



Institut für Volkswirtschaftslehre

Universität Augsburg

Volkswirtschaftliche Diskussionsreihe

Preparing for the Future
The OECD-Countries in Comparison

Horst Hanusch, Yasushi Hara

Beitrag Nr. 331, November 2016

Preparing for the Future

The OECD-Countries in Comparison

Horst Hanusch

Institute of Economics, University of Augsburg, Augsburg

Yasushi Hara

Institute of Innovation Research, Hitotsubashi University, Tokyo

Abstract

In modern growth or development theory innovation is a crucial factor which pushes the dynamics of an economy and determines its success in the future. Out of innovations, created in the presence, the potentials for the future of a country are prepared, deciding how its economic fitness and competitiveness will emerge. So, future-orientation is in a natural way connected with innovativeness of a firm, a region or a country and shapes the strength and the specifics of the process of development.

Looking around the world economy, one can observe a variety of countries which exist at different levels of development. Each of them has to master its economic future, choosing an own specific development strategy. How the various countries, belonging to different continents and cultures, will succeed in this endeavor is surely one of the most exciting and important issues of coming decades.

In this global context our study is focusing on “future preparedness” of a specific group of countries, the so called OECD- countries. The origin of this group dates back to 1960, when 18 European countries and the United States as well as Canada created in Paris an organization dedicated to global development. Today the group consists of 34 member countries which span the globe from North to South America, to Europe and the Asia-Pacific region. They include many of the world’s most advanced countries but also emerging ones like Mexico, Chile and Turkey.

The concept of “future preparedness” gets its analytical and empirical relevance when it is placed and investigated within a specific development model. Such a model determines the theoretical basis of the study and provides the necessary ingredients for an empirical application.

In our study we will use “Comprehensive Neo-Schumpeterian Economics” (CNSE) as an analytical framework (Hanusch and Pyka, 2007). This approach is based (a)

on the notion of future-orientation penetrating all spheres of socio-economic life in developed as well as in developing countries; (b) on the principle of innovation as the main driving force and the engine of future-orientation and development.

Based on the concept of CNSE the central aim of our study is to gain new insights and findings concerning the “future preparedness” of the OECD-countries. To meet this target we (a) rely on the notion of “future-orientation” as a basic prerequisite for being prepared to master the future; (b) try to bring this concept of “future preparedness” on a concrete basis by using indicator analysis embedded in the framework of CNSE; (c) investigate patterns of similarities in the set of indicators; (d) show how these patterns look like by applying cluster analysis; (e) draw some conclusions from the patterns concerning the status and variety of future-orientation in the group of OECD-countries.

Future-orientation will be described and characterized in total by 45 indicators, focusing on the real (16), the public (21) and the financial sector (08) of an economy. The indicators reflect many different activities in the various countries related to innovation and the “emerging future” within the concept of CNSE. Dependent on data availability, the indicator sets comprise different years mainly in the period between 2006 and 2012.

Keywords

Development Models, Neo-Schumpeterian Economics, Indicator Analysis, Future-Oriented Country Analysis (FCA)

JEL Classification N 10, P00, O10

Preparing for the Future*

The OECD-Countries in Comparison

1. Introduction

In modern growth or development theory innovation is a crucial factor which pushes the dynamics of an economy and determines its success in the future. Out of innovations, created in the present, the potentials for the future of an economy are prepared, deciding how its economic fitness and competitiveness will emerge. So, “future preparedness” is in a natural way connected with innovativeness of a firm, a region or a country and shapes the strength and the specifics of the process of development.

Looking around the world economy, one can observe a variety of countries which exist at different levels of development. Each of them has to master its economic future, choosing an own specific development strategy. How the various countries, belonging to different continents and cultures, will succeed in this endeavor is surely one of the most exciting and important issues of coming decades.

In this global context our study is focusing on “future preparedness” of a specific group of countries, the so called OECD- countries. The origin of this group dates back to 1960, when 18 European countries and the United States as well as Canada created in Paris an organization dedicated to global development. Today the group consists of 34 member countries which span the globe from North to South America, to Europe and the Asia-Pacific region. They include many of the world’s most advanced countries but also emerging ones like Mexico, Chile and Turkey.

The concept of “future preparedness” gets its analytical and empirical relevance when it is placed and investigated within a specific development model. Such a model determines the theoretical basis of the study and provides the necessary ingredients for an empirical application.

In our study we will use “Comprehensive Neo-Schumpeterian Economics” (CNSE) as an analytical framework (Hanusch and Pyka, 2007a). This approach is based (a) on the notion of future-orientation penetrating all spheres of socio-economic life in developed as well as in developing countries; (b) on the principle of innovation as the main driving force and the engine of future-orientation and development.

We will see that CNSE is able to provide the conceptual framework for studying and picturing the future-oriented features for the OECD-countries. In such a framework

economic agents as well as political institutions have to be open to the future, characterized by discontinuous dynamics driven by novelties in all fields of the socio-economic system which include a permanent influx of change and transformation in an economy. So, at any time there exists in the economy a potential of futuristic occurrences, of issues related to time to come. In total that situation may be described as a nation's "emerging future". It can be influenced or even determined by creating and shaping the future-orientation or its preparedness for future events embodied in the process of development. In this way, a kind of "future resilience" is build up which may provide a certain surveyor's rod to get an idea about the ability of a country to master the challenges and/or to harvest the opportunities which will happen in coming times.

In other words, to get a good depiction of a country's readiness to cope with its economic future questions like the following have to be asked: How do countries handle their economic future? Does there exist a certain pattern of future preparedness in different countries? Can specific similarities or dissimilarities between single countries be observed and satisfactorily explained?

To answer these questions for the group of OECD-countries a "Future-Oriented Country Analysis" (FCA) is carried out. For such an analysis certain procedural steps have to be followed: (a) bringing the concept of "future preparedness" on a concrete basis by using indicator analysis embedded in the framework of CNSE; (b) investigating patterns of similarities in the set of indicators; (c) showing how these patterns look like by applying cluster analysis; (d) drawing some conclusions from the patterns concerning the status and variety of "future preparedness" in the group of OECD-countries.

"Future preparedness" in our FCA study will be described and characterized in total by 45 indicators, focusing on the real (16), the public (21) and the financial sector (08). The indicators reflect many different activities in the various countries related to innovation and the "emerging future" within the concept of CNSE. Dependent on data availability, the indicator sets comprise different years mainly in the period between 2006 and 2012.

In the succeeding we will proceed as follows.

At first, we will shortly discuss the Neoclassical and the Schumpeterian approaches which represent the main types of growth and development models in the literature. This discussion gives us the theoretical background for deciding which one shall be used as the analytical frame for our indicator analysis. We will come to the conclusion that Comprehensive Neo-Schumpeterian Economics (CNSE) is the right conceptual frame. The next section incorporates the main part of our study, namely the indicator based empirical investigation of "future preparedness" of the OECD countries, using the framework of CNSE. The results of the study are shown and discussed in the following section. At the end some concluding remarks will be drawn.

2. Theoretical Background

Neoclassical economics offers an easily understandable description of an economy if you look out for a theoretical background to exercise an empirical study. In this approach at the micro-level agents act as "homines oeconomici" characterized by perfect rationality. That

means they have full information concerning the current situation of their decisions and they build up rational expectations with respect to future events. Under these circumstances they are able to allocate their resources in such an optimal way that individual utility or profit is maximized according to existing restrictions.

The shift from micro- to macroeconomics is also a relatively simple one. All the results on the micro level of an economy, determined by rational behavior, are aggregated to a macro level using the representative household or firm as a congenial transformation concept.

In this theoretical frame, however, problems arise as soon as changes in the fundamental assumptions are made in order to picture the functioning of an economy in a more realistic manner. Time, for instance, is a crucial element in explaining the dynamics of an economy. As long as time is handled as a mathematical category, no difficulties arise in the perfect neo-classical world. Even long lasting processes can easily be followed on the development path until a steady state equilibrium is reached. Traditional growth theory is full of explanations for this result. Primarily it is determined by defining technological progress as an external phenomenon, falling like “manna from heaven”, and through decreasing marginal factor productivities. Even “new growth theory” - which brought revolutionary insights into the orthodox neoclassical explanation of growth by introducing innovative activities and their feedback effects - still is bound to argue in a concept of general equilibrium as long as time is interpreted in a mathematical sense using a neoclassical frame.

Analysis and explanation of reality are changing fundamentally, however, if time is characterized in a historical perspective. Then, growth and development shine up as a “complex process of evolution and transformation, rather than a simple transition along a steady state growth path” (Castellacci, 2004). The determining factors of such an evolutionary process are change and the pursuit of novelty. Both are creating the basis of a future-oriented development which is characterized by true uncertainty in a non-perfect world.

One of the first economists who focused on these essential features of a capitalistic economy was Joseph A. Schumpeter. In his famous book “Theory of Economic Development” (1912) he revealed the role of innovations and risk taking entrepreneurs as main driving forces of economic development in a historical time perspective. After a long period of intellectual ignorance, Schumpeter’s approach gained growing importance in literature in the last four decades as Neo-Schumpeterian Economics (NSE). NSE builds up on traditional Schumpeterian thinking, improved by stressing besides quantitative aspects also qualitative growth factors and processes based on formal or informal networks as well as collaborations between firms, governments, universities and research institutions (Saviotti and Pyka, 2004). In the literature you may also find the denotations network (cluster) model, Silicon Valley or eco-system model (Wallace, 2013).

The growth path in NSE is characterized by unbalanced dynamics combined with processes of catching up, falling back, forging ahead and leap-frogging. There exists no continuous growth process ending in a long term equilibrium. Growth is characterized by punctuated equilibria, induced by structural change or socio-economic transformations having their origins in marginal as well as disruptive innovations primarily in the technological field.

However, NSE in its present shape is still far from offering an integral theory of economic

development. Most of the research in NSE of the last decades has primarily concentrated on the real sphere of an economy (Hanusch and Pyka, 2007b). Technological innovations propelling industry dynamics and economic growth obviously are a major source of economic development. But, technological innovations are not the only driving force, nor can industry development occur in a vacuum. Instead, development is accompanied and influenced by novelty and change shaping also the monetary realms of an economy as well as the public sector.

In such an institutional setting “Comprehensive Neo-Schumpeterian Economics” (CNSE) (Hanusch and Pyka, 2007a) gains its special importance and relevance as a future-oriented theoretical concept. CNSE is based on the traditional Schumpeterian model and also on the Neo-Schumpeterian one. The most important feature of CNSE, however, is the idea of institutional relevance in the process of development, stressing besides the real sector also the financial and the public sphere of a socio-economic system. These are the decisive pillars of future-oriented dynamics causing in a co-evolutionary manner quantitative growth and qualitative transformations of economies. Novelties then occur in various and multifaceted forms, which embrace technological, institutional and organizational as well as ecological and social dimensions.

3. Conceptual Frame of the Study: Comprehensive Neo-Schumpeterian Economics (CNSE)

The central aim of our study is to gain new insights and findings concerning the “future preparedness” of OECD countries. In which way and to what degree are the different OECD countries prepared to master their economic future? Does there exist a certain pattern of future-orientation? Can specific similarities or dissimilarities between single countries be observed?

To answer these questions we will use a conceptual frame which is based on Schumpeterian thinking in the sense of CNSE. Future in this analytical context has a historical time dimension, it is open to “creative destruction”, to permanent changes and unexpected events. It thus incorporates true uncertainty as a central element of development. This is the case for all three pillars of an economy, the real sector as well as the financial and public sphere. The development process of an economy is not limited to one of these sectors, but it takes place in a comprehensive, co-evolutionary manner in all of them. This is made possible by creating and disseminating an enduring flow of novelties in each of the three institutional entities of an economy. This kind of an “innovation fabric”, however, needs preparatory elements, i.e. certain activities in each of the sectors and specific institutional relationships between them to keep the co-evolutionary development alive and strengthen it.

For instance, to be prepared for an uncertain future the real sector needs a “format of resilience” which will foster at all times the knowledge-oriented progress and the resulting wealth of an economy. This is attained primarily through innovation and parallel investments.

The financial sector, on the other hand, can do its best for the future of an economy if it strengthens this “resilience” of the real economy by engaging in a close almost symbiotic relationship. That means, its foremost task would be to establish a sound financial basis in order to accompany successfully individuals and companies in their future-oriented

activities and to encourage their innovative projects and activities. This could even be done out of speculative motivations.

The governmental and political responsibilities in a co-evolutionary development lie, above all, in monitoring and controlling the future-oriented, long term relationship between the real and financial sector and, if necessary, to support the co-evolutionary process through specific budgetary and institutional means. On the expenditure side of the budget these are above all investments in education, health, infrastructure as well as in science and research. All in all, the public sector has to fulfill, more or less, the role of an “entrepreneurial state” (Mazzucato, 2013).

What consequences have to be drawn from these considerations for our indicator analysis?

We will have to find the right indicators which mirror empirically, on the one side, the evolutionary “innovation fabric” of a country and which picture, on the other side, the related co-evolutionary processes. That means, our primary task is to find indicators expressing the forces and elements of a CNSE-driven development. This challenge has to be met for each of the three pillars of the socio-economic system. Then, using cluster analysis, the pattern of similarities or dissimilarities, i.e. the variety of being prepared for the future, can be detected in the case of OECD countries. To point it out clearly, it isn’t the primary goal of our study to create a ranking system with respect to future orientation of different countries.

4. Indicator Analysis Based on the Concept of CNSE

4.1. Data Set

Our study is based on a comprehensive set of indicators which corresponds with the CNSE concept. That means the data we draw upon are supposed to reflect activities entailing future oriented characteristics for the real, the financial and the public sector.

In total 45 indicators have been calculated for the 34 OECD countries listed in the appendix. The indicators used originate from various sources, the most important one being the the World Bank’s Open Data Base, especially its Main Science and Technology Statistics and its Educational Data Base. From these three data samples, for instance patent statistics, R&D expenditure data as well as several indicators of national education systems and of qualification structures of national work forces have been extracted. Further main data sources used are the Global Competitive Report published by the World Economic Forum and the Market Line Data Base. We also used the OECD data base for demographic, internet and education related figures. See appendix for details.

In dealing with the significance of the circulated data for the indicators in each pillar, we use the Friedman test to check the independence of indicators (Friedman, 1937). As the data is summarized on a national level, a non-parametric test has been selected, and through this process non-significant indicators have been discarded. The indicator set listed in the Appendix is the set which rejects the null hypothesis. That means, the indicators reflect the comprehensive sphere of the three pillars of the CNSE concept.

4.2. Indicator Sets for the Three Institutional Pillars: Real, Financial, Public Sector

The crucial feature of the **real sector** in a CNSE concept is its orientation towards the future, based on innovation and change. In order to comprise these dimensions structurally as well as from a process perspective the indicators used encompass three categories of characteristics:

- a) “Structural characteristics”, like “ease of doing business”, “foreign direct investment” or “brain drain”
- b) “Technological characteristics”, like “high technology exports” or “availability of newest technology”
- c) Characteristics concerning “research and development” as a prerequisite of innovation, like “business spending on R&D” or “researchers in R&D”

Under the category “technological characteristics” we subsumed also indicators dealing with digitalization (internet users). This new revolutionary technology will influence all spheres of human life in the near future. In the eyes of some economists it is even comparable with the first industrial revolution more than two hundred years ago (Brynjolfsson and Mc Afee, 2014).

For the **financial sector** we only have two categories, one for the “general finance situation”, having in mind the soundness of the financial system, and the other for the “relationship between the real and the financial sector”. Here we subsumed indicators like “availability of financial services” or “venture capital availability”. These categories are of fundamental importance in the co-evolutionary process of an economy driven by innovations.

Unfortunately we were not able to find data for all OECD countries concerning digitalization in the financial sector. In this sector processes of using IT-technology have already revolutionized the system and they will continue to do so in the future (Dapp, 2014).

The indicator set for the **public sector** consists of five categories:

The first one comprises “general characteristics” which may illustrate the political atmosphere in a country, either in favor or against innovativeness and future orientation. These indicators focus on institutional and legal as well as demographic conditions.

Categories 2, 3, 4, and 5 concentrate on the expenditure side of the budget and stress four government activities which are crucial for a future oriented development:

- a) Education,
- b) Science, Research and Development,
- c) Health and
- d) Infrastructure

In the literature on innovation economics the “education system” is considered as a fundamental basis for preparing individuals to cope with the future and its unforeseen events. Cognitive skills can account for growth differences in various OECD countries (Hanushek and Woessmann, 2010). So we tried to find as many data as possible to encompass the education sector of the OECD countries from a quantitative as well as qualitative perspective.

Not far less important for a future oriented governing of an economy is “science, research and development” financed and augmented by the public sector. Here, the main programs of technology policy find their expression in quantitative indicators like “research and development expenditures” or in qualitative indicators like “quality of scientific research institutions”.

Concerning the category “health” some economists see in this field even the new upcoming 6th Kondratieff cycle (Nefiodow, 2014).

In modern growth theory either of Neo Classical or Schumpeterian origin the physical infrastructure always plays a relevant role for explaining the development processes of an economy (Romp and De Haan, 2007). Without a well established infrastructure (Streets, railroads, ports, internet) an economy can't compete in the global economic contest. That is why we used indicators for infrastructure also to characterize a countries " preparedness for the future".

In addition, we also found some data concerning "digital government" for all OECD countries.

4.3. Cluster Analysis to Detect Similarities

The indicator approach will be used in combination with the cluster analysis (see e.g. Jobson, 1992). Target of the cluster analysis is to detect cross-national (dis-) similarities in the structure and composition of a socio-economic system, focusing on future-orientation.

The general rationale behind the cluster analysis as an analytical tool is to test a sample of variables for the degree of structural commonalities between the units of analysis. Its outcome is a categorization of the analyzed units so that the coherence of each group (or cluster) as well as the heterogeneity across different clusters is maximized. To determine the coherence of a certain cluster and to calculate the existing diversity of different clusters, distance values between the units of analysis need to be determined on the basis of the characteristics of each entity. In other words, "cluster analysis is a set of tools for building groups (clusters) from multivariate data objects. The aim is to construct groups with homogeneous properties out of heterogeneous large samples. The group should be as homogeneous as possible and the differences among various groups as large as possible" (Härdle and Simar, 2007).

A simple outline of a cluster analysis could be the following: At the beginning, each country is treated as an individual cluster, and a so called "distance-matrix" is created according to the used attributes. Subsequently, those clusters of countries which display the least distance to each other are assigned to a new cluster. Again, the distance between the countries is measured and a new "distance-matrix" is created. This sequence is repeated until only one cluster remains.

To identify clusters, statistical standardization has been applied for every indicator as follows: (1) equalize and standardize (convert to [-1 to 1] score) for each indicator, (2) execute cluster analysis using the Wald-method for each pillar and (3) use the elbow-method to identify the step where the distance makes a bigger jump and in this way determine the ideal or most effective number of clusters.

With the help of the elbow rule, we identified that the real sector pillar consists of 5 clusters, the financial sector pillar contains 4 clusters and the public sector pillar embodies 5 clusters.

5. Empirical Results

A first general result states that looking at the three constitutional pillars of an economy the OECD countries are quite diversified. The real and the public pillar encompass five clusters followed by the financial sector with four groupings. In a worldwide perspective there exists quite a dissimilarity concerning the different sectors with respect to its "preparedness for the future".

However, this diversity has to be seen as a relative phenomenon. The real sector, for instance, consists of two large clusters 2 and 4 containing nine and thirteen member states, and three small clusters 1, 3, 5 which embrace not more than five OECD countries.

Cluster 1 includes the advanced countries Australia, Canada, Norway and New Zealand. If there is a common feature which may characterize their economies, it is the dependency on winning and exporting natural resources.

The larger cluster 2 is formed mainly by smaller industrial economies from Europe supplemented by Israel. The size of the country as well its status of development seems to play a crucial role in the configuration of its “future preparedness”.

Cluster 3 comprises the two English-speaking (Ireland, United Kingdom) or French-speaking (France or Belgium) countries from Europe added by South Korea.

The large cluster 4 shows a mixture of emerging countries from Europe, which in former times belonged to the COMMECON, as well as developing economies from South America (Chile, Mexico). Turkey is also part of this cluster. Surprisingly, the advanced economies of the Mediterranean region (Greece, Italy, Portugal, Spain) join this cluster of emerging countries. As older member states of the European Union and the Eurozone one wouldn't expect them in a cluster together with catching up economies.

Of certain interest is also cluster 5 which embraces Germany, Japan and the United States. These countries are the largest, internationally oriented economies in the OECD sample and apparently they are choosing similar strategies in the real sector to be prepared for the future.

A similar picture as the one for the real sector shows up in the financial pillar where cluster 1 encloses sixteen and cluster 2 thirteen member states. Cluster 3, in contrast, is limited to four countries and cluster 4 consists only of one economy, namely the United States. This configuration of clusters may confirm the conjecture that, on the one hand, large geographical parts of the global financial system have a similar pattern with regard to future orientation and the augmenting co-evolutionary processes between the real and the financial sector based on them.

On the other hand, a small number of countries is quite different compared to the large two clusters. There is the mighty United States which dominates the world of finance with its center New York and its global hub of risk capital, the Silicon Valley, where the two sides of an innovation-oriented co-evolutionary process are brought together, the technological and the financial sphere of an economy. Besides, the United Kingdom with London as a worldwide operating financial center, Japan with Tokyo, Germany with Frankfurt and France with Paris are the other global financial players. These four countries form an own future oriented cluster in the OECD sample.

A comparable picture shows up for the public sector. Here, even twenty countries form a joint cluster 1 comprising countries across the globe, from the Pacific region (Australia, New Zealand) to all parts of Europe ranging from Austria and Switzerland to Iceland. Israel in the Near East is as well included as Japan and Korea in Asia. All over the world many economies rely on a similar institutional setting which might be called the traditional one giving the public sector a certain influence and role to shape an economy's “preparedness for the future”.

Of some interest is also the fact that Mexico and Chile constitute an own South American cluster 2 which is joined by Turkey. These three emerging countries seem to look out for an own way in solving future oriented problems, different from the traditional public sector approach.

Clusters 3 and 4 are mixed ones where countries from Central East Europe are together with economies from the Mediterranean region, Portugal in cluster 3 and Italy and Greece in cluster 4. This situation mirrors the one in the real sector: Italy, Greece and Portugal, three established member states of the European Union, participate in clusters which are formed by countries still struggling to leave behind the political boundaries and economic impediments of the former UDSSR.

The US builds an own cluster. This is not surprising because many of those future oriented activities which our study is assigning to the public sector are part of the private market sector in the United States. The public sector there doesn't play such an important role as in other countries in Europe or Asia. That means, the co-evolutionary process in preparing for the future induced and controlled by the public sector exhibits an own specific character in the US.

Another interesting result illustrates that there exist groups of countries which depict a high degree of similarity in all three sectors. Their "National Innovation Systems" conduct more or less the same components and characteristics. These country groups are:

- a) Austria, Finland, Denmark, Israel, Luxembourg, Netherlands, Sweden, Switzerland
- b) Australia, Canada, New Zealand, Norway
- c) Greece, Italy, Hungary, Poland
- d) Mexico, Turkey
- e) France, United Kingdom,
- f) Germany, Japan

The first group is a large one containing smaller advanced countries from Europe together with Israel. A simple explanation why these countries are staying so close together might be the size of their economies as well as their special quest to keep up with larger competitors in the global economic contest.

The second group is the one which we already know from the real sector. Perhaps, it's their dependency on national resources which shapes not only the real sector but their whole institutional setting in preparing for the future.

The third group is a mixed one consisting of countries from Central East and Southern Europe. Evidently, the new EU member states Hungary and Poland succeeded already in building up a "National Innovation System" which is similar to that of the older members Greece and Italy.

Mexico and Turkey also form a similar institutional configuration with respect to their sectors' ability to form future events. Both are very dynamic emerging countries which act as a kind of connecting bridge between the Protestant North and the Catholic South America, in the first case, and between Christian Europe and the Islamic Near and Middle East in the second case.

France and the United Kingdom are two major well established countries in the EU. In the time period under study they exhibit similar characteristics for all three sectors. This illustrates a closeness which might be derived from their specific role both countries played in the history of the 20th century.

Of special interest is also the result with respect to Germany and Japan. Both are in similar clusters in the real, the financial as well as the public sector. Both experienced a comparable economic history after World War II. They had to build up their economies

from scratch and were able to ascend into front positions of the world economy. In the time period of our study their preparedness for future developments reveals more or less the same pattern.

6. Conclusion

The study has shown that CNSE can serve as an analytical frame for investigating empirically the “preparedness for future” of OECD countries. In the last ten years or so statistical sources were published which allow an international comparison based on indicators of innovativeness of future orientation. Such studies, however, can be exercised only for a time span of the last eight years. If we wanted to include more time periods in order to get a dynamic analysis picturing the process of future orientation over time we would have to wait for the coming years and the statistics offered then. At the moment, because of the data situation, a study of future orientation of countries (FCA) can show only a kind of snapshot for the OECD member states.

But, even this snapshot may deliver a number of insights and findings. For instance, an interesting result is the outstanding role of the US in the OECD sample. With respect to the financial and the public pillar it forms an own cluster.

Another interesting result is that Germany and Japan belong to the same cluster for all institutional pillars. Or, none of the countries entering the EU in 2004 or later belongs to clusters where the majority of established EU members are situated. A remarkable exception in that respect are the Mediterranean countries – Greece, Italy, Portugal and Spain – which seem to have more in common with emerging countries from Central Eastern Europe or other parts of the world concerning their “preparedness for future” than with the established industrial nations.

Besides the date of the EU-membership accession and the former socialist status of countries, also the size of an economy seems to play a crucial role, forming a relatively large homogenous country grouping with respect to future orientation.

If cohesion or catching up are relevant objectives for the future development of the world economy from where and in which way should processes start and be established to reach such global ends? Which role may the different institutional pillars play in a process of harmonization based on innovativeness and its consequences for improving economically? Should a country concentrate, first of all, on the real or better on the financial or preferably on the public sector as the primary institutional or structural candidates for its economic development? Is it still or again the real sector with its industrial production processes or is it the financial sector integrated in a globalized digital world which creates the dynamic impulses for progress and wealth? How does an “entrepreneurial state” fit into a future oriented co-evolutionary development process? Should he become a main player or should he stay back and allow the other sectors to work out the initiatives and actions oriented to the future?

There don't exist easy answers for questions like these. And, as it seems, there exists no general pattern of a congenial masterplan in the membership states of the OECD. On the contrary, diversity to a high degree pictures the reality shown in our data set.

Literature

Brynjolfsson, E. and McAfee, A. (2014), "The Second Machine Age", W.W. Norton & Company, Inc, New York

Castellacci, (2014), A Neo-Schumpeterian Approach to Why Growth Rates Differ, *Revue Economique*, Vol. 55 (6), 1145-1170.

Dapp, T. (2014), *Fintech – The Digital (R)Evolution of the Financial Sector: Algorithm-Based Banking with the Human Touch*, Deutsche Bank Research, Frankfurt am Main

Härdle, W. and Simar, L. (2007), *Applied Multivariate Statistical Analysis*, Springer, New York, Berlin, Heidelberg

Hanusch, H. and Pyka, A. (2007a), The Principles of Neo-Schumpeterian Economics, *Cambridge Journal of Economics*, Vol. 31(2), 275-289

Hanusch and Pyka, A. (2007b), (eds.), *Elgar Companion to Neo-Schumpeterian Economics*, Edward Elgar, Cheltenham UK.

Hanushek, E. A. and Woessmann, L. (2010), How Much Do Educational Outcomes Matter in OECD Countries? NBER Working Paper No. 16515, November 2010.

Jobson, J. D. (1992), *Applied Multivariate Data Analysis: Volume II: Categorical and Multivariate Methods*, Springer, New York, Berlin, Heidelberg

Mazzucato, M. (2013), *The Entrepreneurial State, Debunking Private Vs. Public Sector Myths in Risk and Innovation*, Anthem Press, London, New York

Nefiodow, L. (2014), „The Sixth Kondratieff: A New Long Wave in the Global Economy“, Translation of the 7th German Edition, Rhein-Sieg Verlag.

Romp, W. and De Haan, J. (2007), Public Capital and Economic Growth, A Critical Survey, *Perspektiven der Wirtschaftspolitik*, Vol. 8 (1), 6-52.

Saviotti, P.P. and Pyka, A. (2008), Product variety, competition and economic growth, *Journal of Evolutionary Economics*, Vol. 18, Issue 3-4, 323-347.

Schumpeter, J.A. (1912), *Theorie der wirtschaftlichen Entwicklung*, Duncker & Humblot, Leipzig

Wallace, R. (2013), A New Formal Approach to Evolutionary Processes in Socioeconomic Systems, *Journal of Evolutionary Economics*, Vol. 23(1), 1-15.