.193
U	0.766	-0.140	-0.287
V	0.669	-0.483	-0.250
W	-0.735	-0.073	-0.131
X	0.184	-0.123	0.646
Y	-0.325	-0.248	0.541
ZA	-0.883	-0.031	0.022
ZB	-0.881	-0.014	0.063

Source: Authors' own calculations based on Eurostat (2024)

Tab. 5 Factor coordinates of variables based on correlations (2023)

Variable	Factor loadings of variables derived from the correlation matrix		
(indicator)	Factor 1	Factor 2	Factor 3
A	-0.863	-0.222	-0.283
B	0.612	0.031	-0.397
C	-0.873	-0.033	0.013
D	0.634	-0.617	-0.160
E	-0.795	-0.205	-0.286
F	-0.570	0.457	0.095
G	0.414	-0.494	-0.529
H	0.654	-0.582	-0.221
I	0.765	0.014	0.208
J	-0.006	-0.905	-0.045
K	-0.339	-0.763	-0.044
L	0.045	-0.741	-0.243
M	-0.030	-0.357	0.346
N	-0.644	-0.650	-0.017
O	0.046	-0.432	0.346
P	-0.026	-0.662	0.128
Q	-0.577	-0.041	-0.484
R	-0.877	-0.015	-0.309
S	-0.336	-0.537	0.560
T	-0.352	0.514	-0.454
U	0.813	0.048	-0.353
V	0.569	-0.566	-0.337
W	-0.735	-0.123	-0.277
X	0.112	-0.390	0.423
Y	-0.323	-0.472	0.135
ZA	-0.691	-0.093	0.122
ZB	-0.827	-0.180	0.051

Source: Authors' own calculations based on Eurostat (2024)

The third principal component in 2018 was predominantly shaped by indicators Q–population by educational attainment level, X–pollution, grime, or other environmental problems, Y–noise from neighbours or from the street, and M–employed persons working at night as a percentage of total employment. In 2023, it was primarily influenced by indicators G–unemployment rates, Q–population by educational attainment level, S–people meeting family (relatives) or friends on a weekly basis, T–people meeting family (relatives) or friends once a month, and X–pollution, grime, or other environmental problems. In both years, the third factor exhibited strong correla -

tions with qualitative indicators reflecting environmental quality, educational attainment, and the strength of social and familial ties. This suggests that the latent dimension captured by the third principal component can be broadly interpreted as the *quality of the living environment and social connectedness*, integrating aspects of ecological conditions, education, and interpersonal relations within the wider context of well-being.

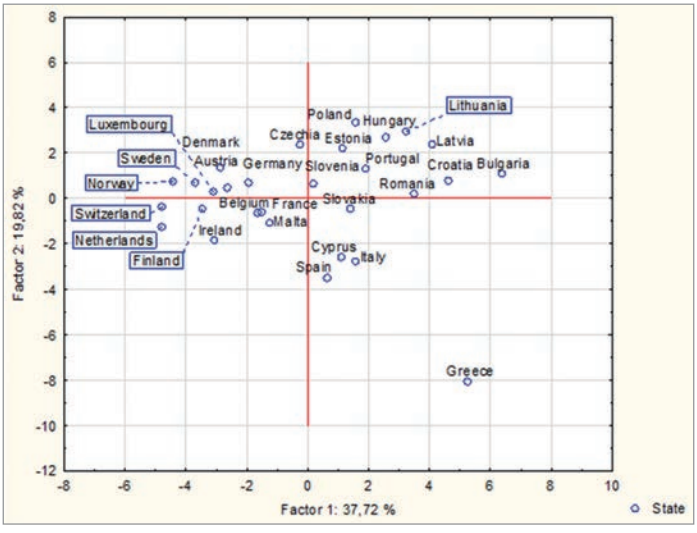

Fig. 5: Projection of cases onto the factor plane (2018)
Source: Authors' own calculations based on Eurostat (2024)

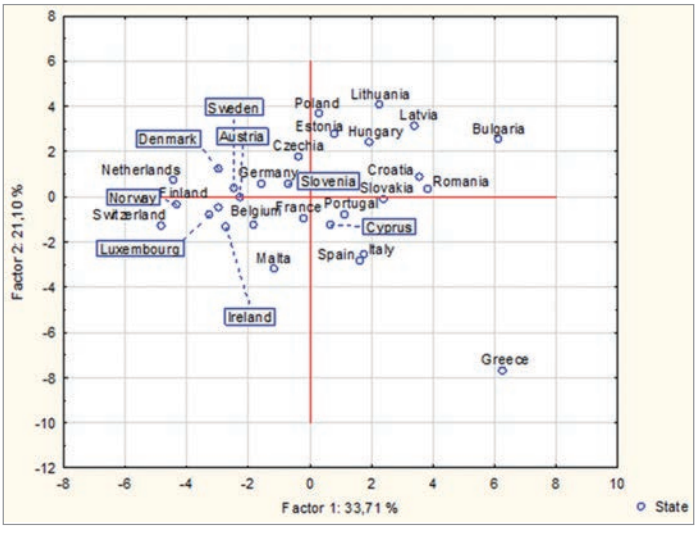

Fig. 6: Projection of cases onto the factor plane (2023)
Source: Authors' own calculations based on Eurostat (2024)

By overlaying the graphs of component loadings (Figures 3 and 4), and component scores (Figures 5 and 6) into a single plot, it is possible to visualise the relationships between indicators and objects (i.e., selected countries). The proximity of the indicator vectors labelled B–at-risk-of-poverty rate threshold and I–average number of usual weekly hours of work in the main job – to countries such as Bulgaria and Romania suggests a close association between these indicators and the respective national profiles. In Romania, the value of indicator B reached 23.5% in 2018 (compared with the overall mean of 16.52%), and in Bulgaria 22% (overall mean 16.52%). In 2023, the figures were 21.1% for Romania and 20.6% for Bulgaria (overall mean 16.03%). In both countries, people spend a substantial proportion of their lives at work – in 2018, 39.8% in Romania and 40.7% in Bulgaria (EU mean 37.98%), and in 2023 both countries recorded 40.1% (EU mean 37.82%). Bulgaria may also be regarded as a heavily indebted country. Following Greece, it recorded the second-highest level of mortgage arrears (indicator V) in the EU in both observed periods – 31.9% in 2018 and 18.8% in 2023. Although the figure declined over time, it remained markedly high (18.8%). Romania (16.5% in 2018, 14.4% in 2023) and Cyprus (21.6% in 2018, 14.3% in 2023) likewise exhibited comparatively elevated values. The poor economic conditions in Romania and Bulgaria are further evidenced by the high values of indicator U–inability to face unexpected financial expenses – which reached 45.9% in Romania in 2018 and 46.4% in 2023, and 32.1% in Bulgaria in 2018, rising to 46.7% in 2023 (EU mean 32.4% in 2018 and 30% in 2023).

As previously noted, Greece exhibited high values for indicator V, a pattern clearly reflected in the component loadings plot through its proximity to this indicator. A similar configuration was observed for indicators D–inability to make ends meet, G–unemployment rates, and H–long-term unemployment. The critical condition of Greece's public finances became evident in March 2012, when the government admitted its inability to service a national debt exceeding EUR 260 billion. Despite the introduction of as many as fourteen recovery packages since 2017, including the abolition of early retirement, increases in value-added tax, income tax, and the so-called luxury tax (Odkladal, 2023), these austerity measures have left a lasting imprint on the population. Consequently, the quality of life in Greece tends to be perceived predominantly through economic factors such as the inability to make ends meet (D–38.2% in 2018, 36.7% in 2023), inability to cope with unexpected financial expenses (U–50.4% in 2018, 44.3% in 2023), and arrears on mortgages, rent, energy bills, or instalment purchases (V–43% in 2018, 47.3% in 2023), the highest levels recorded within the EU in both reference periods. These are accompanied by persistently high unemployment (G–19.3% in 2018, 11.1% in 2023) and long-term unemployment (H–12.5% in 2018, 6.2% in 2023). The adverse effects of unemployment (G) and long-term unemployment (H) on quality of life are also evident in Spain (G – 15.3% in 2018, 12.2% in 2023;

H–6.4% in 2018, 4.3% in 2023) and Italy (G–10.6% in 2018, 7.7% in 2023; H–7.7% in 2018, 4.2% in 2023). In these countries, people also tend to work frequently on Saturdays (J–41.9% in Greece in 2018, 41.7% in 2023; 35.7% in Italy in 2018, 34.9% in 2023; 31.2% in Spain in 2018, 28.7% in 2023; compared with a median of 20.9% across all countries in 2018 and 17.6% in 2023) or during evening hours (L–38.6% in Greece in 2018, 35.7% in 2023; 20% in Spain in 2018, 17.2% in 2023). This pattern may, to some extent, be associated with the cultural and climatic characteristics of southern Europe, particularly the prominence of social life, and higher evening activity levels during the warmer summer months.

A variety of economic factors negatively affecting quality of life also appear to be of particular relevance to respondents in Latvia (B–23.3% in 2018, 22.5% in 2023; I–39.0% in 2018, 38.9% in 2023; U–55.3% in 2018, 44.8% in 2023), Lithuania (B–22.9% in 2018, 20.6% in 2023; I–38.9% in 2018, 39.1% in 2023; U–48.8% in 2018, 44.8% in 2023), and Estonia (B–21.9% in 2018, 22.5% in 2023; V–30.4%). In 2023, Latvia and Estonia recorded the highest values for indicator B (at-risk-of-poverty rate threshold) among all countries under review, while Latvia also registered the highest value of indicator U (inability to face unexpected financial expenses) in 2018. By contrast, the perception of quality of life in several northern and north-western European countries such as Norway, Sweden, Finland, the Netherlands, Luxembourg, and Switzerland appears to be shaped by different priorities. Owing to their relatively high levels of economic development (Luxembourg, the Netherlands, Denmark, Sweden, Ireland, and Finland all display GDP per capita in purchasing power parity well above the EU average), the values of indicator A (median income) exceeded twice the average of all observed countries in Switzerland (43,013 in 2018, 49,524 in 2023) and Luxembourg (34,472 in 2018, 47,636 in 2023), and were likewise very high in Norway (39,438 in 2018). In these economically advanced societies, people tend to focus more strongly on qualitative dimensions of well-being, for instance, participation in cultural and sporting activities during the last twelve months (R–Norway 92.5% in 2018, 76.8% in 2023; Switzerland 89.5% in 2018, 79.1% in 2023; Sweden 88.3% in 2018, 69.6% in 2023; the Netherlands 88% in 2018, 76.1% in 2023; Denmark 87.9% in 2018, 80.7% in 2023; Finland 86.6% in 2018, 71.5% in 2023; Luxembourg 82.8% in 2018, 81.9% in 2023; Ireland 77.4% in 2018, 70.2% in 2023) and regular contact with family and friends (S). These indicators point to a broader understanding of life satisfaction, one grounded less in economic security and more in social engagement and cultural participation. Frequent contact with family or friends (at least once a week) remains an important aspect of social life for residents of Malta (43.6% in 2023), Italy (47.9% in 2023), and Portugal (42.2% in 2023). In 2018, the highest values for this indicator were recorded in Belgium (46.8%), the Netherlands (46.0%), Finland (44.5%), Norway (41.5%), Italy (41.3%), Spain (40.5%), and Malta (40.3%). The significance of maintaining contact with family

and friends, albeit at a lower frequency than in Italy and Portugal, is also evident in Estonia (24.4% in 2018; 21.3% in 2023) and Latvia (21.3% in 2018; 21.8% in 2023). More than 20% of respondents reported monthly contact with family or friends in Bulgaria (20.8%), Lithuania (23.3%), and Poland (23.3%) in 2018, and in Sweden (21.4%) and Denmark (20.5%) in 2023. Overall, the data indicate a decline in participation in cultural and sporting events between 2018 and 2023 across most of the countries mentioned above. Fourteen of the twenty-nine countries surveyed experienced a decrease in the frequency of weekly social contact. The sharpest decline was observed in Sweden (a reduction of 9.7%), whereas the largest increases were recorded in Poland (8.9%), followed by Italy (6.6%) and Slovakia (5.5%).

Having sufficient time to maintain close relationships and to engage in leisure activities such as cultural and sporting events is reflected in higher overall life satisfaction (Finland 8.1% in 2018, 7.8% in 2023; Ireland 8.1% in 2018, 7.6% in 2023; Norway 8.0% in 2018, 7.6% in 2023; Switzerland 8.0% in 2018, 7.8% in 2023), and contributes to the conditions fostering a sense of happiness. In 2023, the pattern of overall life satisfaction changed only marginally compared to 2018, with the highest scores observed in Switzerland and Finland (7.8%), followed by Belgium, Austria, Poland, Romania, and Slovenia (7.7% each). Nevertheless, the results of the descriptive data analysis indicate very small differences among countries (coefficient of variation of 8.86% in 2018 and 5.25% in 2023). In both periods, Bulgaria recorded the lowest values (5.4% in 2018 and 5.9% in 2023).

More than 60% of respondents in Ireland (63.3%), Finland (64.1%), Austria (61.5%), the Netherlands (61.0%), and Switzerland (60.7%) reported in 2018 that they had felt happy most of the time during the previous four weeks. In 2023, this share exceeded 60% in Ireland (67.1%), Finland (66.7%), the Netherlands (65.1%), Sweden (63.0%), Switzerland (62.8%), Luxembourg (62.7%), Belgium (62.3%), and Austria (60.9%). Differences across countries were again minimal (coefficient of variation: 21.9% in 2018; 21.3% in 2023). The lowest levels of happiness were consistently found in Bulgaria (27.9% in 2018, 31.7% in 2023) and Latvia (26.6% in 2018, 30.7% in 2023). In most of the countries surveyed (21 out of 29), the perception of happiness over the last four weeks increased between 2018 and 2023. The most pronounced improvements were recorded in Sweden (+10.8%), Cyprus (+9.4%), and Italy (+8.5%).

CONCLUSIONS

Spatial differentiation in the quality of life across Europe, examined using the point method (Tables 1 and 2), clearly confirms a stable northwest–southeast gradient that corresponds to the long-term trajectory of socio-economic convergence and divergence within the European space. The countries of north-western Europe (Switzerland, Norway, Denmark, Sweden, Finland, Luxembourg, and the Netherlands) exhibited the highest levels of the composite quality-of-life indicator.

Their profile is characterised not only by favourable material conditions but also by a high degree of subjective life satisfaction, active participation in cultural and social life, and a relatively harmonious balance between work and leisure. This pattern may be described as a model of quality of life "as cultivated well-being," wherein, once basic economic security has been achieved, post-material dimensions of well-being come to the fore (Pacione, 2003; Woźniak & Tobiasz-Adamczyk, 2014; Murgaš, 2016). In contrast, the south-eastern part of Europe (Romania, Bulgaria, Greece, Latvia, and, to a lesser extent, Slovakia and Croatia) was characterised by a higher proportion of economically vulnerable households, lower income levels, an increased risk of indebtedness, and limited capacity to cope with unexpected expenses. In these countries, quality of life is primarily conceptualised as existential stability, which is consistent with the results of the correlation analysis (Table 3), where indicators reflecting economic security (U, V, D) proved to be strong predictors of the overall level of quality of life.

A positive convergence trajectory can be observed in the Central European countries, particularly Slovenia, Poland, Lithuania, and Estonia, where a shift towards higher quality-of-life values was evident between 2018 and 2023. This development was primarily driven by real income growth, labour market stabilisation, and the gradual strengthening of cultural and civic participation. These changes are further corroborated by the PCA results (Figures 1–4), according to which countries with improving economic performance have moved from a factor zone dominated by economic stressors to one characterised by a stronger presence of post-material qualitative values. The PCA confirmed the existence of three dominant dimensions of quality of life:

1. Economic prosperity and subjective well-being (A, E, C, ZA, ZB, R) – the fundamental axis of differentiation, weakened in 2023 by rising uncertainty.
2. Tension between work, leisure, and health (I, J, L, M, D, H) – particularly pronounced in Southern Europe.
3. Social relations, education, and environmental conditions (Q, S, T, X, Y) – more prominent in countries with established economic stability.

The period under review (2018–2023) was profoundly shaped by a polycrisis – a sequence of several concurrent and mutually reinforcing crises (notably the COVID-19 pandemic, the energy crisis, inflation, and growing security uncertainty) that altered the perception of quality of life (Matlovičová, 2024). The findings revealed that the polycrisis reshaped the relative weight of the quality-of-life dimensions. Whereas in 2018, factors such as subjective satisfaction, cultural participation, and social integration played a dominant role in high-well-being countries, during the polycrisis, dimensions associated with income security, employment, energy affordability, and social stability came to the forefront (Eurofound, 2022; OECD, 2024).

Both the correlation and PCA analyses confirm these shifts, demonstrating an increased weight of indicators reflecting economic resilience (U, V, D). In other words, the polycrisis has altered the hierarchy of individual expectations: in highly prosperous countries, it has reduced the salience of satisfaction and happiness (decline in the importance of indicators C and ZA), while in economically weaker countries, it has intensified the emphasis on material security and resilience to financial shocks.

The differences between European regions have not been levelled out as a result of the polycrisis; rather, they have deepened. Northern and Western Europe entered the polycrisis with high levels of social capital, robust institutions, and diversified economies (Esping-Andersen, 1999; Nolan, 2021). These countries were able to absorb the crisis shocks without a significant deterioration in quality of life, as evidenced by stable or only slightly declining levels of subjective well-being (Eurostat, 2023). In these contexts, quality of life has evolved from an ideal of *prosperity* towards an ideal of *resilient well-being* (Helliwell, Layard & Sachs, 2022). In contrast, the countries of South-Eastern Europe entered the same period with pronounced structural vulnerabilities, such aslower wages, a high share of the working poor, weaker healthcare infrastructure, and strong energy dependence (Halás & Kladivo, 2012; World Bank, 2023). Consequently, the polycrisis accelerated economic stress at the household level, which manifested in a substantial decline in life satisfaction and a rise in social insecurity. In other words, in North-Western Europe, quality of life shifted from *well-being* to *well-being under uncertainty*, whereas in South-Eastern Europe it shifted from *survival* to an *experienced threat to survival*. Our research thus supports the argument of Homer-Dixon et al. (2015) and Beck (2009) that the polycrisis does not operate as a primary source of divergence but rather as an accelerating framework within which the varying levels of institutional stability, social capital, and economic resilience across countries become more visible and effective in differentiating the resultant quality of life. The polycrisis can therefore be understood as a mechanism that amplifies pre-existing inequalities. It did not create new disparities per se but has deepened existing ones by imposing greater demands on the economic and social resilience of territories, factors that determine the extent to which countries are able to process uncertainty and absorb unpredictable shocks (Beck, 2009; Homer-Dixon et al., 2015).

In light of these findings, policies aimed at enhancing quality of life should extend beyond measures focused solely on economic growth to encompass social dimensions, with the objective of achieving a more balanced relationship between economic performance and psychosocial capital such as care infrastructure, social cohesion, and cultural participation. Strengthening household resilience is also crucial, particularly in South-eastern European countries where reducing

vulnerability to financial shocks is a key priority. This involves encouraging savings, ensuring affordable access to energy, and reducing household debt. Finally, investment in the soft factors of regional resilience, such as education, community participation, volunteering, as well as cultural and leisure activities, has proven pivotal in countries with a higher quality of life.

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