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The Innovation Region: An Attempt to Develop a Multivariate Analysis Model¹

Abstract: The aim of the article is to present a novel model for the analysis of regional differentiation of innovation cultures. The research output of sociology in this area allows us to identify three strands of analysis: materialist, ideological and social. It also allows us to make inferences about cognitive reductionism associated with the adoption of a single selected perspective. This is also what the proposed model aims to counteract. It is intended to be a conceptual construct that enables a multivariate diagnosis of the regional diversification of innovation culture. At the same time, it highlights the fact, that a complete diagnosis of innovation requires an appropriate unit of analysis (region) and a related analytical category (culture). Linking together these concepts leads to constructing a model that allows us to determine the level of innovation in the modern world and its territorial differentiation. Investigating innovation in accordance with that model involves reaching the content of the different layers of culture and analysing the relationship between the different layers of innovation and the region. Each of the indicated layers can be diagnosed in a quantitative and qualitative way. This model will be built in three stages. In the first stage, a multivariate (i.e. including the material, ideological and social aspects) unit of analysis – region – will be constructed. In the second stage, a private diagnostic category, i.e. culture, will be matched to this unit. Stage three will bring the final construction of the model.

Key words: region, diversification, culture, innovation, economic culture

Introduction

In light of the available analyses, regional variations in economic cultures are evident. It can be assumed that the research trend focused on the search for regional stimulators of economic activity was initiated by one of the intellectual fathers of sociology – Weber (2001). Although he did not formulate explicitly the thesis on the regionalisation of economic cultures, he nevertheless drew attention to the fact that economic activity can be explained by variables of a non-material-

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istic nature. These, in turn, become known as regional peculiarities. According to Weber, the phenomenon of regional diversification of socio-economic development in nineteenth-century Europe was caused by attachment to principles and ideas typical of Protestantism. A more thorough analysis of the works of this researcher, however, allows us to conclude that it is not the religion itself, but its cultural coordinates, that determines the economic differentiation of regions. Weber has been followed by many other scholars, including Inglehart (1990), who joined the Weberian tradition by pointing to the axiological determinants of economic initiative. He makes an interesting conversion of Weber's law, showing that the gradual abandonment of traditional value systems, rather than sticking to them, determines the development of a given area. Inglehart additionally uses Samuel Huntington's 'cultural regions' in his analysis. It is on the basis of these that he divides the world into parts dominated by the culture of expansion or the culture of survival. Other researchers, including Hagen (1962) and McClelland (1961, 1973) observe the transformation between economic culture types in one geographic area. The former links this process to the 'withdrawal of status', i.e. radical reconstruction of the social structure, and the latter points to the affinity between entrepreneurship and the type of motivation. McClelland also provides an interesting historical and comparative analysis from which he concludes that economic culture is modelled by the dominant narratives and policies in a given region. Based on a similar conclusion, Grosse (2010), identifies two basic models of capitalism functioning in the European Union: market capitalism (Anglo-Saxon) and coordinated capitalism (typical for Austria or Germany).

A different form of explanation of regional variation in economic cultures was provided by 19th-century geographers. Huntington (1915) and his colleagues at Yale University examined the influence of environmental factors on the development of civilization. Based on these observations, Huntington proved the existence of the relationship between the environment and human economic activity. He also ultimately captured economic culture as a function of factors of a physical nature. This thesis was to become the pride of the representatives of moral geography of the time, whose output David S. Landes would summarize by saying that geography, and no other discipline, exhibits an initial tendency to categorize and "emits a sulfurous odor of heresy (Landes 1999, p. 22)". Concurrently, the same scholar noted that many findings in moral geography cannot be denied. "When we look at a map of the world where production or per capita income is marked", writes Landes (1999, p. 23), "we find that the rich countries lie in the temperate zones, especially in the northern hemisphere, while the poor countries lie in the tropical and subtropical zones". 'Physicality', according to Landes, has the power to form economic culture, but is by no means its dominant stimulator. Contemporary moral geography has also moved away from strictly materialist assumptions, although it does employ a spatial attribute to explain ethical and moral issues (Smith 2000).

The area of matter is defended by proponents of technological determinism. One of the leading representatives of the current, Ogburn (1964), noted that technological progress brings into existence institutions that are responsible

for adjusting society to the modernized infrastructure. Finally, this scholar also introduced the division of communities according to two identifiable types of cultures: the culture of stagnation and the culture of change. Ogburn's law was quickly reversed by economic historian North (1981). He made an attempt to present institutions as independent entities, defining them as the binding rules of the game, playing a leading role in shaping the economy. According to North, successive generations develop within institutions (Foundez 2016). Therefore, according to these assumptions, individual regions differ in their institutional backgrounds. They have their own social systems, in which economic life and the process of socialisation into economic roles take place. The optics adopted by North consequently frees institutions from servitude in the economy.

The research tradition thus provides three distinct perspectives on the analysis of regional variation in economic cultures (Zdun 2018):

- ideological (symbolic) – originating in Weber and emphasizing the importance of values in the formation of economic culture;
- materialist – which should be associated with the assumptions of early moral geography and technological determinism;
- social – bringing to the fore the issue of social relations and institutions.

All the approaches invoked here serve to diagnose regional variations in economic culture. Each of them describes diversification in a different way and justifies it differently. However, none of them alone allows for a complete analysis. It seems that only by linking all three of these 'points of view' can a multivariate, objective model of diagnosis be formed.

The aim of this article is to build a universal scheme of diagnosis, which would be free from the errors of reductionisms. One of its parts is the unit of analysis; the other is the primary diagnostic category. The scheme is designed to determine the regional differentiation of economic cultures, and more specifically its particular variety – the culture of innovation.

This scheme will be constructed in three interrelated stages. In the first one, the unit of analysis, i.e. the titular region, will be defined. In the second stage, the analytic category will be presented along with its semantic construction. Finally, the third and final stage will allow the concepts discussed earlier to be linked together and will ultimately form a conceptual model of diagnosis.

Stage I: Region as a unit of analysis

The term region has a wide semantic range, which is evidenced by its Latin etymology. The Latin term *regio* means district, or neighbourhood (Rysiewicz 1967, p. 568). Generally speaking, region is a uniform territorial entity, which can be treated as a tool and unit of analysis at the same time. The schools of analysis of regional differentiation of economic cultures indicated in the introduction allow us to identify different approaches to the region: materialist, interactional and systemic. The first of them is a legacy of geographers; the other two are directly rooted in sociological theory.

Materialistic approach – facilitates indication of three basic meanings of the term region (Szczepański et al. 2011, p. 9). Firstly, it can be a separate part of the world. Secondly, region is defined as a distinct part within a country. Thirdly, region is understood as a specific territory in economic terms. Bourdieu (1991) observed that region should be associated with a commanding act – diacrisis, introducing demarcation in space. This act brings the issue of delimitation to the fore: a region is an area created by breaking the continuity of space. It is also a territory whose distinction becomes possible through the identification of its specificity: it can be recognised by the element that differentiates it from its surroundings (Poniedziałek 2010, p. 24).

A materialistic approach must be derived from research of a tour character. One of their pioneers was Goetel (1936), who expressed the viewpoint typical of 19th century regionalism. In his opinion, the specificity of the territory is determined by nature. According to Andrew John Herbertson, region is 'natural landscape' (Gilbert 1960), and its analysis is to focus on matter and concern "the substances that make up the landscape" (Pawlowski 1938, p. 188). The region consequently becomes an object in which the structure has to be diagnosed and functional connections observed (Wróbel 1965: 9). Over time, however, a significant change in attitude towards region can be observed. Although the material area remained the dominant diagnostic content, the region itself began to be captured in an analytical manner. As a result, it ceased to be an object and, according to the assumptions made by Whittlesey (1954, p. 30), it became a tool for spatial generalization. It started to be treated as a unit of analysis and a tool of systematization of research at the same time. From then on, reference to the concept of region was primarily intended to diagnose territorial homogeneity on the basis of strictly defined criteria. As a result, the region began to be a concept, a category that is real and intellectual at the same time. It means a homogeneous area in terms of objectively identifiable peculiarities, but it also mobilises the focus on the dependencies in the set of features co-occurring in a given area (Wróbel 1965, p. 13). The approach proposed by Whittlesey allows us to treat 'homogeneity' in a non-rigorous way. This means that the uniformity of the region need not be complete. 'Homogeneity' is rather a criterion, enabling the division of regions into central and nodal (Whittlesey 1954, p. 36). The former have the same set of features throughout the entire area; the latter are characterized only by structural homogeneity. It is possible to distinguish the foci and related circulation areas within them (Wróbel 1965, p. 13). Chojnicki and Czyż (1992, p. 4) additionally note that the category of homogeneous region has become a starting point for research on spatial differentiation of various social, economic, and natural phenomena. Nodal regions, on the other hand, were to identify the interactions and linkages of spatial units with the main settlement centre. In this way, the region becomes known as a construct with high empirical utility (Rykiel 2011, p. 81). It begins to show an affinity for another term, i.e. 'economic district', defined as a territorially compact association of people or 'economic organism', with its individual parts cooperating with one another (Wakar 1929). As a result, the region began to be treated as a system, which is studied in the context of the

environment. The focus of diagnosis is shifted to the structure of its connections, including the phenomenon of 'region closure' (Dziewoński 1961). It mobilizes us to determine the tightness of borders and to observe the process of cooperation of the region with the environment (Rykiel 2011, p. 91).

The approach that exposes the systemic character of the region, referred to by many as dialectical, at the same time allows the region to be framed in a modernising way. Walter Isard, a leading representative of the trend, states that the quintessence of regional analysis should consist in the identification of relationships between spatial and economic variables. The region itself is to be part of a state system whose primary objective is technological progress and the progress of civilisation. The dialectical approach also makes distinctions between the content and form of a region. Content is created by man's activity; form is created by nature. Both elements build the material layer of a given territory (Dziewoński 1957). Dialectical approach to region assumes at the same time that a region is shaped in the process of social division of labour and constitutes a historical phenomenon. First of all, however, it can be defined as a real existing area that performs specific tasks within the economic system (Rykiel 2011, p. 51).

The interactional approach develops as a result of the humanization of the materialistic view of the region. Space in this perspective is defined as a framework of social practices. Thus, the sociological concept of structuration (Giddens 1984) is involved in the analysis of the region. Nigel Thrif, the originator of the geographical variation of the above mentioned concept, argues that "region [...] cannot be seen as a place.[...] It must be perceived instead as a construction of diverse connections" (Thrif 1983, p. 40). It is also characterized by a dual nature. According to Thrif, the region, on the one hand, provides opportunities for action; on the other hand, it restricts these actions. Above all, however, it becomes known as a space for encounters, or a 'lifeworld' (Habermas 1981). It is a performative space, a construction of mutual references, not an externally diagnosed object or an artificial, administrative creation. It is more of an area where a game is played and certain rules apply. It is also a special territory in ontological sense, because it is both the effect of change and its initial frame. The interaction region shapes the activity of units and is itself determined by it. As a result, it becomes a field of relations, a space of interpersonal references

As an interacting field, region becomes dynamized. It loses the properties of an object and materialistic qualities of the spatial unit. It also does not have clearly defined boundaries. It reaches where its autonomy ends (Bourdieu, Wacquant 2006, p. 656), but where its rules of the game still apply. In discussing the diversity of economic cultures, the economic field of the region is of particular importance. The category of profit and entrepreneurship is also brought to the fore within the above context. The region as a field of economic relations is characterized by autonomy, but it also builds links with other fields. The game in this field is played by systems of relations, the shape and operation of which determine the economic potential of the region.

Economy in the context of networking is described by Granovetter (1973). According to him, development is embedded in a network of inter-subjective

connections and through these connections it becomes a reality. According to these assumptions, regional economy is a network in which social actors and organizations are distributed. Hungarian scholar Polanyi (2001) adds institutions as the core of that network. As such, they determine the economic character of the region and its opportunities for development: institutions enable action, shape regional habituses, and ultimately determine the pro- or anti-innovative character of the territorial unit.

The economic field needs the activity of a unit for its existence. At the same time, it regulates this activity by making it necessary to be integrated into the existing system of relations. This is because the region is an existing system – an ‘inheritor’ of historical and cultural conditions in which institutions are shaped. The economic specificity of the region is also crystallized in those conditions. Paasi (1986) claims that in an interactional perspective the region can be defined by sequences of practices by social actors that are aimed to socially structure the space. Region is an area in which the process of institutionalization is formulated in stages. In the first stage, the development of a spatial framework takes place. In the second, institutions capable of ruling a given territory are created. In the third stage, institutions begin to produce narratives that form regional consciousness and habituses. (Poniedziałek 2015, p. 100–101). These narratives are also the ‘game’ that regional development strategies and economic policies express. This is also how the region is studied by Italian scholar Becattini (1990). For him, the region is, to a large extent, a network of links. Becattini explains that the phenomenon of dynamic development of Third Italy’s regions is related to the appropriate use of traditions and local ties based on trust.

Systemic approach allows us to assume that the region is a whole, the cohesion of which is determined by the normative factor, and not by the material one. The system-based definition of the region should be derived from the sociological theory of the social system. It is rooted in 19th-century organicism. The systemic approach begins with the considerations of the positivist Comte (2012). He argued that the social world should be studied as a whole entity that is independent of the observer. He also noted that reality can be diagnosed in two basic states: static (which enables analysis of structure) and dynamic (which focuses on functionality) (Szacki 2012, p. 248–249). Continuing these considerations, Spencer (1972) argued that a social system operates like a living being: it has a functionally differentiated structure that is subject to change over time. The structure of this organism is built by institutions and it is those institutions that determine its proper functioning and functionality. Many years later, the neo-evolutionist Parsons (1971) focused his studies on the functionality of the system. He made the category of inter-systemic order the central axis of his analysis.

Parsons defines system as a way of organizing activity (Parsons et al. 2006, p. 376). According to this researcher, system is a whole that operates through two complementary mechanisms: allocation and integration. The first one determines the structural coherence of the system and is responsible for the distribution of units on the appropriate positions in the system. The second guarantees normative coherence. The mechanism of integration binds units together through ‘cul-

turally structured symbols' (Parsons 2009, p. 11). Ultimately, the social system can be defined as a whole coordinated by norms which combines two processes: differentiation and consolidation. The former leads to functionally mature subsystems (Parsons 2006, p. 384). The role of the latter is to establish a pattern that binds the whole together. The pattern is also responsible for maintaining the equilibrium of the system.

Systemic equilibrium was the focus of Luhmann's (2013) work. This researcher also exposed the theme of normativity more strongly. In his view, the system is equipped with its own proper structure of sense and, based on it, 'negotiates' with the environment the state of its own equilibrium. The structure of sense is the inner order of the social whole, it is the 'concept of self'. The system, according to the assumptions made by Luhmann, persists and develops by relating to its own rules, norms and values. It is self-referential. Based on self-reference, it builds boundaries with the external environment. Consequently, it becomes 'a difference-making effect' (Skąpska 2007, p. XI). The sustainability of the system is possible thanks to the norms. They define the functioning of the whole and build its identity. Norms are responsible for the tightness of boundaries and they 'filter' information from the external environment. They make the system transparent to itself and capable of working out its own 'communication code'. It is through this code that the system matches information coming in from outside, with its own structure of sense.

Region is such a normative whole. It is an axiologically coherent area with its own identity. This whole functions surrounded by the external environment. It also cooperates with that environment, maintaining its own specificity. The principle of endogenous development should be associated with region defined as above. Region, as a normative whole, combines seemingly opposite notions of progress and order. On the one hand, it changes; on the other, it retains its own identity. As a result, it develops in an endogenous way – based on reference to its own traditions and resources. At the same time, it demonstrates cognitive openness. Consequently, the imported content is aligned with its internal governance, applicable laws, adopted policies. System policy is translated into functionality. The policy itself is shaped following its system memory. System memory (here: 'region memory') is formed based on historical and cultural experience. As such, it also constitutes the core of the system, the axiological supremacy responsible for the balance. Memory determines the character of a region and its development strategy. Its significance ennobles the tradition of the region and the area of value associated with it. The area of traditionalism appears as a stimulator rather than a barrier to development (Szczepański 1986, p. 104).

The three approaches mentioned above make up the construction of a multivariate model of the region – the unit of analysis of the territorial differentiation of economic cultures (Fig. 1). Part one of the schema allows us to diagnose the region in the way that was outlined by geographers. It is a physical space in which matter is the object of diagnosis. Region in this view is first of all a part of the world, characterized by natural and economic peculiarities. The researcher's task is to identify its material structure and the connections that are embodied in

it. Everything objectively existing, subject to counting, measuring and numerical compilation and verification, is located in this part of the schema. This is also the area that economic indicators are used to describe. The second part of the schema is the interaction area – field of relations. It allows us to link the matter with the activity of social actors and their actions, including work and entrepreneurship. This activity defines the economic specificity of the area. Social institutions must also be associated with it. These institutions develop the region’s habituses – permanent systems of dispositions that naturally build a bridge between the realm of matter and value. The interactional framing of the region in effect is a step towards its dematerialization. It makes region possible to describe through systems of interpersonal relations, social institutions, activity and related capitals: economic, social and symbolic. The last mentioned capital transposes the region to the symbolic area. In it, region is described as a social system. Its quintessence is order, dominant pattern and norms, which determine its cultural peculiarity. Individual activity ceases to be the subject of diagnosis in this area. What matters is the normative framework; the values that underlie the habituses and activity of social actors. Viewed in this way, region focuses the researchers’ attention on the symbolic resources of the region – an area which, according to Weberian approach, is not material itself, but can be expressed in the form of materialized results.

Material approach to territory (physical area)	Natural environment, geographical specificity	Natural resources and conditions	The area of matter
Interactional approach, field of relations	Systems of relations, social institutions	Actions of social actors, social roles, habituses	The area of interaction
System approach, social system	Order and equilibrium of system	Values and norms	The area of values
Approach to region	Key category (region definiers)	Subject of analysis	

Fig. 1. Multivariate model of a region
Source: own elaboration.

Such a finding is not tantamount to asserting the primacy of ‘consciousness’ over ‘existence’; or of ‘ideas’ over ‘matter’. The areas indicated here should be treated jointly, as interacting with each other and forming a whole, and not dominating one over the other. The model is oriented towards a multivariate diagnosis of the region. It also facilitates interregional comparisons in the material, interactional and symbolic domains.

The order of the listed areas appears to be of significance in the presented model. The two extremes are associated with the sphere of materialization and valuation. The central part is the area of practices and relationships. It is the quintessence of the region. Through the rational actions of social actors, their needs and existential motivations, the interactional area turns to matter. It is connected with the symbolic sphere through values, which shape key institutions and habituses for the economy.

The schema thus formed is not only a model of conceptual nature. It can also be used for empirical diagnosis. Then the region becomes the unit of analysis, which, however, should be referred to with an appropriately selected category. In the case of diagnostics of modern economies, this category is innovation culture.

Stage II: Innovation culture as an analytical category

The concept of innovative culture has to be derived from its related terms: culture in general and its specific variety, i.e. economic culture. In each case, innovation culture appears as a concept narrower in meaning than the one mentioned above. This concept should be treated as related to them and at the same time as an independent one. It can be used as value determinant and in analytical way. In the first case, it confronts two realms: technology and nature; in the second, it serves the purpose of developing a descriptive account of the peculiarities observed. The starting point in defining the culture of innovation is the concept of culture in general. Antonina Kłoskowska points to its three basic layers and types: existence (material), social and symbolic. Thus, this researcher refers to the division introduced by Weber (1927), Maclver (1942) or Kroeber (1978). The material area adopts a largely instrumental character. It serves basic needs. At the same time, this layer of culture “is formed in the conditions of social coexistence of people, and, when it is already [shaped], it exerts an influence on the forms of this coexistence [...]” (Kłoskowska 2007, p. 79). Historical materialism treats this layer as fundamental, making the realm of consciousness merely an epiphenomenon of matter. The content of the culture of existence includes tools, objects and activities related to them, used for production, consumption or securing and realization of species and individual human needs (Kłoskowska 2007, p. 71). It is an externally graspable layer. The societal layer, also referred to as the social layer by other researchers, encompasses the activities of social actors, social roles, and configurations of relations between individuals. Social forms (Simmel 1971), institutions and figurations are the measure and realization of this area. It is the area of interdependence, the patterns of relationships in which, according to Elias (1996), individuals carry out their activities. The third of the layers indicated, the symbolic layer, is an area inaccessible through direct observation of symbolism. This is the sphere of values and signs, “the matrix by means of which the human spirit gives shape to reality” (Kłoskowska 2009, p. 75). According to Cassirer (1953, p. 75), it is through these symbolic forms that the human spirit shapes the world and models reality. The symbolic layer cannot be treated as superior to the

others. Nevertheless, it seems inspiring to expose its bond-building character. In defining the concepts of culture, Piotr Sztompka brings to the foreground the content of this particular area. It is, in his opinion, “a system of meanings created and established in a given society and associated with various objects and phenomena, passed on from generation to generation through socialization and education, internalized by the members of society” (Sztompka 2020, p. 165).

The valuation-socialization theme is referred to by the authors of the definition of economic culture. According to North (1981), economic culture is defined by social institutions. McCloskey (2016) on the other hand, argues that economic culture is a function of ideas prevalent in society. Hryniewicz (2004) claims that economic culture consists in attitudes, motivations and institutional solutions. The scholar notes that economic culture is subject to generational inheritance and shapes certain habituses. Based on these findings, Kochanowicz (2010, p. 18) links two categories of phenomena to economic culture, namely the persisting dispositions of groups and individuals, and the widespread view of how the economy should be organized. Host culture, according to Kochanowicz, functions on two levels: socialization (where permanent dispositions are formed) and ideological (where narratives supporting a particular vision of the economic world are formed). Innovation culture is a particular variation of economic culture. This is because innovation is the basic force that stimulates the process of economic development (Schumpeter 1960).

Innovation culture as a special variety of culture must have a similar multivariate structure. It consists of three layers: material, social and symbolic (ideological). The quintessential area of culture should be considered the area of beliefs, which, however, should not be seen as the chief determinant of regional development (Tian et al. 2018). After all, one can speak of two competing explanations of development, built either on the basis of materialist determinism or on the basis of ideological prerogative. At the same time, it should be noted that economic culture, including its diverse varieties (the culture of innovation) can be implemented in different realisations, just like the culture of capitalism, which, according to Poblocki (2017), was realised as a system of social relations in the times before the industrial revolution.

Material layer – the area where all empirically and verifiable evidence of innovative human activity is brought together. The practical nature of the innovative solution is the basic criterion to be qualified to this layer. The ideological background of the layer is historical materialism and technological determinism. These approaches seem to share the view on the primacy of ‘being’ over ‘consciousness’. According to the assumptions of the directions indicated, inventions and new ways of production are the factors that drive the mechanism of socio-economic development. The materialist perspective embeds techno-economic innovation as the chief determinant of social change. It accepts that the world is changed by innovative solutions. The current of thought inherent in these assumptions is represented by evolutionists, including Morgan (1944) and White (1949). White notes that growth depends on the efficiency of technological solutions. Morgan, in turn, associates the process of civilisation progress with the

satisfaction of needs. The techno-economic perspective on innovation is no less linked to the concepts of Karl Marx and Friedrich Engels. These researchers argue that at the root of the mechanism of development is a contradiction, a mismatch between the relations of production and the productive forces. New technologies and ways of production force a reconstruction on a social level, which advocates the domination of social 'existence' over 'consciousness'. The role of technological innovation is defined analogously by Kondratiev (1935). In his opinion, each successive stage of development shapes its own techno-economic regime. It is innovations that determine the shape of societies, forcing institutional changes (Męczyński 2007, p. 26–27).

Innovation in the leading role for economic growth, however, was most firmly established by Schumpeter (1980). This researcher links the category of innovation with entrepreneurship. In this way, he psychologizes it. According to Schumpeter, *novum* throws the economy out of balance, causing creative turbulence in its structure. Innovation enables the system to advance to a higher level of development and is responsible for the transition from a stagnant to a dynamic stage. Veblen (1924) evaluates innovation in a similar way. This researcher argues that the progress of civilization requires the myth of the entrepreneur-adventurer to be settled. This role should be taken by a specialized engineer. Using this statement, Galbraith (1967) links changes within the social structure. In his view, the great importance of innovative technologies leads to the elevation in the social hierarchy of a new category of so-called 'technostructure', i.e. those who have the appropriate knowledge and qualifications to implement innovation.

The material dimension of innovation is equally strongly exposed by classical deterministic concepts. Ogburn (1964) is the leading representative of this trend. While seeking an analogy to Charles Darwin's concept, he states that technology forces adaptations on the individual and society. This concept is to be followed by the phenomenon of cultural lag. It occurs when the society fails to keep up with technology, and its institutions do not allow it to function efficiently in the new world. The contemporary trend of continuation of technicism is transhumanism, using the Nietzschean motto concerning 'life on the edge'. According to its assumptions, technological innovation is to serve the purpose of raising the quality of life, radically improving the human condition, including increasing physical and intellectual fitness (cf. Adamski 2012, p. 106–110). With this in mind, among others, Kurczewska (1997) introduces the term 'technicist worldview'. It is ideosphere that serves to sustain the leading role of the material area. In her opinion, the technicist worldview finds expression in scientism, and an optimistic attitude to the future is typical of this approach.

The material layer of innovation culture is described not only by ideological trends, but also by empirical indicators. They provide information on the level of inventive activity and the economic base of innovation in a given territorial unit. Information on the material dimension of innovation is provided by public statistics, including those collected by the European Commission (Regional Innovation Scoreboard). The results of its work involve the construction of rankings and inter-regional comparisons. This analysis uses the following indicators:

- research and development expenditure in the public sector,
- research and development expenditure in the business sector,
- innovation expenditure outside R&D, and development of SMEs (small and medium-sized enterprises) as a percentage of turnover,
- SMEs introducing product or process innovation,
- SMEs with marketing or organisational innovation,
- SMEs innovating in-house,
- innovative SMEs working with others,
- patent applications,
- trademarks,
- utility models,
- employment in medium/high technology manufacturing and knowledge-based services,
- medium/high technology product exports,
- selling innovation in small and medium-sized enterprises.

The material area is examined in a corresponding way by financial institutions. Bank Millennium used the following indicators in its regional diversification study:

- labour productivity (million PLN/number of employees),
- value-added rate (%),
- expenditure on research and development (R&D in relation to GDP),
- individuals employed in R&D (per 1 thousand professionally active people),
- number of issued patents (per 1 million inhabitants).

In addition, this area is analysed by the data of statistical offices (CIS – The Community Innovation Survey, EuroStat, OECD – Organisation for Economic Co-operation and Development) collecting data on:

- structure of expenditure on R&D sector (Eurostat),
- share of high-tech exports in total exports (Eurostat),
- the rate of financial development (OECD),
- openness of the economy (export intensity and import penetration) (OECD),
- percentage of innovative enterprises (CIS),
- structure of types of innovation (CIS).

All the indicators indicated above allow us to examine the content of the material layer. They are also used to determine the level of innovation protection in economic policy. At the same time, the indicated measures have forecasting function and serve to model the economy in such a way that it serves innovativeness. The point is clear: there are many types innovation ranking. The one referenced here and in subsequent sections of the analysis, however, seems to best define the content of the previously defined layers. According to the assumptions adopted by Schumpeter, innovations determine the possibilities of economic development. Therefore, the indicators informing about its condition and the way it works allow to characterize this ‘natural innovation environment’. Measured and understood in this way, innovation ultimately becomes a matter of public concern and special policy agendas.

Societal layer – the socialised aspects of innovation are derived from the Schumpeterian theory of the entrepreneurship. Schumpeter combines innovation with entrepreneurship. In his *Theory of Economic Development*, published in 1912, he argues the importance of innovation to the economy, but also attributes innovation to the figure of the entrepreneur. In this way he demythologizes the figure of manufacturer – a big owner. The primary task of the entrepreneur, according to Schumpeter, is to create *novum*. Innovative activities require special talents, predispositions, and gifts. Entrepreneurs are additionally characterized by their ‘strength of spirit’. Today, Taleb (2020) would refer to the Schumpeterian entrepreneur as a ‘black swan’ that symbolizes the singularity and atypicality capable of taking risks, reaching beyond the standard, and affecting reality. In this way, the role of the entrepreneur begins to express Max Weber’s assumption about economic activity. Economic initiative combines rationality and axiological conditioning. At the same time, it requires special personality predispositions. Representatives of economic psychology also focus their attention on those factors (Brockhaus 1982). At the same time, entrepreneurship, regardless of individual variation, remains a social role. It is essentially an effect of socialization, a function of assimilated habitus. Innovativeness thus appears here as an acquired predisposition (Hagen 1962). According to Pierre Bourdieu, entrepreneurship is determined by the acquired habitus. It determines how the individual navigates through the economy (Bourdieu, Wacquant 2006, p. 652). It also determines the assimilation of various types of capital (economic, social, cultural), which themselves are beneficial to innovation.

Elias (2006, p. 1062–1073) additionally notes that habitus is also responsible for an individual’s link with social structure. This is achieved by means of the so-called figuration, i.e. the existing systems, in which an individual carries out their activity, including the one related to innovation. Systems are social institutions that introduce specific conditions for the performance of social roles. They can either foster innovation or undermine it. Innovation is hindered by hierarchical and authoritarian systems based on coercion and subordination (Hagen 1962, Fromm, Maccoby 1970, Sorokin 1998). It is, on the other hand, stimulated by democracy (Inglehart 2003, p. 146). Innovation simultaneously benefits from competitiveness, attachment to work, positive assessment of wealth, good legislation and clear norms (Grandona 2003, p. 101–106). All these factors together build ‘good institutions’. According to Acemoğlu et al. (2001, 2005), they constitute the hallmark of inclusive societies. They are the natural environment for innovation and are the quintessence of the societal layer. The ‘good institutions’ include the free market and property. The former spurs competitiveness, which is crucial for innovation. The second shapes the right motivation: through the effort of innovation, individuals can become rich.

Techno-economic innovation therefore benefits from proper rules of the game and transparent principles of navigating in the socio-economic world. These principles enable the optimal execution of entrepreneurial roles. They also foster the building of social capital. This, in turn, like the institutions cited earlier in this paper, is responsible for linking the individual to society and empowers interaction

(Czapiński, Panek 2015, p. 351). As a result, its strength shows the relationship of economic development and diffusion of innovation. This relationship is demonstrated by the studies of Granovetter (1973, 1978), Coleman (1988) and Rogers (1983). The third of the above-mentioned works even determines innovation by its dependence on social capital, arguing that this predisposition, which requires risk, not only needs to be strengthened in a network of contacts, but is also based on socially and culturally distant relations. Granovetter (1978) also introduces the concepts of 'weak bond strength' and 'threshold' in this context. In his view, innovation is served by relationships built on the principle of heterophily, or difference and dissimilarity. Each unit also has an 'individual threshold', i.e. it requires a sufficient number of encouraging examples to undertake innovative activities.

Networks and connections together with entrepreneurial roles are the quintessential social layer of innovation culture. On the one hand, innovation needs a proper institutional background, and on the other, it needs properly filled roles. The role of an entrepreneur-innovator enhances relevant social and cognitive competences. It should also be connected with the motivation to and the chance of advancement in the social structure (McClelland 1961). For this reason, McCloskey (2016) associates innovation with the middle class. In her view, it is a natural reservoir of innovation, since its representatives are focused on improving their qualifications and taking social and economic initiatives. These findings, together with the previously presented concepts, allow us to conclude that the content of the societal layer is determined by information on the social and human capital of the region, as well as data characterizing the social structure in terms of the affluence of the middle class.

Diagnosis of human capital in the context of innovation leans on the contribution of indicators from the reports on innovation published by the European Commission (Regional Innovation Scoreboard 2017), as well as the National Bank of Poland (2016):

- percentage of population with tertiary education (these data are collected by the European Commission and used to construct the Regional Innovation Scoreboard),
- continuous learning rates (these data are collected by the European Commission and used to construct the Regional Innovation Scoreboard),
- post-secondary education – the number of students per 10,000 residents (these data are collected by the European Commission and used to construct the Regional Innovation Scoreboard).

Diagnosing of this area also benefits from information on international cooperation, such as:

- international scientific co-authorships,
- most cited scientific papers.

Measures of the quality of education, on the other hand, are used to diagnose human capital (Innovation Report 200–203):

- Programme for International Student Assessment (PISA).
- EUCYS, the European science project competitions for pupils from the EU and Associated Countries (European Commission).

- The Programme for the International Assessment of Adult Competencies (PIAAC).
- The share of engineering and science graduates (Science, Technology, Engineering and Mathematics, STEM).
- Public expenditure on education (as % of GDP) (Eursostat).
- Gross Enrolment Ratio (Eurostat).

The relationship between human capital and innovation has been proven in many studies. The impact of this form of capital on innovation is noted, among others, in the OECD report (2001). The impact of human capital on Human Development Index was reported by De Clercq and Dakhli (2003). Others, on the other hand, argue that this relationship cannot be demonstrated unequivocally. According to Parker (2011), much depends on the type of human capital. Parker draws a distinction between general and specialized capital and, drawing from this division, argues that innovation is only affected by the former type. This is because general capital is acquired during formal education and not during work in a corporation, and thus contributes to the development of an individual innovative predisposition. In general, however, there is a positive relationship between innovation and human capital measured by the number of years of formal education and the percentage of employees with higher education (Gradziewicz et al. 2016, p. 196–197).

Social capital is diagnosed using data from the World Values Survey Wave and the European Values Survey. These make it possible to diagnose:

- civic engagement in:
 - activity within a political party or organisation
 - contacts with politicians
 - signing of petitions
 - participation in demonstrations
 - involvement in charity and charitable activities
- public confidence in:
 - legal system,
 - national parliament,
 - European Parliament,
 - the police.

These indicators, together with data on the social structure (the number of individual socio-professional categories) and entrepreneurial activity (the number of registered enterprises, the number of enterprises implementing innovations), allow us to examine the content of the social layer and determine its innovative potential in the region.

Symbolic layer – the area of meanings, values and norms connected with innovative activity. Conceptually, the background of this area is the cultural theory of innovation. It is most strongly presented by British, German, and American anthropologists, including Kroeber (1937), Wissler (1923), Suttles (1951), Sharp (1952), Linton (1936), and Barnett (1953). A particularly interesting model of innovation is constructed by the last of the above-mentioned researchers. In the concept proposed by Barnett (1953), innovation becomes both an

object of cultural cognition and an instrument of social change. Barnett explains that *novum* forces the social whole to change and redesign. By the same token, innovation requires not only cognitive readiness, but also courage and risk. Innovation disturbs the natural order of the social system, and thus also faces resistance. As a result, it primarily becomes the strategy of those who lose little from the risks associated with innovation. According to Barnett, these often include outcasts, who remain on the margins of society. They are the ones who are willing to take the risk of innovation. A similar direction is followed by Merton (1968), for whom innovation is a natural response to the state of anomie, i.e. the disruption of the axio-normative order of the social whole. Innovation is a strategy for adapting to a situation in which culturally defined goals are no longer aligned with the institutional way of achieving them. It is a form of rebellion, a creative way of coping with the normatively disordered social reality.

In line with the assumptions adopted by anthropologists, innovation additionally becomes known as a strategy leading to the disruption of order in the social system. Linton (1936) argues that innovation is troublesome for communities. After all, *novum* is characterized by its own 'cultural communicativeness'. This means that it is evaluated not only in terms of practical application, but also in terms of how it fits into the order of the social system. Barnett (1953, p. 357–377) notes that one of the characteristics of innovation is its ability to produce repercussions, to disrupt existing orders and patterns. For this reason, Abernathy and Kim (1985) assess innovation in terms of the degree of its revolutionary character. Aware of these properties, Rogers (1983, p. 223–226) argues that innovation requires normative legitimacy, it must be accepted at the level of the systemic order. In this way, it can also be treated as a peculiarity that the system can 'deal with'. Gumuła (2008, p. 57–59) notes that the measure of 'innovation opportunities' in a system is equal to the tolerance of common structures of the peculiar. Innovation should be treated as an atypical social fact; an element disturbing the homogeneous matrix of the axio-normative standard.

Innovation does not challenge everyone to the same extent. Using the division into survival and expansion cultures, Inglehart (2003) states that innovation is hindered by materialist values, and enhanced by post-materialist ones. Following his research conducted in Java and Burma, Everett Hagen adds that the prevalent norms in a community shape the type of personality. They lead to the development of a form of authoritarian or innovative personality.

As it turns out, the system of permanent dispositions, which is the quintessential social layer of the culture of innovation, is formed at the symbolic level. This is what the studies of McClelland (1961) and Fromm and Maccoby (1970) demonstrate. The former shows that the dominant narratives in a given culture shape the entrepreneurial-innovative personality. Fromm and Maccoby note that social character, understood as the force underlying an individual's behaviour, is shaped by culture. Pro-innovative orientation, in their opinion, is formed in a specific situational and historical context. Values acquired through socialisation determine the chance of developing an innovative orientation. As a result, innovation is attributed not only to the individual but also to the social system.

Consequently, pro- and anti-innovation systems and societies can be indicated. They are accompanied by completely different forms of order. Ogburn (1964, p. 44–61) links innovation to the axio-normative system, which expresses:

- support for experiment,
- looking to the future,
- faith in human capabilities,
- promotion of the young generation,
- permissivism and democracies at the governing level,
- activism,
- cosmopolitanism,
- acceptance of fashions,
- faith in the individual,
- support for mobility in the social structure,
- marginalisation of sentimentalism,
- mobilization of action.

The last of the indicated factors is pointed out by the classics of the subject – Weber (2001) and Sombart (2001). The former derived the entrepreneurial-innovative orientation from Protestant ethics; the latter linked it to the cultural variables of Judaism. Both scholars motivate innovation axiologically, as does Schumpeter (1980), who requires not only rationality but also strength of spirit from the entrepreneur-innovator.

The symbolic layer consequently exposes the normative conditioning of innovation. It allows us to identify the governance that fosters innovation. At the same time, the symbolic dimension mobilizes us to pay attention to the ideological background of innovation. Following Inglehart (2003) or Basáñez (2013), we can use this background as the basis to plot the maps of the world appropriate for the diagnosis of the diversification of the cult of innovation.

The statement that innovativeness is a feature of the social whole, and not only a predisposition of the individual, seems to be crucial to the analysis of the culture of novelty in the symbolic dimension. At the same time, its formation is determined by the values assimilated. As a result, the diagnosis of this area should involve:

- European Values Study data on attitudes towards work, family, politics, religion;
- World Values Survey data, which additionally provide information on the acceptance of egalitarianism, democracy, equality, change, as well as diagnose the level of trust in public institutions, neighbours, foreignness and otherness. The diagnosis of innovation is also supported by information on attitudes towards work, self-employment and wealth.

All of the mentioned indicators facilitate characterization of the axiological background of innovation. They describe the normative nature of the region, as well as enable the identification of hypothetical relationships between, for example, attachment to work, family life, religious principles and innovation. It should also be noted that the content of the symbolic layer may be diagnosed in

an indirect way, i.e. using data from the results of presidential or parliamentary elections. These can lead indirectly to the socially accepted values in a region.

Stage III: Region and innovation culture – a proposal for a conceptual scheme for the analysis of the diversification of regional innovation.

The multivariate account of the region ultimately reveals a direct link to the category of innovation culture. This connection even appears to be natural and bears fruit in the form of a concrete methodological proposal. According to the adopted assumptions, the subsequent identified approaches to the concept of region are connected with particular layers of innovation culture. Three fundamental relationships can be identified in the constructed model:

Geographical territory and material layer – the region as a territory, the diagnosis of which is made by the analysis of its natural resources, natural conditions, economic properties, demonstrates a relationship with the material area of innovation culture. The region is diagnosed here not only as an area for the implementation of innovation, the measure of which is the material realization of innovation, but also as a more or less homogeneous whole, which is a system conducive to the creation, production and dissemination of *novum*. It is also a territory that can be characterized by economic indicators that describe the innovative potential of the region;

Region as a field of interaction and a social layer – region at this level of analysis is diagnosed from a social perspective, as is the innovation itself. The specific nature of regional innovation is determined by a diagnosis of the social structure, as well as social and human capital. It should also be assumed that regions differ in terms of their institutional backgrounds and prevailing habituses. They, too, are the core of the societal layer of innovation. The analysis of the societal layer allows us to ultimately expose the fact that innovation is not only a material resource of a region, but rather a function of social engagement. The measurement of regional innovation should therefore go beyond the analysis of narrow techno-economic indicators. Given the above, it should also include the postulate of social and institutional rooting of the economy (Polanyi 1957, Granovetter 1973)

Region as a social system and symbolic layer – the theme of non-material determinants of innovation exposes the third link. Region as a system is an axiologically coherent whole, having its own principle, order. It should be diagnosed at the level of adopted policies and strategies. In this perspective, the axiology of the system is of paramount importance. It allows the region to be treated as a self-referential whole, capable of endogenous development, by referring to its own principles and values. Concurrently, the regional whole can be described as a cultural and normative singularity, capable of forming specific economic orientations: pro- or anti-innovative.

The layout of the layers in the final proposed scheme (Fig. 2) is not without significance. Its extremes correspond to the distinction between the material and the normative. The middle part is to be connected to the social area. The societal layer of innovation culture, like the interactional field, seems to be a resultant of material and value-based conditioning. Consequently, it also becomes a quintessential conceptual scheme of regional differentiation of innovation cultures.

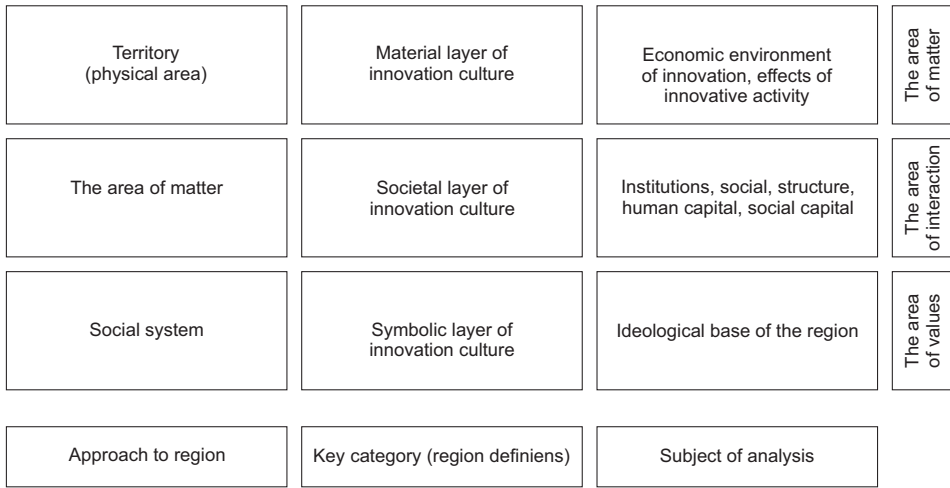


Fig. 2. A multivariate model for analysing regional variation in innovation cultures
Source: own elaboration.

The novelty character of this model must be associated primarily with the interconnection of three distinct areas of reality, expressed successively by: matter, activity and social relations, and the ideological area. Previous multivariate analyses of regional development have tended to consecrate the diagnosis of the concurrency of multiple industrial approaches in a region (Frangenheim et al. 2020). Meanwhile, the key to analysis here is the ideological and social area, which is, as it were, a bridge between the spheres of matter and symbol. Concurrently, it is important to emphasize the independence of each layer, while maintaining their ‘relational’ tendencies. The societal layer, although based on a normative foundation, cannot be reduced to ideological spheres alone, for it manifests itself in practices which, even if they need an axiological motivational background, are ultimately expressed in concrete activities. This is why the societal sphere combines rather than mixes the material and symbolic (ideological) layers.

Conclusion

A complete diagnosis of innovation requires an appropriate unit of analysis (region) and a related analytical category (culture). Linking together these concepts

leads to constructing a model that allows us to determine the level of innovation in the modern world and its territorial differentiation. Investigating innovation in accordance with that model involves reaching the content of the different layers of culture and analysing the relationship between the different layers of innovation and the region. Each of the indicated layers can be diagnosed in a quantitative way. Such an analysis consists in calculations based on listed indicators. With the above applied, it seems particularly interesting to diagnose the interactions between layers on the basis of multivariate regression. At the same time, the innovative potential of the region is determined by qualitative research. The layers of innovation culture can then be defined as follows:

- material layer – through the analysis of the traces of innovative human activity and the way they relate to the environmental conditions of the region;
- societal layer – through the characteristics of the institutional background and the method of and motivation to perform entrepreneurial roles;
- symbolic layer – through the analysis of dominant cultural and economic narratives.

The most important postulate, however, seems to be the one resulting from the presented model of multivariate analysis. It emphasises the necessity of multivariate diagnosis, focused on the analysis of interactions between the layers. It also seeks to identify the types of links between the different areas of innovation, without an aporia in terms of advantage to any of them. This finding ultimately leads to an account of innovation that is free of cognitively harmful reductionism.

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Region innowacyjności. Próba konstrukcji wielowymiarowego modelu analizy

Zarys treści: Celem artykułu jest przedstawienie nowatorskiego modelu analizy regionalnego zróżnicowania kultur innowacyjności. Dorobek badawczy socjologii w tym zakresie pozwala na identyfikację trzech nurtów analizy: materialistycznego, ideowego i społecznego. Umożliwia również wyciągnięcie wniosków na temat redukcjonizmów poznawczych wynikających z przyjęcia tylko jednej wybranej perspektywy. Temu też ma się przeciwstawić proponowany model. Ma on być konceptualną konstrukcją umożliwiającą wielowymiarową diagnozę regionalnej dywersyfikacji kultury innowacyjności. Jednocześnie eksponuje on fakt, że do określenia potencjału innowacyjności służy odpowiednia jednostka analizy (region) i związana z nią kategoria analityczna (kultura). Powiązanie ze sobą tych pojęć konstruuje model, który pozwala określić poziom innowacyjności we współczesnym świecie i jego terytorialne zróżnicowanie. Zgodnie z nim zbadanie innowacyjności polega nie tylko na dotarciu do treści poszczególnych warstw kultury, ale również obejmuje analizę relacji pomiędzy poszczególnymi warstwami nowatorstwa i regionu. Każda ze wskazanych warstw może być diagnozowana w sposób ilościowy i jakościowy. Model ten zbudowany zostanie w trzech etapach. W pierwszym skonstruowana zostanie wielowymiarowa (uwzględniająca aspekt materialny, ideowy i społeczny) jednostka analizy – region. W drugim do jednostki tej dopasowana zostanie prywatna kategoria diagnozy – kultura. Etap trzeci przyniesie finalną konstrukcję modelu.

Słowa kluczowe: region, dywersyfikacja, kultura, innowacyjność, kultura ekonomiczna