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Meeting the Challenges of the EU-2020 Agenda
A Future-Oriented Indicator Analysis
for the EU-Countries

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Abstract

Future-orientation or innovativeness is a leading credo in the EU's economic policy agenda of the 21st century. It started in the year 2000 with the Lisbon Agenda, the first 10 years plan in which Europe should have become the most competitive and dynamic knowledge-based economic region in the world. And, it continued in 2010 with the second 10 years framework program "EU 2020" which again is concentrating on research and innovations in the technological, but also in the social (political) and ecological field. The evolving quantitative and qualitative effects summarize under the strategy of "smart, inclusive and sustainable growth" (European Union, 2010).

The aim of our study is to deal with these grand European visions and to focus on the "emerging future" of the EU countries. How do the EU member states handle their economic future? Does there exist a certain pattern of future-orientation? Can specific similarities or dissimilarities between the single countries be observed and satisfactorily explained?

To give an answer to these questions we use an empirical indicator approach combined with cluster analysis. This approach, however, has to be based on a specific model of future-orientation or economic development. Such a model determines the theoretical scaffold 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 principle of innovation as the main driving force and the engine of development coupled (b) with the notion of future-orientation penetrating all spheres of socio-economic life in developed as well as in developing countries.

Meeting the Challenges of the EU-2020 Agenda

A Future-Oriented Indicator Analysis for the EU-Countries*

Introduction

In the 21st century political authorities of the EU concentrated on two central strategies for its economic development. In the year 2000 the EU started with the Lisbon Agenda, the first 10 years plan in which Europe should become the most competitive and dynamic knowledge-based economic region in the world. The economic substrate of the Lisbon Agenda can be summarized as a development strategy mainly based on technological progress as the central determinant of growth and dynamics in modern economies. These dynamics are propelled by innovative activities in all parts and spheres of the economy and the society representing the main driving force of change and development.

In 2010 the EU introduced its second 10years framework, the program "EU 2020". This program again is focusing on research and innovations in the technological, but also in the social (political) and ecological field. The evolving quantitative and qualitative development effects summarize under the strategy of "smart, inclusive and sustainable growth" (European Union, 2010). A substantial part of that strategy is "Horizon 2020", the biggest EU Research and Innovation Program ever with nearly € 80 billions of funding available over 7 years from 2014 to 2020 (EU Commission, 2014).

The main element of development strategies, based on processes of innovation, is future-orientation. 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 things 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" embodied in the process of development.

In this way, the status of "future-orientation" which exists in a country provides 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.

The aim of our study is to deal with the grand European visions of development and to focus on the "emerging future" of the EU countries in that context. In other words, a "Future-Oriented Country Analysis" (FCA) is carried out asking questions like the following: How do the EU member states handle their economic future? Does there exist a certain pattern of future-orientation? Can specific similarities or dissimilarities between the single countries be observed and satisfactorily explained?

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An answer to these questions may also offer some information concerning the "inclusiveness" of the 2020 European development strategy. That means, it can provide some hints related to the economic and social cohesion prevailing in the EU member states.

In economic terms, future-orientation gets its analytical and empirical relevance when it is placed and investigated within a specific (macro-economic) 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 principle of innovation as the main driving force and the engine of development coupled (b) with the notion of future-orientation penetrating all spheres of socio-economic life in developed as well as in developing 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 future-oriented activities embodied in the process of development. In this way, a kind of "future of resilience" is build up, which means the ability of a country to master the challenges and/or to harvest the opportunities which will happen in coming times.

Future-orientation 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 (8). The indicators reflect 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-orientation of theEU-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.

Analytical 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) (Hanusch and Pyka, 2007b). 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. 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.

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 orientation of EU countries. In which way and to what degree are the different EU countries prepared to master their economic future? Does there exist a certain pattern of future-preparedness? 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 pillar. 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, and 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 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, by means of using clustering analysis, the pattern of similarities or dissimilarities, i.e. the variety of being prepared for the future, can be detected in the case ofEU 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.

Indicator Analysis based on the Concept of CNSE

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 circulated for the EU-countries listed in the Appendix. The indicators used originate from various sources, the most important one being the World Bank's Open database, especially Main Science and Technology Statistics and its Educational database. 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 Marketline database. We also used the OECD database for demographic, internet and education related figures.

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.

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:

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

In innovation and evolutionary economics these categories are assumed to have a high impact on a country's ability to handle successfully its process of development based on the dynamics of creating and distributing novelties (Fagerberg, 2006).

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 McAfee, 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 (Perez, 2002).

Unfortunately, we were not able to find data for all EU 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, (c) research and development, (d) health, and (e) physical 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 countries (Hanushek and Woessmann, 2010). So we tried to find as many data as possible to encompass the education sector of the EU 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" (Metcalfe, 1995).

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 countries "preparedness for the future". In addition, we also found some data concerning "digital government" for all EU countries.

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

Empirical Results

The **real sector pillar** consists of five clusters:

Group 1: Austria, Belgium, France, Ireland, Luxembourg, The Netherlands, United Kingdom

Group 2: Bulgaria, Croatia, Greece, Romania

Group 3: Cyprus, Czech Republic, Estonia, Hungary, Italy, Latvia, Lithuania, Malta, Poland, Portugal, Slovakia, Slovenia, Spain

Group 4: Denmark, Finland, Sweden

Group 5: Germany

The **finance sector pillar** comprises four clusters:

Group 1: Austria, Cyprus, Denmark, Estonia, Malta, Slovakia

Group 2: Belgium, Finland, Luxembourg, The Netherlands, Sweden

Group 3: Bulgaria, Croatia, Czech Republic, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Poland, Portugal, Romania, Slovenia

Group 4: France, Germany, Spain, United Kingdom

The **public sector pillar** embraces five clusters:

Group 1: Austria, Czech Republic, Hungary, Ireland, Lithuania, Portugal, Slovenia,

Group 2: Belgium, Denmark, Finland, Netherlands, Sweden

Group 3: Bulgaria, Croatia, Greece, Italy, Latvia, Poland, Romania, Slovakia

Group 4: Cyprus, Estonia, Luxembourg, Malta

Group 5: France, Germany, Spain, United Kingdom

As a first result the study shows that looking at the three constitutional pillars of an economy the EU-countries are quite diversified. The real and public sector pillars encomparse five clusters, followed by the finance sector pillar with four clusters. In an European wide perspective the EU-countries display quite a dissimilarity with respect to future-orientation of its different sectors.

However, the diversity has to be seen as a relative phenomenon. The **real sector**, for instance consists of a large Cluster 3 with thirteen member states, a medium sized Cluster 1 with seven countries and two small Clusters 2 and 4 with four and three members. Germany even has an own cluster five.

Group 1 mainly comprises countries which joined the EU early in the 1950's and 1970's. Austria is the only exception. It accessed in 1995. So, the cohesion regarding future-orientation is a very high one in the real sector for these "old EU members".

Group 2 shows just an opposite constellation. Here, the newly accessed countries Bulgaria (2007), Croatia (2013), and Romania (2007) form an own cluster, together with Greece which entered already in 1981, but was not able to gain those features of future-.orientation which are characteristic for the elder membership states in the EU.

Group 3 consists of a mixture of Central-Eastern countries which came into the EU after the fall of the Berlin wall and of the Mediterranean members Italy, Malta, Portugal and Spain. So, there is no much difference regarding future-orientation of the real sector between these two country groups.

Group 4 brings together the Scandinavian countries Denmark, Finland and Sweden. They show up a remarkable homogeneity with respect to their real sector's future-orientation.

An interesting result is that for Germany. It forms an own cluster showing that Germany`s real sector is a unique one in EU-Europe with regard to its future-orientation or innovativeness.

A different picture as the one for the real sector shows up in the **financial pillar** where the size of the clusters is much more equal. Cluster 1 embraces six members, Cluster 2 has five and Cluster 4 only four members. The largest cluster is number 3 with thirteen countries.

Each cluster allows a specific interpretation. The large Cluster 3 mainly brings together countries which entered the EU in 2004 or later with member states from the Mediterranean region.

Remarkable is also Cluster 4 where we find France, Germany and the United Kingdom. These countries embody the most relevant financial marketplaces in Europe with Frankfurt,

Paris and London. Quite surprisingly also Spain joins this trio. It is hard to find an interpretative answer why this is so.

Cluster 2 forms a group of established countries from the Benelux and the Scandinavian region. With regard to the financial sector this geographical area depicts quite a homogeneity concerning its future-orientation.

Cluster 1 is a mixed one bringing together very small countries from all over Europe. An interpretation of this result is not easy, especially because of Austria and Denmark which also join this country group.

The **public sector** pillar is the most equalized one with respect to the number of members in each of the five clusters. The largest one is Cluster 3 with eight countries. It brings together the Mediterranean countries Greece, Italy and Croatia together with countries from the former Socialist country block, namely Bulgaria, Latvia, Poland, Romania and Slovakia.

An interesting result shows up in Cluster 5. Here again France, Germany and the United Kingdom form a homogenous group joined by Spain, which again is quite surprising.

Cluster 2 pictures a mixture of Benelux and Scandinavian countries, a result which is similar to that of the financial sector.

In Cluster 4 a group of the smallest European countries is brought together, with Cyprus, Estonia, Luxembourg and Malta.

Cluster 1 is a very mixed cluster concerning the geographical affiliation as well as the political history of the member states. They seem to have found a similar copy for organizing the activities of their public sector with regard to future-orientation.

Another interesting result illustrates that there exist some countries in the EU which depict a high degree of similarity in all three sectors. Their future-oriented "National Innovation Systems" (Lundvall, 1992; Nelson, 1993) conduct more or less similar components and characteristics. These country groups are:

a) Bulgaria, Croatia, Greece, Romania
b) Cyprus, Estonia, Malta
c) Finland, Sweden
d) France, United Kingdom
e) Italy, Latvia
f) Belgium, The Netherlands

The first group contains countries from Eastern Europe which where the last ones to join the EU. For the period investigated their former political history still seems to shape their readiness and strategy to cope with a future-oriented development. Greece joins this group, which shows its diminished ability to focus on future-orientation or innovativeness. This seems to picture also the so called "Greek Dilemma". The country being since a longer time

period a member of the EU-community and the Euro-zone without having achieved the standards of the established EU member states.

There are four "twin countries" which show up a high homogeneity in their developing basics, the core European countries France and the United Kingdom, the Benelux countries Belgium and the Netherlands, the Scandinavian twins Finland and Sweden as well as Italy and Latvia.

The Mediterranean Islands Cyprus and Malta also contain a high degree of similarity, joined by Estonia.

Conclusion

The study has shown that CNSE can serve as an analytical frame for investigating empirically the future-orientation of the EU countries. In the last 10 years or so statistical sources came up which allow an international comparison based on indicators of innovativeness or future-orientation. Such studies, however, can be exercised only for a time span of the last five years. If we want to include more time periods in order to get a dynamic analysis picturing the process of future-orientation over time we will have to wait for the coming years and the statistics offered then. So, at the moment, because of the data situation, a study of future-orientation can show only a kind of snapshot for the EU countries.

But even this snapshot may deliver a number of insights and findings. For instance, an interesting result is the geographical influence and that of the size of an economy on its cluster membership. So, the three largest economies in the EU – Germany, France and the United Kingdom – form a country group with homogeneous features in two sectors, the financial and the public sector. Concerning the real sector dominates with an own cluster. In addition, we have to mention the "Scandinavian group" as well as the "Benelux group" which also show up with a high degree of similarity. Another interesting result is that none of the countries entering the EU in 2004 or later belongs to clusters for all three sectors where established EU membership countries like Germany, France, the UK, the "Benelux group" or the "Scandinavian group" are situated. That is also true for the Mediterranean countries – Greece, Italy, Portugal and Spain – which seem to have more in common with the former socialist Central-Eastern European countries concerning their future-orientation than with the established older membership countries of the EU.

What does that mean for the EU-2020 development strategy and especially for the pretention of the EU to increase the economic and social cohesion of its membership in the coming years?

The dissimilarities concerning the EU countries' future-orientation are remarkable but, interestingly, this variety shows up not at the level of single nations but in certain country blocs, either determined by geography (Benelux-, Scandinavian-, Mediterranean, Baltic-, Central-East European countries), by the size of an economy (Germany, France, UK), or by the time of EU membership accession and the former socialist status of countries. This picture composes a very complex mixture of variety in future-orientation and needs a careful and comprehensive investigation of the reasons for that result before political actions in a general form can be formulated and applied. The EU still seems to be a disparate country group not only with respect to the construction of its monetary

system in the Euro-zone, but also concerning its future-oriented potentials for economic development.

If cohesion is a dominant goal in the policy box of the EU, where should concrete measures start to be applied? Should the EU concentrate, first of all on the real, or better on the financial or preferably on the public sector as the institutional and structural candidates for a process of harmonization? Which sector is more relevant nowadays for the development of an economy? Is it still or again the real sector with its physical, 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 is no general consensus to be found in the membership states of the EU, even if a visionary programmatic development strategy like "EU 2020" has been formulated and agreed on.

Appendix

A. Indicator Set for the Real Pillar

Sub Categories	Indicator	sample length	Data Source
Structural characteristics	Ease of doing business index	2011 and 2012	Global Competitiveness Report
Structural characteristics	Value chain breadth	2006-2012	Global Competitiveness Report
Structural characteristics	Cooperation in labor-employer relations	2006-2012	Global Competitiveness Report
Structural characteristics	Brain Drain (aka attract talent)	2009-2013	Global Competitiveness Report
Structural characteristics	Foreign Direct Investment, Outward	2007-2011	Marketline Database
Structural characteristics	Start-up procedures to register a business	2007-2011	World Bank Database
Research and Development	Technicians in R&D (per million people)	2007-2011	World Bank Database
Research and Development	Patent applications, residents	2005-2010	World Bank Database
Research and Development	Efficacy of corporate boards, 1-7 (best)	2006-2012	Global Competitiveness Report
Research and Development	Capacity for innovation, 1-7 (best)	2006-2012	Global Competitiveness Report
Research and Development	Company spending on R&D, 1-7 (best)	2006-2012	Global Competitiveness Report
Research and Development	PCT patents applications/million pop.	2006-2012	World Bank Database
Research and Development	Researchers in R&D (per million people)	2004-2009	World Bank Database
Technological characteristics	Availability of latest technologies 1-7	2006-2012	Global Competitiveness Report
Technological characteristics	Internet Users (Absolute Number)	2008-2012	World Bank Database

Technological characteristics	High Technology Exports (US Dollar)	2008-2012	World Bank Database

B. Indicator Set for the Financial Pillar

Sub Categories	Indicator	Sample length	Data source
General Finance situation	Bank capital to asset ratio(absolute)	2007-2011	Marketline database
General Finance situation	Central bank, assets(absolute)	2007-2011	Marketline database
General Finance situation	Monetary gold reserves(absolute)	2007-2011	Marketline database
General Finance situation	Stocks traded, total value (current US$)	2008-2012	World bank database
Relationship between real and financial sectors	Availability of financial services 1-7 (best)	2006-2012	Global competitiveness report
Relationship between real and financial sectors	Net domestic credit (absolute)	2007-2011	Marketline database
Relationship between real and financial sectors	Venture capital availability	2009-2013	Global competitiveness report
Relationship between real and financial sectors	Ease of access to loans	2009-2013	Global competitiveness report

C. Indicator Set for the Public Pillar

Sub Categories	Indicator	Sample Length	Data Source
General characteristics	Urban population (% of total)	2007-2011	World bank database
General characteristics	Strength of auditing and reporting standards, 1-7	2006-2012	Global competitiveness report
General characteristics	Population age structure	2010-2014	OECD Database
Education	Quality of management schools, 1-7	2006-2012	Global competitiveness report
Education	Public spending on education, total (% of government expenditure)	2005-2010	World bank database
Education	Number of students in primary education	2007-2011	Marketline database
Education	Number of students in secondary education	2007-2011	Marketline database
Education	Number of students in tertiary education	2007-2011	Marketline database
Science, Research and Development	Quality of scientific research institutions 1-7 (best)	2006-2012	Global competitiveness report
Science, Research and Development	University-industry collaboration in R&D 1-7 (best)	2006-2012	Global competitiveness report
Science, Research and Development	Gov't procurement of advanced tech products 1-7 (best)	2006-2012	Global competitiveness report
Science, Research and Development	Number of Scientific and technical journal articles	2005-2009	World bank database
Health	Public healthcare expenditure	2007-2011	Marketline database
Health	Life expectancy	2010-2014	OECD Database

Health	Total public and primary private health insurance(% of total population covered)	2010-2014	OECD Database
Infrastructure	Quality of railroad infrastructure, 1-7 (best)	2006-2012	Global competitiveness report
Infrastructure	Quality of port infrastructure, 1-7 (best)	2006-2012	Global competitiveness report
Infrastructure	Quality of air transport infrastructure, 1-7 (best)	2006-2012	Global competitiveness report
Digital Government	E-government readiness index	2010-	OECD Database
Digital Government	Businesses using the internet to interact with public authorities, sending filled forms	2010-	OECD Database
Public Finances	Government 10-year bond rate(absolute)	2007-2011	Marketline database

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