GREEN

in the context of local financial and demographic differences

PAWEŁ DZIEKAŃSKI



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INTRODUCTION

Economic development is spatial in nature. Uneven endowment of regions with production factors, availability of natural resources and technology, together with historical conditions, cause uneven development of areas. Additionally, it results from the processes of concentration of economic activity, regional development (its dynamics and structure), population migration, and the specific conditions of individual regions (Klasik, 2001). An element of differentiation becomes the internal dynamics of business development (Best, 2001; Best 2003), the quality of the environment (natural and social) (Zaucha, 2007). This may indicate the need for a renewed definition of local development factors in relation to socio-economic development processes (green transformation processes of the region).

The process of an individual's action takes place in the space of the natural, economic, social, infrastructural environment, etc. (Dijkstra, Annoni, Kozovska, 2011). They form a network of interconnections acting for the benefit of the community, are interdependent, and should be considered together. The processes of shaping activities are carried out under objective conditions to achieve integrated order (Zakrzewska-Półtorak, 2011).

The region's local resources determine the level of development. It is necessary to look for regularities that explain not only the spatial differentiation of their development but also its structures and local conditions. The existence of differences in the development of units is an objective phenomenon, while their measurement is subjective. Development factors can be both internal and external from the point of view of a given unit and should form a balanced whole. The causes of the current changes we are observing in the economy can be seen in demographic change (e.g., the process of urban shrinkage), growing social disparities, the growth of large cities, increasing demand for resources (materials, energy, and water), growing environmental disparities, and changes in production that are too material- and energy-intensive and thus unsustainable.

The development of territorial units (counties) is a complex phenomenon that is difficult to assess unambiguously (e.g., due to the availability of detailed, homogeneous variables for all surveyed units). It can be characterised on the basis of variables depicting the demographic situation and labour market, the social potential, the economic structure of the county, the technical infrastructure, the state, and the protection of the natural environment. Development requires the proper formation of resources and principles of action, and then the setting of goals and ways to achieve them (Klasik, Kuźnik, 2001; Kuciński, 1998). The assessment of the performance of districts in the conditions of a networked economy depends on systemic solutions allowing for independence in undertaking activities, financial resources, the natural environment, infrastructure, entrepreneurship, and the ability to cooperate. As the complexity of phenomena increases, their uncertainty increases, which makes the quality of human decisions increasingly dependent on the quality of the information they have (Jajuga, 1993).

It is also important to keep the region coherent in four dimensions: coherence over time, social, economic, and environmental. All these dimensions are to operate in the same space. In this context, the sustainable development of regions is crucial, as this is what can lead to an improvement in the quality of life of the inhabitants (Miłek, 2018). In the context of discussions about the diffusion effects of economic growth, or the polarisation or convergence of regions, it is pointed out that growth trends in the poorest areas can be stimulated through strong territorial growth poles (growth centres, which can become county cities). One of the key factors shaping growth poles, on the other hand, is the presence of attractiveness or innovation driving industries in a given region.

The dominant linear model of economic growth (take, produce, and waste) is based on the assumption that natural resources are widely available and unlimited, which is an obstacle to further economic, social, and environmental development (Rogall, 2010). This poses a sustainability problem because it raises economic, environmental, and social issues. The dwindling resources of raw materials are forcing the economical management of waste. Closing the production cycle to a closed loop is also indicated, resulting in a sustainable development policy.

A green economy (GE) (closed loop) is an economy that leads to improved well-being and social equity while significantly reducing economic risk and natural resource scarcity (Newton, Cantarello, Shiel, and Hodder, 2014). Features of the green economy include low carbon emissions, efficient use of natural resources, and social inclusion. It is based on a holistic approach to the principles of sustainability, i.e., achieving a balance between economic, environmental, and social goals (Denona Bogovic, Grdic, 2020), which implies active engagement at the level of public policy and at the level of implementation in the territory (Dogaru, 2020).

Green growth is a prerequisite for sustainable development, which is essential for a better life. It takes into account both the quality and efficiency of development and focuses on efficient resource use and environmental protection. It is influenced by economic, social, energy, environmental, and technological factors (Wang, Zhao, Gong, Ji, 2019). Sustainable economic development requires ensuring economic growth and environmental development by providing a bridge between sustainable economic growth, social justice, employment, and environmental protection. It requires financial, material, and human resources to work together to produce positive economic outcomes (Pociovălișteanu, Novo-Corti, and Aceleanu, 2015). Sustainable economic development should be realised through the development of a green economy based on energy reduction and clean energy (Chapple, Kroll, and Lester, 2011).

Green infrastructure is a strategically planned, designed network of natural and semi-natural areas managed to protect the value and services of ecosystems, providing associated benefits to society (EEA Technical report 2011). Its importance is primarily related to the provision of clean water and air, places for recreation, protection from flooding. The concept emphasises the importance of the natural environment in spatial planning decisions (Giedych, Szulczewska, Maksymiuk, 2012). The benefits of green infrastructure have been studied in relation to environmental, social and economic impacts. Environmental benefits include biodiversity and open space protection, economic benefits include sustainable water and flood risk management, efficient energy use, and social benefits through increased green space (Shao, Kim, Li, 2021; Parker, Zingoni de Baro, 2019). These include water management and quality improvement, improved energy efficiency, air pollution and carbon sequestration, noise reduction, food production and improved aesthetics of the built environment (Tayouga, Gagné, 2016).

Analyses conducted by P. Churski and his co-authors (2013), M. Stanny (2015) and P. Dziekański (2020) show that the element that influences development opportunities is financial potential. Identifying the economic potential on a local scale makes it possible to identify problem areas in order

to then take measures to improve the economic situation (Czornik, 2013). As D. Milczarek (2005) points out, local potential is the sum of, inter alia, geographical, demographic, economic, social, etc. elements. I. Kiniorska (2014) distinguishes three types of it: demographic, economic, and infrastructural. When looking at the potential and possibilities of the local economy, it is necessary to diagnose the intangible and tangible factors of development. These also influence the green potential or its specialisations. The interconnectedness of the elements of the regions' operating environment - the elements of economic and social activity - is an instrument for realising economic potential.

The multidimensionality of the social, economic and spatial processes that make up the region's activities. In view of the necessity to determine the proper relations between individual development goals at the social, economic and environmental levels, effective implementation of development policy is a particularly difficult challenge for local authorities (Luczyszyn, 2013). It requires a wealth of information that should provide a multidimensional space to support the decision-making process of local authorities. Indicators at the local level are needed to achieve policy goals and development. There is a lack of ongoing analysis of the regions' situation to address the challenges faced by local authorities. It is also important to define the future and possible scenarios for the development of regions on the basis of diagnosed endogenous resources and recommendations, especially in the situation of the economic and energy crisis of recent years or the armed conflict in Ukraine.

The aim of the study was to identify and assess the spatial disparity of the green economy and its relationship with the financial situation and quality of life at the district level. The research process sought to identify the essence of the green economy, build a synthetic measure of the green economy (financial situation, quality of life), identify the determinants of the green economy process and the areas affected by green economy polarization, and determine the strength of their interplay in the changing pattern of developmental disparities in the district economy between 2010 and 2020 (Figures 1 and 2). A synthetic measure was used for the assessment, which made it possible to rank and group the studied districts from the point of view of the main criterion, as well as to examine whether and to what extent the diagnostic variables determine the differentiation of the studied areas.

INTRODUCTION

Scope of subject matter	Entity (territorial) scope	Time scope
Object of the study (potential of the region): green economy and its components, financial situation, quality of life, green infrastructure, waste management, demography, entrepreneurship, infrastructure, ecology and environment, diversi- fied development	Study area (subject): districts (counties) in Poland; 314 terrestri- al districts	Years of study: 2010-2020

Figure 1. Subject, entity (territorial) and time scope Source: own study

For the research purpose, the main hypothesis was formulated: The districts, thanks to their diverse endogenous resources, foster positive changes in socioeconomic space as a result of the relationship of transformation processes towards a green economy and an adequate financial situation and quality of life, and specific hypotheses:

The concentration of GE resources at the poles of development is an obstacle to the steady and coherent development of individual districts.

The development of GE and its diversification have a significant impact on the spatial changes of the areas located in the zone of influence of the more developed units.

The transformation process towards GE does not have a large impact on the financial situation due to the dependence of the district budget on transfers from the state budget and the different scope of the statutory tasks of the districts.

The green infrastructure and quality of life influence the green economy process.

Peripheral areas are characterised by a continuous trend of declining economic and social development, poor infrastructure, a process of capital leaching, and a low quality of life.

The transformation of local economic structures contributes to the consolidation of local inequalities, which leads to a strong polarisation of areas.

To present areas of differentiation and identify the impact of the green economy on changes in the socioeconomic outage of counties.	Presentation of scenarios and recommendations in the aspect of social and economic obsolescence and its conditions in the process of loss of social and economic functions, determination of current potentials and barriers to development, assessment of the transformation towards a green economy	Systematization of knowledge in the aspect of green economy of counties and its spatial differentiation
Verification of the proposed solutions by practical application through empirical research (identification of county poles in terms of financial situation, quality of life and green economy, assessment of the impact of depopulation on county economic processes and its impact on quality of life		Approximation and identification of existing theoretical and empirical studies in the aspect of green economy, assessment of financial situation, quality of life, green economy of counties and disparities and interrelationships between them and identification of areas affected by polarization
To propose and present the possibility of using a synthetic measure in the aspect of recognition and evaluation of spatial disparities in the aspect of the main criterion (to indicate the author's set of variables that allows to evaluate the main criterion)		Introduction of selected green concepts in the aspect of transformation of the region's economy, endogenous factors shaping the transformation process towards a green economy (green infrastructure, sustainable development, waste management, environment and ecology)
Methodological area	Application area	Cognitive area

Figure 2. Arrangement of objectives implemented in the study Source: own study

Analyzing the issue of greening the economy, the author decided to formulate the following research questions adequate to the main objective:

What is the map of spatial differentiation of the green economy, quality of life, and financial situation of counties?

How do we relate the local scale to the concept of the green economy? Is the level of green economy of the counties interdependent with the level of their financial situation, quality of life, and green infrastructure?

Which diagnostic variables of the financial situation, quality of life, and green infrastructure of the districts most explain their level? Does the

structure of the financial system of the districts determine the direction of the development policies pursued by the local authorities?

What conditions influence the processes in the district economy as a centre of growth or stagnation?

What constitutes the green potential of a region, what is the essence of the greening process in the economy, and what differentiates it in the socio-economic space of the districts?

The scientific contribution and significance of the work in the achievements of economic science are both cognitive and empirical. The findings contained in the work can be used in the discussion of the shape of changes taking place in counties, determining the direction of changes in the processes taking place in counties, assessing the effects of implementing sectoral policies or previously used instruments, and indicating the essence of individual territorial capital in creating changes in the county economy. The included analyses allowed us to expand the analytical workshop in the process of assessing the performance of the district in key dimensions for the economy. The practical aspect of the dissertation and the author's contribution to the field of economics is also manifested in the provision of information on the local economy, i.e.: the definition of development variables taking into account the differentiation of endogenous potentials, their impact on the processes occurring in the local economy with the simultaneous occurrence of concentration and deconcentration of development phenomena, the multidimensionality of the approach to the systematization of variables taking into account the territorial differentiation of the available potential and the specificity of local conditions, the possibility of using a synthetic measure to assess and model the processes occurring in the local economy, the multidimensionality of the structure of the local economy under the conditions of the processes of hybridization of local economies.

This makes it possible to determine the conditions for the development of an entity in the new conditions of the green economy (Green Deal) on the basis of a research methodology and database. This methodology can be applied at different times and places. It also allows for a wide range of studies of different aspects of the topic addressed, which allows for comparative analysis of different units and areas. This way of proceeding supports the concretization and implementation of sustainable development. It depends on a certain set of internal factors (location rents) and location in relation to the center periphery. The work remains in the science stream of the field of regionalization and ecological (environmental) economics. The synthetic measure is an instrument for monitoring and modelling local government activity, an indicator for assessing the economic asymmetry of activity under the dynamics of changes in economic and social phenomena, a criterion for selection in a specific situation, a measure for modelling activity, a decision-making measure and a measure of the economic situation of an individual. It is possible to analyse it in time and/or space, which implies a broader understanding of the phenomenon under study. A detailed analysis makes it possible to show which measures or areas of measures have undergone the most significant changes and in which direction. On the basis of the synthetic measures determined, it is also possible to assess the homogeneity of the structure of the local economy, the statistical similarity, the level of development of the units, the degree of differentiation between groups, the quantitative distance at the spatial level of the units and the separate groups.

The proposed procedure for the centrality coefficient makes it possible to evaluate the essence of the region's functions. It involves the study of a multidimensional approach to the phenomena occurring in the region. A comprehensive view of the studied region covers all local potentials. All evaluated functions can be arranged according to the hierarchy of importance, so that it is possible to separate main from side phenomena (dominant from peripheral). Such a comprehensive approach also makes it possible to provide information to facilitate decision making.

The work's structure reflects the adopted goals and research issues. The monograph comprises an introduction, five chapters, and a conclusion. Chapter one provides an overview of the region under the conditions of economic, social, and environmental differences. The text primarily focuses on the region as an economic category, examining local development and regional inequalities through selected economic theories and spatial factors of regional disparities. Chapter two presents green concepts for transforming the region's economy, including environmental and ecological economics, the circular economy, green infrastructure, and sustainable development. Chapter three discusses the characteristics of regional development processes, including the networking of regions in complex economic conditions, the multidimensionality of regional structure, the economic, social, and environmental attractiveness of the region, and the region's efficiency and cohesion. Chapter four analyzes the spatial differentiation of processes that shape the transformation towards the green economy in Polish districts (counties). It covers topics such as ecology, environment, green infrastructure, waste management, and

diversified development. Chapter five examines the impact of the green economy on the differentiation of quality of life and financial situation. This text provides a detailed descenarioion of the green economy and its spatial variation in relation to the financial situation and quality of life. It includes an analysis of the rank of the green economy in the county economy and emphasizes the importance of green economy research for shaping variables in the region's economy.

This monograph addresses the research gap in the literature on the relationship between the level of transformation towards a green economy and its financial situation and quality of life, taking into account spatial variability. It contributes to the field of (spatial) economics, which aims to understand the spatial relationships between territorial units and the mechanisms that govern the modern economy and the territorial cohesion of regions.

1. THEORETICAL BACKGROUND TO LOCAL ECONOMIC DEVELOPMENT

1.1. Region as an economic category

The term 'region' is derived from the Latin word 'regio, regionis', which has two meanings: space, or more precisely, the directions defining space, and a set of areas bordering each other, distinguished by similar criteria in relation to adjacent areas (Kornak, 2001). The fundamental logical division here is between two concepts: the natural (physical-geographical) region and the economic region (Szymla, 2000).

A region is a distinct area with specific economic, functional, legal, and organizational features (Borodako, 2009). It is a crucial element of the socioeconomic space, resulting from the differentiation of human life and economic activity in space (Domanski, 1976). Three main criteria can be used to distinguish regions (Heller, 2000; Secomski, 1987):

- The administrative criterion refers to the spatial arrangement of the administration, such as a bounded area of the country or an economic complex with an established profile.
- The physical-geographical criterion is determined by the territory of an area with similar attributes of the natural landscape and climate (Table 1).
- The economic-spatial criterion is determined by the characteristics of the territory, taking into account the physical-geographical rationale. These characteristics may include raw material deposits, water management, agricultural or forestry conditions, an area characterized by similar physical features, human resources involved in industrial

manufacturing, land communications, trade, social or economic infrastructure.

Table 1. Criteria for defining regions

Criteria	Physical-geographical	Economic-spatial	Administrative
Distinguishing characteristics	Biological, Atmospheric, Geological, Hydrostatic	Infrastructure, traditional development, settlement network, distribution system, specialization, economic model	State administrative system, political and social division
Spatial objects distinguished	Countries, provinces	Basins, districts, counties	Voivodships
Types of regions	Geographical, natural, climatic region	Economic region, social region	Administrative region

Source: own study based on S. Korenik (1999). Rozwój regionu ekonomicznego na przykładzie Dolnego Śląska, Wyd. AE we Wrocławiu, Wrocław

A region has specified elements, which include population, natural environment and economic resources, entrepreneurship, and infrastructure (referred to as the region's potential) (Winiarski, 1976). The set of these elements, which is interdependent, forms the basis for conducting socioeconomic activities in the territory. It also helps to delimit the regions that make up the regional system. As a result of socio-economic processes, the most important of which is the progress of civilization, these elements are changing not only in terms of distribution but also in terms of their potential and impact on the economy of the country as a whole (Strzelecki, Legutko-Kobus (ed.), 2013). A region is a territory, and the spatial structure of development and the relationship between the components that make up this structure are called regions (Feltynowski, Przygodzki, 2013). It is both a natural and cultural living environment for its inhabitants and for the operation of businesses.

A local government region, as an object of activity or subject of study, can be captured as a territorial economic, socio-economic, planning, or administrative unit (Kieres, Sowinski (ed.), 1991). The basis for distinguishing specific regions, as noted by I. Pietrzyk, are historical, cultural, administrative, and political considerations, as well as economic and environmental nature (with which the rent of location is associated) (Pietrzyk, 2000; Kachniarz, 2011). The objective criterion for identification does not seem to be the occupied area, as

there are small and large regions, nor homogeneity, as there are homogeneous and heterogeneous regions in terms of certain characteristics (Korenik, 2007).

A. Klasika (1974) defines a region as a historically formed geographic and socio-economic space based on its own spatial structure. Individual elements, such as population, natural and property resources, and economic units, are distributed in a certain way in space and are linked by relations of co-occurrence and interdependence, forming a spatial structure of development with a given specificity (Winiarski, 1992).

According to S. Korenik (1997), a region is a set of adjacent areas that share similar criteria in relation to their neighboring areas.

- A geographical unit is determined by natural physical elements such as geological features, relief, climatic conditions, waters, soils, plant and animal life, as well as the size, borders, and neighbors. It also takes into account the inhabited population and economic homogeneity, including development conditions, dominant sectors of activity, known products, and tourist attractions. The language used is clear, objective, and value-neutral, with a formal register and precise word choice. The text follows conventional structure and adheres to formatting guidelines, with no grammatical errors or spelling mistakes.
- A social system comprises various types of relationships between individuals and groups, leading to interdependence, such as in the sphere of security, or various forms of cooperation defined by membership in its structures.
- It is an entity with a specific identity that has structures for decisionmaking, as defined by Borkowski (2007).

A region, in socio-economic terms, is a system with defined boundaries that shows certain connections of

- According to Szul (1991), a system with defined boundaries and unique characteristics that differ from the surrounding area is shown, along with its internal and external connections.
- It is also an area with endogenous potential that it uses to effectively implement its own goals or tasks.
- It is also a place where a population concentrates, develops, and controls the area.

Regions are a fundamental component of a country's regional administrative and economic structure (Churski, 2008). Zonal regions are typically determined by their economic profile, meaning that their formation and development are largely influenced by geographic factors (Churski, 2008). Zonal regions are characterized by their relatively homogeneous territories, which is why they are sometimes referred to as homogeneous regions. The concept of a zonal region can be particularly useful in the context of regionalizing agriculture, forestry, industry, or tourism. The homogeneity of a zonal region simply indicates the dominance of a certain type of economic activity in the region, while other, less developed spheres of the economy are also present (Strojny, 2010).

Nodal regions are generally indeterministic, as their extent depends primarily on socioeconomic ties (Gorzym-Wilkowski, 2017). According to Z. Szymla (2000), a nodal region is a smaller territorial unit than the country, within which a central part (central area) can be distinguished. The central part plays an active role and concentrates socio-economic activity, while peripheral areas provide resources to support activity in the central part.

Based on the historical circumstances and stages of development of the territories in question, five basic types of regions can be distinguished:

- industrial regions, characterized by a significant industrial manufacturing potential;
- agro-forestry regions, dominated by agriculture and forestry;
- industrial-agricultural regions, distinguished by the ratio of these two divisions.
- urban regions, including large urban agglomerations, and touristrecreational regions, which are territories where large-scale human activities based on tourist and recreational services are carried out (Fajferek, 1966).

To provide a more comprehensive characterization of a region, it is important to consider the economic characteristics of the region. According to K. Kucinski (1990), a region is composed of similar units that are connected internally and externally, possess their own endogenous potential, and exhibit a certain degree of economic independence. An economic region is defined as a territorial complex for production and services that is distinguished from surrounding areas by unique forms of development (Winiarski, 1992). According to Pajak (2016), an economic region must meet specific conditions, including being part of a larger territory, having a distinct production and service specialization, containing at least one urban center, and constituting a spatially compact area. Economic regions are territories distinguished from others by their unique production and services. According to A. Klasik (1971, 1974), these regions are historically formed geographic and socio-economic spaces with their own spatial structure. H.S. Perloff (1960) defines an economic region as a set of geographically contiguous areas that share common or complementary characteristics and are linked by broad inter-zonal activities or flows. In the field of economics, the primary determinant of a region is its economic criterion (Chądzyński, Nowakowska, Przygodzki, 2011). An economic region is defined as a territory with a specific economic specialization resulting from both endogenous and exogenous development factors (Strzelecki (ed.), 2008).

R. Florida (2008), based on the attractiveness of the location of knowledge and innovation, distinguished knowledge-generating regions, successful knowledge-absorbing regions, megacities in underdeveloped countries, and the most numerous underdeveloped peripheral regions compete with cheap unskilled labor with the lowest level of attractiveness. The processes of change in the modern economy affect both companies and regions. A special place is given to the concept of the learning region in relation to the interpretation of the traditional region. The learning process concerns the modification of directions taken as a result of changes in socio-economic conditions.

S. Korenik (1997) describes a region as a set of contiguous areas with similar criteria of differentiation from neighboring areas. In economic terms, the boundaries of a region are defined by the level and type of economic development (Malicki, 2009). It can be assumed that a region must have four characteristics (Kania, 2010): unity of economic interests, political representation established through elections, a sense of common identity on which a sense of social bonding is based, and dependence in a direct way on the central level.

The systemic conception of the region combines the community, the economy and the environment (natural and man-made) into one holistic and organized system that functions within a separate fragment of space. The components of this structure enter into various relationships resulting from coexistence and interdependence and, at the same time, are open to external systems. In this definition, it can be assumed that administrative, even heterogeneous, regions are united by the coherence of the concepts and activities of the local government community (Głuszczuk, 2011).

The region in the European Union is primarily of economic importance as an object of EU policy. It can be assumed that regions are spatial subsystems of the economy with different spatial relationships and interrelationships. The Nomenclature of Territorial Units for Statistics (NUTS) in the European Union divides the economic territory of countries into smaller parts, which are subject to reliable statistical surveys by Eurostat, allowing better comparison of data and monitoring of economic changes. Their nature depends on whether they meet the requirements set out in the regulation. If not, neighboring and economically similar units are merged. The division of the community territory into NUTS levels 1, 2, and 3 units is not permanent (Małuszyńska, 2010). The regional level has three levels, and the local level has two levels: counties and cities with county rights (NUTS 4) and municipalities, including urban municipalities with county rights (NUTS 5).

The concept of the administrative region is inseparable from the decentralization of public authority, as administrative regions are the units of the administrative-territorial division of a country (Kosiedowski (ed.), 2005). It is therefore a spatial system endowed with attributes of power, and the degree of autonomy of regions is an important element shaping development processes (Gorzelak (ed.), 1989).

The functional perception of a region is linked to the emphasis on the size and importance of the central center and centers of lesser importance. The central center and other centers of the region with a local sphere of influence provide specialized services that respond to the collective demand of the population (Sluvocki (ed.), 2009). A functional region has a spatial endowment of all kinds of facilities and technical and social infrastructure elements that guarantee accessibility and some facilitation for both residents and visitors.

As the region becomes a market player, it is increasingly subject to the rules of modern economics. The crises that have recently hit the world economy have their roots in financial phenomena. However, they are spreading to all areas of life, including the functioning of regions (Analiza tendencji rozwojowych regionu Dolny Śląsk 2020). By identifying the prerequisites and factors for development, an attempt is made to identify its sources in order to be able to implement successful solutions elsewhere. Success in one place will not necessarily have the same effect in another. This is due to the complexity of the development process. The importance of endogenous factors, taking into account local potentials and local constraints in the development process, is increasingly emphasized.

As a result of globalization, regions (municipalities, districts, and provinces) are competing with each other in a similar way to companies. One solution is to increase their attractiveness. A municipality or district functions and develops

as an integral part of a larger whole (voivodeship, region, country). They benefit from the goods and services produced in other areas and, at the same time, provide their products to their surroundings (Brol (ed.), 1998a). Regions can only fulfill their tasks if they have stable and efficient sources of income. Financial resources are the basis for the operation and realization of current and developmental tasks. Analyzing them makes it possible to assess the structure of the budget and provides information on the state of the local economy or endogenous growth potential. Some units are economically backward, while others are at the forefront of economic development. High economic development concerns regions (municipalities and counties) located close to economic centers. Other units, far from the main transport routes and economic centers, have worse economic development indicators.

1.2. Local development - concept, elements, nature

In a market economy, there is clear territorial differentiation in the level of development or economic and social activity. The permanent nature of interregional disparities leads to the separation of central and peripheral regions in the spatial structure. The persistent differences in the economic potential of individual regions constitute one of the fundamental problems of today's economy (Fourth Report on Economic and Social Cohesion, 2007).

Development is a process of qualitative and quantitative change. It should be based on the use of local resources. It is a specific process of interrelated changes (economic, social, environmental, demographic, political, or cultural) taking place in the local socio-territorial system. They form a network of interrelationships (a multidimensional space), and because they act for the benefit of a community, they are interdependent and should be considered together (Szewczuk, 2011). Development is a multidimensional concept and is seen as changes occurring in the social and economic functioning of local government units (Markowski, 2008). It denotes a long-term process of directional change in which one can correctly distinguish consecutive stages of transformation of a given object. Development includes activities undertaken by the will of local actors (local governments, economic entities, associations, and others), i.e., the bottom-up generation of development dynamics. Socio-economic development does not proceed at the same pace and direction everywhere. Development processes can refer to different scales of territorial systems, e.g., local, regional, or in larger systems, national and continental (Szymla, 2000).

Local development in general is the process of all transformations taking place in a region. The changes taking place within the region are assessed depending on the criteria adopted and the structure of the objectives established on this basis. J. Binecki and W. Frenkiel (2006) argue that development is a process of bringing local reality closer to the pattern written in terms of vision (mission), priorities, and goals. The development of a region is a measurable category, which, however, is difficult to express with the help of a single universal yardstick. The complex nature of the socio-economic phenomena occurring in the development processes of individual regions requires the use of different yardsticks to describe the phenomenon under study (Szymla, 2000).

Local development concerns smaller territorial units (municipalities and counties). Regions, as spatial socio-economic systems, are characterized by varying levels and rates of development. In other words, endogenous development factors are the foundation of local development. J. Parysek (2001) writes that local development is understood as the creation of new jobs for a given local territorial system and the shaping of the best possible living conditions in the local environment or the improvement of the organization, structure, and functioning of the local territorial social system, mainly through the use of local development resources.

R. Brol (1998b) defines development as a harmonised and systematic activity of the local community, local authorities, and other entities functioning in the municipality, aiming at creating new and improving the existing utility values of the municipality, creating favorable conditions for the local economy, and ensuring spatial and environmental order. At the local scale, the identification of the field of social, economic, and spatial development becomes particularly complicated as the district (or municipality) functions and develops as an integral part of a larger whole and benefits from goods and services created in other areas while at the same time providing its products to its surroundings (Brol, 1998a).

Local development is therefore a multidimensional, multi-thematic, and multi-level concept in which values are expressed and which can be shaped through the setting of goals, the use of appropriate factors, and the selection of instruments, subject to evaluation in terms of impact and effects. (Jewtuhowicz, 1995). Development in local systems depends on the conditions under which it takes place and on the factors used. These conditions and factors are classified according to various criteria of a natural, spatial, economic, social, cultural, historical, or political nature. A commonly used division is also the division into internal and external factors, or material and intangible factors. (Adamowicz, 2020).

Each region has a potential whose accumulation in a given area is the result of the activity of the population. It is an internal development potential that consists of individual sub-potentials such as environmental (green capital), financial, entrepreneurial, demographic, employment, or infrastructure potential. Knowledge of factors and the ability to correctly select, measure, and control them in the process of regional development are the basis for conducting an effective regional policy (Rudnicki, 2000). The development potential of the regions reflects a unique set of factors affecting the development capabilities of the individual units of administrative division (Martin, 1999). The approach based on the analysis of many economic categories makes it possible, first of all, to approximate the real conditions of functioning, life, and development of economic operators as well as residents. The development potential is both a result of the transformations of the regional economy so far and determines the potential opportunities for the development of a given area in the future.

The territorial approach exposes unique characteristics, its own dynamics, and the autonomy of development processes. It is therefore a place historically shaped, a place offering unique, strategically valuable resources, a location built by economic and social actors, and a site of competitive capacity building (Nowakowska, 2017). It goes from the interpretation of space in terms of the static location of resources and economic actors to the dynamic view, determined by the prisma of relations and activity of local actors and social and institutional capital. The importance of development factors in the modern economy is changing. As M. Rogowska (2010) notes, in the knowledge-based economy, there is a revaluation of the factors traditionally perceived. However, despite the growing importance of intangible determinants, technical infrastructure remains one of the fundamental components of development potential. From a passive, passive, and quantitative factor limited to meeting the needs of local communities, it has become an active factor in pro-development activities of a qualitative nature.

Studies of socio-economic development are complex issues because each area does not develop as a separate element based on individual potential located in a given space (Kukliński, 1980). The occurrence of interregional differences gives rise to different tendencies in different countries to address them. As many economists note, these differences will always exist because there will always be variation in the spatial conditions of human activity.

Variation in the level of socio-economic development of regions is a natural phenomenon resulting from unequal access to basic factors of production, such as labor, capital, or natural resources. The differences in the potential of regions are in line with most theories of regional development, although these theories, originating from different scientific orientations, explain the differentiated spatial dynamics of socio-economic processes in different ways (Gałązka, 2017; Grosse, 2002; Korenik, Zakrzewska-Półtorak, 2011). The variation in internal potentials of a region may relate to issues, demographics, the labor market, the level of entrepreneurship, infrastructure, the natural environment, and many other conditions affecting development opportunities. Thus, the specific, individual characteristics of a region and external conditions determine the possibilities for their development.

1.3. Factors of spatial disparities in the local economy

Spatial variations in the level of development of individual regions are objective in nature and result from the diversity of geographical space. Regions differ in terms of history, landscape, size and stature, function, resources and capital, location and linkage, attractiveness and competitiveness, among others. Differing geographical and social development factors mean that different regions show different development dynamics. These differences will always exist because there will always be variations in the spatial conditions of human activity.

Traditional factors of local development are resources: material, sustainable, and financial capital; knowledge and innovation; human and social capital (their availability, allocation, and productivity); and institutional factors that make up the quality and efficiency of public administration, as well as institutional capacity to manage development (including increasing local autonomy) (Kosiedowski (ed.), 2005). The concept of local was understood as a historical, economic, social, cultural, and symbolic space equipped with its own dynamics of development. It was a territory that should be defined and protected from external expansion, a territory that should be developed from within through the valorization of its resources based on its own strengths. (Jewtuchowicz, 2013, 2016).

The decentralisation of competences in the public sector means that we can speak of an increasing endogenisation of development processes, i.e. an increase in the importance of local tangible and intangible resources. Their differentiation, both in terms of value and quality, results in different conditions for economic activity, different levels and living conditions of inhabitants (Churski, Kołsut, 2017). The scale of these disparities can determine the acceleration of development processes or their slowdown or inhibition especially in the case of peripheral regions (Pichierri, 2002).

Territorial (regional) capital are both tangible and intangible resources, although the importance of the latter is crucial. They are all those elements of space that arise from interaction and form the system of relations, norms, and regulations of the territory. Territorial capital accounts for the distinctiveness of a place and its uniqueness in cultural, spatial, social, and economic terms. Markowski writes that territorial capital is synergistically generated from a combination of traditional resources linked to knowledge and innovation, a new factor in creating the competitive advantages of modern economies (Markowski, 2016). The occurrence of differences between regions is due to the availability of endogenous capitals, i.e., entrepreneurial, social (demographic), ecological and environmental, infrastructure, and financial (information on the variables in the Annex Potentials). The factor of geographical space is often of key importance in shaping the nature, scale, and dynamics of development (Ziółkowski, Goleń, 2003).

Basically, local development factors can be divided, following W. Kosiedowski (2008), into four basic groups: economic, social, technical and technological, and ecological. Geographical conditions and the effects of heterogeneous socioeconomic factors mean that individual communes are characterized by varying levels of development. The reasons for this, in addition to historical conditions, can be found, inter alia, in the implementation of new investments, the creation of new jobs, the inflow (outflow) of capital, the increase in the income of the population (Maitah, Toth, Smutka, Maitah, Jarolínová, 2020), and the services provided, etc. (Malina, 2020).

The financial situation is complex in nature and refers to the overall economic development of the municipality and the entity's ability to raise sufficient funds, provide public services, and manage debt, among other things. It indicates the entity's ability to meet its own administrative and investment needs, which means maintaining and developing its own assets in line with current and future demands for the provision of public services (Hendrick, 2004). Financial position is a relative assessment of a municipality's finances, i.e., its capacity to provide financial security (Stanny, Strzelczyk, 2018).

Local authorities should take care of the state of the infrastructure, which will increase the attractiveness of the areas, attract new entrepreneurs, create new jobs, and improve the quality of life of the inhabitants. Infrastructure contributes to the economic activation of a region, the increase in the openness of regions, and the influx of competitive products from other areas. It is an essential factor in the development of an area. A well-developed and modern infrastructure is crucial for long-term economic growth and sustainable regional development. Regions better equipped with infrastructure also have relatively greater development potential (Krysiuk, Brdulak, Banak, 2015).

Human capital	Security and stability, population health, entrepreneurship and innovation, knowledge, jobs, places to live, sustainability of democratic structures and institutions, health infrastructure, cultural heritage, and regional identity.
Economic capital	Economic resources of regional entrepreneurs (buildings, structures, machinery, equipment, and transportation) and business-related infrastructure (administration, transportation, and ICT).
Natural capital	Quantity, availability, and quality of natural, renewable, and non- renewable resources (utilization capacity of environmental elements, landscape values, health values, biosphere biodiversity, ecosystems), ecological networks, parks, and natural monuments, and flood protection infrastructure.
Financial capital	Amount and availability of financial resources of the local government necessary for implementation of the adopted goals and tasks of the public utility.
Infrastructural capital	The amount and availability of infrastructural (social and technical) resources of the local government.

Table 2. The capital of the region that forms its endogenous balance sheet

Source: own study based on K. Bedrunka, K. Malik, Zintegrowana efektywność polityki rozwoju regionalnego w okresie programowania 2014-2020, s. 9, http://www.wneiz.pl/katedry/kpsg/publikacje/handel_Szczecin_II_t2.pdf (20.11.2015)

Knowledge of social and labor market potential at the municipal level and its changes is important for identifying the determinants of development policy making. Human capital is one of the key elements of development (Jutengren, Jaldestad, Dellve, Eriksson, 2020). The quality of human capital can be assessed by considering aspects of regional development such as demographic resilience, level of functional knowledge, health status, spatial mobility, economic activity, and social activity. The demographic structure of the population influences regional competitiveness because, on the one hand, the predominance of young people causes an increase in occupational and spatial mobility, a propensity to learn, and thus increases flexibility in the labor market. A migratory outflow of people, usually to the central areas of large cities, resulting from a lack of opportunities in the local labor market, is becoming a problem for the regions (table 2).

The natural environment is an important component of the wealth of municipalities as well as an important element of the quality of life. For economic reasons, it is, among other things, a source of raw materials and energy and provides geographical space, an area of economic activity, a place of residence, or a place of leisure (Dziekański & Prus, 2020). Relationships between the economy and the environment occur in many activities observed in JST, such as the use of land and space as a place of economic activity, the movement of environmental elements, the extraction of raw materials and energy, and the release of waste into the environment (Poskrobko, 2012).

Economic capital includes resources produced that are used to produce other goods and services, such as machinery, tools, buildings, and infrastructure. Natural capital includes ecosystems and natural resources that are involved in creating social well-being, i.e., wood, water, energy, mineral resources, biodiversity, water, and air filtration. Human capital is the physical and mental health of man, prosperity and productive potential, education, motivation, and skills (tables 3 and 4) (Gorzelak, Płoszaj, Smętkowski, 2006). Socio-economic development is influenced by various factors that are constant over time and should therefore be subjected to continuous and ongoing analysis. The main factors influencing or limiting development include external and internal, macroeconomic and microeconomical, spatial, hard, and soft (Kogut-Jaworska, 2008).

Direct budgetary	Size of the budget of local government units, own income, investment expenditures, fixed assets, debt level, operating surplus, local debt.
Indirect infrastructural	Infrastructure development, sewerage, roads, telecommunications, and energy infrastructure.
Institutional capital	Human capital of the region, modern advanced technologies, technical and organizational progress, and innovation.
Economic policy of local government units	Tax incentives, the creation of economic areas (economic zones), business activity, and pro-development activities.
Economic activity	Education, distribution of occupations, industry preferences based on the specifics of local government units, and entrepreneurship.
Local investments	Level of private investment and investment by local government units

Source: own study based on M. Warczak (2015). Endogeniczne i egzogeniczne czynniki rozwoju gospodarczego z perspektywy finansów gminy, Contemporary Economy Electronic Scientific Journal, Vol. 6 Issue 4, 111-122

Economic	Labor resources, natural resources, grassroots assets, human resources, human capital, social capital internal market.
Social	Demographic structure, education, upbringing, health care, social security system, culture, tourism, sports, traditions, education.
Spatial	Location factors, concentration factors.
Ecological	Preservation and consolidation of ecological balance, rational management of environmental resources.
Political and systemic	The scope and competence of government, the way in which power is exercised, existing regulations.
Technical	Adequate infrastructural equipment, technical and research facilities, high-tech industry, process and product innovation.
Local	Development of self-government, unique qualities of the area, development of social activity initiatives.

Table 4. Classification of local development factors

Source: own study based on S. Korenik (1999). Rozwój regionu ekonomicznego na przykładzie Dolnego Śląska, Wyd. AE we Wrocławiu, Wrocław; M. Warczak (2015). Endogeniczne i egzogeniczne czynniki rozwoju gospodarczego z perspektywy finansów gminy, Contemporary Economy Electronic Scientific Journal, Vol. 6 Issue 4

Development, efficiency of functioning in a dynamic environment, on a regional scale comprise the following elements: economic growth and employment, increase in the well-being and quality of life of the population, technological development and innovations, restructuring of economic activities, development of services and social resources, increased professional, social and spatial mobility, the development of institutional infrastructure, improvement of the quality of the environment (Klasik, Kuźnik, 2001). These include: resources of the geographical environment (measured by, among other things, the quantity and quality of natural resources), the state of technical and social infrastructure (measuring, among others, by indicators of saturation by railways, by the number of universities, public libraries, theaters), human potential (measured by, inter alia, the population number, the rate of natural growth, the level and structure of education of the population), the quality of the broadly understood institutional sphere (measured, among others, the efficiency of the local government, the amount of banking institutions, the ratio of corruption) (Kosiedowski, 2005).

External conditions are macroeconomic in nature (level of socio-economical development of the country, historical conditions, economic system, state policy and technical progress). They include changes in the macrocirculation of the region, which are a consequence of, among other things: processes of globalization, European integration, macroeconomic conditions (e.g. taxes,

subsidies, expenditure), interregional policy and sectoral policies, structural changes (eg. decentralisation of the state), economic conditions, political situation, competitiveness of surrounding regions, etc. External conditions present and foreseeable for the near future give a mixture of opportunities and threats arising from the environment (e.g. immediate neighbourhood, general environment, called macro-circulation at the national level, overall environment at the international level) (Matejun, Nowicki, 2013).

The essence of development is to see it as a continuous process based on mutually balanced economic, social and environmental factors. Local development factors can be grouped according to four aspects of development:

- economic factors (productive and financial),
- social factors (changes in natural movement and population structure, pace and nature of urbanization processes),
- technical and technological factors (increase in fixed capital and changes in its structure),
- ecological factors (depletion of natural resources, progress in the protection of the natural environment) (Churski, 2008).

Endogenous Resources	Factor
Demographic	Population structure by age and education, professional qualifications, living standards, and conditions
Infrastructure	Technical infrastructure facilities of regional and local scope, infrastructure development potential, infrastructure investments, and budget wealth of regions
Economy	Economic base, entrepreneurship, innovation potential, and competitiveness
Spatial	Accessibility, physiographic conditions, spatial organization
Ecosystem	Components of the natural environment, state of environmen- tal pollution, environmental awareness

Table 5. Endogenous resources and factors

Source: own study based on S. Korenik (red.) (2010), Współczesne koncepcje przestrzennego rozwoju gospodarki i społeczeństwa, Wydawnictwo UE, Wrocław; D. Strahl (red.) (2006). Metody oceny rozwoju regionalnego, Wydawnictwo AE, Wrocław

According to T. Kudłacz (1999), the development of the region is conditional on: the economic potential, the economic structure of the area, the natural environment, infrastructure management, spatial management, space management and the level at which the inhabitants live. A different classification is presented by S. Korenik (2003), who distinguishes the following groups of factors:

- economic factors (owned and available capital, structure and size of demand and directions of its changes, income level of the population, specialization of production);
- social factors (level and structure of consumption, urbanization processes);
- technical factors (modern production equipment, R&D facilities);
- environmental factors (progress in environmental protection, use of natural resources);
- political factors.

For comparison, we can quote the classification of factors of regional development, presented by R. Brola (2006), which distinguishes:

- endogenous factors (internal; inter alia, demographic resources, infrastructure, economy, regional ecosystem);
- exogenous factors (external; changes in macroeconomic parameters in the context of integration and globalization);
- factors determining the capacity of the region to respond to changes in the macro-circle (e.g. flexibility of the structure of the economy, openness of policy, community activity).

J.J. Parysek (2001) highlighted the unconditional barriers to the development of the region, that is, those that always lead to the limitation of development, and the conditional barriers, understood as increasing the risk of development. A group of unconditional barriers, called classical development constraints, can be included: underdevelopment of technical and social infrastructure, lack of free investment areas, underdevelopment of housing construction, devastation of the natural environment, and inadequate qualifications of personnel, especially those who are active and unemployed.

Local authorities have specific development opportunities resulting from their resources, including technical, social, economic, and environmental. The dynamics and direction of local development are influenced by the type of resources, their availability, size, and efficiency of use. The geographical location is also important. An important determinant of the stable, dynamic, and harmonious development of a given municipality is its position in the economic system of the country and the region, as well as its potential and existing international links. (Telka, 2006; Marks-Bielska, Dereszewski, Zaborowska, 2014).

Space in the economy is treated as a rare good, which causes the need to make decisions regarding the management of space and consciously shaping it. Numerous factors are involved in the creation of space, which differ in the direction of the effect on space as well as the strength of this effect. The socioeconomic space is a multi-element system that consists of the actors of economic life as well as many other factors that condition the functioning of the system.

1.4. Regional inequalities in the light of selected economic theories

Key aspects of the theory of regional development are the theoretical concepts and research on the dynamics of economic development in regional systems and the factors determining the processes of this development. The degree of development of individual regions affects their competitiveness with each other. The development is influenced by exogenous and endogenous factors. Attempts to comprehensively address the main concepts and factors of regional development are found in the works of I. Pietrzyk (1992), Z. Szymli (2000), and T. Kudłacza (1999). Among the main concepts of regional development are the theories of localization, growth poles, exogenous development, endogenous development, and conceptions of decentralized development.

Theories of regional and local development can also be divided into:

- theories identifying the primary causes of economic activity in space (location theories);
- theories of an organizational-technocratic nature indicating the activity of economic operators taking into account the socio-economic environment (development theories from above);
- theories focusing on the role of external conditions in economic operators' activities (development theories from the bottom) (Gałązka, 2017).

In the theory of location, the development of a region is a consequence of directed investments and focuses on explaining spatial structures. We describe the concept of location as the existing location, density, structure, and relationships of socio-economic entities in space. It can also be defined by analyzing the development of spatial structures and systems, the placement in space of new elements, and the creation and study of models for making decisions about

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the location of these elements (Kuciński, 1997). A. Weber points out that the company assumes cost minimization and is looking for a location where it can be achieved. The author points to the costs of transportation, personnel costs, and the so-called benefits of agglomeration as elements affecting the location of enterprises. J.H. Thunen points to land use and location rent in the development process. This rent is a derivative of the market price of the manufactured goods minus the cost of production and transport to the market. As important factors in the process of localizing enterprises, Loscha points to the maximization of sales and maximizing profit. The location analysis also considers factors such as accessibility of transportation, prices of raw materials, supply of labor, market absorption, and others (Dorożyński, 2009; Grosse, 2002).

The concepts of endogenous development reject a unified and linear vision of regional development. Regional development should be created by local needs, technical and technological progress, and the skills and knowledge of local communities. The concept of decentralized development emerged as a recognition of the complementarity of the concepts of exogenous and endogenous development and the need to combine them in a synthetic way.

The economic base theory created by companies and export sectors forms the basis of the region's economy (as well as a threat to development). Endogenous factors aimed at serving the internal needs of the region are seen as a system of interacting elements from the economic base. (Strahl (ed.), 2006; Churski, 2011). Its main objective is to base regional development on export activity, which is possible thanks to the specialization of the given areas (country, region). The most important stimulating factor for economic growth is the external demand for goods or services produced in the region. (Grosse, 2002). Hightech industries and services supporting technological transformation and highly competitive manufacturers are considered to be extremely beneficial. (Malecki, 1997). The prosperity of the economic base of the region guarantees multiplier results in the form of the development of similar sectors, subcontractors, and the system of local and regional services. (Sługocki (ed.), 2009). The most significant threat to growth resulting from the theory of the economic base can be industrial monoculture, the collapse (weakening) of the dominant industry (e.g., metallurgical), or the departure of the investor on which the economic development of the region was based, and local policies aimed at assisting large investors at the expense of local enterprises. (Malecki, 1997). As a result, it can undermine the endogenous development of the entire region. (Malizia, Feser, 1999).

The staple theory considers factors of regional development in export activity (including the theory of comparative benefits of D. Ricardo and economic base theory). It recognizes as the most important factor in regional development the gradual introduction of production specialization and a focus on a selected competitive group of goods. Some of its supporters encourage the continuous deepening of regional specialization; others indicate that public authorities should seek to diversify the economic base, attract new production sectors, and support the export activity of regional enterprises (Gałązka, 2017).

The essence of the concept of polarization is the assumption that existing states of imbalance drive a development process that can lead to even greater interregional disparities. Economic development, both sectoral and regional, can be unsustainable. The issue of space polarization was presented independently by A.O. Hirschman (1953), G. Myrdal (1957) and F. Perroux (1955).

According to F. Perroux (presenting the sectoral approach), there are growth poles that have a strictly spatial dimension. Sectoral polarization also leads to regional polarization, and the process of polarizing the economy can also have an intersectoral dimension (Grzeszczak, 1999). Growth poles can be certain industries or enterprises, which are distinguished by high dynamics of development and also have a large scale of production and numerous links with other branches of production (Domański, 1989). Growth poles can also be local communities located in a given geographical area (Domański, 2006; Perdał, Borowczak, 2012; Stankiewicz, 2011).

Economic development is uneven and concentrated in so-called geographical growth centers (geographical growth centers). Later, there is the spread of development from the center to neighboring areas. The concept of core-periphery models formulated by Friedman divides regions into two main components: core and peripheral regions. The development of the periphery is induced by the center and dependent on it (von Stackelberg, Hahne, 1998). The strength of the region's polarization is linked to the concentration of demographic, productive, service, and endogenous potential. The absorption of polarization impulses is also determined by the level of urbanization and the shape of the economic structure (Gawlikowska-Hueckel, 2005).

P. Krugman creates his own model of core and periphery. The formation of clusters of economic activity is the result of a combination of center-to-center forces. In proposing the core and peripheries model, he recognizes that the formation of centers (clusters) of economic activity is the result of a combination of center and center forces. (Miszczuk, 2013).
According to G. Myrdal's forecasts (1957), the spread force of the economic base is too weak in economic practice, and the growth of some regions leads to the inhibition of growth in other areas, which deepens the processes of spatial divergence. G. Myrdala, who presented asymmetric spatial economic development. In his view, this is a long historical process, dependent not only on economic but also social and cultural stimuli (Sługocki (ed.), 2009). Regional development disparities are increasing over time. This is due to the accumulation and interaction of economic, political, and cultural factors. (cumulative causation). The rich regions are growing faster and faster, while the poor are lost in stagnation. Therefore, there is a need for public intervention, especially in poor areas, which could stop the system in the wrong circle. (Morawski, 2001). Poorly developed (peripheral) regions offer the benefits of lower labor costs, but they are offset by the advantages of agglomeration in industrialized regions. For peripheral regions, the effects of the diffusion of innovation generated in developed regions can be development impulses (Miszczuk, 2013). The theory of cumulative causality suggests that the areas that were first industrialized develop best. (Stanny, Strzelczyk, 2018). The accumulation of development factors in specific areas increases their attractiveness while limiting the development opportunities of other units (Kudłacz, Hausner (ed.), 2017; Mempel-Snieżyk, 2013; Stawasz (ed., 2004).

The concept seeking the motives of regional development in export activity is the so-called new theory of trade (new trade theory). It shows why regions with large reserves of cheap labor have the opportunity to specialize in laborintensive production, while capital-rich regions export goods that require high capital investments. The public apparatus is expected to engage in infrastructure investments, supporting financial institutions, training activities, and other projects that deepen production specialization. In addition, the authorities must maintain export activities and promote free trade rules on the global stage (Kania, 2010).

According to J. Schumpeter, economic development occurs not under the influence of changes coming from outside but from within, from the own initiative of economic life (Glapiński, 2012). The second stimulating element of development was innovation (introduction of a new product, a new production method, a new technological process, and the acquisition of new sources of organization) (Schumpeter, 1960; Zagóra-Jonszta, 2015).

The theories of gravity (interaction, gravity, and attraction) assume that the socio-economic system seeks a state of equilibrium. The centralized force

leads to the concentration of economic units in a small number of larger centers. The centrifugal force directs economic activity to many smaller centers. Small centers will link their development opportunities with those types of social and economic activities, the deployment of which is controlled by the center forces (Parysek, 2001).

The diverse economic structure is one of the features that gives the region a competitive advantage. It is also important to preserve the cohesion of the region in four dimensions: coherence in time (historical continuity), social, economic, and environmental. All these dimensions are to function in the same space, which is a clear reference to the principle of sustainability described below (Kronenberg, Bergier (ed.), 2010). Networks are an important economic policy instrument (Domański, 2002). Network development can be seen as an evolutionary process driven by innovation, i.e., an increasingly efficient combination of technology and user needs. This process should be seen as a process of collective learning (Korenik, Pięta, and Soczewka, 2004).

Also worth mentioning are the theories of complexity, the path-dependence in terms of so-called closure and opening, the lagging behind regions and the geography of dissatisfaction and economic resilience of the region, and the new economic geography.

The theory of complexity (co-dependence) is the international relations theory developed by Robert Keohane and Joseph Nye, which states that states and economic resources are closely interrelated. (Crane, Amawi, 1997; Keohane, 2002).

Under the concept of path dependence, some processes can be described as subordinated to their own history, which means that their development depends on their historical development. Thus, a given process develops according to different paths of development, which can lead to the achievement of different states of equilibrium. (Sukiennik, 2017).

In lagging regions, there is a high risk of the phenomenon of geography of discontent manifested in the feeling of abandonment by its inhabitants in the context of the forecasted changes (Drobniak, https://). Resilience (flexibility, adaptability, ability to learn, transforming crisis into opportunity) is a commonly used concept of development, equipped with tools for rapid diagnosis, evaluation, and programming of the development paths of cities and regions. (Drobniak, 2018a, 2018b).

The creators of the concept and theory of human capital are T. W. Schultz, G. S. Becker, and J. Mincer. This capital and its development are taken into account

in the activities of enterprises and the strategic development of municipalities, voivodeships, and countries (Wieczorek-Szymańska, 2010).

The New Economic Geography and Economic Development Theory is a combination of the above concepts and indicates the existence of areas of core and periphery that are the result of natural agglomeration trends, generally perceived as good for growth and development due to geographical privilege (New paradigm of strategic directions of local development, https://).

The territorialization of development processes refers to the specific resources used in the social and spatial relations of the local economy. It leads to the creation of new values and resources or the ability to adapt quickly to change. Territory (territorial capital) becomes a strategic resource in local authorities' decisions, strengthens their competitiveness, and is a source of added value. It is both a resource for development and a product of development. (Pietrzyk, 2001).

2. A GREEN RATIONALE FOR MODERN LOCAL DEVELOPMENT

2.1. Environmental and ecological economics and the circular economy

To ensure the sustainable development of the local economy, it is necessary to create conditions for the proper use of endogenous resources and attract exogenous resources (Jewtuchowicz, 2005). The economy and the environment are interdependent, as economic activity relies on the availability of minimum material and energy resources. However, pollution, waste, and other humanrelated activities can negatively impact environmental systems (Opschoor and Reijnders, 1991). It is widely acknowledged that the environment has limitations. Resource depletion is a growing concern (Prandecki, 2007). Local economies are subject to constant change due to internal interactions and environmental factors (Batty, Barros, and Alves, 2004).

Natural resources are crucial for economic and social development. The unsustainable use of resources leads to environmental degradation and resource depletion, which pose a threat to both humanity and the environment. The concept of a green economy is an instrument aimed at managing resources sustainably (Merino-Saum, 2018). Resources are a specific economic category; they constitute national wealth, and they drive socio-economic development. The depletion of national wealth and ecological barriers to development can result from the overexploitation of resources and environmental degradation (Górka, 2014).

From an economic perspective, it is crucial to comprehend the correlation between the natural environment and the economy. The environment serves as a source of energy, a means and object of labor, and a means of consumption. Additionally, it acts as a recipient of production and consumption waste, influences agricultural, forestry, and fishing production, and impacts human health (Winpenny, 1995). Environmental and natural resource economics is a branch of neoclassical economic theory that studies the conditions for resource use and the value of the natural environment. The analysis focuses on the preservation of environmental quality and resources as well as the optimal use of resources and values of the natural environment in the process of economic growth and development. Environmental economics is based on the economization paradigm, which refers to theories of natural resource use, pollution, environmental protection, and preservation (Bartkowski, 1981; Bąk, 2021).

The concept of independent regional development highlights the environmental factors that influence regional development (Wróblewski, 2012). In this concept, the region is considered a subject of development. The environment can be a development factor and a component of endogenous potential, providing the basis for delineating the process of action (von Stackelberg and Hahne, 1998). It can act as both a determinant and a barrier to economic development. However, the quantitative expansion of this capital has certain limits (Borys, 2013).

When considering the environmental determinants of regional development, attention should be paid to the concepts of independent regional development, green economy, and zero waste. These concepts clearly indicate the need to consider environmental issues in the process of regional development and the integration of environmental aspects with economic and social aspects (Wroblewski, 2012). Proper use of environmental potential will generate additional economic effects, improve the environment, promote social goals, and improve the quality of life (Kasztelan, 2010).

Economic development planning recognizes the normative nature of ecological economics, which stems from a broader perspective of scientific knowledge. Ecological economics tries to incorporate elements of uncertainty, values, or different perspectives of analysis into the cognitive process (intraeconomic and intra-environmental couplings, the impact of the environment on the conditions of the economy, the use and transformation of the environment in economic processes, the impact of the environment on health and life) (Fiedor (ed.), 2002; Pieńkowski, 2008). Ecological economics deals with both environmental protection and sustainable development.

Environmental economics focuses on the relationship between socioeconomic development and the environment, specifically assessing the impact of economic growth. It determines responsibility for pollution caused by economic activity. Technical progress and technological innovation are important factors in the adjustment processes in environmental economics. They can contribute to the renewal or restoration of resources (Blaug, 1994). Economists in the environmental stream highlight socio-economic factors that limit people's ability to use natural resources sparingly. Environmental economics proposes instruments to change the behavior of market actors in response to the factors identified. These instruments include political-legal measures such as orders, bans, fees, and limits, as well as indirect measures that incentivize and inform changes in behavior (Rogall, 2010).

The development of the economy thus far has necessitated a consistent rise in the consumption of raw materials and energy, resulting in a corresponding increase in pollution and environmental degradation. For sustainable development, it is essential to have a policy that considers the product life cycle, which can protect the environment and natural resources. Implementing a closed material cycle economy can be an effective tool for achieving this goal. Gradually replacing mineral energy resources with secondary raw materials extracted from waste can help achieve this. The concept of a closed-cycle economy should be implemented in the local economy to ensure proper waste management, energy conservation, and material recovery.

GE is an economy that aims to maintain the value of products, materials, and resources for as long as possible while minimizing waste generation and maximizing waste and pollution reduction (Barreiro-Gen & Lozano, 2020). This approach leads to reduced environmental degradation, positive social impacts, and stimulated economic growth (Cullen, 2017). The circular economy is the opposite of a linear economy. Its operations involve obtaining raw materials, processing them, and then reusing or recycling the product. The linear economy model poses challenges such as resource depletion and pollution (Jackson, Lederwasch, Giurco, 2014; Persson, 2015). According to this model, all products have a linear cycle. This text describes the process of extracting raw materials, processing and transforming them into products, distributing and selling them, and disposing of them as waste (Laumann, Tambo, 2018). It also discusses the concept of the sharing economy in the context of regional operations, where

the unrestricted consumption or accumulation of property is replaced by shared use (Degórski, 2018). The circular economy is influenced by environmental economics, industrial ecology, efficiency economics, and ecological economics (Stahel, 2010).

The development of a green closed-loop economy in different regions is influenced by geographic location, level of economic development, and distribution of resources. Geographic factors play a significant role in shaping the energy structures and industrial arrangements of these regions. Regional disparities in economic development and industrial structures lead to differences in carbon emissions. Developed regions generally have lower levels of carbon dioxide emissions, while economically less developed regions face greater challenges in reducing their carbon footprint (Di et al., 2023).

In a market economy, the focus is on the value of economic products. However, the depletion of natural resources and the accumulation of economic waste are often disregarded (George, Chiang Lin, and Chen, 2015). The circular economy promises green growth and the decoupling of economic growth from environmental impact. The decoupling effect is currently under scrutiny (Blum, Haupt, Bening, 2020). The implementation of circular economy principles is increasingly recommended as a convenient solution for achieving sustainable development goals. One of the fundamental principles of the circular economy is the 3R (reduce, reuse, recycle) principle (Zhu, Zhu, 2007). The 4R approach emphasizes the importance of recovering the energy contained in waste (Jawahir, Bradley, 2016).

The circular economy is a system that considers the productive reuse of a product throughout its life cycle. It is characterized by a closed structure, which presents a new approach to resource flow, unlike the linear economy model. The transition to a circular economy creates opportunities for regeneration, renewal, and innovation in various social, economic, and environmental spheres while also addressing resource scarcity (Sharma, Mangla, Patil, Liu, 2019). CE enables more efficient use of available environmental resources, allowing optimal use of natural resources and making economic development independent of the consumption of scarce resources.

2.2. Concept Waste Management

The modern crisis, including financial, economic, social, and environmental issues, has been caused by various factors, including the existing linkages in the

economy, networks of dependence and cooperation, and the growing unification of markets (Krugman, 2009). The increasing interconnectivity of regional economies presents a risk of transferring negative phenomena to other economies that are closely linked in a network of cooperation and the global system of flows, including resources, production factors, capital, goods, and services (Gorzelak (ed.), 2009; Gorzelak, 2010). Proper management of natural resources enables their preservation and the enjoyment of their non-economic values, such as aesthetic and recreational values. Inappropriate exploitation of the environment leads to its degradation (Łuszczyk, 2010).

Implementing a zero-waste philosophy in environmental strategies enables the creation of closed economic cycles where waste re-enters the system as full-value products. This approach should also involve reducing material consumption and energy use. The recycling sector of the economy has significant socio-economic value and a positive impact on the environment (Rumelhart, Widrow, Lehr, 1996; Europa 2020, Strategia na rzecz inteligentnego ..., https://). Waste in the region is generated by consumption and production processes. It is a consequence of society's inefficient behavior and a sign of wasted resources. The growing amount of waste has prompted authorities to adopt more sustainable waste management practices, such as waste reduction and environmentally and socially friendly handling (Zaman, Lehmann, 2013; Song, Li, Zeng, 2015).

The waste is a significant environmental problem, symbolising societal inefficiency and poorly allocated resources. The creation of waste exhausts natural resources, consumes energy and water, puts pressure on land, pollutes the environment, and ultimately generates additional economic costs associated with waste management (Memon, 2010). Historically, waste has been treated as a burden and a social problem, representing a stage in the resource transformation taking place during the consumption process. In order to promote sustainable development, reduce greenhouse gas emissions, and prevent waste, it is important to redirect resources that would otherwise become waste back into the production process through holistic management systems (Zaman, 2015). This approach considers waste as a resource and emphasizes the importance of recycling and reuse to minimize environmental impact. The primary goal of waste management is to establish a cleaner and more environmentally friendly environment. Achieving a cleaner environment is dependent on reducing pollution of water, air, soil, and other elements. Rational waste management practices enable energy conservation through recycling or reuse (Vardopoulos et al., 2020).

The scarcity of resources and the increasing amount of waste produced necessitate their reduction. The recovery and reuse of waste materials are becoming increasingly important for economic reasons. In waste management processes, waste prevention is preferred, and waste storage is the least desirable option (Famielec, 2017). Waste management should adhere to the principle of sustainable development, balancing the needs of the economy, human comfort, and environmental interests. The negative impact of waste on the environment can lead to degradation. Human-produced waste does not disappear; instead, it produces harmful substances that poison the soil, water, and air (Grodkiewicz, Michniewska, 2017). Waste management should adhere to an environmental framework of reduction, recycling, and reuse, which has its own limitations. The ideal goal is zero waste, which requires transforming the linear economy into a circular economy and viewing waste not as a by-product but rather as having negative external effects that need to be deliberately addressed (Kumar, Bhati, 2022).

Zero-waste is a comprehensive approach to managing waste and resources in a sustainable city. Waste management systems encompass socio-economic, political, environmental, and technological aspects and involve multiple stakeholders. The concept of zero waste is based on three pillars: society, the economy, and the environment. It is a response to the significant increase in consumption and, consequently, waste. It emphasizes the importance of using waste materials as resources and promoting the cyclical use of raw materials. The text describes the concepts of waste management and resource conservation. The goal is to improve the quality of life sustainably by managing economic, human, and natural capital. ZW proposes a shift from a linear to a cyclical waste management system. The management of waste poses a significant challenge to humanity (Sharma, Garg, 2019). The zero-waste approach considers waste as a resource and a symbol of modern society's inefficiency. Developing a sustainable waste management system requires tailored solutions that account for local circumstances (Wilson, 2007).

Efficiency and progress in a zero-waste economy can be described using specific indicators. However, currently available indicators are not yet sufficiently integrated or identified as key indicators for evaluating waste management systems (Zaman, 2014). Introducing the Zero West concept offers benefits in various aspects, including community, financial, economic, environmental, and industry stakeholders, both in macro and micro environments (Pietzsch, Duarte Ribeiro, Fleith de Medeiros, 2017).

2.3. Green Infrastructure

The concept of green infrastructure is gaining recognition as a tool for planning and protecting areas and is now considered one of the new paradigms of sustainable development (Giedych, Szulczewska, Maksymiuk, 2012). It has an impact on spatial planning, the protection of open areas, and the sustainable management of rainwater (Green Infrastructure Sustainable Investments for the Benefit..., https://; Houet et al., 2022). The concept of ZI pertains to activities within the region, such as developing and activating natural structures, forming a network of links and corridors that connect diverse natural areas, and increasing urban biodiversity (Jakubowski, 2013). Additional actions should aim to improve the state of ecosystems and enhance ecosystem services (Zwierzchowska, Mizgajski, 2019).

Green Infrastructure (GI) is a strategically planned network of natural and semi-natural areas, along with other environmental features. It is designed and managed to provide a wide range of ecosystem services. The main elements of GI are the network of natural and semi-natural areas and the provision of a wide range of ecosystem services. Strategic planning is also a crucial component of GI, which involves identifying the elements of green infrastructure (Identyfikacja elementów zielonej infrastruktury ..., 2019). Green infrastructure is a network of interconnected natural or other open areas that protect the values and functions of ecosystems and provide a wide range of benefits to people and nature (Benedict, McMahon, 2006). Its characteristic features include the multifunctionality of individual components and the entire structure, as well as its spatial coherence (Zielona infrastruktura – zwiększenie kapitału naturalnego Europy, 2013). Additionally, it creates a network of connections at different levels of planning (Szulczewska, 2018). The significance of this infrastructure system for the development and smooth functioning of the region should be highlighted, on par with other systems. (Gaczek, 2003).

The identification of elements of green infrastructure, as indicated by B. Szulczewska (2014), should result from the conditions, needs and policies of the authorities of the area. Thus, the elements of GI may include: natural areas, semi-natural areas, natural habitats, ecological corridors, greenways, park systems, Natura 2000 areas, vegetation, soils, hydrological system, surface waters, forests, wooded areas, landscaping and gardening, green roofs and walls. The list of potential elements of green infrastructure is open, comprehensive and not exhaustive. However, these are purely natural or semi-natural elements

CHAPTER 2

and their associated engineered features. Other elements that make up green infrastructure are: parks and gardens; natural and semi-natural green areas in the city (e.g. forests, meadows, lawns, wetlands, brownfields, water bodies); ecological corridors; sports areas; amenity areas (e.g. home gardens, informal recreation areas, neighbourhood green areas); children's and young people's areas (e.g. playgrounds, skate parks). e. playgrounds, skate parks, adventure play areas); food production areas (i. e. plots, urban farms, urban gardens); cemeteries; suburban areas; urban areas (exhibition squares, pedestrian areas - boulevards, promenades); green roofs and walls (Goździcziewicz-Biechońska, 2017; Parker, Zingoni de Barooni, 2019).

Green infrastructure is a multifunctional solution based on natural elements, whose individual elements form a system and are components of the space of anthropogenic areas. The attractiveness of the residential area is increased by biologically active areas, such as urban parks, which are considered to be one of the factors that serve to improve the standard of living of urban residents and facilitate the realization of their life needs. (Korwel-Lejkowska, Topa, 2017). The holistic planning approach, characterized by green infrastructure and combining environmental and social perspectives, is also considered more efficient and appropriate for planning complex systems. This characteristic explains the success of the green infrastructure swith the dynamic interaction of ecological, social, economic factors, etc. (Zielona infrastruktura – zwiększenie kapitału naturalnego Europy, 2013; Goździewicz-Biechońska, 2017).

Given the current needs for sustainability and flexibility in regions, the application of the multifunctionality of green infrastructure for spatial planning can be very effective. Green infrastructure planning is important for local environmental and social equity for green services (Chen, at all, 2022). It is perceived as tools and objects necessary for the functioning of society and the economy, but with the maintenance of natural processes. It is a solution that supports sustainable development (green development) and technical solutions that support sustainable growth that bring long-term benefits to the environment. AI shapes the environmental needs of society, the economy, and the spatial cohesion of the region, strengthening the local economy by building on local resources (Szulczewska, 2018).

Green infrastructure is characterized by its multifunctionality due to the diversity and infinity of its components. Green infrastructure can serve many functions and bring many benefits to a given area. These functions can be environmental (e.g., preserving biodiversity or adapting to climate change), social (providing drainage and organizing green spaces, performing educational and training functions), and economic (creating jobs and increasing the value of real estate) (Zielona infrastruktura: lepsza jakość życia, https://), structural (creating spatial compositions), or economic (shaping the operation of infrastructure) (Puzdrakiewicz, 2017; Polska 2030. Trzecia fala nowoczesności ..., 2013; Grunewald, at all, (ed.), 2018). Green infrastructure also fulfills functions such as biological, climatic, and technical, while at the same time being a space that is used by people in a variety of ways. To create a social space, it should meet the needs of its users (Sutkowska, 2006)

GI is the natural system of a sustainable regional environment and is the basis of ecological security for sustainable environmental development. GI can improve the built environment, provide people with access to nature, enhance landscape aesthetics, and promote social equity, thereby improving social well-being and human health. It can attract tourists, consumers, and investment by improving the quality of the environment, bringing effective economic benefits to the surrounding areas, and promoting the prosperity and sustainable development of the regional economy (Wolf, 2020).

Green infrastructure is a planned or managed spatial structure and network of interrelated features of the environment, including natural areas, open spaces, and landscapes. It is a policy measure that can promote sustainable development and smart growth. The use of green infrastructure and the benefits of multifunctionality require a holistic approach, as some practical applications lack an environmental and social perspective. Multifunctionality refers to the effects of the many environmental, social, and economic functions of GI that result from the combination of these functions. Multifunctionality benefits people (improved health and social cohesion) through ecosystem services (Meerow, Newell, 2017; Nazir, Othman, Nawawi, 2015).

Green infrastructure has become an important tool for achieving sustainable development. GI is a strategically planned network of natural and semi-natural areas with other environmental features, designed and managed to provide a wide range of ecosystem services. Green infrastructure mimics natural processes to improve water quality and quantity management by partially restoring hydrological functions. Green infrastructure is, among other things, the integration of vegetated areas in buildings (Liberalesso, 2020).

2.4. Green economy - low-carbon, resource-efficient

Over the past decade, societies have become more environmentally aware. This has led to changes in public policy that have a direct impact on the economy itself. Governments are responsible for legislation and are the largest investors in most modern economies. In the face of resource scarcity, global climate change, environmental degradation, and increasing demand for food, the Green Economy (GE) is a promising strategy to promote sustainable development. The concept of the green economy itself is part of the Europe 2020 strategy implemented in the European Union (EU). Undoubtedly, it is primarily the individual states that are involved. In this context, we must not forget the cohesion policy, which is the main instrument for promoting socio-economic convergence in the European regions. Many projects related to the development of the green economy have been co-financed by cohesion policy funds.

The Green Economy (GE) contrasts with the so-called Brown Economy (an economy based on the exploitation of fossil fuels and non-renewable resources). GE increases prosperity, ensures social justice, and reduces environmental risks. It integrates economic, social, and environmental objectives that can be achieved at local and central levels. (Akalibey, at all, 2023). SGE is one of the pathways to sustainability, and its advantage is the greater concretization and operationalization of sustainability. The GE concept is multifaceted and includes aspects of the economy: social, infrastructural, financial, etc. The transition from the traditional economy to the green economy is a major change and will affect almost all sectors of the economy (industry, trade, agriculture, and tourism) (Naik, 2021).

It is difficult to find a generally accepted definition of the green economy. Most often, this concept appears in the context of: the direction of transformation of the economy and the whole system economy-society-environment (ethical, responsible, based on respect for the planet and people); the process of civilisational changes necessary due to exceeding the limits of the planet; the model desired in the process of balanced development, combining economic, environmental, and social aspects; alternatives to the brown economy; the specific goal of the current ecological policy and ecological modernization; and the result of green growth (Ryszawska, 2013).

The green economy is becoming a factor in structural change in the economy and in social life. It contributes to a more efficient and sustainable use of limited resources, which is part of the impact of SP on the development of spatial units. The orientation of sustainability (or green economy) towards the 'three E's' (environmental protection, economic growth, and social equity) is also correlated with quality of life considerations (Cusack, 2019). It is beneficial for the economy of the region in the social, environmental, and economic spheres by providing better ways of using resources or eliminating pollution and ecological growth in the area (Elimam, 2017; Aldieri, Vinci, 2018).

As P. Szyja (2013) points out, the green economy is linked to the Green New Deal. Its essence is to create a new dimension of management processes using environmentally friendly solutions. Its elements can be found in the National Strategy for Regional Development 2030. It points to the effective use of the internal potential of the territories and their specialization for the sustainable development of the country. The aim is to create conditions for increasing the incomes of Polish citizens while at the same time achieving social, economic, environmental, and spatial cohesion.

A green economy is a circular economy. It points to the need for the economy to be based on renewable processes that promote biodiversity and benefit people now and in the future (D'Amato, Korhonen, 2021). This approach recommends the collection and recycling of residual waste in order to recover raw materials and/or convert them into useful heat, electricity, and fuels (Amaral, at all, 2020; Tascione, Mosca, Raggi, 2021; Bucea-Manea-Oniş, Zecheru, 2020). GE refers to issues of economic development, in sectoral and regional terms, perceived as an element of the ecosystem. The essence of this approach is to create solutions that enable a better adaptation of the economy to the specifics of the environment and the region (Cato, 2009).

In contrast to the current model of the brown economy, which is largely based on the use of fossil fuels and other non-renewable resources, the new model should draw on the experience of the green economy and ensure appropriate relationships between the economy and ecosystems. (Towards a Green Economy, 2011). The aim of the green economy is to optimize and manage natural and socio-economic ecosystems in such a way that development is ecologically, economically, and socially sustainable (Figure 3 and 4).

Aims of the green economy			
Social	Economic	Environmental	
Social inclusion Ensuring social justice Reducing poverty and inequality	New jobs (green jobs) Increase in the size of green sectors in the economy, economic development Development of competitiveness	Resource efficiency Reduction of emissions, waste and pollution Protection of ecosystems and biodiversity Increasing the area of green areas	

Figure 3. The basic aims of the green economy according to their dimensions

Source: own study based on Ł.J. Kozar (2019). Żielone miejsca pracy, Uwarunkowania – identyfikacja – oddziaływanie na loklany rynek pracy, Wyd. UŁ, Łodź, (https://dspace.uni.lodz.pl/bitstream/handle/11089/46812/Kozar_Zielone_miejsca%20pracy-.pdf?sequence=1&isAllowed=y; 02.07.2023).

(UNEP) A green economy is one that enhances human well-being and social equity while reducing environmental risks and consumption of natural resources.	A green economy is one in which economic growth and environmental responsibility are combined and mutually reinforcing in the process of promoting social progress.
(European Commission) A green economy is a low-carbon, resource-efficient economy that delivers growth, creates jobs, and eradicates poverty by investing in and protecting the natural capital on which the long-term survival of the planet depends.	(OECD) Green Growth Outcome. A desirable model for balanced development combines economic, social, and environmental aspects.

Figure 4. Definition of the Green Economy

(for autor GE is the sum of the values of the environment, infrastructure, ecology, entrepreneurship and demographics desired in the process of sustainable development) Source: own study based on A. Grudziński, (2018) Wybrane narzędzia usprawniające proces zazieleniania gospodarki, Rynek-Społeczeństwo-Kultura, 4 (30), 39-43

The transition from a traditional, brown economy to a green economy will be a gradual, complex process (Naik, 2021). The green economy focuses on sustainable development without environmental degradation, promoting the concept of the Triple Bottom Line, i.e., profit, society, and planet (Green Economy: The Future of the World Economy, https://). The benefits of a green (circular) economy include, among other things, better resource efficiency, a smaller carbon footprint, and less dependence on fossil resources. This concept focuses on the idea of recycling, reuse, and a sustainable production process. Sustainable and environmentally friendly waste disposal is crucial to protecting the environment and human health (Gralak, 2021; Leong, 2021).

A green economy is a way of obtaining and using resources. The related structural changes in the economy are due to the emergence of new industries in waste recycling, emissions-free energy production, greenhouse gas emission absorption, and green urban planning. These changes should be accompanied by a parallel increase in the quality of life of the inhabitants and sustainable development (Loiseau, 2016). Increasing resource efficiency, promoting sustainable consumption and production, combating climate change, protecting biodiversity, and managing natural resources and ecosystems responsibly are both a necessity and a driving force for the transformation of the green economy (Contribution by the European Union and its Member States, 2012; United Nations Conference on Sustainable Development, https://). At the same time, these processes should have a positive impact on the quality of life of the inhabitants. A green economy allows for harmonious management of local resources. GE refers to issues of economic development, in sectoral and regional terms, as well as urban, perceived as an element of the ecosystem. The essence of this approach is to create solutions that allow greater adaptation of the economy to the specifics of the environment (Cato, 2009; Domański, 2002).

The green economy is a means of achieving sustainable development, not a substitute for it. It helps to integrate the dimensions of sustainable development. It must be based on resource efficiency and sustainable consumption and production patterns (Huang, Quibria, 2013; The United Nations University World Institute for Development Economics Research, https://). It provides better ideas to eliminate pollution and reduce the misuse of limited resources (Elimam, 2017). A green economy is a sustainable economy in which all energy is produced from renewable sources. It is a path of economic development that is possible in a sustainable way, taking into account environmental constraints and criteria. It is a tool for achieving sustainable development. It promotes sustainability as a strategic economic policy agenda. A green economy is a way of obtaining and using resources. The concept of a green economy is multidimensional and refers to the economic, social, and environmental dimensions (Ryszawska, 2013).

The benefits of a green economy also include better resource efficiency, a smaller carbon footprint, less dependence on fossil resources, and the valorization of by-products and waste from multiple sources (e.g., agricultural and industrial industries). The concept focuses on the ideas of recycling, reuse, regeneration, and the creation of a sustainable production process. Sustainable and environmentally friendly waste management is crucial for environmental protection (Leong, 2021). A green economy can (and should) be seen as a way to pursue growth and economic development while preventing environmental degradation, loss of biodiversity, and unsustainable use of natural resources. It is a form of economic progress that promotes environmentally sustainable, low-carbon, and inclusive development by ensuring environmental sustainability and maintaining the conditions for continued social progress (OECD and Green Growth, Why Green Growth?, 2009). The added value of the green economy is that the solutions it creates can be applied in both modern and traditional industries (Chapple, Hutson, 2009; Berkeley, Cooke, 2008).

The green economy aims to provide sufficient resources and other ecosystem services for economic development while minimizing adverse environmental impacts. The areas subject to continuous assessment under GE should include both natural capital and the environmental quality of life of the population (economy-environment relations) (Green Growth Indicators, 2014). Social aspects related to the economy or the environment (i.e., environmental productivity and resources, natural resource base, environmental dimension of quality of life, economic opportunities and policy responses, socio-economic context) should also be monitored under GE. (Towards Green Growth: Monitoring Progress—OECD Indicators, 2011).

UNEP (United Nations Environment Programme, 2012) does not provide an arbitrary set of indicators. It proposes a methodology for developing systems of such indicators based on the assumption that countries should develop their own monitoring systems adapted to their specific circumstances. The specifics of the environmental conditions (geographical location, climatic zones) and the socio-economic conditions of the country or economic structures should be taken into account (UNEP, 2012).

National statistical offices in some countries also provide databases of green economy indicators (e.g., Denmark, Poland, Czech Republic, Holanda, Korea, and Canada). The approach of the Central Statistical Office is mainly based on the OECD methodology. Indicators are collected in four main areas of monitoring: natural capital (environmental status), environmental efficiency of production (economy-environment relationship), environmental quality of life (ecology-society relationship), and economic policies and their consequences (instruments of impact on the economy and society) (Godlewska, Sidorczuk-Pietraszko, 2019).

The set of indicators proposed by Broniewicz E. and co-authors (2022) can be used to assess legislation in terms of adaptation requirements to climate

change (and thus changes in the transition to a green economy). As B. Ryszawska (2013) points out, the set of indicators should focus on several themes: natural capital, government policies supporting the green economy, and socio-economic issues. Examples include forests, protected areas, energy consumption, energy productivity, renewable energy production, waste recycling, expenditure on environmental contributions and development, environmental innovation, employment, and policy instruments. The desirable relationship between the economy and the environment should therefore indicate the necessary changes in economic activity to reduce environmental problems. Areas of economic activity that are critically important for the natural environment and its changes (Herodowicz, 2018).

J. Hickel (2021) shows the traps of exponential growth, i.e. the quantities of steel, non-ferrous metals, food, products and energy that we need more and more. Vuković et al. (2019) argue that green economy indicators have the characteristics of uncertainty and fuzziness, which is why many authors have involuntarily used elements of the fuzziness collection theory to describe the subject of the study. Finally, in developing the criteria for assessing the green economy, researchers do not outline strictly defined rules or principles for their construction.

The performance of the green economy at the regional level has additional limitations compared to the indicators at the national level. The set of indicators chosen by the author (for B Ryszawska) focuses on natural capital, public policy and socio-economic problems, assessment of the state of the environment, risk of resource consumption, resource productivity, biodiversity, access to ecosystem services and quality of life in relation to the environment. The problem encountered by the author in this respect is the availability of data collected at the Voivodeship level in Statistics Poland.

2.5. Sustainable development of the local economy

The activities carried out at the local level should be aimed at developing conscious, pro-environmental attitudes in the local community and the appropriate orientation of production processes, raising the level of ecological awareness (Rakoczy, 2009). The most important aspects of local action include: harmonization of socio-economic development with the natural environment; rational use of environmental resources; lack of actions leading to irreversible changes in the environment; improvement and maintenance of a high quality of

life (for present and future generations); and reduction of the adverse impact of human activity on the environment (Piontek, 2002).

Ensuring the sustainable development of the local economy requires creating conditions for the proper use of endogenous resources and the attraction of exogenous resources. The development of the local (regional) economy often coincides with growing social and economic inequalities. The model of unsustainable consumption is a source of progressive environmental degradation. It also affects the depletion of its resources and contributes to the violation of ecological balance (Tarapata, 2015).

According to the OECD (2011), sustainability (Table 6) means promoting economic development while ensuring that natural assets continue to provide the resources and environmental services on which our prosperity is based. (Towards Green Growth, 2011). It is focused on the needs of the local community, environmental protection, and the ability of the environment to meet current and future social needs (Verma, Kandpal, 2021). According to L. Popławski (2009), the work of D. Pearce, E. Barbier, and A. Markandyi had a significant influence on the development of the concept of sustainable development. (1990). These authors define development as the realization of a specific set of socially desirable objectives, i.e., an increase in real income per capita, improvements in health and nutrition, access to natural resources, ensuring sustainable economic growth, and ecological sustainability. Sustainability, in their view, means that none of the elements of the vector of development should diminish in the socio-economic process. Development should take place over an unlimited time horizon.

Local authorities play a crucial role in promoting sustainable development in the local economy. Their responsibilities include infrastructure development, waste management, education, social welfare, and spatial planning. The socioeconomic development of regions is influenced by spatial factors, which are determined by their location in the multi-dimensional system of the region's economy.Environmental, economic, social, and infrastructural resources are interdependent and used in economic and social relationships.

Sustainable development and a green economy are crucial for the future and the competitiveness of regions. Sustainable, balanced development is an approach based on the assumption that economic, social, and environmental changes are interrelated. The problem of economic development sustainability, which refers to the ability to meet the increasing material and intangible needs of present and future generations, has always been a central issue in economic theory.

Definition	Meaning
Ecodevelopment	Oldest approach Economic development that is compatible with the protection of the human environment, in particular nature conservation. Nature-based development Clearly narrower in scope
Sustainable develop- ment	Traditional approach: the right balance within the framework of socio-economic development, for example, between investment in technical and social infrastructure and in other economic sectors, ensuring what is known as internally compatible development. Modern development: a balance within ecosystems ("ecological balance") and a balance between the economic, ecological, and social elements or aspects of economic development—economic, spatial, and social order—taking into account the needs of future generations. Does not mean rapid development for all. Does not justify the dominance of a single cultural pattern.
Sustainable (stable) development	Socio-economic development that ensures an adequate state of the environment and its ecological balance, as well as a quality of life for future generations. Is intended to eliminate the threat of economic and social crises. The broadest approach
Self-sustainable developmen	Maintaining the status quo. Further development is only possible if the current situation can be sustained.

Table 6. The concept of sustainability development

Source: own study based on P. Trzepacz, Zrównoważony rozwój – wyzwania globalne, Podręcznik dla uczestników studiów doktoranckich, https://ruj.uj.edu.pl/xmlui/bitstream/handle/ item/81176/trzepacz_zrownowazony_rozwoj_wyzwania_globalne_2012.pdf? sequence=1&isAllowed=y#page=55 (02.07.2023)

Green growth, or environmentally sustainable economic growth, is essential in light of the region's current environmental crises and resource depletion, which should be more environmentally and economically sustainable (Estella Kim, Kim, and Chae, 2014). One of the elements of this concept, a form of development for modern economies, is the green economy.

Sustainable development is concerned with three pillars simultaneously, i.e., the environment, the economy, and the quality of life (Brundtland, 1991;

Zrównoważony rozwój – polityka i wytyczne, 2006). They are regarded as an indispensable basis for sustainable development, a tool for achieving it (Zhang, at all, 2019). Spatial heterogeneity in the distribution of resources or environmental pollution results in uneven resource scarcity or environmental pollution in regions, which means that regions are subject to different resource and environmental pressures. Difficulties in its practical implementation also arise from the fact that it is a concept that attempts to reconcile often contradictory, especially in the short term goals.

3. LOCAL SPECIFICITY OF DEVELOPMENT PROCESSES

3.1. NETWORKING OF THE LOCAL ECONOMY IN A COMPLEX ECONOMY

A network, in the economic sense, is a response to market failures. It is a search for the most effective coordination mechanism that, on the one hand, provides freedom of exchange and a certain level of planning activity. Such a network creates its own added value and additional profit. It is also the result of an exchange relationship that would not be generated by individual organizations separately. This additional profit can only reveal itself when cooperation between organizations reaches a certain level. The main problem in conceptualizing the network is its complex nature and the multiplicity of relationships within it. The goals of the economic network are considered in a broad economic as well as social context as dimensions of technical and technological progress (network economy) and socio-cultural and civilisational progress (network society). The formation of a network is mainly carried out in order to carry out specific tasks, improve operating conditions, and develop the competitiveness of participating entities (Wisniewska-Paluszak, 2017).

The definition of networks in economics indicates that a business network is a set of long-term formal and informal relationships that occur between two or more entities. A network is formed as a result of a longer process of developing relationships and the interactions that occur within them (Ratajczak-Mrozek, 2010). A network in an organizational context defines the interdependence

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between entities that pursue a specific goal. The formation of network organizations is part of a broader process of change taking place as a result of contemporary development challenges (Suszynski, 2007). A network can be defined as a system that:

- ensures an economic entity's survival and strengthens its position among competitors through multilateral cooperative relationships.
- enables a focus on core competencies that are activated and utilized in a coordinated manner, thus enabling the sharing of network resources and knowledge potential.
- is constrained by the need to ensure the network's manageability (Wyrwicka, 2003).

The network economy is a form of market activity in the area of consumption and production, where the network is a form of coordination of processes between actors (Perechuda, 2007). The network approach is a new concept of cooperation between economic entities. It emphasizes the importance of the totality of contacts with the entity's environment, forming multi-entity, complex systems of relationship dependencies and an extensive network of connections.

Cooperation in networks makes it possible to achieve a synergistic effect, which is derived from the differentiation of the network's components. Long-term cooperation in a network results in the blurring of boundaries and an increase in dependencies between entities in the network. As a result, there is an increase in economic, legal, technological, and marketing ties and the introduction of similar administrative standards (Golinska, 2010). The modern economy has a network character. Networks have become an integral part of socio-economic life. The endogenous potential of a territorial unit includes elements grouped as follows: infrastructure potential, entrepreneurial potential, ecological and environmental potential, demographic and labor market potential, and financial potential. Networks are formed as a result of intentional cooperation between at least two entities. The characteristics of a network include continuity, complexity, symmetry, adaptation, and informality (Håkansson, Snehota, 1995).

A network is a hybrid form of cooperation and competition, as both of the aforementioned forms of coordination can occur simultaneously in a network. The network is characterized by specific properties that are the basis for its separation. These include maintaining private ownership of the means of production, remaining in a relationship of mutual dependence, entering into informal contracts, and seeking equitable mutual benefits (Wiśniewska-Paluszak, 2017).

The concept of "hybrid" is identified by many researchers in such categories as the crossing of two elements belonging to different entities or the combination of different cultures or technologies (Drobniak, 2017; Drobniak, 2018). The rationale for introducing the concept of hybridization of development can be found in building the adaptive capacity of regions for strengthening their potential. Spatial hybrid development is a type of uneven development resulting from the forces of neoliberal capitalism, for which, in terms of efficient capital allocation, only those places in space that provide a satisfactory return on investment are important. Elements of hybridized development are close to the assumptions of the concept of polarized development. Hybridization should be considered in an environmental, technological, product, and organizational context. The increase in interest in this category and its growing importance for development processes are due to the popularity of technologies that enable the exchange of information and knowledge, facilitate intellectual contacts, and build socio-economic relations, excluding the spatial dimension (Drobniak, 2019). The concept of polarized development is also important for the hybridization of development. This was noted by François Perroux, who captures development in the spatial dimension with the assumption that geographic space is understood as the area over which the volume of production or population density spreads (Perroux, 1950).

Nowadays, there is an increase in the role of horizontal networks, i.e., the intertwining of economic, institutional, technological, and social relations at a local and regional scale. The elements of the network are changing at an uneven pace. The differences between the speed of change in network infrastructure and network flows are important. Network elements change slowly and are usually equipped with permanent devices that subordinate flows that change rapidly. What is important, however, is that there must be a forum for interaction and networking, as well as an efficient mechanism for their operation. This situation is conducive to job creation, growth in population income, spatial order, and the expansion of human and social capital (Miszczak, 2004).

The interest of the local government regarding network connections is a consequence of the influence that residents, businesses, and other actors have on the local scene (Dziekański, 2016). The network connections within the local economy are a very extensive phenomenon that considers the impact of institutions that provide social services (such as educational institutions, social welfare, and healthcare), the residential environment (housing situation, labor market), the countrywide situation (level of development), and the living conditions of the citizens (Strahl et al., 2006). The growing role of the local government in the network economy entails a one-dimensional assessment of its performance in the context of demographic, economic, infrastructural, or financial variables.

Local government units, as a complex system in terms of the economics of complexity, due to their characteristics (social, economic, spatial, etc.), generate values, among others: creating value in the environment, building the utility of the resources that make up the complex system, adaptive socio-economic interactions with the environment, optimizing the functionality and utility of the system, and creating useful tangible and intangible resources (Gospodarek, 2012).

Complexity economics considers economic objects as complex adaptive systems. These are open, dynamic systems that consist of interacting agents and exhibit emergence. Proponents of complexity economics usually, as mentioned, regard this trend as a new economic paradigm, combining several strands of unorthodox economics, primarily behavioral economics, ecological economics, evolutionary economics, experimental economics, and econophysics. Complexity economics seeks to view the economy as a complex system that operates under the same laws as all complex dynamic systems. In general, the behavior of a complex adaptive system is the result of a huge number of decisions made at each moment by many individual factors (Holland, 1999; Dooley, 2002; Manson, 2001; Wojtyna, 2008; Mrozinska, 2016). Complexity economics focuses on empirical phenomena occurring under non-idealistic conditions (i.e., disequilibrium states or adaptive behavior). It takes into account the heterogeneity of individuals, their limited knowledge and rationality, adaptive behavior, the dynamics of economic systems, the increase in the complexity of systems, disequilibrium, and the non-linear and non-ergodic nature of socioeconomic processes (Wieliczko, 2020).

The local economy in the era of the network economy must shape its potential. This process is an integral part of development and operates on many levels distinguished by economic, cultural, social, and spatial characteristics.

3.2. MULTIDIMENSIONALITY OF THE STRUCTURE OF THE LOCAL ECONOMY

Local government, as an entity of cultural and civilizational life, optimizes the interests of the general public, fusing tradition and socio-political challenges and shaping culture in terms of trust, loyalty, regional ties, individual and collective identity, as well as supporting the solution of emerging social problems. The essence of local self-government is its vocation to carry out certain public tasks, and in this regard, independence from government administration is limited by the control powers of the government.

A. Łuczyszyn (2013) highlights the intricacy and dynamism of the object of influence in local development policy, as well as the multidimensionality of the processes occurring in the local economy. With respect to the requirement to establish the appropriate relationship between the various social, economic, and environmental developmental objectives, the effective execution of developmental policies poses a notably challenging task for regional authorities. This requires having, under the conditions of the dynamics of change and its impact on economic relations in the local socio-economic-environmental space, a lot of information, which should provide a multidimensional space to support the decision-making process of local authorities. Thus, the role of constant monitoring of the performance of municipalities as a tool for strengthening the accountability of local authorities in relation to the resources they have and the processes they carry out, as well as the goals they intend to achieve, is increasing.

Development is a multidimensional process of qualitative and quantitative changes in successive stages. Considered mainly in economic terms, it produces effects on a much broader scale. The following aspects can be pointed out: social, demographic, cultural, psychological, and natural (Gruszewska, 2007). It should be based on the rational use of local resources. Space at the local scale can adapt to changing conditions. Its flexibility is the idea of an economy able to adapt quickly and to manage systems that are complex and diverse in terms of culture, community, and variability of needs. Local development is the activity undertaken by the authorities, the local community, entrepreneurs, and socio-cultural organizations using the factors of development, aimed primarily at improving the quality of life of residents and the development of entrepreneurship (Jewtuchowicz, 1996; Sekuła, 2005).

The multidimensionality of the development process is evidenced by the courses of action of municipalities as a local multidimensional system

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of interdependent and interrelated economic, social, infrastructural, and natural factors, as well as the benefits achieved in spatial, social, economic, etc. aspects. These activities usually revolve around the objectives, among which are sustainable development, growth of residents' income and budget, or development of entrepreneurship. The concept of sustainable and balanced development is a multi-faceted and extremely complex issue. It assumes harmonious development of economic (economic growth), social (residents' expectations), and ecological (protection of the natural environment) goals (Prus, Grabowski, 2016).

The development capabilities of individual territorial units are determined by their endogenous capacities and potentials. The development of a unit depends on human, innovative, ecological, infrastructural, financial, and institutional potential. Intangibles, such as knowledge, research, new qualifications, and skills, as well as leadership capabilities and local initiatives, occupy a special place in local development policy (Bury, 2004).

Recognizing the complexity arising from the multidimensionality of sustainable development, it is appropriate to conduct interdisciplinary research on the issue. Sustainable development is a multidimensional, multifaceted, and dynamic process. Expressing it in numerical terms requires taking into account many parameters, including time horizons. Economic, social, and environmental phenomena operate in different dimensions. In addition, it should be taken into account that sustainable development is a process linking the past, present, and future, which means, among other things, that all present decisions and the events that are their side effects will have consequences in the future.

The multidimensionality of local activities makes their quantification a major methodological challenge for any researcher. The local economy, with its spatial resources, draws attention to the attributes of sustainable development. Every spatial decision and every process of formulating the conditions and directions of development is based on certain premises and information. The possession of information is a fundamental condition for making correct spatial decisions. The system of the local economy changes over time. As a multi-elemental structure, it consists of, among other things, actors in economic life, finance, infrastructure, environment, etc. The degree of intensity of the region's endogenous assets, as well as their structures and interconnections, will shape the efficiency process. Implemented activities are a tangle of interrelated factors that form a multidimensional space. Understanding the complexity and interrelationships between all types of resources in the local economy can provide a basis for taking action to secure their supply in the future. It is necessary to look at the entire spectrum of metrics using a holistic approach. Only a systemic and multifaceted assessment of the economy will allow an answer to the question of the level of efficiency of its operation. An important difficulty in analyzing the vulnerability (susceptibility) of complex systems to external stimuli is the need to consider socio-economic and natural aspects together since they are closely interrelated. Analysis of these factors and relating them to regional specifics should help to accurately diagnose the elements whose influence on the development path of a given area can be described as the strongest, which will enable their strengthening through skillfully designed and selected support mechanisms.

3.3. ATTRACTIVENESS OF THE LOCAL ECONOMY

Attractiveness is the cumulative value of endogenous variables in local resources. Attraction consists of many determinants and activities; it takes a complex form due to its focus on multidimensional results (economic, infrastructural, tourist, investment, and environmental attractiveness). It occurs in a specific local, regional, national, and international space. Its inherent feature is multidimensionality (Pawlik, Dziekański, 2020; Pawlik, Dziekański, 2020). Attractiveness is the ability of a territorial system to be perceived as competitive (e.g., for potential investors). It can be said that regions compete with each other by the degree of their attractiveness to potential investors (Raszkowski, 2011), such as transportation accessibility, labor resources and costs, market, economic, and social infrastructure, and level of security.

Attractiveness is the ability to induce socio-economic activity by offering the best combination of location advantages possible in the course of conducting it. They result from the specific characteristics of the area in which socio-economic activity is developed. Cities and municipalities that offer an optimal combination of these are attractive because they reduce the risk of socio-economic activity failure. Attractiveness is also a set of regional locational advantages that affect the achievement of socio-economic goals, e.g., the formation of the cost of business activity, sales revenue, profitability, and competitiveness.

Investment attractiveness is important for the development of cities and municipalities. An area characterized by locational advantages relevant to an investor can attract investment and thus produce a development effect by creating an economic base and undertaking the production of products and services for the internal market. Economic, infrastructural, demographic, environmental, and financial potential consequently contribute to the attractiveness and development of an area or region (Nowicki et al., 2014). Potential attractiveness (including investment attractiveness) is defined as a set of regional locational advantages that affect the achievement of investor goals (e.g., in the form of the development of business costs, sales revenues, net profitability, and competitiveness of a given investment). Actual investment attractiveness is understood as the region's ability to create customer-investor satisfaction and trigger the absorption of financial and physical capital in the form of investment (Godlewska-Majkowska (ed.), 2012).

The attractiveness of a county is determined by the presence of certain characteristics (territorial capital) that attract stakeholders (e.g., investors) to a specific area due to the value of endogenous resources. Attractiveness is an element related to the formation of local government activity, determining the competitiveness of the studied community. It constitutes a set of factors of territorial capital. It is also a process that takes place in space and is determined by the structure and organization of the local and regional economies. The factors that most shape investment attractiveness on a regional basis include: transportation accessibility, labor resources, market absorption, economic infrastructure, social infrastructure, the level of economic development, the state of the environment, the level of public safety, and the activity of provinces towards investors (Nowicki et al., 2014).

The following are also considered factors influencing attractiveness: the situation on the labor market, equipment in technical and social infrastructure, as well as the market situation and natural conditions. An assessment of the labor market informs the investor about the possibility of acquiring employees for planned business ventures. The assessment of the state of technical infrastructure allows for the planning of economic ventures. Social infrastructure is assessed through the prism of equipping a given location with buildings and facilities that determine the quality of life of residents. The market situation informs the investor about the absorptive capacity of the market, i.e., the number of potential consumers (Atrakcyjność Inwestycyjna Regionów, 2017).

The balance of the district, which is the basis for assessing functioning and development, is the sum of the factors that make up the integrated order. It can be defined as a positive target state of developmental changes, combining in a coherent, non-contradictory way the component orders, i.e., economic (economic development), social (social development), and ecological (environmental protection). The indivisibility of the orders is accomplished through the balanced protection of natural capital (environment), social capital (and human capital), and anthropogenic capital (man-made, especially cultural and economic capital) (Borys, 2011).

Opportunities to influence the action of individuals are also determined by external conditions, i.e., the economic situation in the country and in the global market, the formed socio-economic relations with external entities, as well as the inflow of capital to the region in the form of investments and aid funds. Endogenous factors are the most important driving force for municipalities. They result from their socio-economic potential, location and infrastructure, availability of production factors, entrepreneurship, etc. They are divided into economic, infrastructural, social, spatial, and ecosystem factors (Nogalski, Szreder, Walentynowicz, 2006).

The market-oriented nature of local government activity is undoubtedly reflected in the search for new management opportunities to improve the ability of local government units to achieve planned goals (Laskowski, 2003). There is a growing interest in issues related to the acquisition and processing of information. Information accompanies all areas within an organization. Its intangible nature means that it is present in much greater quantities than material resources and that, in many cases, there is subjectivity in its interpretation (Kolbusz, 1999; Kudłacz, 2005).

The economic system, in the process of creating and developing new economic entities or developing regions, is in a state of constant institutional change. Under such conditions, new relations between economic and administrative entities are formed, and ideas of previous achievements are revived. The institutional model of economic development is the reproduction of objective, internal relations of economic activity, which determines the necessity of its construction in accordance with the internal regularities of economic development. It is a system that contains economic structural elements and relations between them.

External conditions are macroeconomic in nature (the level of socioeconomic development of the country, historical conditions, the system of the economy, state policy, and technical progress). They include changes in the macro-environment of the region, which are a consequence of, among other things: globalization processes, European integration, macroeconomic conditions (e.g., taxes, subsidies, spending), interregional and sectoral policies, political

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system changes (e.g., state decentralization), economic prosperity, political situation, competitiveness of surrounding regions, etc. External conditions current and projected for the near future give a tangle of opportunities and threats coming from the environment (e.g., immediate neighborhood, general environment, called macro environment at the national level, general environment at the international level) (Matejun, Nowicki, 2013). The territorial unit shapes the quality of life of the local community through the use of such instruments as planning, financial, economic, institutional, social, and information infrastructure (Piontek, 2006, 2010). The realized activity of local government is a multidimensional phenomenon, occurring in many spheres in parallel, i.e., economic, social, and environmental (Richert-Kaźmierska, 2010).

The development of local infrastructure, as a factor in improving attractiveness, under the conditions of self-government faces many problems, the most important of which are raising funds and choosing the right investment priorities. Each municipality has different conditions for its investment policy, so municipalities deal with these issues in different ways. The problem is the existing infrastructure gap in Poland. It is still not the rule in our country that the population uses water supply systems or treats household wastewater. A well-developed and modern infrastructure is crucial for long-term economic growth and sustainable regional development. Regions better equipped with infrastructure also have relatively greater development potential (Krysiuk, Brdulak, Banakm, 2015).

Among other factors determining the attractiveness of local government units, territorial capital deserves emphasis. Economic capital includes resources that are used to produce other goods and services, such as machinery, tools, buildings, and infrastructure. Natural capital includes ecosystems and natural resources that participate in the creation of social wealth, i.e., timber, water, energy, mineral resources, biodiversity, water, and air filtration. Human capital is a person's physical and mental health, well-being and productive potential, education, motivation, and skills (Gorzelak, Płoszaj, Smętkowski, 2006).

3.4. EFFICIENCY IN THE LOCAL ECONOMY

The territorial unit's activities are operational, tactical, and strategic. They are made in the multidimensional space of functioning. They refer to endogenous and exogenous resources, the use of which is expected to ensure qualitative and quantitative changes in the local economy. Resources such as the natural environment, economic, social, and infrastructural resources used in economic and social relations are interdependent and occur at the same time. They should therefore be considered together. Indeed, there is an interdependence between the fundamentals of municipalities and the level and conditions of life of residents or the operation of businesses.

In assessing the development process of a territorial unit, the model of four capitals, extended by financial capital, can be useful. It allows to explain sustainable development, assuming that development (i.e., satisfaction of human needs and aspirations) occurs due to various services provided by human, financial, economic, and natural capital (Żylicz, 2004). Strengthening territorial capital (endogenous; territorial capital is a set of resources located in a territory, e.g., natural, human, organizational, and financial, which determine the competitive potential of the territory) through proper policy profiling means recognizing and taking into account the fact that any strategy and policy should have an integrated character (Olechnicka, K. Wojnar (ed.), 2013). Reinforcing the ongoing relationship between endogenous and exogenous variables in the region are intellectual capital and financial capital, which form the so-called value chain (Jarosz-Angowska, 2013). Local resources should serve as a temporal and spatial organization of local government activities that will imply trust, interaction, and empowerment of local actors. With regard to internal factors, the following are currently considered the most important: new services and new jobs; soft infrastructure; human resources; quality of life; cultural image; inclusion of private funds in public benefit investments. These are elements that simultaneously determine the effectiveness of local government (Lengyel, 2002).

Efficiency is a multidimensional category, broader than economic efficiency. It is defined generally as the ability of an organization to achieve its goals. Efficiency is the result of an activity defined by the ratio of the achievement of an effect to the input of a given factor or set of factors (Wait (ed.), 2012). It is directly understood as achieving a given effect with the least amount of available resources or achieving the best result with a given amount of resources (Szudy, 2013; Kotarbinski, 1986). Efficiency is the most effective application of a society's resources in the process of meeting people's deficiencies and needs (Samuelson, Nordhaus, 1999; Meredyk, 2000, 2007).

Barczak (2013) proposes criteria for efficiency, including dimensions such as organizational (indicating goals and objectives, dynamics, coordination, and scale of operations), economic (including rational calculus and methods for evaluating the effects of value and knowledge management), and social (including community involvement). Steers points out that efficiency is the

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ability of an organization to achieve its goals (strategic and operational) using its resources. It should be considered and analyzed in terms of the various dimensions of the space in which the organization operates (Steers, 1975; Barczak, 2016). As Lawless (1972) or Steers (1977) believe, organizational effectiveness includes, among other things, such aspects of the organization as the social dimension as well as relations with the environment. This involves a systemic view of the organization. It allows it to be described through the prism of processes adopted and performed by different functional divisions.

Efficiency is a multidimensional process carried out by a set of elements, including demographic, economic, financial, and environmental, as well as the links between these elements. Its specific determinant is the overarching nature of public tasks. Therefore, it should be evaluated in terms of the various dimensions of the space of the territorial unit's operations (Dziekański, 2018). Efficiency in relation to the implementation of public and local government tasks is understood as a set of economic relations in the form of cash flows between participants in the activities for the implementation of tasks set by law and depends largely on the accuracy of the selection and correctness of the construction of monetary instruments through which the processes of distribution and exchange of produced goods and services are implemented (Sochacka-Krysiak, 2009).

Efficiency in the public finance sector cannot be considered solely in terms of the amount of public funds spent. In their measurement, it is a matter of determining the relationship between the level and structure of public spending and the actual benefits to society and the economy as a result of this spending. However, it is difficult to determine the impact of public spending on socioeconomic development in particular areas (Jastrzebska, 2016). Operational efficiency, competitiveness, or the development of a territorial unit as complex phenomena are difficult to assess unequivocally. This is difficult due to limited access to detailed, homogeneous variables for all units under study. In the case of a territorial unit, efficiency can be equated with a process that must be properly planned. It requires the proper formation of resources and operating principles, and then the setting of goals and ways to achieve them. Integrated efficiency is the sum of the legal, economic, social, and environmental assessments of municipalities' actions. It should both take into account the purpose of action and the non-financial nature of tasks in the process of current and strategic adaptation to changes in the environment (Klasik, Kuźnik, 2001; Kuciński, 1998).

The efficiency of a territorial unit is a multidimensional process carried out by a set of elements, including demographic, economic, financial, and environmental, as well as the links between these elements. Its specific determinant is the overriding nature of public tasks. It should therefore be evaluated in terms of the various dimensions of the space in which the municipality operates. An effective territorial unit, which shapes territorial capital, is an efficient and effective management system that operates through an informed and well-organized cadre of officials. It seems most appropriate to frame the effectiveness of local government in a dual way. On the one hand, it is based on an objective approach, and on the other, it is based on a multicriteria approach (Pawlowski, 2004).

Measuring the results of local government efficiency is a complex and multifaceted issue (Łukasiewicz, Klosowska, 2006). The evaluation of an organization's effectiveness should take into account various areas of its functioning and be correlated with the actions taken. Most often, the evaluation of an organization's effectiveness is closely linked to its strategy and its appropriate implementation (Pawlowski, 2004; Oblój, 2007). Efficiency is a measure of the evaluation of the organization's performance and affects the improvement of attractiveness (competitiveness). Thus, efficiency is the state of relatively sustainable advantage obtained by an entity due to its location in a certain place and the process of subjective competition of public authorities in the conditions of realized expenses (Brol, at all, 2001; Bury, Markowski, Regulski, 1993; Pedraja-Chaparro, Salinas-Jimenez, Smith, 2005).

When evaluating the activities of public organizations, we often have to deal with subjective measures and effects that are difficult to measure.

The most important problem here is the necessity of gaining stakeholder approval for the directions of allocation implemented and the results obtained. This does not necessarily coincide with efficiency understood in economic terms. The activities of territorial units refer to endogenous and exogenous resources, the use of which is expected to provide qualitative and quantitative changes in the local economy. Resources such as the natural environment, economic, social, and infrastructural resources used in economic and social relations are interdependent and occur at the same time. They should therefore be considered together. This is because there is an interdependence between the fundamentals of the territorial unit and the level and conditions of life of the residents or the operation of businesses. Performance measurement should be considered in the broader context of the expanded concept of management by results (Bouckaert & Halligan, 2008). Effective action leads to the effect intended as a goal. Among other things, the purpose of local government operations is to provide social, technical, and administrative services. The analysis of the efficiency of a public organization should take into account the decomposition of total cost effectiveness into total efficiency (Opolski, Modzelewski, 2009).

Efficiency is determined by economic, financial, and social factors, as well as the resources of information available to the entities. Efficiency factors can be both internal and external from the district's point of view and should form a balanced whole. It is important to make systematic analyses of the management of endogenous resources by local governments. Such analyses make it possible to assess the socio-economic situation of the units. Individual conditions for assessing performance are the overriding nature of social tasks and the high degree of dependence on public funds. The possibilities for improving the performance of individual districts are determined by their endogenous capacities and potentials (human, innovative, ecological, infrastructural, financial, and institutional). Endogenous factors result from socio-economic potential, location and infrastructure, availability of production factors, entrepreneurship, etc.

3.5. Interregional cohesion of the region

In Poland, clear differences in socio-economic development between regions (or urban areas, center areas, and rural areas) still persist. To ensure territorial development based on endogenous potential, it is necessary to look at the differentiation of endogenous potentials. At the local level, this mainly concerns adequate provision of infrastructure and strengthening of human, social, or physical capital (Stanny, Drygas (ed.), 2010).

Regional policy most often means the activity of public entities aimed at stimulating endogenous growth factors in the territorial system through activities aimed at increasing the competitiveness of individual regions and the country as a whole and fostering convergence (Pastuszka, 2012). It is also defined as a conscious and purposeful activity of public authorities aimed at regional development, aiming to optimally use the resources of regions for sustainable economic growth and raising their competitiveness (Szlachta, 2012).

Cohesion policy implies the equalization of living and working conditions for all citizens. The aim of approximating the socio-economic development of the regions as a whole is to be carried out through the creation of additional support instruments aimed at underdeveloped areas (Yegorov, 2016). Cohesion policy is a range of activities aimed at reducing disparities between the levels of development of different regions to strengthen economic and social cohesion (Pietrzyk, 2002; Jóźwik, Sagan, Stępniewski (ed.), 2012).

The definition of cohesion in its three-dimensional sense (economic cohesion, social cohesion, and territorial cohesion) involves the presence of three groups of cohesion indicators focusing on the analysis of economic inequality, social disparities, and geographic conditions. It is interpreted in terms of the presence of functional relationships between parts of the region's structure, which is due to the diversity of economic activities and land use. Economic cohesion indicates economic inequalities between regions. An analysis of social cohesion includes phenomena occurring in the labor market and the living conditions of the population. Territorial cohesion makes it possible to determine the position of a region in comparison with other areas (Wojcik, 2011; Sagan, 2001).

The concept of economic cohesion is identified with the process of convergence, i.e., the reduction of differences in the level of economic development of regions, and with the functional and harmonious development of regions based on endogenous potential. Economic cohesion was analyzed in connection with the level of socio-economic development of an area resulting from the state and structure of the economy, the level of infrastructure development, and the financial situation of economic entities. Reducing intraregional differences within these aspects of socio-economic development was interpreted as an increase in economic cohesion (Murzyn, 2016; Spójność wewnętrzna a konkurencyjność regionu łódzkiego, https://). Economic cohesion means reducing differences in the level of socio-economic development. It is analyzed, among other things, in connection with the level of socio-economic development of a region, the state and structure of the economy, the level of infrastructure development, and the financial situation. The reduction of intraregional differences within these aspects is interpreted as an increase in economic cohesion (Gorzelak, 2009). Economic cohesion refers to both the competitive and ecological growth of regional economies (Szlachta, 2011; Zrozumieć politykę Unii Europejskiej - Polityka regionalna, 2016). It can be assessed on the basis of a synthetic index of change, describing the financial, economic, and infrastructural situation (Swianiewicz, 2007).

Social cohesion is the ability of a society to ensure the well-being of all its citizens, minimize disparities among them, and avoid social polarization.
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Improving social cohesion involves reducing intra-regional disparities in the aforementioned aspects of development (Churski, 2011). Social inequality appears to be a natural consequence of development processes. A direct consequence of social inequality is the exclusion, in various ways, of an increasing number of people and the deepening polarization of regions and societies. Social cohesion as a multidimensional concept is becoming increasingly difficult to analyze, assess, and achieve. Its assessment requires increasingly sophisticated indexes for its measurement (Jastrzebska, 2017). Improvements in the indices describing social development can indicate that progress is being made and, at the same time, that social cohesion is increasing. It seems that it is synthetic measures that capture its many aspects that enable comprehensive measurement.

Social cohesion is the ability of a society to ensure the well-being of all its citizens, minimize disparities among them, and avoid social polarization. Social cohesion can also be linked to social inclusion, which is related to access to the means of securing basic needs, progress, protection of rights, and dignity. Social cohesion also relates to social capital. When analyzing social cohesion, various aspects of it are emphasized: the sphere of human activity (economic, political, and socio-cultural), and the nature of social relations related to formal relationships and meaningful relationships regarding observed behavior and practices (Dziembala, 2017). Studies of social cohesion tend to focus on selected aspects and factors of social cohesion, thus hindering a dynamic and integral approach to these highly complex, multi-layered, and interrelated issues (Wojnar, 2011).

Territorial cohesion is considered to complement and strengthen economic and social cohesion. Indicators (including synthetic ones) in aspects of development, infrastructure, economy, finance, and demography are a condition for the formation of territorial cohesion and contribute to the growth of intra-regional cohesion. Development processes in the regions may occur asymmetrically, which is a highly undesirable phenomenon. Its consequence can be the formation of new ones or the deepening of existing differences in economic development. The territorial dimension of development gained particular strength after the provisions of the Lisbon Treaty, especially in terms of the so-called placebased policy, which essentially refers to looking at social and economic problems through space (Koncepcja Przestrzennego Zagospodarowania Kraju 2030, 2012).

T. Markowski (2009) defines territorial cohesion as a state of spatial development that guarantees improved social and economic cohesion. According to G. Gorzelak (2009), it is the elimination of barriers and restrictions arising

from spatial development that limit the possibility of achieving economic and social cohesion. Its most important elements are correct spatial development, harmonious development, polycentricity, and sustainable development. Territorial cohesion can be seen as strengthening endogenous development, reducing spatial disparities, creating network links, strengthening access to knowledge services and infrastructure, or integrating sectoral policies (Churski, 2012). An important factor in the process of territorial cohesion is infrastructure, which results from the fact that it is associated with the territory for which it performs certain tasks; that is, it is a specific resource associated with the territory. Thus, it is an important factor in the development of space as well as economic growth (Kołodziejczyk (ed.), 2014; Churski and Perdał, 2008).

4. ASSESSMENT OF SPATIAL DIVERSITY OF PROCESSES SHAPING THE GREEN ECONOMY

4.1. A synthetic measure as an element of the assessment of processes shaping the green economy

When studying the development activity of territorial units in spatial comparative analyses, it is helpful to use a synthetic measure. The measure replaces a multitude of diagnostic characteristics of an object with one aggregate variable. It makes it possible to evaluate an object by means of a single quantity and makes it possible to order the analyzed objects in terms of the phenomenon under consideration (the main criterion) or to control the course of the development process (approaching or departing from the set goal) (Krakowiak-Bal, 2005). The synthetic measure provides an opportunity for a comprehensive assessment of the various areas of activity of territorial units. It allows one to indicate its specialization and key and peripheral areas. The aggregated value of the synthetic variable facilitates the comparison of objects in multidimensional spaces but also makes it possible to organize them due to the phenomenon under study (Bak, 2018).

In the context of achieving the primary objective and answering the research questions posed, literature studies (including Polish as well as foreign literature), the descenarioive method, the synthetic measure method, and internal autocorrelation were used. The diagnosis of the social, economic,

CHAPTER 4

and environmental situation, green economy, and green infrastructure was analyzed using descenarioive statistics. The monograph was written based on the deductive approach of inferring from general phenomena (including known facts about parts and wholes). Deductive reasoning consists of looking for the relationship between the level of development and endogenous resources of an individual based on general knowledge of the theoretical basis of development. The diagnostic variables that describe the counties activities are interactive. They are related to each other, form a multidimensional space, and occur on the same spatial and temporal horizon. Therefore, they should be subjected to ongoing analysis. The set of diagnostic variables is described by:

The research plan is based on the established research objectives and the objectives and hypotheses set for verification. The process of analyzing design problems broken down into structured stages will aim at the following steps.

Determination of the set of diagnostic variables and the study area (stage 1)

In the analysis of the districts, attention was paid to such levels as financial situation, entrepreneurship, demography and infrastructure (including green), environment, waste management, and green economy (the subject of the study). The finances of local government were treated as a factor (condition) of socioeconomic development, thanks to which they were included separately from the measurement of its level. In the monograph, the indicated planes of analysis are considered through the prism of the multidimensional nature or polarization of intra-regional local systems.

A district (the subject of the study) is a local self-governing community, i.e., residents, economic entities, social groups, interest groups, and the relevant territory. Thus, it is the area of several to a dozen municipalities and the area of a city with county rights (i.e., a municipality with city status that has been granted county rights; Figure 5) (Rozporządzenie Rady Ministrów z dnia 7 sierpnia 1998 r. w sprawie utworzenia powiatów (Dz. U. z 1998 r. poz. 652); Ustawa z dnia 24 lipca 1998 r. o wprowadzeniu zasadniczego trójstopniowego podziału terytorialnego państwa (Dz. U. poz. 603, z późn. zm.); Ustawa z dnia 5 czerwca 1998 r. o samorządzie powiatowym (Dz. U. z 2020 r. poz. 920)).

The statistical data used as a basis for the study meet certain criteria, which include reliability, accuracy, comparability, completeness, consistency, integrity, timeliness, and timeliness. The data from the Central Statistical Office was used as source material.

ASSESSMENT OF SPATIAL DIVERSITY OF PROCESSES SHAPING THE GREEN ECONOMY



Number of districts in the voivodeships Dolnośląskie 26 Kujawsko-pomorskie 19 Lubelskie 20 Lubuskie 12 łódzkie 21 Małopolskie 19 Mazowieckie 37 Opolskie 11 Podkarpackie 21 Podlaskie 14 Pomorskie 16 Ślaskie 17 Świetokrzyskie 13 Warmińsko-mazurskie 19 Wielkopolskie 31 Zachodniopomorskie 18 Polska (total) 314

Figure 5. Study area - counties in Poland Source: own study

The collected statistical material was the basis for calculating statistical measures and was subject to processing in Statistica, PQStat, and Gretl, among others.

The diagnostic variables that describe the counties activities are interactive. They are related to each other, form a multidimensional space, and occur on the same spatial and temporal horizon. Therefore, they should be subjected to ongoing analysis. The set of diagnostic variables is described by:

$X = \{X_1, ..., X_n\},\$

n is the number of variables studied, where we assume that $m \ge n$ (1).

The set of counties under study is described as:

$Q = \{Q_1, ..., Q_m\},\$

the number of objects studied (2).

The set of objects described in this way can be presented in the form of a matrix of observations of data about the analyzed units. It consists of a set of objects and features. The matrix is written as X_{ij} :

$$X_{ij} = \begin{bmatrix} x_{11} & x_{12} & \dots & x_{1m} \\ x_{21} & x_{22} & \dots & x_{2m} \\ \dots & \dots & \dots & \dots \\ x_{n1} & x_{n2} & \dots & x_{nm} \end{bmatrix}, (3)$$

where: X_{ij} – denotes the values of the j-th variable for the i-th object, i number of the object (i = 1, 2,..., n), and j number of the variable (j = 1, 2,..., m).

The selection of diagnostic variables for the study depends on the purpose and scope of the analysis. The set of potential diagnostic characteristics should: represent different aspects of the analyzed phenomenon; concern important aspects and properties of the analyzed phenomenon; be unambiguously and strictly defined; contain measurable variables; be in causal relationship with the analyzed phenomenon; and be a complete set for all objects under study (Zeliaś, 1991). The selection of diagnostic variables that make up aggregates of synthetic measures was guided by the following criteria: relevance from the point of view of the analyzed phenomenon, unambiguity and precision of definition, exhaustiveness of the scope of the phenomenon, logicalness of interrelationships, preserved proportionality of representation of partial phenomena, measurability, availability, and completeness of statistical information (Młodak, 2006).

Endogenous and exogenous resources form a network of interrelationships. Acting for the benefit of a community, they are interdependent and should be considered together. Resources such as the natural environment, economic, social, infrastructure resources used in economic and social relations, among others, are interdependent. They shape and build investment attractiveness and indicate key areas of business determinants. The degree of intensity of the region's endogenous assets, as well as their structures and mutual coupling will shape the process of change (Dziekański, 2018).

Reduction of the space of diagnostic variables statistical-verification (stage 2)

The substantive selection of variables was based on literature studies. It was also conditioned by the availability of statistical data collected by county in Statistics Poland. Some of the diagnostic variables originally selected were incomplete, or did not cover all the surveyed units. The quality of the set of variables determines the reliability of the final results and the accuracy of decisions based on them (Walesiak, 2005).

The statistical analysis of diagnostic variables included the elimination of quasi-constant variables. From the set of variables were eliminated those meeting the inequality $|V_i| \le V^*$ (where V* is the critical value of the coefficient of variation; taking the cutoff value at = 0.10) (Malina, 2004) and highly correlated variables (according to the inverse correlation matrix method) (Malina, Zeliaś, 1997). A. Malina notes that a high value of the correlation coefficient causes duplication of information about the analyzed phenomenon and can lead to incorrect conclusions (Wysocki, Lira, 2003; Panek, 2009; Malina, 2004). The strength of the relationship between the variables was examined, and Pearson's linear correlation coefficient was used. A high value of the correlation coefficient (threshold level of the correlation coefficient value r*=0.75) results in duplication of information about the phenomenon, which can lead to incorrect conclusions (Młodak, 2006; Malina, Zeliaś, 1997; Kukuła, Luty, 2018).

Factor analysis performed in Statistca software was also used in the process of selecting variables. This method allows transforming a set of objects into a set of their groups using transformations of the original data (Sobczak, 2003). It makes it possible to reduce the number of variables analyzed. The advantage of factor analysis is the ability to determine a number of variables that sufficiently explain the interrelationships between multiple observable variables (Chojnicki, Czyż, 1975).

Determining the direction of the variables' preferences over the main criterion and bringing the variables to mutual comparability (normalization of the variables using the zeroed unitization method) (step 3)

Diagnostic variables usually have different titres and different ranges of variability, which makes it impossible to directly compare and add them (Rogowski, Krysiak, 1997; Hellwig, Siedlecka, Siedlecki, 1995).They have an obvious character in relation to the main criteria considered (they are stimulators, destimulators, or nominators) (Wysocki, 2010; Łuczak, Wysocki, 2005). The determination of the nature of variables should be based on statistical and factual grounds. The correctness of the determination of the nature of variables can be verified by determining the direction of the correlation of individual variables with the decision variable. This direction should be positive for stimulants and negative for destimulants. In cases where there is no clear interpretation, it is worth applying Grabiński's procedure (stimulants should be positively correlated with stimulants, similarly destimulants with destimulants, and negatively correlated with destimulants) (Grabiński, 1985; Grabiński, Wydymus, Zeliaś, 1989). In order to make the variables comparable, a zeroed unitization procedure was applied. Its aim is to replace the varying ranges of variation of individual variables by a fixed range (Rogowski and Krysiak, 1997). In the zero-based unitization method, there is a fixed reference point, which is the range:

$$\mathbf{R}(\mathbf{X}_{j}) = \max_{i} \mathbf{x}_{ij} - \min_{i} \mathbf{x}_{ij}, (4).$$

Normalization of the diagnostic variables, according to the zero-based unitarization procedure, was carried out according to their variable types, $X_j \in S$, according to the formula

$$Z_{ij} = \frac{x_{ij} - \min_i x_{ij}}{\max_i x_{ij} - \min_i x_{ij}}, \ Z_{ij} = 0 \Leftrightarrow x_{ij} = \min_i x_{ij}; \ Z_{ij} = 1 \Leftrightarrow x_{ij} = \max_i x_{ij}, (5).$$

Normalizing for a variable $X_j \in D$, the zero-based unitization is done using the formula:

$$Z_{ij} = \frac{\max_{i} x_{ij} - x_{ij}}{\max_{i} x_{ij} - \min_{i} x_{ij}}, \ Z_{ij} = 0 \Leftrightarrow x_{ij} = \max_{i} x_{ij}; \ Z_{ij} = 1 \Leftrightarrow x_{ij} = \min_{i} x_{ij}, \ (6).$$

where: $\max_{x_{ij}} \neq \min_{x_{ij}}, \max_{x_{ij}} > \min_{x_{ij}}, \sum_{ij} = \max_{x_{ij}}, \sum_{i,j} = \max_{x_{ij}}, \sum_{x_{ij}} = \max_{x_{ij}}, \sum_{x_{ij}}, \sum_{x_{$

The research was carried out in a dynamic way, determining min{xij} and max{xij} values for the whole research period (Wysocki, Lira, 2005; Kukuła, 2000; Młodak, 2006). As a result of the process of setting the initial diagnostic variables to zero, we obtain a matrix of Z_{ii} values

$$Z_{ij} = \begin{bmatrix} z_{11} & z_{12} & \dots & z_{1m} \\ z_{21} & z_{22} & \dots & z_{2m} \\ \dots & \dots & \dots & \dots \\ z_{n1} & z_{n2} & \dots & z_{nm} \end{bmatrix}, (7)$$

where $Z_{ij} \in \{S\} \cup \{D\}$ - is the standardised value of the j-th variable for the i-th object; i=1, ..., m, j=1, ..., k, are the standardised values of the j-th diagonal variable for the i-th object.

Determination of the value of the synthetic measure on the basis of the chosen aggregation formula of the diagnostic variables (synthetic measure as an element of situation monitoring, step 4).

In the assessment of spatial differentiation, a synthetic measure based on the Technique for Order Preference by Similarity to an Ideal Solution (TOPSIS) method was used (Malina, 2020; Hellwig, 1968). It allows a multifaceted and comprehensive view of the level of the phenomenon (both spatially and temporally, according to the main criterion) in the studied objects (Kozak, Mrówczyńska-Kamińska, Wołoszyn, 2022). Z. Hellwig (1968) was the first to propose a synthetic measure of development.

The TOPSIS method is a benchmark method (Głowicka-Wołoszyn, Wysocki, 2018). Within the chosen method, two benchmarks are determined (Bak, 2018; Velasquez, Hester, 2013), i.e., the Euclidean distances of the individual objects (municipalities under study) from the benchmark (=1) and the anti-benchmark (=0), according to the formulas:

(a) Distances of objects from the benchmark:

$$d_{i}^{+} = \sqrt{\frac{1}{n} \sum_{j=1}^{m} (z_{ij} - z_{j}^{+})^{2}}, (8)$$

(b) Distances of objects from the anti-pattern:

$$d_i^- = \sqrt{\frac{1}{n} \sum_{j=1}^m (z_{ij} - z_j^-)^2}, (9)$$

where: n- is the number of variables forming a pattern or anti-pattern, – is the normalized value of the jth variable of this object, z_i^*/z_i^- is the pattern or anti-pattern of the object.

The value of the synthetic measure was determined on the basis of the TOPSIS method for the individual objects studied and the formula (Hwang, Yoon, 1981; Özkan, Özceylan, Kabak, Dikmen, 2021; Kozera, Dworakowska-Raj, Standar, 2021):

$$q_i = \frac{d_i^-}{d_i^- + d_i^+}$$
, where $0 \le q_i \le 1, i = 1, 2, ..., n$, (10)

where: $q_i \in [0; 1]$; d_i^- denotes the distance of the object from the anti-pattern (from 0), d_i^+ denotes the distance of the object from the pattern (from 1). A higher value of the measure indicates a better situation for the individual in the studied area (Łuczak, Wysocki, 2012; Łuczak, Kalinowski, 2020).

The synthetic measure (as an element of monitoring the situation of the studied object) will allow a multidimensional and comprehensive view of the level of the phenomenon in individual studied counties, conducting comparative analyses and linear ordering of objects, i.e., building a ranking in both spatial and temporal terms (Malina, 2004; Zeliaś (ed.), 2000). The TOPSIS method allows to carry out an assessment using an unlimited number of criteria; the degree of readability of the obtained results is high; and it allows to present the results in numerical form (Wysocki, 2010; Kozera, Wysocki, 2016). The quantification of a complex phenomenon by means of a single numerical value, which facilitates all comparisons and synthesizes partial images of the areas under investigation, can be considered an advantage in this respect. An important advantage of the classical TOPSIS method is its computational simplicity and the indication of positive and negative patterns. It can be a useful tool for local authorities to assess the relevance of past decisions and the effectiveness of past regional management instruments. It makes it possible to identify weaker and better areas of a unit's performance (based on a sectoral synthetic measure) and to place the unit in an appropriate group. Its value depends on the number and type of variables employed in the study (Nermend, 2015; Huang, Keisler, Linkov, 2011).

Evaluation of the results obtained and conclusions (step 5)

The obtained values of the synthetic measure made it possible to divide the studied group into typological groups, indicating, for example, the direction and speed of development (growth, stagnation, decline/divergence), the position of the region in relation to the best unit, and changes in position over time (proximity of the analyzed units to the best or weakest). The first, second, and third quartiles were taken as thresholds for the groups (Tokarski, 2005). A higher value of the synthetic measure means that a unit is assigned to the better group, with weaker units in the subsequent groups. A wider period of data presentation and years of analysis allowed us to capture the dynamic aspects of the studied phenomena as well as control the phenomenon of deviations related to cyclical changes occurring in the regional economy.

The significance of the mutual influence of the diagnostic variables was tested using Pearson's linear correlation coefficient (carried out in the Grtel program).

In order to assess the impact of endogenous potentials on the spatial variation of the synthetic measure, a regression model was estimated to describe the dependence of the variables. Regression analysis (implemented in the Gretl program) is concerned with the study of relationships between variables of interest and allows us to describe the relationships between explanatory (Y) and predictive (X) variables, between which there are more or less pronounced linear relationships.

The scatter plots and bag plots presented in the form of the synthetic measure allowed us to show the differentiation of the municipalities in the studied community and to indicate outliers (the plots were made in the Ststistica program) (Zeliaś, Malina, 1997; Nowak, 1990). The Gini index is a measure of the concentration (unevenness) of the distribution of the variable under study. It takes a value between 0 and 1 (the concentration coefficient has been calculated in Statistica). If the observations are arranged in ascending order, the Gini coefficient is expressed by the formula:

$$G(y) = \frac{\sum_{i=1}^{n} (2i-n-1)y_i}{n^2 \overline{y}}, (11)$$

A measure of the dominant function within a region is rank (described by the author as an indicator of centrality). It indicates the potential of the center (as a pole of growth or stagnation), the spatial arrangement of the distribution of functions in the region (defining them as dominant or peripheral), the determination of the direction of strengthening functions within the framework of the regional policy implemented, the assessment of territorial cohesion, the prevalence of a given set of functions, and the determination of the possibility of determining regional specialization (Ilnicki, 2003; Mularczyk, Hierarchia funkcjonalna miast... https://):

$$R_{mj} = \frac{(R_{Ai} - \min(R_{Ai})) \times 99}{\max(R_{Ai}) - \min(R_{Ai})} + 1, (12)$$
$$R_{Ai} = \sqrt{\sum_{j=1}^{n} \frac{a_j}{A_j}}, (13),$$

 R_{mi} rank between 1 and 100 of the region (centrality coefficient),

 $R_{A_i}^{m_j}$ the value of the median synthetic indicator for region A_i,

aj value of the j-th characteristic in region a,

A, is the value of the j-th characteristic in all the regions considered,

n the number of characteristics included in the analysis.

where yi is the value of the i-th observation and \bar{y} is the average value of all observations yi (Makarewicz-Marcinkiewicz, 2015). It should be understood that the higher it is, the greater the inequality of the variable in question. An index of 0 indicates the absence of inequality, while an index of 1 indicates complete inequality.

The rank (centrality index) takes values between 1 and 100. A value of 1 indicates a characteristic that is rare in the region (the weakest result); 100 indicates situations where the characteristic is common (the best result). A higher value of the index indicates a higher centrality of the functions of the region (a higher spatial frequency of occurrence). The ranks obtained in relation to, for example, the number of inhabitants, economic units, or persons carrying out economic activities can indicate a shortage or surplus within a given function (defining it as central or peripheral).

The defined centrality makes it possible to determine the importance of the territorial unit (or the studied function) in the region, its role as a growth region, to indicate areas that can be subject to intervention, and to indicate the degree of specialization of the region in relation to the surrounding space (Runge, 2012). The central functions of a region significantly influence the organization of space. The diversity and extent of these functions provide the basis for defining the functional hierarchy (as well as the possibility of indicating a region's specialization or gaps in endogenous territorial capital). Identifying and interpreting changes on an ongoing basis is an important element in the local strategies of both economic operators and local authorities. Changes in the structure of a region are influenced by political, economic, social, cultural, and technological aspects. The importance of individual regions changes gradually over time as a certain type of function develops (Sokołowski, 2006; Sokołowski, 2011).

On the basis of the centrality coefficient, it is possible to distinguish between the most important units (with surplus potential) and those with the least potential. The centrality coefficient is shaped, among other things, by the endogenous potentials of the region, the settlement network, the transport accessibility of the region (in a broader sense, spatially), the potentials for socioeconomic development, the green economy, green infrastructure, and zero west. It should also make it possible to identify the functions (growth poles) of the region within the region, to answer the question of whether they should be further strengthened, or to identify the weaker functions of the region and the need to strengthen them (or suppress them if possible).

¹ We have k, $k \ge 1$, regions indexed by i, $k \ge i \ge 1$. For all regions, we consider n features, $n \ge 1$, indexed by j, $n \ge j \ge 1$. Let aji denote the value of the jth feature in the ith region, and Aj denote the value of the jth feature in all regions under study. Let RAi be the root of the sum of j=1 to n quotients of aji/A for each i, $k \ge i \ge 1$. Let rmi = (RAi-min(RAi))/(max(RAi)-min(R)), where min and max are counted by index i, $k \ge i \ge 1$. Then rmi is a value in the interval <0,1>. The resulting value (rank) Rmi=rmi*99+1 is the rescaled value of rmi to the interval <1,100> (Sobala-Gwosdz, 2023).

4.2. County as a subject of activities and area of study

The basic legal act defining the position of local government units and the basic principles of their functioning is the Constitution of the Republic of Poland. In addition to the Constitution, a number of regulations are contained in the European Charter of Local Self-Government, which was ratified by Poland in 1993 (Niewiadomski, 2011). The sources of local government law include:

- Act of 8 March 1990 on Local Self-Government, Journal of Laws 1990 No. 16 item 95,
- Act of 5 June 1998 on Counties Self-Government, Journal of Laws 1998 No. 91, item 578,
- Act of 5 June 1998 on Voivodeship Self-Government, Journal of Laws 1998 No. 91, item 576,
- Act of 16 July 1998 on the Election Rules for the Councils of Municipalities, County Councils, and Sejmics of the Voivodship, Journal of Laws 1998 No. 95, item 602,
- Act of 20 February 2002 on the Direct Election of the Mayor, the Mayoress, and the President of the City, Journal of Laws 2002 No. 113, Item 984,
- Act of September 15, 2000, on the local referendum, Journal of Laws 2000 No. 88, item 985,
- Act of 20 December 1996 on the Municipal Economy, Journal of Laws 1997 No. 9, Item 43,
- Act of November 13, 2003, on the revenue of local government units, Journal of Laws 2003 No. 203, item 1966,
- Act of 12 January 1991 on local taxes and levies, Journal of Laws 1991 No. 9, item 31,
- Act of 27 August 2009 on Public Finances, Journal of Laws 2009 No. 157, Item 1240.

According to the Law of June 5, 1998, on the self-government of counties, a county is a local self-government community and its territory. The legal personality of a county is proof of its self-government. It enables it to enter into legal relations characteristic of two equal entities. In the statistics of the European Union, counties are NUTS 4 regions; they are areas of deconcentration of selected functions of public administration performed by territorial state institutions. A county-region is an economically, socially, and culturally

homogeneous area in which appropriate economic, social, and cultural policies are implemented by regional institutions established for this purpose.

The counties performs public tasks of a supra-municipal nature. Its functions are complementary to those of a municipality (Kallas, Lipowicz, Niewiadomski, Szpor, 2002). The district's tasks must not infringe on the municipalities' sphere of competence. The district deals with issues related to supra-municipal infrastructure (technical and social), supra-municipal public order, and safety or spatial order (Act on District Self-Government; Małecka-Łyszczek, 2013). The tasks of the district also include ensuring the performance of certain tasks and competencies of the heads of district services, inspections, and guards. The tasks of the district in the supra-municipal dimension can be grouped as follows: social infrastructure (e.g., health care), technical infrastructure (e.g., district roads), public order and safety of citizens, environmental protection and spatial planning, and organizational activities (Kallas, Lipowicz, Niewiadomski, Szpor, 2002; Administrative Law...; Ustawa o samorządem powiatowym). The county has the possibility of taking over state administrative tasks (Art. 5(1) of the Law on County Self-Government). It may also enter into agreements with local government units and with the province in which the county's territory is located in order to delegate the performance of public tasks.

The organs of the county are the county council, the county board, and the county office. In cities with county rights, these functions are performed by the city council and the mayor. The rules for the operation of counties are regulated by the 1998 Law on County Self-Government. The activities of the county authorities are public (Art. 8a of the County Self-Government Act). The openness of the county's activities includes, among other things, access to information, admission to sessions of the county council and meetings of its committees, and access to documents resulting from the performance of public tasks.

The county council is the decision-making and controlling body of the county. The county council is the executive body, consisting of the county office as the chairman, the deputy and the members. It implements the decisions of the county council and the tasks of the county as defined by law. In the performance of its duties, the district executive is subordinate only to the district council. The Mayor of the counties organizes the work of the county council and the county office, manages the current affairs of the district, and represents it externally.

Efficient management of the district's finances and assets, as well as human resources, should lead to optimization of the expenditure incurred and the results obtained. The right balance between the pace of economic, social, and environmental development should be conducive to maintaining the sustainability and high quality of the living and working environment of the population.

The county conducts independent financial management on the basis of the budget resolution. The county conducts independent financial management on the basis of the budget, which includes revenues and expenditures. The revenues of the region include (Art. 56, para. 1): shares of taxes constituting revenues of the state budget, subsidies and earmarked subsidies from the state budget, revenues from the region's property, equalization subsidies from the state budget, subsidies from state earmarked funds, earmarked subsidies from the state budget, as well as inheritances, legacies, donations, and interest. The management of the financial resources at the disposal of the district is open.

The ability to manage its resources (territorial capital) and the way in which it uses its opportunities will determine its development. Each district is obliged to perform the same tasks imposed by law. The factors that differentiate the way in which individual tasks are carried out are the financial possibilities and the actual needs of the residents and business entities operating in the district.

The future of county government is an issue worth discussing. Its financial weaknesses (frequent indebtedness of counties) and difficulties in carrying out tasks, as well as weaknesses (ambiguities) in competence, are factors pointing to the need for changes in its operation. As P. Swianiewicz points out, leaving districts in their current form of territorial fragmentation, with concomitant financial and functional weaknesses, makes it difficult to refute on substantive grounds the arguments for abolishing this level of local government and public administration (Swianiewicz, 2015). Municipal and county governments are supposed to complement each other in their activities to meet the collective needs of local communities. The issue of financing district tasks has become an important thread in the discussion (Państwo sprawne, przyjazne, bezpieczne, ...). W. Kieżun (2011, 2012) points out the insufficient equipment of district administration with the tools (mainly financial) necessary for independent functioning and development, or the proper indication (delimitation) of tasks to individual territorial units.

4.3. Ecology and environment

In analyses of both local development and the green economy, more and more attention is being paid to the quality of life of people and the environment. The impact of human activity is the progressive degradation of the environment. Clean air, clean water, a variety of flora and fauna, and a low level of waste are essential for the quality of life of the population. The environment has its limits. Natural resources used in the production process create certain goods. The problem with their limits concerns the use of renewable resources (e.g., water, wood). Further irrational use of the environment leads to inhibition of development and degradation of the natural environment. It can be slowed down by a proper environmental policy equipped with effective instruments (e.g., appropriate analysis, obtaining the right information). The state of the environment is an important factor in shaping the living conditions of society, the development process, and the transition to a green economy (Łuszczyk, 2010).

The synthetic measure allows to control the trend of the analyzed composite phenomenon—ecology and environment. The synthetic measure of the ecology and environment of counties in Poland ranges from 0.36 to 0.60 in 2010 and from 0.32 to 0.62 in 2020. An increase in the value indicates that the situation of the studied unit is improving compared to all objects; a decrease indicates that its situation is deteriorating.

Measures of central tendency (mean, quartile) in the relationship from 2010 to 2020 take lower values for the mean (0.49–0.45) and higher values for the quartiles (0.47–0.51; 0.42-0.48). As for the measures of variability, we observe both growth (0.24-0.32 interval; 8.04-9.57 coefficient of variation) and equilibrium (0.04-0.04 standard deviation) in the years considered. An island value of the coefficient indicates that the community is more diversified and that the values of the variable are highly dispersed around the mean. The higher the value of kurtosis (0.56–1.39 for the synthetic measure of the counties' ecology and environment), the greater the concentration of the community around the mean, which is reflected in the narrowness of the distribution curve. A decrease in the value of the kurtosis indicates a greater spread of values, a low concentration, and a flattening of the abundance curve (Table 7).

	2010	2013	2014	2018	2019	2020
Average	0.49	0.50	0.45	0.45	0.45	0.45
Minimum	0.36	0.35	0.32	0.34	0.33	0.32
Maximum	0.60	0.63	0.61	0.63	0.64	0.64
Lower Quartile	0.47	0.48	0.43	0.42	0.42	0.42
Upper Quartile	0.51	0.52	0.48	0.48	0.47	0.48
Range	0.24	0.28	0.29	0.29	0.31	0.32
Quartile range	0.04	0.04	0.05	0.06	0.05	0.06
Standard deviation	0.04	0.04	0.04	0.04	0.04	0.04
Coefficient of variation	8.04	8.87	9.18	9.47	9.12	9.57
Skewness	-0.26	-0.24	0.50	0.51	0.60	0.45
Kurtosis	0.56	0.99	1.46	1.18	1.92	1.39

Table 7. Statistical characteristics of ecology and environment of Polish counties (in 2010, 2013, 2014, 2018, 2019, 2020)

Source: own study based on data Statistics Poland

Figure 6 shows the size of the study population and the distribution model of the synthetic measures of ecology and environment. In the case of 2010, we observe a left skewness (AS<0), whereas 2020 has a right skewness (AS>0). Left-skewness indicates that a greater number of units have values of variables greater than their mean (right-skewness, vice versa). The most frequent range in 2010 was 0.48–0.50 (88 units, 25% of the collective), while in 2020 it was 0.40-0.45 (159, 51%). There is also a dominant factor in this case.

The counties are characterized by strong spatial differentiation, both in terms of development, demographic potential, quality of life, green infrastructure, and green economy. This differentiation is the result of natural and historical conditions as well as natural processes of social and economic development. Spatial differentiation is also created by the influence of larger and medium-sized cities, an indication of economic conspiracies. Social, communication accessibility, distribution of large (medium, small) settlement centers, concentration (location) of entrepreneurship, access to investment capital or knowledge.



Figure 6. Distribution of the synthetic measure of ecology and environment of counties in Poland (in 2010, 2013, 2014, 2018, 2019, 2020) Source: own study based on data Statistics Poland

Figure 7 provides information on the relationships (correlations) between pairs of variables (between synthetic measures) and shows atypical observations (i.e., those located on the bag chart). It also identifies clusters of data (groups of objects with similar values). The synthetic measure of ecology and environment in the period 2010–2013 was subject to divergence in the analyzed years (the correlation coefficient was 0.811), while for the period 2019–2020 it was 0.934. The pouch diagram shows groups of districts that are statistically similar, including outliers, whose graphical shape in the following years may indicate their low correlation.





Figure 7. Relationship (year to year) of the synthetic measure of ecology and environment of counties in Poland in 2010, 2013, 2014, 2018, 2019, 2020

(The absence of a bag on the graph in the relationship between 2020/2019 and 2019/2018 may indicate a low variation of the variable in any of the adopted years of analysis—a small number of different values of at least one of the variables taken into the graph. In order to produce a bag chart with colored areas, there must be more values so that they are scattered on the plane.). Source: own study based on data Statistics Poland

4.4. Green infrastructure

Green infrastructure is an arrangement of spatially related green areas with infrastructure that performs ecological functions, provides aesthetic values, and positively influences the quality of life of residents. Its use in local government activities is intended to allow for a comprehensive (integrated) consideration of natural issues. Influence a better quality of life through solutions using natural processes that offer interesting solutions to environmental, social, and economic problems. Contribute to a more sustainable and healthier lifestyle, thereby supporting the green economy.

	1					
	2010	2013	2014	2018	2019	2020
Average	0.36	0.37	0.38	0.38	0.38	0.38
Minimum	0.28	0.30	0.30	0.31	0.31	0.32
Maximum	0.52	0.56	0.57	0.60	0.60	0.60
Lower Quartile	0.35	0.36	0.36	0.36	0.36	0.36
Upper Quartile	0.37	0.39	0.39	0.39	0.40	0.40
Range	0.24	0.26	0.27	0.29	0.29	0.28

Table 8. Statistical characteristics of the synthetic measure of green infrastructure of counties in Poland in the years 2010, 2013, 2014, 2018, 2019, 2020

Quartile range	0.02	0.03	0.03	0.03	0.04	0.04
Standard devia- tion	0.03	0.03	0.03	0.03	0.03	0.03
Coefficient of variation	7.24	7.69	8.01	8.57	8.73	8.67
Skewness	1.22	1.69	1.76	1.82	1.85	1.86
Kurtosis	4.77	6.40	6.57	7.31	6.97	6.90

ASSESSMENT OF SPATIAL DIVERSITY OF PROCESSES SHAPING THE GREEN ECONOMY

Source: own study based on data Statistics Poland

The synthetic measure of green infrastructure ranged from 0.28 to 0.52 in 2010 and from 0.32 to 0.60 in 2020. Compared to the previous year, the surveyed entities showed an increase in the synthetic measure, or their measure remained unchanged. The increase in the value of the measure indicates that the situation of the surveyed unit is improving compared to all institutions. Measures of central tendency (average, quartile) show higher values compared to the previous year. In the case of measures of variability (range, standard deviation, and coefficient of variation), we observe growth, decline, and equilibrium. An increase in the range of the indicator indicates that the community is more diversified; the values of the variable are highly dispersed around the mean. An increase in the kurtosis value indicates that the community is more concentrated around the mean, which is reflected in the narrowness of the distribution curve (Table 8).

Figure 8 shows the number of counties (the study population) and their distribution pattern according to the synthetic measure of green infrastructure. For 2010 and 2020, we observe right skewness (AS > 0). Right skewness indicates that a greater number of units have values of variables that are smaller than their mean. The higher the AS, the greater the right skewness and the greater the asymmetry of the distribution.

The correlation coefficient is a statistical measure that tells how strongly two variables influence each other. The higher the correlation coefficient, the more likely it is that the two different variables we observe will behave similarly. For the 2010–2013 relationship, the level of Persona's correlation measure was 0.934, while for the 2019–2020 relationship it was 0.979, respectively. The bag chart indicates groups of municipalities that are statistically similar, including outliers, whose graphical shape in subsequent years may indicate their slight variation. In the case of the bag chart, we observe an erroneous numerical condition, i.e., a small number of different values of at least one of the variables taken for the study. In order to produce a bag chart with colored areas, there must be more values so that they are scattered on the plane. The bag chart shows where within the main criterion an individual is located in the studied population (Figure 9).



Figure 8. Distribution of the synthetic measure of green infrastructure of counties in Poland in 2010, 2013, 2014, 2018, 2019, 202 Source: own study based on data Statistics Poland





Figure 9. Relations (year to year) of the synthetic measure green infrastructure of counties in Poland in the years 2010, 2013, 2014, 2018, 2019, 20200 Source: own study based on data Statistics Poland

4.5. Waste management

Waste management should be in line with the principle of sustainable development. The negative impact of waste on the environment leads to its degradation. The rational management of diminishing resources requires that waste be treated as a valuable raw material that can be reused, recycled, or, as a last resort, recovered from it. The basis of sustainable municipal waste management is the comprehensive treatment of waste, taking into account economic, environmental, and social considerations. Man-made waste does not disappear; it persists and produces harmful substances that pollute the soil, water, and air. The need to change the approach to waste management is also driven by the need to reduce the valuable space required for waste disposal, processing, and storage (Grodkiewicz, Michniewska, 2017).

The synthetic measure of waste management ranges from 0.43 to 0.60 in 2010 and from 0.39 to 0.55 in 2020. An increase in the value of the measure indicates that the situation of the studied unit is improving compared to all the districts analyzed. A decrease in the measure means that the situation of the studied unit is worsening. Measures of central tendency: the mean takes values from 0.52 to 0.48, the lower quartile from 0.51 to 0.47, and the upper quartile from 0.54 to 0.49. In the case of volatility measures (striatum, standard deviation, coefficient of variation), we observe both increases, decreases, and equilibrium. A decrease in the striatum indicates a lack of variation. An increase in the coefficient of variation indicates a differentiation of the characteristics, testifying to the heterogeneity of the population studied. An increase in the value of kurtosis

(0.85–1.96) indicates a greater concentration of the community around the mean, which is reflected in the smoothness of the distribution curve. A decrease in the kurtosis value indicates a greater dispersion of values, a low concentration, and a flattening of the abundance curve (Table 9).

	2010	2013	2014	2018	2019	2020
Average	0.52	0.53	0.48	0.48	0.48	0.48
Minimum	0.43	0.45	0.44	0.38	0.38	0.39
Maximum	0.61	0.60	0.55	0.56	0.55	0.55
Lower Quartile	0.51	0.52	0.47	0.46	0.46	0.47
Upper Quartile	0.54	0.55	0.49	0.49	0.49	0.49
Range	0.18	0.15	0.11	0.18	0.17	0.16
Quartile range	0.03	0.03	0.02	0.03	0.03	0.02
Standard deviation	0.03	0.02	0.02	0.03	0.02	0.03
Coefficient of variation	5.18	4.26	4.43	5.24	4.64	5.21
Skewness	-0.87	-1.36	0.79	0.50	0.28	0.32
Kurtosis	0.85	2.47	0.63	1.46	2.33	1.86

Table 9. Statistical characteristics of the waste management measure of counties in Poland in the years 2010, 2013, 2014, 2018, 2019, 2020

Source: own study based on data Statistics Poland

Analysis of statistical data on waste management shows wide variations between regions. The recycling rate, which is one of the indicators of the goal of a closed-loop economy, is important. The reuse and recycling of waste must become an everyday occurrence. However, for this to be possible, a series of changes in consumption patterns, broad design, producer responsibility, technological and organizational changes in business, and linkages based on the circulation of primary and secondary raw materials in the economy must occur beforehand (Ciechelska, 2017).

Figure 10 shows the size of the study population and the distribution model of the synthetic measure of waste management. In the case of 2010, we observe a leftward skewness (AS<0), while 2020 has a rightward skewness (AS>0). Leftward skewness indicates that a greater number of units have values of variables greater than their mean (rightward skewness, vice versa). The greater the value of skewness and the stronger the rightward skewness, the greater the asymmetry of the distribution.



Figure 10. Distribution of waste management measures of counties in Poland in 2010, 2013, 2014, 2018, 2019, 2020 Source: own study based on data Statistics Poland





Figure 11. Relationship (year-on-year) of the waste management measure of counties in Poland in 2010, 2013, 2014, 2018, 2019, 2020 Source: own study based on data Statistics Poland

The Pearson's correlation coefficient between the value of the measure in 2010 and 2013 was 0.592, while in the relationship 2019/2020 it was 0.803, as shown in Figure 11. This allows groups of objects with similar values to be identified, describing the regularities that occur in the set. The bag chart shows where an individual is located in the studied municipality within the main criterion. It also shows groups of municipalities that are statistically similar and the distribution of two variables, including outliers whose graphical shape in subsequent years may indicate their slight variation. In order to create a graph with coloured areas, the values must be more diverse so that they are scattered on the plane (we observe a slight variation in the relationship between 2018–2019 and 2019–2020).

4.6. Sustainable development - diversification in the district economy

A feature that characterizes the modern determinants of development is the marked differentiation of the economic potential of individual regions. It determines economic development and, among other things, economic transformation, employment, and investment. Its appropriate level affects an increase in the standard of living, increased production, a better social situation, and greater public safety (Krakowiak-Bal, 2006; Szymkowiak, Roszka, 2016).

An area characterized by locational advantages relevant to an investor can attract investment and thus create a developmental effect by creating an economic base and undertaking the production of products and services for the internal market. Economic, infrastructural, demographic, environmental, and financial potential thus contribute to the attractiveness and development of an area or region.

The synthetic measure of sustainability ranges from 0.33 to 0.49 in 2010 and from 0.35 to 0.51 in 2020. An increase in the value of the synthetic measure indicates an improvement in the situation of the studied unit relative to the studied collective (Table 10). The measures of central tendency (mean 0.38–0.20, lower quartile 0.36-0.38, upper quartile 0.39–0.41) take on higher values in the year-to-year relationship The gap takes on a value of 0.16-0.16 in the relationship between 2010 and 2020. Its value indicates the stability of the differentiation.

	2010	2013	2014	2018	2019	2020
Average	0.38	0.38	0.37	0.39	0.40	0.40
Minimum	0.33	0.32	0.33	0.34	0.35	0.35
Maximum	0.49	0.50	0.49	0.51	0.52	0.51
Lower Quartile	0.36	0.37	0.36	0.38	0.38	0.38
Upper Quartile	0.39	0.39	0.38	0.40	0.41	0.41
Range	0.16	0.18	0.16	0.17	0.17	0.16
Quartile range	0.03	0.02	0.02	0.02	0.03	0.03
Standard deviation	0.02	0.02	0.02	0.02	0.02	0.02
Coefficient of variation	5.84	6.13	6.22	6.26	6.21	5.84
Skewness	1.24	1.19	1.38	1.32	1.46	1.52
Kurtosis	2.94	3.16	3.31	2.91	3.55	3.83

Table 10. Statistical characteristics of the measure of sustainable development of counties in Poland in 2010, 2013, 2014, 2018, 2019, 2020

Source: own study based on data Statistics Poland

The coefficient of variation takes values from 5.84 to 5.84 (2010–2020), while the standard deviation is 0.02-0.02. They indicate the stability of the variation of the characteristics, which testifies to the greater statistical similarity of the studied municipality. The higher the value of kurtosis, the greater the concentration of the community around the mean, which is reflected in the narrowness of the distribution curve. A decrease in the value of kurtosis indicates a greater spread of values, poor concentration, and flattening of the frequency curve.

Figure 12 shows the size of the study population and the distribution model of the synthetic measure of balanced development. The higher the asymmetry

value, the stronger the right skew (2010, 1.24; 2020, 1.52) and the greater the asymmetry of the distribution. The right skew indicates that fewer units have values of variables that are smaller than their mean. The most common range in 2010 was 0.36-0.38 (i.e., 126 units, 40% of the study population), while in 2020 it was 0.38-0.40 (130, 41%).



Figure 12. Distribution of the measure of sustainability of counties in Poland in 2010, 2013, 2014, 2018, 2019, 2020 Source: own study based on data Statistics Poland

The scatter plot provides information on the relationship between pairs of variables, shows non-normal observations (i.e., their position on the graph), and allows the identification of groups of objects with similar values. The value of the correlation coefficient between measures of differentiated development in the relationship 2010–2013 was 0.897, while in the case of the relationship 2019–2020 it was 0.957. The graph shows groups of statistically similar municipalities, including outliers, whose graphical shape in the following years may indicate their slight differentiation. In the case of the 2013/2014 relationship (and subsequent years), we observe a numerical perturbation, i.e., a small number of different values of at least one of the variables used for the study. In order to produce a scatterplot with colored areas, there must be more values so that they are scattered on the plane. The scatterplot shows where an individual falls within the main criterion in the studied population, illustrating the two-dimensional distribution of the two variables (Figure 13).





Figure 13. Relation (year-on-year) of the measure of sustainable development of counties in Poland in 2010, 2013, 2014, 2018, 2019, 2020 Source: own study based on data Statistics Poland

5. PROSPECTS FOR THE DEVELOPMENT OF THE GREEN ECONOMY IN THE LOCAL ECONOMY SYSTEM

5.1. Green economy and its spatial differentiation

The green economy should include the elimination of waste and environmental hazards, the preservation of its values, the rational management of natural resources and raw materials, social exclusion, and economic efficiency. In the study, the author uses his own set of indicators, a synthetic measure, according to the data available at the district level.

	2010	2013	2014	2018	2019	2020
Average	0.49	0.50	0.48	0.48	0.48	0.48
Minimum	0.42	0.44	0.42	0.43	0.42	0.43
Maximum	0.55	0.56	0.55	0.56	0.55	0.56
Lower Quartile	0.48	0.49	0.47	0.47	0.47	0.47
Upper Quartile	0.50	0.51	0.50	0.50	0.50	0.50
Range	0.13	0.12	0.13	0.13	0.13	0.13
Quartile range	0.02	0.02	0.03	0.03	0.03	0.03
Standard deviation	0.02	0.02	0.02	0.02	0.02	0.02
Coefficient of variation	3.76	3.84	4.01	4.36	4.18	4.36
Skewness	-0.32	-0.11	0.29	0.32	0.31	0.41
Kurtosis	1.04	0.80	0.53	0.23	0.26	0.26

Table 11. Statistical characteristics of the green economy measure of counties in Poland in 2010, 2013, 2014, 2018, 2019, 2020

Source: own study based on data Statstics Poland

On this basis, the synthetic measure of the green economy ranges from 0.42 to 0.55 in 2010 and from 0.43 to 0.56 in 2020. An increase in the value of the synthetic measure indicates an improvement in the situation of the county in comparison with all the counties studied; a decrease indicates a deterioration in its situation.

The measures of central tendency (mean, quartile) are characterized by relative stability over the period analyzed (mean 0.49–0.48; lower quartile 0.48–0.47; upper quartile 0.50–50). The first measure of variability, the coefficient of variation, shows both an increase (3.76-4.36, 2010-2020) and stability (0.13-0.13; 0.02-0.02). The value of the measures may indicate low variability in the studied municipality in the field of green economy. A decrease in the kurtosis value (1.04-0.26) indicates a wider spread of values, a low concentration, and a flattening of the abundance curve (Table 11).

Figure 14 shows the size of the study population and the distribution model of the synthetic green economy measure. Left skewness (AS<0) is observed in the case of 2010 and right skewness (AS>0) in the case of 2020. Left-hand skewness indicates that a greater number of units have values of variables that are greater than their mean (right-hand skewness, vice versa). The greater the skewness, the greater the right skewness and the greater the asymmetry of the distribution.

The Person correlation coefficient between the year-to-year values of the measure is presented in Figure 15. In the case of the relationship from 2010 to 2013, it was 0.803 in 2019 to 2020, respectively 0.937. It provides information on the relationship between pairs of variables, shows outliers, and identifies clusters of data. The bag chart indicates groups of statistically similar municipalities, including outliers, whose graphical shape in subsequent years may indicate their slight variation. It also indicates an erroneous numerical condition, i.e., a small number of different values of at least one of the variables taken for the survey. In order to produce a bag chart with colored areas, the values need to be more diverse so that they are scattered on the plane.



Figure 14. Distribution of the green economy measure of counties in Poland in 2010, 2013, 2014, 2018, 2019, 2020

Source: own study based on data Statstics Poland


Figure 15. Relations (year-on-year) of the green economy measure of counties in Poland in 2010, 2013, 2014, 2018, 2019, 2020

Source: own study based on data Statstics Poland

5.2. Spatial diversification of the financial situation

The actions of the counties stimulate development, lead to the expansion of the economic base, and consequently to an increase in income (Swianiewicz, 2004; Poniatowicz, 2015; Poniatowicz, 2014). Finances allow for an overall assessment of the performance of districts and their development potential (Zawora, 2014). The state of finances is a synthetic expression of the economic development potential of any economic entity (Klepacki, Kusto, 2009). Significant disparities between the financial situation of districts, their own revenues, and investment expenditures should be a challenge and a task to be solved by the regional authority. In addition, counties differ in terms of their social, economic, natural, and infrastructural potential. Information on the state of finances is the basis for a comprehensive evaluation of activities. The rational management of public funds and expenditures will indicate the development potential of these units.

The financial situation of districts is a relative measure depicting the state of finances. It is a multidimensional (complex) phenomenon. It can be defined in various ways, as presented in Table 12. X. Wang, L. Dennis, and Y. Sen (2007) consider that the socio-economic environment is only one factor to be taken into account when analyzing the financial situation. Berne R.I. and Schramm R. (1986) include among the main determinants of the financial situation the needs of the local community, the size of the supply and direction of distribution of local public goods and services, the cost of labor, the wealth of the population, and the way in which financial policy is conducted. M.P. Rodríguez Bolívar (2016) and co-authors identified as the main determinants of the financial situation, among others, the state and changes in the size of the population, local labor market conditions, the growth of local government expenditure, and the management of public finances.

The financial situation determines the ability to meet financial obligations on time and to ensure continuity in the provision of services (Douglas and Gaddie, 2002). It is a multidimensional phenomenon, and hence a number of indicators are selected to describe it with logical justification and statistical validity. Properly selected indicators for financial evaluation increase the risk of their selective selection by the entity's managers in order to avoid responsibility for erroneous decisions made in the past. Among the variables shaping it, one should distinguish grants, subsidies, own income, investment expenditure, and financial surplus.

Table 12. Selected	l definitions o	of financial	situation
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Ossowska L., Ziemińska A. (2010)	The financial position of municipalities refers to their financial state over a certain period of time. It is evidenced by their ability to perform their tasks, achieve a balanced budget, increase their assets, and meet the needs of their residents. The financial situation is shaped by, among other things: the level of income, financial independence, the amount of investment expenditure, the ability to raise extra-budgetary funds, and the financial result.
Stanny M., Strzelczyk W. (2018)	The financial situation is a relative assessment of the municipality's finances, i.e., its ability to ensure financial security. This security encompasses the ability to perform tasks and reliability regarding the ability to repay current as well as future liabilities.
Hendrick R. (2004)	Financial position refers to an entity's ability, among other things, to raise sufficient funds, provide public services, and manage debt. It is the municipality's ability to meet its own administrative and investment needs, which means maintaining and developing its own assets in line with current and future demands for the provision of public services.
Cabaleiro-Casal R., Buch-Gómez E. J., Vaamonde Liste A. (2013)	The financial position is complex and influenced by many factors. Knowledge of the current state of finances allows local authorities to make comparisons with other entities and is helpful in making financial decisions. The financial position cannot be described by a single indicator based on, for example, the financial statements or the budget.
Groves S.M., Valente M.G. (1994)	Financial position is the state of its finances to cover: current bills, expenditures without incurring debt in a given budget period, all costs of doing business in the long term, and services at a level that ensures the safety and well-being of the local community.

Source: own study

The size of the self-government's own revenues, and particularly its high share in total revenues, testifies to the wealth of territorial self-government units, as well as their high financial independence and dependence on transfers from the state budget. They determine the degree and scope of financial independence of self-government authorities, as they are treated as an indicator of the level of this independence (Marczak, 2007; Zawora, 2008). They provide security for the needs of the local community.

Expenditure testifies to the desire of municipalities to increase their wealth, contribute to the improvement of the living conditions of residents, and contribute to overall socio-economic development (Sobczyk, 2009). The persistent differences in the level of expenditures are determined by

the nature of individual regions; they result from the financial possibilities and obligatory current expenditures or the necessity to maintain them at a level ensuring an impassable minimum to meet social needs. The analysis of investment expenditures allows not only the evaluation of development activities involving the unit but can also be an important tool for assessing the investment activity of the municipality in the spatial dimension (Zioło, 2011).

The operating surplus informs how much financial resources remain after covering the most important expenditures related to the current functioning of the local government unit. Operating surplus is a figure that informs how much financial resources remain after covering the most important expenditures related to the current functioning of the local government unit (Lubińska, Franek, Będziszak, 2007). The higher the value of the operating surplus, the greater the ability of these units to implement new investment projects. It also allows for assessing the ability of these units to repay debt and finance investment expenditures (Poniatowicz, 2014).

The synthetic measure of the financial situation (financial situation index) shows the position of the district in the examined community. The closer its value to one, the better the financial situation; the closer it is to zero, the weaker the situation. A synthetic measure allows one to control the course of the analyzed process (according to the criteria of a complex phenomenon, e.g., a financial situation). The synthetic measure of financial situation ranged from 0.37 to 0.49 in 2010 and from 0.37 to 0.51 in 2020. An increase in the value indicates that the situation of the studied unit is improving in comparison to all studied districts; a decrease indicates a deterioration in its situation. Measures of central tendency have higher values year on year (average 0.43-0.45, lower quartile 0.41-0.44, upper quartile 0.44-0.46). In the case of measures of variability, we observe both an increase (range 0.12-0.14), a decrease (coefficient of variation 5.39–4.17), and constancy (standard deviation 0.02-0.02).

	2010	2013	2014	2018	2019	2020
Average	0.43	0.42	0.43	0.45	0.45	0.45
Minimum	0.43	0.42	0.43	0.45	0.45	0.45
Maximum	0.37	0.34	0.37	0.35	0.32	0.37
Lower Quartile	0.49	0.48	0.49	0.51	0.51	0.51
Upper Quartile	0.41	0.41	0.42	0.44	0.44	0.44

Table 13. Characteristics of the descenarioive statistics of the synthetic measure Financial situation of counties in Poland in the years 2010, 2013, 2014, 2018, 2019, 2020

Range	0.44	0.43	0.44	0.46	0.46	0.46
Quartile range	0.12	0.14	0.12	0.16	0.19	0.14
Standard deviation	0.03	0.02	0.02	0.02	0.02	0.02
Coefficient of variation	0.02	0.03	0.02	0.02	0.02	0.02
Skewness	5.39	6.09	4.65	4.54	4.93	4.17
Kurtosis	0.07	-0.33	0.44	0.31	-0.6	-0.14

Source: own study based on data Statstics Poland

An increase in measures of variability indicates an increase in variation in the study area, indicating the heterogeneity of the study community. The higher the kurtosis value, the greater the clustering of the community around the mean value, which is reflected in the slenderness of the distribution curve. A decrease in the value of kurtosis indicates a greater dispersion of values, a weak concentration, and a flattening of the abundance curve (Table 13).

Counties are characterized by spatial diversity. They differ in terms of their level of development, demographic potential, and financial situation. This differentiation results from natural and historical conditions as well as natural processes of socio-economic development. Spatial differentiation is additionally created by the influence of larger and medium-sized cities.

Figure 16 shows the number of counties the studied community) and the distribution model of the synthetic measure of financial situation. In the case of the measure, we observe a rightward skewness (AS>0) for 2010 and a leftward skewness (AS<0) for 2020. Leftward skewness indicates that a greater number of units have values of variables greater than their mean value (rightward skewness, vice versa). The greater the AS, the stronger the rightward skewness and the greater the asymmetry of the distribution. The most numerous range in 2010 was 0.42-0.43 (69 counties , representing 22% of the collective), and in 2020 it was 0.44-0.46 (147, 47%).

Figure 17 provides information on the relationship between pairs of variables, shows atypical observations, allows groups of objects with similar values to be identified, and describes the regularities occurring in the set. The concentration coefficient of the year-to-year synthetic measure of financial situation was 0.618 (for the relationship from 2010 to 2013) and 0.797 (for the relationship from 2019 to 2020). The bag chart shows groups of municipalities that are statistically similar, including outliers whose graphical shape in subsequent years may indicate

their differentiation. The bag chart shows where, within the main criterion (financial situation), the unit is located in the surveyed community. In the case of the 2013/2014 relationship, we observe an erroneous numerical condition, i.e. a small number of different values of at least one of the variables taken for the survey. In order to produce a bag chart with colored areas, there must be more values so that they are scattered on the plane.



Figure 16. Distribution of synthetic measure of financial situation of counties in Poland in 2010, 2013, 2014, 2018, 2019, 2020

Source: own study based on data Statstics Poland





Figure 17. Relation (year-on-year) of the synthetic measure of the financial situation of counties in Poland in 2010, 2013, 2014, 2018, 2019, 2020 Source: own study based on data Statstics Poland

Proper financial management requires a lot of information to support the decision-making process of local government. It is important to assess the financial situation as well as analyze the factors and phenomena affecting it. The analysis of financial resources makes it possible to assess the structure of the budget itself and indirectly provides information on the state of the local economy (Dennis, 2004). There is a feedback loop between socio-economic and financial variables. The results of the analyses indicate a low correlation between measures of the financial situation and the level of the green economy. Local authorities should first and foremost take care to improve the economic potential, which will increase the attractiveness of the areas, attract new entrepreneurs, create new jobs, and improve the quality of life of the inhabitants. This should also contribute to improving the income structure and strengthening financial independence (Standar, 2017).

5.3. Green economy and financial situation

The nature of the spatial differentiation of counties is changing. Counties clearly differ from each other in the aspect of quality of life; a similar level is observed in the aspects of ecology, the natural environment, and waste management. On the basis of the values of the quartiles, which constituted the threshold values for the subsequent groups, the examined community was divided up. The darker (dark blue) color indicates the group is characterized by a better condition in the main criterion studied; the lighter color indicates

weaker units. Spatial differentiation is perpetuated over time and in the same areas, as indicated by Figure 18.





Figure 18. Spatial variation of the synthetic measure of the green economy and the financial situation of counties in Poland in the years 2010, 2013, 2014, 2018, 2019 and 2020 Source: own study based on data Statistics Poland

The level of differentiation was influenced by the function of the region, i.e., industrial, tourist, agricultural, residential, and service. The counties clearly differ in terms of their level of development, demographic potential, financial situation, green economy, and green infrastructure. The diversity results from natural and historical conditions as well as natural processes of socio-economic development. Spatial differentiation is additionally created by the influence of larger and medium-sized cities, with an indication of economic, locational, and social couplings. The source of regional disparities is the spatial differentiation of natural conditions, communication accessibility, distribution of large (medium, small) settlement centers, concentration of entrepreneurship, access to investment capital, and access to knowledge.

When conducting a correlation analysis, we interpret whether there is a relationship between the studied variables, whether it is statistically significant, and what the sign of the correlation coefficient is. The financial situation is correlated (positively or negatively) with the green economy, ecology and environment, green infrastructure, waste management, and sustainable development (Table 14).

Table 14	4. Correlati	on of the syn	thetic measu	ire of the green	economy	of counties in	Poland in	2010,
2013, 2	014, 2018,	2019, 2020		Ċ.	•			

		q green economy					
	2010	2013	2014	2018	2019	2020	
			Sperman 1	ank correlat	ion		
q financial situation	0,006	-0,005	-0,063	0,006	-0,002	-0,012	
q quality of life	0,356	0,464	0,468	0,510	0,518	0,528	
q ecology and the environ- ment	0,734	0,753	0,781	0,790	0,772	0,807	
q green infrastructure	0,485	0,612	0,588	0,588	0,622	0,613	
q waste management	0,454	0,349	0,374	0,414	0,361	0,419	
q demography	0,114	0,133	0,183	0,186	0,159	0,150	
q sustainable development	0,268	0,342	0,340	0,385	0,393	0,400	
q entrepreneurship	-0,027	0,040	0,061	0,070	0,088	0,029	
			Persona lii	near correlat	ion		
q financial situation	0,010	0,027	-0,001	0,055	0,032	0,043	
q quality of life	0,378	0,492	0,495	0,515	0,516	0,525	
q ecology and the environ- ment	0,741	0,765	0,759	0,770	0,756	0,779	
q green infrastructure	0,526	0,620	0,620	0,607	0,632	0,613	
q waste management	0,473	0,436	0,422	0,471	0,444	0,474	
q demography	0,075	0,065	0,137	0,162	0,137	0,149	
q sustainable development	0,284	0,375	0,385	0,408	0,407	0,418	
q entrepreneurship	-0,015	0,059	0,081	0,073	0,084	0,030	

Source: own study based on data Statstics Poland

The low ratio of own revenue to total revenue is a result of the county's limited ability to shape this figure. The low rate of investment expenditure in total expenditure may be due to rigid expenditure, e.g., related to social policy, expenditure on administration, or current expenditure. A significant share of income from subsidies and grants (transfers from the state budget) in the total income of counties weakens their independence. The correlation coefficient of the value of the synthetic measure of financial situation vs. economic green in 2010 was 0.009, and in 2020, it was 0.04 (Figure 19).





Figure 19. Relation (year-on-year) of the synthetic measure of the green economy and the financial situation of counties in Poland in 2010, 2013, 2014, 2018, 2019, 2020 Source: own study based on data Statstics Poland

It seems that the main reason for the relatively low impact of financial conditions on the green economy is their strong dependence on transfer revenues transferred from the state budget and the amount of current expenditures (the distribution of revenues to territorial units, as well as the delimitation of tasks between them, is therefore problematic). The above circumstances make the financial economy more rigid and, at the same time, stable, making it relatively insensitive to the influence of other factors. The bag chart shows groups of municipalities that are statistically similar, including outliers whose graphical shape in subsequent years may indicate their differentiation in subsequent years under study.

The measure of the inequality of the distribution (concentration, Gini coefficient) of the values of the synthetic measure Financial Situation and Green Economy took values from 0 to 1. The higher the value of the indicator, the greater the degree of concentration of the synthetic measure, and the greater the variation between them. Thus, the higher the value of the indicator,

the greater the degree of concentration of the financial situation and the green economy and the greater the variation between them (Figure 20).





Figure 20. Concentration of the synthetic measure green economy and financial situation of counties in Poland in 2010, 2013, 2014, 2018, 2019, 2020 Source: own study based on data Statstics Poland

5.4. Spatial diversification of quality of life

One of the tasks of the self-government administration units is to take care of the process of sustainable development and improvement of the quality of life, as well as the improvement of competences and social cohesion, effective management of local resources, providing the inhabitants, as well as business entities, with a sense of stability, and reducing the uncertainty of business operations. In the economic sphere, the priority should be to build modern industry, support entrepreneurship, and invest in innovation and new technologies. The indicated areas can be achieved with sustainable development consistent with environmental protection and sustainable resource management (Binda, Łapińska, 2019).

Quality of life refers to the degree of satisfaction of material and non-material needs of individuals and social groups, and it is determined both by objective indicators, e.g., average life expectancy, extent of poverty, level of enrolment, and subjective indicators, e.g., degree of satisfaction with the conditions of life and its various aspects, level of happiness, stress, and sense of life. J. Drewnowski and W. Scott (1966) define the standard of living of the population as the level of satisfaction of needs in a unit of time as a result of the goods, services, and living conditions enjoyed by the population in that unit of time.

Quality of life is a complex, multi-faceted category. A high quality of life as an overarching goal of the concept of sustainable development should be the end result of conducting development policy at all levels of governance (national, regional, and local) (Kusterka-Jefmańska, 2015). The concept of quality of life is referred to as multidisciplinary due to its complexity and internal

interconnectedness (Gutkowska, Murawska, 2010; Romney, 2002). Quality of life can be considered in terms of people's health, the state of the economy, employment, infrastructure development, crime, and the environment, both at the individual and societal level (Enchescu, Hristache, Paicu, 2012; Van de Kerk, Manuel, 2008). M. Gotowska and A. Jakubczak (2015) highlight the impact of local authorities on the lives of residents. Most often, quality of life is interpreted as the degree to which people's material and spiritual needs are satisfied. It is shaped by many factors, the most important of which are considered to be: housing situation, employment security, health and life protection, opportunities to learn and improve qualifications, access to culture, access to commercial establishments, the state of the technical infrastructure, or the degree of satisfaction of individual needs. J. Rutkowski includes general satisfaction with life, expectations, prospects for the future, aspirations (subjective factors), or those shaped by the socio-economic conditions in which we live (objective factors) among the factors that shape the quality of life (Rutkowski, 1988; Kud, Woźniak, 2013). The level and quality of life of the population are influenced by numerous micro (among which are human, material, and financial resources that form the proximity of households and the population) and macroeconomic (development policy, fiscal policy, unemployment, and inflation) determinants (Rogala, 2017). Institutional factors (administration, social infrastructure, social assistance, and public safety) affecting quality of life are a relatively new area of its measurement (Borys, 2003). When discussing quality of life, factors such as, inter alia, health care, life safety, the state of the natural environment, the standard of living of the inhabitants, the state of transport and public transport, the housing situation, educational and training opportunities, and access to culture are most often analyzed. An important area of quality of life is social infrastructure and social assistance, which are the clout of state social policy.

The synthetic measure of quality of life is the result of combining statistical values that are measurements of different parameters (variables) in the area of analysis; it allows to control the course of the analyzed process (according to the criterion of a complex phenomenon: quality of life). The higher the quality of life, the higher the value of the measure. The synthetic measure ranged from 0.29 to 0.50 in 2010 and 0.32 to 0.51 in 2020. On a year-on-year basis, the surveyed units recorded an increase in the synthetic measure. This jumps to an improvement in the situation of the study district compared to all districts. A decrease indicates a worsening of the situation. Measures of central tendency have lower values in the year-to-year relationship (2010–2020; average 0.36-0.37, lower quartile

0.34-0.35, upper quartile 0.37–0.38). In terms of measures of variability (range 0.21-0.19, standard deviation 0.03-0.03, coefficient of variation 7.16-7.43), we observe both growth, decline, and equilibrium. The lower the kurtosis value, the smaller the clustering of the community around the mean value. A decrease in the value of kurtosis indicates a greater spread of values, poor concentration, and a flattening of the abundance curve (Table 15).

In analyses of regional disparities, more and more attention is being paid to the population's quality of life, including living in harmony with the natural environment. Due to the progressive degradation of the environment as a result of human activity, clean air, water, and the diversity of fauna and flora are becoming values in themselves and are an integral part of the inhabitants' quality of life.

	2010	2013	2014	2018	2019	2020
Average	0.36	0.36	0.35	0.37	0.37	0.37
Minimum	0.36	0.36	0.35	0.37	0.37	0.37
Maximum	0.29	0.28	0.29	0.31	0.31	0.32
Lower Quartile	0.50	0.50	0.48	0.51	0.52	0.51
Upper Quartile	0.34	0.35	0.33	0.35	0.35	0.35
Range	0.37	0.37	0.36	0.38	0.38	0.38
Quartile range	0.21	0.22	0.19	0.20	0.21	0.19
Standard deviation	0.03	0.02	0.03	0.03	0.03	0.03
Coefficient of va- riation	0.03	0.03	0.03	0.03	0.03	0.03
Skewness	7.16	7.41	7.80	7.64	7.70	7.43
Kurtosis	1.13	0.97	1.17	1.16	1.33	1.32

Table 15. Characteristics of descenarioive statistics of the synthetic measure of the quality of life of counties in Poland in the years 2010, 2013, 2014, 2018, 2019, 2020

Source: own study based on data Statstics Poland

Poland is characterized by strong spatial diversity. counties differ both in their level of development and in their demographic potential. The diversity results from natural and historical conditions, as well as natural processes of socio-economic development or demography. Spatial differentiation is additionally created by the influence of larger and medium-sized cities. The level of differentiation was influenced by the function of the region, i.e., industrial, tourist, agricultural, residential, and service.

In the case of the synthetic measure of quality of life, we observed rightward skewness (AS>0) in 2010 and 2020. Right skewness indicates that a smaller number of units have values for variables that are smaller than their mean value. The greater the AS, the stronger the rightward skewness and the greater the asymmetry of the distribution. The most numerous range in the year 2010 was -0.34-0.36 (114; 36%), while in 2020. it was -0.34-0.36 (106; 34%) (Figure 21).



Figure 21. Distribution of synthetic measure of quality of life of counties in Poland in 2010, 2013, 2014, 2018, 2019, 2020

Source: own study based on data Statstics Poland

Figure 22 provides information on the year-to-year relationship of the synthetic quality of life measure, shows atypical observations, indicates groups of objects with similar values, and indicates the regularities occurring in the set. In the case of the year-to-year relationship, the concentration coefficient of the synthetic quality of life measure was 0.904 in 2010 and 0.952 in 2020.- 0.952. The bag chart shows where, within the framework of the main criterion, a unit is located in the studied community; it indicates groups of statistically similar municipalities. It also indicates outliers whose graphical shape in subsequent years may indicate their slight variation. In the case of the relationship 2013 to 214, we observe an erroneous numerical condition, i.e., a small number of different values of at least one of the variables taken for the study. In order to produce a bag chart with coloured areas, there must be more values so that they are scattered on the plane.





Figure 22. Relation (year-on-year) of the synthetic measure of the quality of life of counties in Poland in the years 2010, 2013, 2014, 2018, 2019, 2020 Source: own study based on data Statistics Poland

The quality of life of the inhabitants is built, among other things, by the professional activity of the inhabitants, the local labor market, entrepreneurship, infrastructure, and the state of the environment. Adequate potential contributes to a higher standard of living, increased production, a better social situation, and greater public safety. The level of quality of life is not uniform. Each county has its own endogenous potential (all elements of importance for the economy

of the area, often of a specific, unique character, corresponding only to a given local system), which, in combination with the exogenous potential and the ability to react to changes in the environment, can provide an opportunity for the development of the area and its quality of life. The level of quality of life is not uniform.

5.5. Green economy and quality of life

The green economy is a means to achieve sustainable development in terms of the efficient and purposeful use of endogenous development factors and actions. It helps to achieve integration between the dimensions of sustainable development (environmental, social, economic, and also spatial or institutional (political). It reinforces the context of environmental protection (which determines socio-economic development) and quality of life. The green economy (which reduces carbon emissions and increases resource efficiency) must recognize state sovereignty over natural resources and be based on resource efficiency and sustainable consumption and production patterns. The environment is the main source of resources that facilitate life and foster development, shaping the quality of life (The green economy... the "cornerstone" of sustainable development, https://).

The nature of the spatial differentiation of the districts is changing. The applied method of synthetic measurement indicates spatial differentiation of counties in the aspects of quality of life, ecology and environment, and waste management. On the basis of the values of quartiles, which constituted threshold values for subsequent groups, a division of the studied community was made. A dark color indicates a group characterized by a better state in terms of quality of life, while a lighter color indicates weaker units (Figure 23).

Green infrastructure, as the sum of environmental and infrastructural values, also has important social functions and improves the quality of life. It creates places for recreation and leisure (forests, parks, and squares), increases the comfort of movement, especially in hot weather (rows of trees and other shade zones along traffic arteries), and enables city dwellers to have contact with nature. Green infrastructure is a tool that uses nature for environmental, economic, and social benefits. It shapes the processes of the green economy.



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Figure 23. Spatial variation of the synthetic measure of green economy and quality of life of counties in Poland in 2010, 2013, 2014, 2018, 2019, 2020 Source: own study based on data Statstics Poland

Figure 24 presents information about the relationship between quality of life and the green economy, shows atypical observations, and allows groups of objects with similar values to be identified. In the case of the indicated relationship for 2010, the correlation coefficient was 0.378; for 2020, it was 0.524. The bag chart indicates groups of counties that are statistically similar, including outliers, whose graphical shape in subsequent years may indicate their slight differentiation.







Figure 24. Relation (year-on-year) of the synthetic measure of green economy and quality of life of counties in Poland in 2010, 2013, 2014, 2018, 2019, 2020 Source: own study based on data Statistics Poland

A measure of the inequality of the distribution of values of the quality of life and green economy synthetic measures is presented in Figure 25. The higher the value of the indicator, the greater the concentration of the synthetic measure and the greater the variation.





Figure 25. Concentration of the synthetic measure green economy and quality of life of counties in Poland in 2010, 2013, 2014, 2018, 2019, 2020 Source: own study based on data Statstics Poland

Functioning definitions of quality of life are extremely broad and complex, as a result of combining both measurable and unmeasurable, objective and subjective, quantitative and qualitative characteristics of life, indicating its multidimensionality (Kalinowski, 2015). Sustainability (or green economy) issues will have a huge impact on all aspects of human life in economic, social, environmental, and political terms. Both the green economy and sustainable development aim to improve the quality of life by guaranteeing the satisfaction of human needs and protecting the environment, natural and social resources,

and the integrity of society (Tapia-Fonllem, Corral-Verdugo, and Fraijo-Sing, 2017). Gunnar Myrdal, in his theory of cumulative causality relating to the analysis of the interdependence of social, economic, and institutional phenomena, proved that each element interacting with another element influences its behavior while being modified by the reaction of that element (Stanny, Strzelczyk, 2018).

The regression analysis between the synthetic measure of the green economy and the variables that shape it is presented in Table 16. It shows that the presented regression model allows 0.729 in 2010 and 0.768 in 2020 to be explained by the variability of the model, i.e., by the variability of the independent variables. It can be concluded that the model is sufficiently fit. The fit of the model is measured using the following indices: multivariate R2 0.531 and adjusted R2 0.526 in 2010 and 0.589 and 0.584 in 2020. The adjusted coefficient of determination did not reach 60%. This may indicate the multidimensionality of the phenomenon under study and the possibility of extending the analyses to include economic and environmental variables so as to characterize the study area in a multidimensional way.

shaping it)		0			1	
	2010			202	20	

Table 16. Summary statistics of regression results (green economy and dependent variables

201	10	2020			
statistics	Value	statistics	Value		
multivariate R	0.729	multivariate R	0.768		
Multiple R2	0.531	Multiple R2	0.589		
Adjusted R2	0.526	Adjusted R2	0.584		
F(3,310)	117.003	F(3,310)	110.739		
р	0.000	р	0.000		
Estimation std. error	0.013	Estimation std. error	0.014		

2010								
	b*	error of standardised regression coefficient (z b*)	b	error of standar- dised regression coefficient (z b)	t(310)	р		
Free expression			0.142	0.020	7.179	0.000		
q green infra- structure	0.544	0.039	0.383	0.028	13.814	0.000		
q waste manage- ment	0.483	0.039	0.330	0.027	12.306	0.000		
q demography	0.221	0.040	0.071	0.013	5.570	0.000		

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2020								
	b*	error of standardised regression coefficient (z b*)	b	error of standardised regression coefficient (z b)	t(309)	р		
Free expression			0.210	0.024	8.723	0.000		
q financial situation	-0.144	0.039	-0.161	0.044	-3.685	0.000		
q quality of life	0.258	0.054	0.199	0.042	4.793	0.000		
q green infrastructure	0.425	0.052	0.270	0.033	8.207	0.000		
q waste management	0.420	0.037	0.355	0.031	11.464	0.000		

Source: own study based on data Statstics Poland

Further increasing the multidimensionality of the model would result in a slight increase in values, and statistically insignificant variables could enter the model. In doing so, statistically insignificant variables could enter the model. This error eliminates the adjusted R2. It indicates the true fit of the model, independent of the number of non-significant variables added to the model. The F-statistics are F(3.310) 117.003 and F(4.309) 110.739 and are statistically significant (p < 0.0000). The model indicates the important role of green infrastructure, waste management, demographics, and financial situation, depending on the year studied.

5.6. Rank of the green economy in the economy of the counties

The nature of the spatial differentiation of the districts is changing. The applied method shows spatial differentiation of counties in the main criterion (within the examined function). The districts clearly differ from each other in terms of quality of life, ecology and environment, waste management, or green economy. The level of differentiation was influenced by the function of the region, i.e., industrial, tourist, agricultural, residential, and service.

The division of counties in terms of green economy was made into 4 groups on the basis of quartile values, which were the threshold values for the subsequent groups. Figure 26 shows the classification due to the centrality coefficient. It indicates the rank of county in the studied cluster due to the analyzed years (2010–2020) and the main criterion, green economy, and it is possible to

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indicate in this respect central areas (dominant in the studied function; areas of south-eastern Poland with tourist character and a good natural environment) and peripheral areas (often those where we deal with industry). The dark color indicates a group of counties characterized by a higher centrality index (a higher value of the index indicates a higher centrality of the function); the lighter color indicates a lower index.



Figure 26. Spatial differentiation of the green economy according to the centrality coefficient of the region's function under study Source: own study based on data Statstics Poland

In analyses of both regional, national, and global development, more and more attention is being paid to the quality of life of the population, including its existence in harmony with the environment. An assessment of the Euclidean distance between units was made on the basis of a similarity/dissimilarity matrix. This indicates the distance of successive functions in terms of the green transformation of the economy from the green economy. Figure 27 shows a greater differentiation in the aspect of the relationship of the green economy with green infrastructure, the environment, and quality of life; in the other examined elements, this differentiation seems to be stable. The further apart the sites are, the more dissimilar they are, while the closer together they are, the greater the similarity between them. The greater the differences between the structures of the objects examined,. The smaller the values, the less the structures of the objects under examination differ from each other.





Figure 28 indicates outliers, identifying clusters in data with similar values. A bag chart indicates groups of units that are statistically similar, including outliers whose graphical shape may indicate variation. In order to produce a bag chart with colored areas, there must be more values so that they are scattered on the plane. The bag chart shows where, within the main criterion, an individual is located in the study population.

The centrality index takes values from 1 to 100. A value of 100 indicates functions that are common in each region; 1 indicates situations where the function is very rarely present in the examined region. A higher value of the index indicates a higher centrality of the region's functions; this may translate into a higher position in the hierarchy of the region's functions. Figure 29 shows the diagnostic variables for the county (best and weakest within the green economy function), how the centrality of the variables changes, and thus how the rank of the

county changes within the analyzed diagnostic variable. It is possible to observe a group of variables with low values (urban and municipal green maintenance expenditure, water consumption per capita, area of existing landfills, gas network, treated municipal wastewater, total discharged treated wastewater) within which one can speak of a deficiency and a negative impact on the central criterion.



Figure 28. Relationship of the centrality coefficient (rank function) of the green economy and the socio-economic variables describing the county economy (in 2020) Source: own study based on data Statstics Poland



Figure 29. Centrality coefficient of selected green economy transformation variables of selected counties in 2020 Source: own study based on data Statistics Poland

The concept of the function of a place should be considered as broadly as possible, linking it to the material content of an area (natural environment and development) and its spatial organization. Contemporary function reflects spatial development (Kulawiak, Suliborski, and Tomczyk, 2016).

Figure 30 shows what the distribution of functions looks like over time, how their rank changes, and how they are shaped in the study space in terms of the centrality coefficient. It indicates 2018, 2019, and 2020 as periods of relative stability for the indicated functions. Figure 30 indicates the diversity of the variables studied. It is possible to indicate the dominant variables and those that have a negligible impact on the phenomenon under study due to the value of the Euclidean measure. Therefore, it is possible to indicate variables that need to be strengthened within the framework of regional policy and those that can be extinguished (if legislation and socio-economic reality allow it).

The analysis of the diagnostic variables in the indicated area should additionally make it possible to indicate to what extent the variables reflect the diversity (demographic, social, structural, environmental, and economic) of the examined units and to what extent they are the basis for past trends in the



Figure 30. Level of variables shaping the green transformation of the economy in terms of the centricity index

Source: own study based on data Statstics Poland

transformation of the region. Changes in the centrality of functions and tasks are a consequence of direct and indirect changes in the structure of the economy, civilizational changes (e.g., new social needs, new types of services), globalization and internationalization of the economy, competition between regions, an increase in the wealth of society, and population changes (Sokołowski, 2011).

5.7. Importance of green economy research for shaping changes in county's economy

Modern economic systems are faced with the dilemma of whether or not to continue economic growth in its current form. It becomes necessary to consider the green economy (or green infrastructure) as a tool for sustainable development. In turn, action should be directed towards new energy technologies and environmental protection (Rabe, 2016). The challenge for Poland is to bring together sectors such as energy, industry, innovation, agriculture, the environment, the economy, the labor market, and business support policies in the context of pursuing green goals. The environment and the economy must be seen as unique opportunities to be exploited (Ryszawska, 2013). Successive crises (economic, social, epidemiological, as well as energy) have drawn attention to the need to realistically implement structural changes in the economy. One of these changes is the so-called green transformation, which aims to transform economies into systems with minimal environmental impact. The changes associated with green transformation are a long-term process and strongly linked to active environmental policies that create demand for new environmentally friendly products, services, and technologies while also strongly influencing changes in social attitudes (Cheba, at all, 2022).

The green economy is an economy that contributes to human well-being and increases social justice while significantly reducing environmental risks and resource scarcity. Economic, technological, and social progress have a negative impact on the environment. Therefore, the rational management of natural resources and, consequently, the protection of the environment have become the impetus for the creation of a new model of economic management based largely on the rational use of factors of production, striving for the proper allocation of knowledge and competences, and skillfully combining economic, social, and environmental aspects into a whole (Pan, 2019).

In realising economic development, we must also pay attention to environmental protection. Green growth attaches importance to both the environment and economic development. It is environmentally friendly and sustainable growth that saves resources and is environmentally friendly (Cui, Mu, Shen, 2022). Green economy development is the shaping of the environmental aspect (in line with the specifics of the local economy). The transition to a green economy is challenging. Local economic adaptation can prevent the dangerous effects of environmental degradation and climate change. Development factors are variable over time and therefore need to be subjected to continuous and ongoing analysis (Jules, Toulmin, Williams, 2011).

Variations in the internal potential of the local economy can relate to issues, demographics, the labor market, the level of entrepreneurship, infrastructure, the environment, and many other conditions affecting development opportunities. Thus, a region's specific individual characteristics and external conditions determine the possibilities for its development. It is worth noting that the concept of green growth is in line with the Europe 2020 strategy, which is based on three main pillars: smart, sustainable, and inclusive growth (Kasztelanm, 2015). The concept of the green economy includes three core elements: elimination of environmental risks and conservation, rational management of natural resources and raw materials, and social inclusion and economic efficiency. It is multi-layered, covering many aspects of the economy (social, infrastructural, financial, demographic, etc.) (Cato, 2009). Spatially, it is concerned with the pursuit of reducing environmental burdens in local systems, improving housing conditions, and enhancing local and regional competitiveness (Hahnel, 2010).

The green economy serves to improve human well-being, social equity, and reduce environmental risks and ecological scarcity.Important elements for its creation include public and private investments related to the environment, reduction of gas and pollutant emissions, increased efficiency in the use of energy and raw materials, and protection of biodiversity (Wyszkowska, 2016). Its assessment should include the environmental and raw material productivity of the economy, the assets of the natural base, the environmental dimension of quality of life, economic opportunities, and policy responses (Szyja, 2015). The green economy is one of the important tools to ensure sustainable development. It incorporates an environmental aspect (reduction of CO2 emissions, resource efficiency) and a social aspect (counteracting social exclusion).It can be analysed from a sectoral perspective (includes renewable energy industries, green building materials, green transport, water, and waste management) (Ayres, van der Lugt, 2011).Spatially, the green economy concept can be implemented in

cities as well as in regions and countries. In sectoral terms, the green economy is most often referred to as industries related to renewable energy sources, green building materials and energy-efficient construction, green transport, and green infrastructure (Plac, 2015).

The causes of the green transition can be traced to demographic and climate change, urbanization, and globalization. Population growth makes sustainable development necessary. An attempt to identify the effects of the green economy in the economic system indicates its particular relevance for strengthening diversity, efficiency, and adaptability in regions. Within the framework of the green economy concept, development processes and accompanying activities can be significant from the perspective of strengthening the attributes of the local economy in the economic and environmental dimensions (Janiszek, Drobniak, and Plac, 2016). Key elements of the transition to a green economy are the value of natural capital, appropriate economic regulations and incentives, adequate environmental regulations, sustainable production and consumption patterns, or equitable distribution of income and social standards. The green economy seeks to create incentives for economic activity that ensure environmental sustainability and social inclusion (Loiseau, at all, 2016; Mardani, at all, 2018).

Green economy development systems are complex systems as they are influenced by economic, social, energy, environmental, and technological factors. Therefore, in constructing measurement indicators, care must be taken to ensure that each evaluative indicator truly reflects the state of development of the regional green economy, taking into account the rationality of each indicator and its usefulness in the long term (Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication, 2011; Fay, Hallegatte, and Bank, 2012). There is a broader limitation of both economic measurement and indicators for the green economy (especially access to information on green transformation processes, e.g., at the municipal level in Poland). Economic measurement should be supported by other types of information (e.g., in terms of demography, environment, and economy). For all aspects of the green economy, attention should be paid to capacity and data limitations, as well as the aspect of data availability at the level of municipalities in Poland. The green economy is a very complex construct in terms of its attempts to integrate economic, environmental, and social issues, the wide range of actors involved, its material outputs, and the forms of governance needed to regulate greening processes (Bailey, Caprotti, 2014).
The TOPSIS method is one of the multi-criteria methods for assessing the spatial differentiation of socio-economic phenomena. It allows to create a ranking of regions but also assess progress towards a green economy. It was found that all regions of Poland have made progress in this regard; none of the studied regions had high values for all variables included in the synthetic measure.

The natural environment is a source of resources necessary for the economy and society and a source of endogenous capital. The natural environment in the green economy performs the functions of production (providing a base of raw materials for the economy and society), absorption of pollution and storage of waste, living space for humans (determinants of their quality of life), and a place of operation for businesses (Wskaźniki zielonej gospodarki w Polsce 2020, 2020). A closed-loop economy is becoming the answer to environmental problems related to extraction, resource use, waste management, and socio-environmental changes. Moving away from a linear economy and high rates of resource extraction and waste production toward a closed-loop system of sustainable production and consumption ensures the formation of the right proportions in the economic, environmental-spatial, and social dimensions and the integration of problems in the areas indicated (Luo, at all, 2021; Aklin, Mildenberger, 2020).

A circular economy can be a source of growth or new jobs, reductions in negative environmental effects (e.g. carbon emissions). It is a system aimed at decoupling economic development from the consumption of scarce resources, preserving and enriching natural capital, increasing the amount of renewable resources (Ku gospodarce o obiegu zamkniętym:, https://).The benefits of more sustainable development and a closed loop economy include optimizing the use of materials. This requires changes in attitudes toward waste, which is an inevitable part of operations that should be treated, as a capital resource.It is also important to remember that recycling needs energy.

The financial situation is crucial in shaping the local government's ability to carry out investment activities, or its ability to attract EU support. The financial situation is influenced by own income, cash transfers - grants, subsidies, investment and current expenditures, the level of debt. The problem of the financial situation of local governments should also be considered in light of the level of socio-economic development of the regions (Patrzałek, 2019). Financial determinants, as J. Zawora (2018, 2019) points out, related to the budgetary situation, play an important role among the factors affecting the stimulation of local development.

Waste management, or waste management policy, is in the sphere of broad interest of the European Union in terms of both aspects of legal solutions, including those that protect the environment, and the economic use of waste within the framework of the urban economy. Poland, following EU trends, is adapting its legislation to EU legislation. Thus, more and more attention is being paid to the "waste" policy, implementing some waste management solutions from Swedish or German models, and attempting, for example, to thermally transform part of the waste and thus obtain fuel for heat and electricity production (Grzymała, Maśloch, https://). Significant differences in waste generation (including municipal waste) were observed in EU countries. The amount of waste generated depended on economic development. The most effective tools for solving the waste problem should be to strengthen reduction, reuse, and recycling behavior. Countries seeking to minimize waste generation should also pay more attention to promoting sustainable consumption and production. EU residents lack adequate knowledge of the link between waste reduction and natural resource conservation (Minelgaitė, Liobikienė, 2019). EU member states are increasingly shifting from landfilling municipal waste to waste prevention and recycling. It is recognized that landfilling is the worst waste management option for biodegradable waste.

Problems associated with municipal waste management in Poland include a slowly declining volume of municipal waste. At the same time, insufficient development of the selective collection and recycling system, an increase in the number of wild dumps, and insufficient protection of landfills are observed. According to the principle of sustainable development, waste should be reused (Spike, 2012). The best way to manage waste is to reduce its volume by reusing (recycling) it (Wilson, 2007). Waste is a symbol of inefficiency in any modern society and a representation of misallocated resources. Significant progress has been made in reducing waste, but it varies from city to city, region to region, and country to country. The continued depletion of limited natural resources by urban or regional populations leads to an uncertain future. To prevent further resource depletion, we need sustainable consumption and strategic waste management systems based on waste avoidance, material efficiency, and resource recovery (Zaman, Lehmann, 2013; Song, Li, and Zeng, 2015).

The change in the approach to waste is driven by the need to reduce the valuable space required for waste disposal, processing, and storage. Waste management, therefore, pays special attention to avoiding waste generation and conserving raw materials, promoting the cyclic use of raw materials (Grodkiewicz,

Michniewska, 2017), reusing, recycling, and recovering those wastes that cannot be avoided, disposing of waste through safe storage, and using landfills as little as possible (Dyrektywa Parlamentu Europejskiego i Rady 2008/98/WE z dnia 19 listopada 2008). This is because waste is a threat to human and animal health. Waste management contributes to the destruction of the natural, aesthetic, and landscape values of plant habitats. In addition to environmental aspects, waste management affects the social and economic spheres of the country. Threats to the environment and humans associated with the composition, properties, and improper handling of waste, especially hazardous waste, are enormous, as they not only affect human health and life but also the economic sphere. Hence, there is a need for clarified and comprehensive legal regulations at the international, EU, and national levels, which would contribute to improving the efficiency of waste management and thus reducing its nuisance (Bauman-Kaszubska, Sikorski, 2016).

The development of the green economy is influenced by economic factors such as geography, energy structure, foreign direct investment, green tax policies, industrial structure, and carbon emissions. The development of the green economy and its success depend on investments by the state and others in green and less harmful industries while ensuring good land use decisions and inclusiveness. They should be directed toward reducing carbon emissions and pollution, increasing the share of renewable energy and efficient use of natural resources, and paying greater attention to biodiversity and ecosystem services (Vargas-Hernández, Rakowska, Vargas-González, 2022).

Green economy as instruments for modeling the economic-environmental space of local government operations, affecting the financial situation, quality of life, development process, transformation of the local economy, etc. It is a way of obtaining and using resources. The concept of green economy is becoming multidimensional pointing to economic, social and environmental dimensions. It should have a positive impact on the quality of life of residents (e.g., by increasing resource efficiency, promoting sustainable consumption and production, combating climate change, protecting biodiversity, reducing pollution, rational management of natural resources). It is related to ecological economics. Green economic efficiency is an important indicator of green development.

The literature presented has significantly helped to provide a background on the changes in the transition to a green economy, and the quantitative research carried out has made it possible to answer the questions posed at the beginning of the analysis of the problem. The study discussed the discontinuities of the concepts of green economy, green infrastructure, environmental economics and ecology, waste management, financial situation, and quality of life. A synthetic measure was used for evaluation, which made it possible to rank and group the studied counties from the point of view of the main criterion, as well as to examine whether and to what extent the diagnostic variables determine the differentiation of the studied areas. Counties, thanks to their diverse endogenous resources, foster positive changes in socio-economic space as a result of the relationship between transformation processes towards a green economy and an adequate financial situation and quality of life.

The concentration of GE resources at development poles at the county level is an obstacle to the steady and consistent development of individual counties. County development policies lack reference to the green economy (or green infrastructure or waste management). The development of the green economy and

its diversification have a significant impact on the spatial changes of areas located in the zone of influence of better developed units. The stronger the financial situation of counties, the higher the sustainability, financial situation, and quality of life. The process of transformation to a green economy does not have a large impact on the financial situation due to the dependence of the district budget on transfers from the state budget and a different range of statutory tasks for districts. Peripheral areas are characterized by a steady trend of decline in economic and social development, low infrastructural equipment, and the process of capital leaching. The transformation of the local structures of the region's economy contributes to the consolidation of local inequalities (divergence), which leads to the marginalization (peripheralization) of areas.

The activities of local government are characterized by a significant degree of freedom. The specific conditions for evaluating the activities of municipalities are: the overriding nature of social tasks; the universal availability of public services; universal and equal access to the services provided; the permanent nature of the activities carried out; and the non-reliance of the conduct of activities on the benefits of an economic nature. The activities of districts are directed at achieving the goals using their endogenous resources. They should be analyzed in social, economic, financial, and environmental aspects, among others. An important feature of the efficiency of action is flexibility, manifested in the ability of entities to adapt. It becomes important, therefore, to build a model of multidimensional evaluation of action or to recognize the territorial capital characteristic of the local economy. On the basis of the synthetic measure, among other things, it was tried to assess the homogeneity of the structure of the local economy, statistical similarity, the level of development of units, and their spatial differentiation, or the development distance of units.

In a market economy, there is a clear territorial differentiation of the level of economic and social activity. The permanent nature of interregional differentiation leads to the separation of central regions and peripheral regions in the spatial structure. Persistent differences in the territorial capital and economic potential of individual regions are a problem in the modern economy. This situation is not conducive to the process of socio-economic development and, in fact, becomes one of its main barriers (Fourth Report on Economic and Social Cohesion). Growing Regions, Growing Europe, 2007).

The environment ensures the proper implementation of consumption processes, enables the creation of ecological and technical infrastructure, allows the creation of resource reserves, provides factors of production, and influences human functioning (Bzunek, 2012). The resource approach assumes that sustainable competitive advantage is achieved through the permanent development of existing resources and the creation of new resources. The socio-ecological problems of the region determine the processes of the purchase and consumption of goods. The unsustainable consumption model is a source of progressive environmental degradation. It also affects the depletion of its resources and contributes to the violation of ecological balance (Tarapa, 2015). Excessive consumption of goods and services (not taking into account social and environmental costs) leads to the occurrence of many negative effects on the environment and society (Pukas, 2014). Waste management and the formation of social attitudes about it are the tasks of local governments. It fits into the essence of local sustainable development (describing the needs of the economy, human comfort, and the interests of the environment). It is also important in the context of environmental protection, but also for socio-economic reasons (Dacko, 2011).

The results of the study of the quality of life, financial situation, and green economy should be available to the staff of government offices and city councilors and provide a starting point for urban planning, transportation planning, management of urban greenery and public spaces, and revitalization efforts. The diagnosis should also be available to NGOs and socially active residents so that it can become the basis for public discussion and public participation in decision-making on budget expenditures during public consultations and project submissions for civic budgets. In this way, systematic surveys can be an important part of a knowledge-based and participatory decision-making process (Czepkiewicz, Jankowski, 2015). Such analyses make it possible to assess the socioeconomic situation of individuals. Individual determinants of action assessment are the overriding nature of social tasks and the high degree of dependence on public funds. Under the conditions of high variability in the environment, as well as increasing competition among municipalities, it becomes important to know and continuously monitor the use of resources that determine the level of development.

Counties become active entities whose effectiveness can stimulate or limit the development of the entities within them (Jewtuchowicz, 2014). The development opportunities of individual counties are determined by their endogenous capacities and potentials (territorial capital).Territorial capital is dynamic in time and space; as T. Markowski (2016) writes, it is a kind of external benefit produced and available as a result of the multifunctional interaction of users of a relatively separate territory. The development of a unit depends on human, innovative, environmental, ecological, infrastructural, financial, and institutional potential. Intangibles occupy a special place in local development policy (Bury, 2004; Gaczek, 2010). The success of the region's development process depends on the degree of accuracy in identifying opportunities and threats from the environment and identifying the region's capitals (Gierszewska, Romanowska, 1994). In the study, the district was treated as a mini-region (built from the value of the territorial capital of its structure).

An assessment of the spatial variation of the green economy, quality of life, financial situation, and waste management shows spatial variation in the situation of counties. At this stage of the transition to the green economy, it is necessary to slow down the consumption of natural resources and view waste as a raw material in the circular economy. This should bring social, economic, and environmental benefits to the economy.

The socio-economic space of the counties (Figure 31) is a multi-component system, consisting of, among other things, the local community, businesses, as well as endogenous and exogenous factors. Listed here are the resources of the environment: infrastructure, labor and capital, quality of life, and financial situation. The process of an individual's action takes place in many elements of the space of the internal and external environment at the same time. These factors are interdependent and should be considered together. The variability of internal and external conditions of growth implies the need to study new factors affecting local development and spatial organization. The role of local authorities is to create the conditions for stable and dynamic economic development in a given territorial unit, using all those resources, possibilities, and opportunities arising from the environment that can serve this development (Kot, 2006).

In the aspect of county government in particular, it should be pointed out that the mismatched structures of administration, including tasks and finances, and the layout of functional links raise the need for changes and greater coordination of the activities undertaken. Integrated planning in local government is becoming an instrument that can affect the effective formation of local processes. The diagnosis of activities undertaken should be comprehensive and take into account comparative analysis, in-depth studies of potential, and identification of processes taking place within the geographical, economic, and social.



Rational management of natural resources and environmental protection have become the impetus for a new model of economic management. The transition to a green and resource-efficient economy (transformation to a green economy) is due to the trend of resource scarcity and rising energy and raw material prices. Waste generated in the management process should be recycled in accordance with the principle of sustainable development. Efficient and truly sustainable waste management is an essential element of sustainable development. Such a system should take into account both the quality of life of residents, the operation of businesses, and the environmental benefits derived from effective waste management practices.

The environment both underpins development in the broadest sense and is also a barrier due to resource depletion. The finiteness of environmental resources juxtaposed with the unlimitedness of human needs makes it necessary to rationally manage their resources. This is because it makes it possible to use the natural environment and thus meet human needs, resulting in the achievement of an adequate quality of life (Kryk, 2015).

Transformation of the region's economy towards a green economy is the process of transforming economic structures into environmentally friendly ones (including natural resources), i.e., a sustainable economy that takes care of environmental aspects in the process of socio-economic transformation. Problems of socio-economic differentiation, including transformation towards green economy, included analysis of the concept of green economy (its relevance to the district economy), its measurement, analysis of social structures (quality of life), economic structures (financial resources), and characteristics of local conditions for sustainable development. The analysis also took into account limitations in terms of data availability, especially describing the green economy at the county level, changes in legislation, and the completeness of data for all surveyed units.

Waste management is relevant to both the principle of sustainable development and the process of transformation to a green economy. The problem of waste management is becoming a challenge for local, regional, and national economies. This is due to the increasing amount of waste, both in the sphere of production and consumption. Waste requires a certain way of management, disposal, and reuse. Rational management of depleting resources requires treating waste as valuable raw materials. They can be reused, recycled, or, as a last resort, recovered. Sustainable waste management requires comprehensive treatment of waste, taking into account economic, ecological, and social aspects. When studying the financial condition of local government, it is necessary to take into account a number of metrics and data. Such that it will contribute in any way to determining the actual state of finances. The significant share of income from subsidies and grants (transfers from the state budget) in total income weakens the independence of counties. It seems that the main reason for the relatively low impact of financial conditions on economic and social development is their strong dependence on transfer income transferred from the state budget and the amount of current spending. The above circumstances stiffen and, at the same time, stabilize the financial economy of the districts, making it relatively insensitive to the influence of other factors. Low self-reliance can, therefore, be a significant barrier to future development.

Counties are an important player in the country's economic and social system. They are centers of economic and cultural activity. The multidimensionality of local activities makes their quantification a major methodological challenge for any researcher. Every spatial decision and every process of formulating the conditions and directions of development is based on certain premises and information. Having information is a fundamental condition for making correct spatial decisions. The system of the local economy changes over time. As a multi-elemental structure, it consists of, among other things, actors in economic life, finance, infrastructure, environment, etc. The degree of intensity of the region's endogenous assets, as well as their structures and interconnections, will shape the efficiency process. Implemented activities are a tangle of interrelated factors that form a multidimensional space.

Regional policy concepts increasingly emphasize the importance of the so-called integrated territorial approach (place-based approach), which aims to make better use of local resources and territorial specialization. Each territory has its own, often highly differentiated set of characteristics that make up its development potential (local individual territorial capital). Taking into account spatial, social, economic, and environmental conditions, as well as the diversity of individual territories, it is possible to build a regional policy based on internal development potential and better respond to specific local and regional needs. The multidimensionality of development processes embodied in the integrated territorial approach, based on the use of endogenous potential, territorial resources, and knowledge, allows regional policies to be more precisely adapted to local conditions. The calculation of a measure of the green economy, financial situation, and quality of life makes it possible to assess the degree of use of the potential of an entity in terms of the measures taken.

It should be emphasized that the complexity and dynamics of the activities undertaken as part of the local development policy and the multidimensionality of the processes taking place in the local economy. In view of the need to determine the appropriate relationships between individual activities at the social, economic, and environmental levels, effective implementation of development policy is a particularly difficult challenge for local governments. Therefore, it is necessary to pay attention to an integrated approach to the activities of local authorities, a functional view of the area of activity, or marking cooperation between different territorial entities. The author's analyses indicate the persistence and widening of differentiation in the level of the green economy, financial situation, quality of life, and development of infrastructure (including green and its polarization), which may indicate that these are not accidental and temporary phenomena but reflect permanent trends. In these areas, there has been a weakening of territorial cohesion in the indicated areas. The diffusion of development in the indicated analyzed areas indicates that counties with thriving urban centers are the strongest centers of diffusion on the scale of their regions. Particularly unfavorable in terms of development prospects is the situation of counties located on the periphery of the provinces. They do not have functional links with urban centers in their regions (the problem is especially true for the districts of the eastern Polish provinces).

Scenario I: an optimistic scenario, the positive aspect of the transformation towards a green economy

In this scenario, the districts in the studied area of the main criterion (quality of life, financial situation, green economy, green infrastructure) are based on: the use of endogenous factors; the persistence of the favorable socio-economic situation of the country and the region in the long term; and the skillful use of national and regional tools to support development processes. The element of supporting activities will also be the processes of supporting a more resourceefficient economy that is environmentally friendly and more competitive.

Anticipation of the formation of activities in the field of green economy (tailored to the potential of the region) is based on the skillful and correct use of national, provincial, and local instruments, thanks to which the districts shape the positive direction of changes in the economy. In this regard, it is necessary to stimulate the activity of the local community and its integration for a common goal, strengthen the financial situation of the districts, and make adjustments in the aspect of delimitation of the tasks of the districts (environmental policy and energy policy are areas on which the district should have more influence). The formation of the most optimal scenario of activities should assume:

moderate and stable development of the Polish economy, stable socioeconomic policy creating conditions for the development of entrepreneurship, green economy,

- opportunities for effective acquisition of financial assistance for the implementation of infrastructure (including green), waste management policy,
- restructuring of old and obsolete branches of the economy;
- increase in the importance of the sector of small and mediumsized enterprises belonging to various branches of the economy, their transformation towards a closed-loop economy,
- development of tourism (including health, medical, and spa), i.e., recreational, regenerative, leisure, and preventive activities carried out in spas, as well as health tourism in agro-tourism,
- strengthening energy conservation programs (e.g., reduced consumption of electricity, water, or fuel), visible at both national and regional levels,
- strengthening people's awareness of living and consuming in an environmentally friendly way (green labels and standards),
- interest in renewable energy,
- engaging the free labor resources that exist in Poland to work in the green economy,
- properly planned training programs for, among others, entrepreneurs and the unemployed in the context of green economy development,
- expansion of the definition of the green economy to new areas, assuming a reduction in the consumption of natural resources, which will contribute to improving the quality of the

The effectiveness of the indicated scenario will be positively influenced by the growth of the international economy and its direct impact on the country's socio-economic development and, consequently, on its individual regions. The provisions contained in the most important program documents on medium-sized cities losing socio-economic functions (Koncepcja Przestrzennego Zagospodarowania Kraju 2030, http://) will contribute to the realization of this scenario. Scenario II: Pessimistic scenario: disintegration of the transition to a green economy

The pessimistic scenario assumes the existence of negative factors and socioeconomic actions in the international, national, regional, and local systems, which may be either short-term or long-term. This scenario assumes that the worst possible operating conditions in the external and internal environment may occur for the counties, which will significantly impede the further process of transformation towards a green economy. The assumptions of the pessimistic scenario include:

- economic crisis in the global system, reduction in investment in science, development of cooperation, knowledge, and business (prolonged COVID-19 pandemic, war in Ukraine, energy crisis, financial crisis),
- unstable state policy regarding social, economic, and environmental aspects,
- rising unemployment and inflation, increasing negative migration balance, aging population,
- slumping economy, negative demographic processes,
- decline in the economic activity of residents will result in a growing area of poverty and an increase in crime,
- low importance of counties in the economy of the region and the country (inadequate financial resources of counties, poor road infrastructure, lack of land for new economic investments, low innovation of enterprises, decline in the number of business entities),
- renewable energy policies that are too general and unknown to citizens, which blocks the development of the sector;
- administrative barriers to renewable energy installations; increasing coal consumption in developing countries; making climate-friendly policies ineffective globally;
- low quality of life for residents, poor environmental quality, little achievement in the area of green economy,
- Poland's dependence on natural gas imports, insufficient development of its own renewable energy sources,
- excessive cost of organic products and organic production compared to conventional products,
- economic, financial, energy, and social crises as the main barriers to the transformation towards a green economy.

Depending on the nature of the processes taking place in the local economy and the quality of socio-economic activities, the scenarios adopted may also be shaped by:

- the willingness of some residents to undertake or develop activities in the fields of green economy, waste management, green infrastructure,
- innovative ideas and investment intentions of local businesses and residents in the green economy,
- state and local tools to protect and support the development of the green economy,
- EU programs to support the green economy to level the pandemic socio-economic crisis,
- increase in investment attractiveness of regions as places from which economic links, especially supply chains, are closer or shorter and can be maintained even in crisis situations (e.g., pandemic),
- decrease in the regions' revenues from taxes and local fees caused by the economic crisis, increase in expenses for removing the effects of the economic crisis, too deep increase in debt resulting from the decrease in own revenues caused by the economic crisis and incurred liabilities (loans, bonds),
- implementation of investments in green infrastructure, which will result in a multi-year burden on the city budget,
- inadequate environmental awareness among residents may pose a serious problem for the region in the future due to the dependence of spa services on the state of the environment.

The above challenges (factors considered stimulants or destimulants) should counteract negative trends within the regions. In addition, they should shape the region's structures in a way that counteracts the emergence of monofunctionality and create rational transportation networks that provide convenient access to public transportation, services, and places of recreation. Each of these should be analyzed in detail, but their interrelationships and impact on the aspects analyzed should not be forgotten. This indicates the necessity of an integrated approach in the efforts for sustainable, durable development.

Key recommendations are measures to attract investors and increase their competitiveness, as well as changes in their statutory tasks or financial resources. The counties need a development boost because they are characterized by a relatively weak economic situation, low business activity, and unfavorable

demographics. Actions for the development of the green economy should include, first of all: identifying business entities with development potential in the green economy; verifying and learning about development plans; proposing cooperation; and presenting strategies and concepts in the area of the green economy. Joint ventures should activate the local or regional community and improve the quality of life of residents. Therefore, local governments should take measures to designate vacant investment areas and equip them with the necessary technical and communications infrastructure in line with the requirements of the green economy. From the point of view of counties, it is important, among other things:

- strengthening efforts to initiate and develop economic ties with regional entities,
- reduction of the capital, financial gap,
- development of links between regional specialization entities and the broader business environment to integrate the regional economic environment and strengthen cooperative ties in the province,
- strengthening integrated planning,
- demographic changes (aging population) and shrinking labor market,
- development disparities, especially in functional areas,
- poor state of infrastructure (and poor population mobility),
- housing deficit (especially affordable housing).

The actions taken by district authorities should focus on creating conditions for sustainable development, a green economy, and infrastructure, developing mechanisms for cooperation in their functional areas, strengthening their ability to create jobs, and improving the quality of life of their residents. Equally important is the promotion of sustainable development through, among other things, changes in the area of waste management, counteracting the negative phenomena of suburbanization or revitalization, and assisting local urban centers affected by development problems.

A systematic study of the green economy, as well as waste management, should provide the information necessary for authorities to evaluate and adjust policies. The increase or decrease in the synthetic measure must be considered as a way of evaluating the effects of past management under the main criterion. The results obtained provide information on the variation occurring between territorial units. For comparison between regions, the proposed methodology should include the same variables in the indicated study areas. The obtained

results can be a source of information for district authorities on the disparities occurring between units and set potential directions for optimizing sustainable development and waste management. The results also indicate that measures should be taken to reduce development disparities between districts. The results confirmed the usefulness of synthetic measures for assessing complex phenomena. For comparison between regions, they should include the same variables in the indicated research areas. The synthetic measure used in the study made it possible to measure a multidimensional phenomenon as well as to linearly organize the studied units. The quantification of a complex phenomenon by means of a single numerical value, which facilitates all comparisons and synthesizes partial pictures regarding the studied elements, can be considered a benefit in this regard. It can be a helpful tool for the region's local government authorities to assess the accuracy of past decisions and the effectiveness of past regional management instruments. It makes it possible to indicate weaker and better areas of the unit's performance and to place the unit in the appropriate group, and its value depends on the number and type of variables adopted for the study.

Assessing the green economy at the regional level comes with additional limitations compared to indicators at the national level. At the local level, direct transfer of indicators (whether used as a set of separate indicators or as part of an aggregate indicator) used at the national level often faces limitations in the form of data availability. Also, the availability of data (to a specific level of administration, such as a county) can affect the measurement of progress toward a green economy and infrastructure, quality of life, financial situation, and waste management. Problems occurring in the survey process are related to changes in legislation (involving the revenue system, the scope of tasks, budget reporting), changes in the administrative division (liquidation, transformation of municipalities or counties), changes in the level of prices of goods and services (which affect both the level of revenue and public funds spent), and changes in the socio-economic situation.

Consideration of districts (green economy and infrastructure, waste management, quality of life, financial situation) made it possible, first of all, to systematize various concepts, definitions, and processes related to local and regional development. The highest level in terms of the main criterion was usually characterized by districts located in the area of large urban units and in their immediate surroundings. Better-developed districts were usually characterized by a better financial situation. Demographic potential, geographic factors, the state of the local economy, and the quality of life of the local community

also influenced the differentiation of district activities. The study also takes a closer look at the multifunctional analysis of the performance of the units in the context of the selected criteria. They formed the basis for the formulation of many conclusions that summarize the entire monograph. The content of the monograph makes it possible to pose a fundamental question relating to changing thinking about the future of counties. Also fundamental is the question of the nature and character of the change, which today is manifested both in the development and regression of various spheres of county life.

The level of development of GE counties is determined by the positive process of transformation of socio-economic outages. Concentration of GE resources at the poles of development is an obstacle to the steady and consistent development of individual counties. The districts' development policies lack reference to the green economy, green infrastructure, and waste management. The development of the green economy and its diversification have a significant impact on the spatial changes of areas located in the zone of influence of better developed units. The stronger the financial situation of counties, the higher the sustainability, financial situation, and quality of life. The process of transformation to a green economy does not have a large impact on the financial situation due to the dependence of the district budget on transfers from the state budget and a different range of statutory tasks for districts. Peripheral areas are characterized by a steady trend of decline in economic and social development, low infrastructural equipment, and the process of capital leaching. The transformation of the local structures of the region's economy contributes to the consolidation of local inequalities (divergence), which leads to the marginalization (peripheralization) of areas. Concentration of GE resources in the poles of development is an obstacle to the steady and consistent development of individual counties.

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This monograph addresses the research gap in the literature on the relationship between the level of transformation towards a green economy and its financial situation and quality of life, taking into account spatial variability. It contributes to the field of (spatial) economics, which aims to understand the spatial relationships between territorial units and the mechanisms that govern the modern economy and the territorial cohesion of regions.