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### EVOLUTIONARY ECONOMIC GEOGRAPHY AND ITS APPLICATION IN REGIONAL RESEARCH

**Summary:** Evolutionary economic geography became popular in the late 1990s. The study has developed on the basis of evolutionary economics, which has achieved greater success in explaining phenomena in the microeconomic than in the macroeconomic sphere and it has had non-spatial character. Evolutionary economic geography is an alternative in economic geography and regional planning for static or pseudo-dynamic research. Supporters of evolutionary economic geography, by criticizing among others New Economic Geography by P. Krugman, conduct research with the use of generalized Darwinism, path dependence and complexity theory. In this paper the author discusses the basic approach and assumptions of evolutionary economic geography and its application in regional economy, especially as an answer to the search for ways out of the economic crisis of regions and cities.

**Keywords:** evolutionary approach, regional economy, path dependence, regional resilience.

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#### 1. Introduction

Evolutionary economic geography as a study based on evolutionary economics became popular in the late 1990s. In the consecutive years, further research in this area contributed to the development in this field. At the beginning of the second decade of the twenty-first century, the term “the paradigm of evolutionary economic geography” started being used [see e.g. Boschma, Martin 2010, p. 30]. However, until now this term has not been widely adopted among economic geographers and economists. Among the supporters of evolutionary economic geography the following scientists should be listed: R. Boschma, J. Essletzbichler, K. Frenken, J. Lambooy, R. Martin, P. Sunley. This trend is being developed especially by those researchers who are gathered around the Urban and Regional Research Centre of Utrecht (URU), Utrecht University, the Netherlands, and the CIRCLE (Centre for

Innovation, Research and Competence in the Learning Economy), Lund University, Sweden.<sup>1</sup> In Poland, those who refer to evolutionary economic geography or spatial planning are among others: B. Domański, R. Domański, K. Gwosdz.

Evolutionary economics seeks for an analogy between the natural world and economy. In particular Darwinism makes comparisons between market competition and the struggle for survival based on natural selection which is present in the animal world. On this basis, it explains the processes of innovation and adaptation (adaptive processes) in the economy which are spontaneous in their nature. Entrepreneurs *per se* do not search for optimal solutions but for satisfactory ones. However, in certain conditions these solutions may prove to be optimal. The mechanism of natural selection determines the growth or collapse of particular entities. Most often it results from a combination of events that occurred in the past [see more Nelson, Winter 1982].

It is worth noting that so far evolutionary economics has achieved greater success in explaining phenomena in the microeconomic than in the macroeconomic sphere [see e.g. Kwaśnicki 2014, pp. 1–17]. An attempt to use the evolutionary approach in economic geography necessitates taking into account the meso and macro levels and more importantly the aspect of spatial planning, previously absent in this approach, similarly lacking in the mainstream economics. As the evolutionary approach is better suited to the micro level rather than the macro and meso levels, the critics of this approach point out that its use could mean a return to economic geography considerations from the point of view of individual entities. Consequently, it signifies a departure from the evolving concept of examining the spatial economy from the point of view of location and other complex variables comprising the features of a particular territory.<sup>2</sup>

## 2. Basic approach and the assumptions of evolutionary economic geography

In evolutionary economics there are three basic approaches which are used by the representatives of evolutionary economic geography in the field of economic geography. These are:

- 1) generalized Darwinism,
- 2) path dependence ideas,
- 3) the complexity theory (the theory of complex adaptive systems).

Generalized Darwinism involves such concepts (derived from modern evolutionary biology) as: variety, novelty, selection, fitness, retention, mutation,

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<sup>1</sup> The authors publish in the periodical focused on this approach entitled “Papers in Evolutionary Economic Geography” issued by URU.

<sup>2</sup> Territory is defined as an area distinguished by certain characteristics; it is one of the factors of development, characterized by numerous links functional, strong interaction of unique endogenous resources, and having the ability to learn.

adaptation, fitness landscapes and hysteresis. The theory of path dependence primarily takes into account the role of contingency and self-reinforcing (autocatalytic) dynamics, branching, “lock-in” by increasing returns (network externality), effects and path creation. On the other hand, the complexity theory is based on the complex “far-from-equilibrium” adaptive systems, it uses such concepts as emergence, self-organization or adaptation [Boschma, Martin 2010, p. 7].

Both in economics and economic geography, the first two approaches are relatively popular and the third is the least likely to be considered because of the difficulty in applying the holistic complexity (the formulation of universal principles and rights) [Taylor 2010, p. 632]. In the recent years using the dependence path approach is particularly popular among economic geographers and other researchers of spatial economy.

The concept of path dependence may be understood in a broad or narrow sense. In a wider context, it may be summed up with the general statement that “history has a meaning”, i.e. using this concept, we evaluate the impact of historical events and their sequence (including the choices) for the direction and pace of the present development of the examined entity. However, in the narrow sense, the path dependence occurs only when contingent events (unforeseen historical events) result in the cause and effect transformation which are difficult to change (nearly irreversible), caused by the mechanisms of deterministic characteristics [see: Mahoney 2000, pp. 507–548; Domański 2008, pp. 48–49; Gwosdz 2014, pp. 2–3].

In the approach based on path dependence, three basic conceptions have developed; in each of them the path dependence is understood in a different way. This concerns mainly the possibility of achieving economic equilibrium. These concepts are [Martin, Sunley 2010, pp. 73–75]:

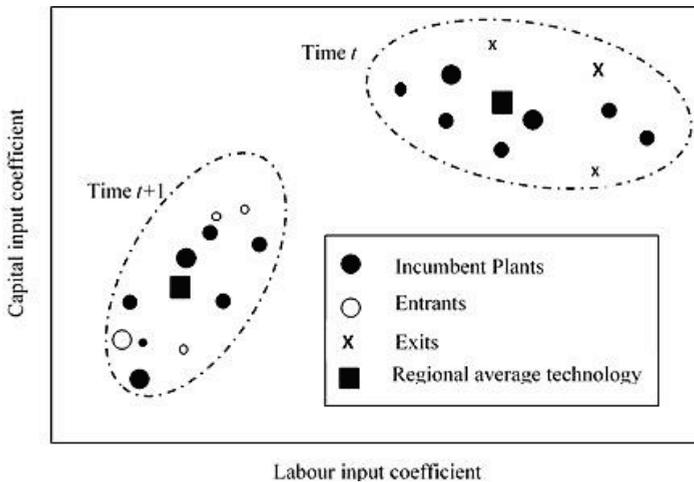
1) The David-type conception: dependence on the path is a historically random choice; there are many possible outcomes when the economy reaches equilibrium [see more: David 1985, pp. 332–337; 1988; 2001, pp. 15–40; 2005, pp. 151–194].

2) The Setterfield-type conception: processes path dependence lead to “temporary equilibrium.” Subsequently, there is endogenous growth based on innovation and the economy moves away from the equilibrium [Setterfield 1997b, pp. 47–76; 1997a; 2001, pp. 107–112].

3) According to the third type, the so-called an open, non-equilibrium-type conception (described by R. Martin and P. Sunley), the dependence on the path is open, dynamic historical process in which the economy (companies, institutions, technologies, sectors) evolves along the trajectory; this approach does not seek to achieve equilibrium.

In line with the approach of generalized Darwinism, e.g. in the study on the competition in regions, one should consider first and foremost the principles of differentiation, selection and continuity. The structure and economic landscape of the region depend on the nature of the competition between entities located in a region and beyond, interacting with the system of competitive forces in a region.

Cognition of the developmental trajectory of a region is possible through the study of the evolution of a population of entities in a region [Essletzbichler, Rigby 2010, p. 50]. Attempts to apply this approach to the analysis of the changes in the economic landscape of a region were made by the following researchers who took technological progress into consideration, among others: J. Essletzbichler and D.L. Rigby (see Figure 1 and 2). Figure 1 shows schematic evolution of the economic landscape within a region and Figure 2 shows the trajectories of development based on technologies of two different model regions.



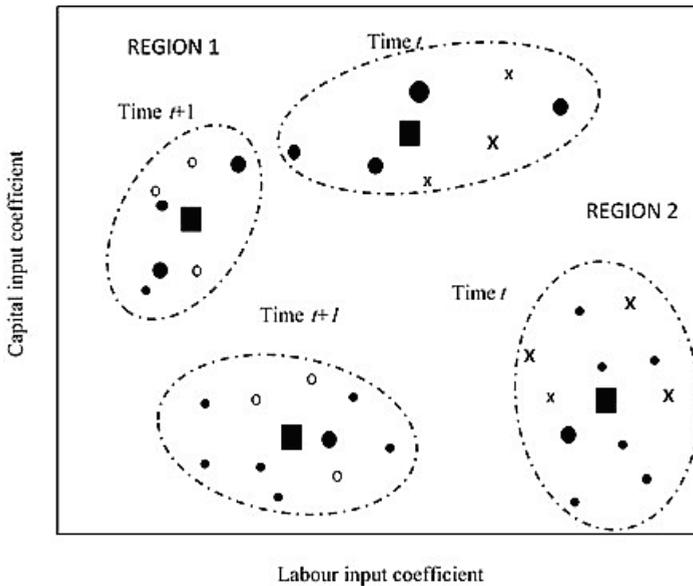
**Figure 1.** Schematic evolution of the economic landscape within a region

Source: Essletzbichler, Rigby [2010, p. 50].

The approach which is based on the idea of a comprehensive adaptive system, as already mentioned, is relatively rarely used to study the evolution (growth and transformation) of the economic landscape [see e.g.: Martin, Sunley 2007, pp. 573–602; 2010, pp. 62–92]. Complexity theory examines open systems and their interaction with the dynamic environment remaining outside the state of equilibrium. Within these schemes, however, there comes to the formation of some internal order – self-organization of the structure [Boschma, Martin 2010, p. 9].

The features distinguishing evolutionary economic geography borrowed from evolutionary economics are [Taylor 2010, p. 4; Kwaśnicki 2014, pp. 3–4]:

- the study of dynamic phenomena (historical perspective; the causes of the current effects are sought for in past events – especially unusual events);
- the analysis of the processes in the state which is far from the equilibrium (the analysis of the equilibrium is also possible, but in reality, it rarely takes place);
- the use of a selection mechanism in the study of spontaneous economic processes;
- both quantitative and qualitative research;



**Figure 2.** Diagram of the evolution of the economic landscape with the use of technological advances in two different regions – along two different trajectories

Source: Essletzbichler, Rigby [2010, p. 53].

- taking into account the heterogeneity of the behavior of economic entities;
- the existence of hereditary information (transmitted in the form of knowledge);
- macroeconomic approach based on the aggregation of actions taken at the microeconomic level;
- the so-called “vision of the population” on economic phenomena and processes (perception of them as an aggregated set of coupled entities and other elements);
- examination of the past, irreversible processes which affect the present and the future;
- examination of the so-called novelty (innovation, new entities, new businesses, new networks, etc.) as a source of structural changes.

### 3. Evolutionary economic geography as an answer to the search for ways out of the economic crisis of regions and cities

Evolutionary approach gained new followers during the global financial crisis which started in 2006 in the United States. The crisis rippled into the economic collapse in various countries and regions, including Europe, in subsequent years. In this context one began to seek the new ways of explaining this type of situations theoretically,

and above all – new methods of overcoming the crisis and preventing its development in the future. Evolutionary economic geography offers new tools for research which are based on the analysis of past events.

Many researchers observe that today it is difficult to speak, in the universal way, of regional development and especially of the groups of factors determining this process. Thus, in the studies it becomes purposeful to use regional approaches depending on the individual path. This approach should provide the view from the perspective of local development trajectory resigning from the evaluation of some regions against other ones and the assessment of processes globally [Domański 2008, pp. 47–48]. Table 1 shows the four categories of development trajectories in regions.

**Table 1.** Typology of developmental trajectories of regions dependent on the path

Results	Dominant mechanism	
	Self-reinforcing	Reactive
Negative	Entrapment in the path (lock-in)	The fall of the previous dynamic features
Positive	Cumulative increase	New path

Source: Domański [2008, p. 50].

Developmental trajectories of regions shown in Table 1 are divided into four categories considering the type of the process of path dependence (self-reinforcing growth or development as a result of a reactive sequence of cause and effect relationships between consecutive events) and the majority of effects which this process causes (positive or negative). Consequently, there are four possible situations:

- 1) cumulative growth,
- 2) the transition to the new path,
- 3) entrapment in the existing path (lock-in),
- 4) the collapse of the previous dynamic features.

At the end of the first decade of the twenty-first century, there is also the concept of regional and urban resilience. There is no single generally accepted definition of resilience in economic or social sciences. J. Simmie and R. Martin define resilience as “the ability of a system (...) to return to a pre-existing stable or equilibrium state or to move quickly to a new one” [Simmie, Martin 2010, p. 28]. They distinguish resilience as such and economic resilience. They insist that it consists in how a local or regional economy responds to, copes with or adapts to various types of shocks caused by such phenomena as economic recession, natural disasters, unforeseen liquidation of plants, etc. [Simmie, Martin 2010, p. 27]. The way of dealing with the above-mentioned interferences shows the development and evolution of the economy. However, what is important is not just the response to the shock but also the ability of the economy and society to function flexibly in uncertainty. Resilience in the wide sense also embraces the ability of capitalization on opportunities which may appear

in the future [Drobniak 2013, p. 206]. This concept uses an evolutionary approach, including the adaptability of systems and path dependence. The results of analyses with the concept of regional and urban resilience may also be useful in modern research of economies and regional structures.

## 4. Conclusions

The primary determinant of the development of spatial units is innovation. In contemporary economic geography one seeks the sources of innovation in the neoschumpeterian trend, which rests on the theory of evolution, neo-institutional economics and the resource-based theory. In line with this approach, the development takes place through the “shock” connected with the emergence of innovation in selective environments such as markets, institutions or regions. The second common approach, the so-called “School of Sussex” puts more emphasis on the technologies themselves than entities (e.g. innovative enterprises) [Lambooy 2008, p. 298]. The first of the indicated angles provides relatively large capabilities for research on the development and the transformation of regional structures. Evolutionary economic geography is the example of its use.

Evolutionary economic geography is an alternative in economic geography and regional planning for static or pseudo-dynamic research. On the other hand, it is criticized among others due to the departure from the consideration of space as a competitive territory for research of individual entities which should be reflected in the action of discovering the principles of creating time-varying economic landscape of regions. Critics also point out that in this concept the importance of past events is overrated, for instance by focusing on the events of the past that were not essential for further development or belittling the importance of the impact of present external factors.

In evolutionary economic geography one does not formulate generally applicable laws or assertions; therefore, it does not aspire to become a scientific theory or the basis of a model. It does not lead to extracting a universal set of variables which would determine the development or construction of general hypotheses [Rončević 2008, pp. 182–183]. It is possible, however, that such an individualized approach of explaining phenomena and the processes occurring in specific regional economies may be most useful in turbulent and complicated modern world economy.

Supporters of evolutionary economic geography, by criticizing among others New Economic Geography by P. Krugman, conduct further research by means of generalized Darwinism, path dependence and complexity theory. The evolutionary take on this is useful in explaining the mechanism of structural change, growth and regional development, dynamic competitive advantages as well as notions of the geography of technological progress [Taylor 2010, p. 629]. The further step is to apply the concept of evolutionary development to analyze the regional and urban

resilience [see e.g.: Simmie, Martin 2010, pp. 27–43; Boschma 2014, pp. 1–27]. Another interesting direction is the study of the evolution of innovation networks, including the search for answers to the question: What are the relationships between different proximity dimensions (cognitive, organizational, institutional, social, geographical) and path dependence in the spatial evolution of the network [see e.g. Boschma, Frenken 2010, pp. 120–135].

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## EWOLUCYJNA GEOGRAFIA EKONOMICZNA I JEJ ZASTOSOWANIE W BADANIACH REGIONALNYCH

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**Streszczenie:** Ewolucyjna geografia ekonomiczna zyskała popularność pod koniec lat 90. XX wieku. Kierunek ten wyrósł z ekonomii ewolucyjnej. Ekonomia ewolucyjna osiąga większe sukcesy przy wyjaśnianiu zjawisk na poziomie mikroekonomicznym niż makroekonomicznym oraz ma charakter aprzestrzenny. Ewolucyjna geografia ekonomiczna jest alternatywą w geografii ekonomicznej i gospodarce przestrzennej dla badań statycznych lub pseudodynamicznych. Zwolennicy ewolucyjnej geografii ekonomicznej, krytykując m.in. Nową Geografię Ekonomiczną P. Krugmana, prowadzą badania z wykorzystaniem uogólnionego darwinizmu, zależności od ścieżki oraz teorii zależności. W artykule autor omawia podstawowe podejścia i założenia ewolucyjnej geografii ekonomicznej oraz jej zastosowanie w gospodarce regionalnej, w szczególności jako odpowiedź na poszukiwanie dróg wyjścia z kryzysu gospodarczego regionów i miast.

**Słowa kluczowe:** podejście ewolucyjne, gospodarka regionalna, zależność od ścieżki, prężność regionalna.