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Variety of Future-Orientation:
The Case of G-19 Countries

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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.

Our study is focusing on the group of G-19 countries with respect to their future-orientation shaped and characterized by innovation and the underlying processes of creating and distributing novelties. This group is an economic, financial and political forum which consists of 19 major economies, advanced and developing ones, allocated in Asia, Europe, Euro-Asia, North and South America, The Middle East and Oceania. If you add the European Union you get the G-20 group which is the main economic council of wealthy nations nowadays.

The concept of future-orientation, defined by innovativeness, 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 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.

Based on the concept of CNSE the central aim of our study is to gain new insights and findings concerning the variety of future-orientation of the G-19 countries. For that purpose we use an empirical indicator approach which (a) tries to bring the notion of future-orientation on a concrete basis by using indicators embedded in the framework of CNSE; (b) investigates patterns of similarities in the set of indicators; (c) shows how these patterns look like by applying cluster analysis; (d) draws some conclusions from the patterns concerning the status and variety of future-orientation in the group of G-19 countries.

Variety of Future-Orientation : The Case of G-19 Countries*

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 presence, the potentials for the future of an economy are prepared, deciding how its economic fitness and competitiveness will emerge. So, future-orientation, in this sense, is in a natural way connected with the innovativeness or preparedness for the future of a firm, a region or a country and shapes the strength and the specifics of the process of development. It gets its analytical and empirical relevance when it is a) defined in a proper way as alignment towards coming events shaped and characterized by innovations and the underlying procedures of creating and distributing novelties. And, b) when it is placed and investigated within a specific development model which fulfills the prerequisites demanded by the criteria of future-orientation, i.e. innovativeness.

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 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.

On the basis of CNSE our study is focusing on future-orientation of a specific group of countries, the so called G-19 countries. This group is an economic, financial and political forum which consists of 19 major economies, advanced and developing ones, allocated in Asia, Europe, Euro-Asia, North and South America, the Middle East and Oceania. If you add the European Union you get the G-20 group, which is the main economic council of wealthy nations nowadays. The 19 member countries of the G-20 group together account for about 77% of world GDP, 60% of world trade and 62% of the world population (Vestergaard, 2011).

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 with respect to innovativeness and their prerequisites? 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 G19-countries a "Future-Oriented Country Analysis" (FCA) is carried out within the analytical frame of CNSE. For such an analysis certain procedural steps have to be followed: (a) bringing the concept of future-orientation on

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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-orientation in the group of G19-countries.

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 (08). 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 the G19-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 (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 G19-countries. In which way and to what degree are the different G19-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 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, 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, 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 G19-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 calculated for the G19-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 Market Line Data Base. We also used the OECD data base 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:

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".

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 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 (Perez, 2002).

Unfortunately we were not able to find data for all G-19 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 G-19 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 a countries "preparedness for the future". In addition, we also found some data concerning "digital government" for all G-19 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

Real Sector Pillar

France	1	Russia	2	Indonesia	2	India	2
Unitedkingdom	1	Mexico	2	Canada	4	Korea	1
China	2	Italy	2	Japan	3	SaudiArabia	1
Brazil	2	UnitedStates	3	Turkey	2	Australia	4
Germany	1	SouthAfrica	4	Argentina	2		

The real sector pillar consists of four clusters:

   Group1: France, United Kingdom, Germany, Korea and Saudi Arabia
   Group2: China, Brazil, Russia, Mexico, Italy, Indonesia, Turkey, Argentina and India
   Group3: United States and Japan
   Group4: South Africa, Canada and Australia

Finance Sector Pillar

France	1	Russia	2	Indonesia	2	India	4
Unitedkingdom	1	Mexico	2	Canada	4	Korea	2
China	1	Italy	2	Japan	1	SaudiArabia	4
Brazil	2	UnitedStates	3	Turkey	2	Australia	4
Germany	1	SouthAfrica	4	Argentina	2		

The finance sector pillar comprises also four clusters:

   Group1: France, United Kingdom, China, Germany and Japan
   Group2: Brazil, Russia, Mexico, Italy, Indonesia, Turkey, Argentina and Korea
   Group3: United States
   Group4: South Africa, Canada, India, Saudi Arabia and Australia

Public Sector Pillar

France	1	Russia	3	Indonesia	2	India	3
Unitedkingdom	1	Mexico	3	Canada	1	Korea	1
China	2	Italy	3	Japan	1	SaudiArabia	1
Brazil	3	UnitedStates	1	Turkey	3	Australia	1
Germany	1	SouthAfrica	1	Argentina	3		

The public sector pillar consists of three clusters:

   Group1: France, United Kingdom, Germany, United States, South Africa, Canada, Japan, Korea, Saudi Arabia and Australia
   Group2: China and Indonesia
   Group3: Brazil, Russia, Mexico, Italy, Turkey, Argentina and India

A first result states that looking at the three constitutional pillars of an economy the G-19 countries are quite diversified. The real and finance sector pillars encompass 4 clusters followed by the public sector pillar with 3 clusters. In a worldwide perspective, the G-19 countries, representing the richest economies on the globe, display quite a dissimilarity with respect to future-orientation of its different sectors.

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

Cluster 1 includes the European countries Germany, France and the United Kingdom filled up by Korea and Saudi-Arabia. If there is a common feature which may characterize their economies, it is their technological advancement, at least with respect to the European countries and Korea. Saudi-Arabia already seems to have reached a status of development which allows the country's real sector to follow a strategy of future-orientation comparable to the well-established ones in Europe and Asia.

The large cluster 2 mainly is formed by countries which are characterized by an emerging status of their development. The only exception is Italy which seems to have accommodated to the emerging economies in its real sector's preparedness for the future. That means, the status of development plays a crucial role concerning the configuration of a country's future-orientation.

Cluster 4 comprises of three countries, South Africa, Canada and Australia. The common feature of their real economy might be seen in the dependency on winning and exporting natural resources.

Also of certain interest is cluster 3 which embraces Japan and the United States. These countries are the largest internationally oriented economies in our G-19 sample. Apparently, they are choosing similar concepts in planning and conducting their real sector activities to be prepared for the future.

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. There exist two clusters 1 and 4 with the same amount of members, namely five. The largest cluster 2 embraces eight countries.

The most interesting result is that the US builds an own cluster. This mighty economy 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.

Remarkable is also the composition of pillar 1, where we find the European countries Germany, France and the United Kingdom together with the Asian economies China and Japan. These countries embody not only the most relevant financial market places in Europe – with Frankfurt, Paris and London – and in Asia with Hong Kong (Shenzhen) and Tokyo. They also have a similar pattern with regard to the augmenting co-evolutionary processes between the real and the financial sector.

In cluster 2 emerging countries are brought together, with the exception of Italy and Korea. It seems that not only in the real but also in the financial sector the status of development has a high influence on how a country copes with its future development.

A similar factor influencing the preparedness for the future in the real as well as in the financial sector shows up in a country's dependency on natural resources as the composition

of cluster 4 demonstrates quite apparently. Here, countries all over the globe are assembled which play a crucial role in the world's supply of energy and raw material.

A quite different situation shows up for the **public sector pillar**. Only three clusters are forming this pillar, a large one (group 1) with ten countries, a medium-sized one (group 3) with seven and a very small one (group 2) with only two members.

Cluster 1 comprises countries across the globe, from Europe to North America and Africa, from Asia to the Near East. This result is a remarkable one, because it brings together countries from different economic regions in the world which also belong to different cultures and possess a different status of development. All over the world many economies rely on a similar institutional setting which might be called the traditional one of a mixed economy (Musgrave, 1959). This allows government mainly to focus on activities, which give the public sector a certain influence and role to shape an economy's process of development.

Cluster 3 consists of emerging countries including Italy. The status of development again seems to have quite an influence on how a country organizes its institutional setting and its procedural performance to be prepared for the future.

China and Indonesia form an own cluster 2. The public sector there has a special character. It looks as if the authoritarian principle is governing not only the organization of the state but also its future-oriented activities (Fu, 2015).

Another interesting result illustrates that there exist groups of countries 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) Argentina, Brazil, Mexico, Italy, Russia, Turkey
  b) Australia, Canada, South Africa
  c) Germany, France, United Kingdom

The first group contains the South American countries together with Russia, Turkey and Italy. A simple explanation why these countries are staying so closely together might be their developmental status as emerging economies, with the exception of Italy. Also geographical – in the case of Argentina, Brazil and Mexico – as well as historical elements – in the case of Italy, Russia and Turkey – might play a certain role. The latter are still looking out to find a well-respected position in the world economy which is in accordance with their once highly appreciated cultural and political heritage. Perhaps, it is this historical background which influences and even determines their coordinates how to execute the complex task of mastering the future in a modern, globalized world.

In the second group of countries (Australia, Canada, South Africa) the dependency on natural resources is shaping the whole institutional setting and the development process of their economies in an own specific "National Innovation System".

The countries of the third group (Germany, France, United Kingdom) are the largest established economies in Central Europe. They embody the core actors of the European Union. Their economic and political prospects have decisive effects on how the whole Union will develop, in an integrating or eroding manner. The remarkable homogeneity in their preparedness for the future gives a solid basis for a common solution of an "European Innovation System".

Conclusion

The study has shown that CNSE can serve as an analytical frame for investigating empirically the future-orientation of countries belonging to different regions and cultures in the world and having attained a different development status. In the last ten years or so statistical sources came up which allow an international comparison based on indicators of innovativeness. This can be done, however, 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 in 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 only offer a kind of snapshot for G-19 countries.

But, even this snapshot can present a number of insights and findings. For instance, an interesting result is the extraordinary status which the US-economy holds compared to the other countries especially concerning its financial and real sector. The USA shows in these fields a singular performance concerning its future-orientation.

Another remarkable result is that the European countries in the G-19 group are characterized by a very high degree of homogeneity. That is true for Germany, France and Great Britain with the exception of Italy. In its features for all three pillars this "advanced" country belongs more to clusters where emerging economies are situated. Maybe, this result pictures a situation where the so-called economic crisis of the Mediterranean region comes into view in statu nascendi.

The danger of a "fragile" situation can also be detected if one looks at the financial sector. Here emerging countries like Argentina, Brazil, Russia, Mexico and Indonesia belong to the same cluster. These countries experienced in the last decades severe financial crises and there exists a certain risk that a critical situation may come up again, if they don't reform their finance pillar towards criteria of future-orientation.

Interesting are also the results we attained for the public sector pillar. The largest part of the G-19 countries seem to have installed an organizational structure and a political spirit in the state sector which might be called "entrepreneurial". In the time period observed, they obviously rely more on a mixed, co-evolutionary strategy which connects the state in a pragmatic way with the other institutional pillars and doesn't follow anymore the neo-libertarian credo of "either market or government".

All in all, one can argue that the status of development plays a crucial role with respect to the patterns of future-orientation. Emerging countries are still in a process of "catching up" which has remarkable influences on these patterns.

If "catching up" or cohesion are relevant objectives for future development from where and in which way should processes start and be established in order to reach an advanced economic status? Which role may the different institutional pillars play in the process of improving economically based on innovativeness and future-orientation?

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 emerge easy answers for questions like these. And, as it seems, there exists no general pattern of a congenial masterplan with respect to economic development in the membership states of the G-19 country group. On the contrary, diversity to a high degree pictures the reality shown in our data set.

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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