Smart growth and sectoral transformations in the European regional space – measurement methods

The objective of the project covers both methodological and cognitive approach.
Methodological purpose consists in developing an integrated research approach, based on multivariate data analysis methods and modern econometrics, allowing to determine the relationships between smart growth (and its pillars, i.e. smart specialization, innovativeness and creativity) and structural transformations in sectoral perspective at regional level, as well as dependencies between the scale of structural transformations and economic growth, and also the assessment of knowledge-intensive services impact on economic growth based on regional development theories, including the theory of economic growth by Kuznetz and the three-sector theory.
This objective covers the following **specific goals**:
1. The development of measurement concept applying measures for structural similarities and the dynamic classification for the assessment of the scale and direction of sectoral structure transformations covering regional economies (illustrated e.g. by employment rate) allowing to identify joint and universal transposition models of regional sectoral structures.
2. The verification of smart growth concept in the light of selected regional growth theories (primarily their sectoral aspect) and the identification of joint or universal development models.
3. The scale verification of the identified sectoral structural transformations in the European regional space in the light of the three sector-theory (including its modern modifications).
4. Smart growth rate identification and the sub-rates resulting from the pillar approach (including regional innovation), and also the dependence analysis between these rates and structural transformations in sectoral perspective, occurring at the regional level, as well as the dependence between the scale of structural transformations and economic growth, also covering the assessment of knowledge-intensive services impact on economic growth.
Cognitive purpose consists in investigating answers to the following research problems:
1. Is there any dependence between the level of smart growth (also including its identified pillars, e.g. innovativeness) and sectoral structural transformations (scale and direction) in the EU regional space and also what is the strength of their mutual interactions?
2. Is there any dependence between the type of sectoral structure and the scale of structural transformations in the European regional space and what is the direction of the structure type impact on the scale of occurring transformations?
3. Is it possible to identify universal models of structural transformations and deviations from these models, including the reorientation of structures?
4. What is the extent to which the sectoral structural transformations contribute to economic growth in the EU NUTS 2 regions?
5. What is the extent of service sector (sections of specialized services) impact on economic growth in EU regions?
6. Are the sectoral theories (including the three-sector theory) confirmed in the European regional space?
Research hypotheses:
1. Smart growth and sectoral structural transformations (their scale and direction) remain integrated at regional level – the level and strength of dependence results from the level of smart growth, whereas the scale of structural changes largely depends on the basic structure system and takes on different pace of changes in the specific groups, identified based on the criteria related e.g. to the integration chronology.
2. The tools of multivariate data analysis and econometric methods, including classification methods, econometric models and also the apparatus of spatial econometrics, represent effective tools allowing for:
– dynamic taxonomy of the EU NUTS 2 regions in terms of various criteria related to smart growth,
– the dynamic taxonomy of the European regional space in terms of sectoral structural transformations in the selected economic aspects,
– the identification of dependencies between smart growth and also the scale and direction of sectoral transformations occurring in economic structures in regional dimension and regarding its impact power,
– the integrated dynamic typology covering both smart growth and its pillars, as well as structural transformations in sectoral perspective,
– the assessment whether structural transformations, primarily those focused on innovation oriented sections, remain the source of economic growth.

Justification for tackling specific scientific problems by the proposed project
Winiecki [2013] emphasizes that the sectoral assessments of structural changes present theoretical insufficiencies and empirical base problems, since different research studies describe – as the introduction to more detailed discussion – the model of structural transformations characterized by share changes of three major economy sectors: permanently decreasing share of agricultural sector, curvilinear (ascending and later descending) share of industry sector and the constantly growing share of service sector. However, none of the studies confirm expressis verbis that these changes shall result in just o n e sector in the future, i.e. the service sector. Furthermore, the theoretically supported outline of these shares' boundaries is missing. It is impossible to find well justified assessments of boundaries related to the decreasing total share of agriculture and industry sector within the most interesting problem, whereas with reference to the service sector, the tri-sector statistics offer little information about structural transformations, which could indicate not only higher total service sector share, but also changes in these branches share of the service sector which are informally included in the branches characterized by an intensive use of human capital.
The literature review shows that the existing research output lacks complex research on dependences between smart growth and sectoral changes of economic structure in regional perspective. The suggested methodological approach shall extend the spectrum of modern econometrics methods' applications because of the proposal to modify the classification methods focused on the dynamic perspective. The research results collected in the project shall deepen and expand the knowledge about smart growth role and impact on the dynamics of growth processes at regional level in the European Union, and the role of smart growth as the determinant of sectoral structural changes. The identification of the above-mentioned changes can support the European Union strategic planning, primarily in the context of the implementation of the EU regional policy goals – Europe 2020.
Approaching the discussed problem results from **three fundamental reasons**: 1/ the identification of scale and direction of

sectoral structural changes in economy as the research obligation to offer input in the construction of global and regional civilizational development, 2/ the assessment of smart growth role in stimulating sectoral transformations of economic structures in regional perspective, 3/ the assessment of feasibility and effectiveness of possibilities for economic analyses and econometric methods' application to identify dependencies between smart growth and structural changes in economy sectors.

Pioneering nature of the project
The research conception offers an innovative approach in two basic aspects. Firstly, the implementation of the research objective shall allow for the identification of dependencies between smart growth pillars and sectoral transformations in the European regional space, which has still not been either broadly or comprehensively covered in the existing research output. Secondly, the project takes advantage of known research tools in carrying out both methodological and cognitive objectives, such as econometric models and multivariate classification methods with newly proposed modifications needed for applications devoted to structural changes analysis. Moreover, the research conception remains the component of the general trend, focused on activities in economy and science sectors, preferring the simulation of innovative solutions. The implementation of an innovative regional development concept requires the adjustment skill of national and regional economies, or even the entire economic systems and the EU, to the changes occurring in an economic space of the sectoral structural changes. Many regional growth theories, including e.g. the theory of sectoral polarization by J.A. Schumpeter, emphasize the significance of innovations in the emerging sectors, which are gradually translated into further growths. This conception assumes the existence of wealth accumulation period, resulting from the emergence and development of innovation sectors. The observations of structural changes, reflected in tri-sector conceptions by A.Fisher, C. Clark and J. Fourastié indicate, however, that economic activity is shifted from an agricultural sector though industry to services. In spite of various explanations to these processes it seems founded to expect that these sectors will have different impacts on the level of smart growth, depending on growth poles concentration. It should be emphasized (which has been presented below) that so far an insufficient number of studies have analysed the problem of structural changes in such categories as GDP, investments, fixed assets, employment in sector perspective at regional level (including EU regions at NUTS 2 level). If such research was carried out it covered the area of a country, or was based on comparative analyses of two or several countries.

The results of the suggested project shall:
– identify possibilities and limitations in the application of modern econometrics methods in the assessment of regional growth diversification in the perspective of smart growth and structural changes within economy sectors, as well as dependencies between smart growth and also the scale and direction of these changes,
– allow assessing whether the actual processes occurring in the European regional space are focused on establishing creative regions, smart specialization growth in regions and increasing their potential, as well as the improvement of innovative capacity in regions, in the context of changes covering sectoral economic structures and, moreover, if they remain a component of regional growth theory realization in terms of sectoral problems,
– facilitate supplementing and developing knowledge regarding research methodology and mainly the place-based approach and its implementation in the construction of the European Union development strategy in regional perspective.
The research conducted within the framework of the project will be focused on the development of methodology allowing for the assessment of dependencies between smart growth and sectoral changes of economic structures in regional dimension, having assumed that smart growth implies changes for the benefit of innovative sectors, resulting in such competitive advantages which contribute to better effects and thus to economic growth. The project output will constitute the component of research on civilizational development of nations by means of smart growth measurement in regional dimension and the identification of dependencies between smart growth and sectoral transformations of economic structures.