Regional Development and Competitiveness – an Analysis of Indices of Regional Competitiveness

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Acknowledgements

I first like to thank my supervisor Dr. Gillian Bristow who was always available for discussions and feedback especially over the last few months. I also like to thank my former supervisor Professor Dr. Dylan Jones-Evans for helping me shape this project. Besides these two academic supporters, I'd like to thank all other people from private and professional for the support they have given to me over the last years. I am deeply grateful for that, especially for Frau Schneider's support.

"The business of an economy is to make people happy,

not to perform statistical feats."

David Landes (1998: 455)

Summary

There is a growing debate on the theoretical basis, how it could be conceptualised, as well as the utility and meaning of regional competitiveness. This is associated with various attempts to measure regional competitiveness with the help of composite indices for coming-up with league tables. However the measurement of regional performance has run ahead of the academic debate, such indices receive a lot of media attention, and in some cases are even used by policy-makers to support their arguments. It is therefore instructive to look at such indices in more detail to evaluate their utility from a practical standpoint. This is done by working out the theoretical framework for six indices, deconstructing these and analysing the single indicators. Methodologically, issues such as normalization, standardization and the aggregation into a single number are also included. In addition to this, since many authors claim that their indices can function as a proxy for future growth, a statistical analysis of the predictive quality with respect to economic performance has also been carried out. This thesis, therefore, for the first time, sheds light on the utility of regional competitiveness indices and contributes to the discussion of the meaning of benchmarking regional performance based on the regional competitiveness hegemony that can be observed. The findings suggest that indices of regional competitiveness can be of only limited help for policy-decisions besides although they are a source for a wealth of information on certain regional indicators. This is primarily because of the lack of a theoretical basis for measuring regional competitiveness, and secondly because of the poor performance in functioning as a proxy for future economic performance.

DECLARATION

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Abbreviations

BISW	Bundesländer im Standortwettbewerb (Index)
BTU	British Thermal Unit
CHF	Swiss Francs
DEA	Data Envelopment Analysis
ε	Elasticity
EU	European Union
FDI	Foreign Direct Investment
GCR	Global Competitiveness Report
GDP	Gross Domestic Product
GEM	Global Entrepreneurship Monitor
GVA	Gross Value Added
IMD	Institute for Management Development
MFP	Multi-Factor Productivity
MSA	Metropolitan Statistical Areas
NUTS	Nomenclature of Units for Territorial Statistics
OECD	Organization for Economic Co-operation and Development
PPP	Purchasing power parity
REM	Regional Entrepreneurship Monitor
Plc.	Public limited company
SCR	State Competitiveness Report
SME	Small and medium-sized enterprises
SNEI	State New Economy Index
SWOT	Strength, Weaknesses, Opportunities and Threads
TFP	Total Factor Productivity
UK	United Kingdom
UKCI	UK Competitiveness Index
USD	U.S. Dollar

WCS	World Competitiveness Scoreboard
WCY	World Competitiveness Yearbook
WKCI	World Knowledge Competitiveness Index

1 Introduction

1.1 Measuring Economic Success

Why some nations[1] prosper and some do not has been one of the central questions in economics since the days of Adam Smith. Since then, competition has been seen as the driving force of markets: "the net effect of this competition is that efficient or innovative firms are more likely to increase their market shares, lower their average costs, and reduce prices for customers" (Greene et al 2007: 5). If there were no competition, markets would not be as efficient and there would not be any pressure for improvements and innovations of goods or services offered. But questions surround the question whether the concept of competitiveness can be effectively applied to places.

Many administrations around the world assert that places are indeed competitive and follow policies for fostering place competitiveness[2] on the meso (regional) and macro (national) level (Budd/Hirmis 2004; Bristow 2005a; Cellini/Soci 2002; Kitson et al 2004; Martin 2005, Thompson 2004). Even the European Union with the Lisbon strategy focuses on (regional) competitiveness and competitive advantage (Hospers 2006: 3).[3]

However, policy acceptance of the importance of regional competitiveness has run ahead of sound theoretical development of the concept. Indeed, there "is not even an accepted definition of the term 'competitiveness' as applied to a nation" (Porter 1990b: 84) and competitiveness – be it on the regional or national level – is anything but easy to define (Boltho 1996; Bristow 2005a; Greene et al 2007; Martin 2005; Reich 1990, Thompson 2004).

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1 The term nation here is used in the sense of a state or country, but not necessarily a sovereign state. For a discussion see Alesina/Spolaore (2003).

2 One may also find the terms "location competitiveness", "territorial competitiveness" or "area competitiveness".

3 The term was even mentioned in a draft of the European constitution as one of the goals in art. I-3(3).

Year	International Competitiveness	Regional Competitiveness
1990	1,078	3
1991	1,182	8
1992	1,379	17
1993	1,651	17
1994	1,548	21
1995	1,770	35
1996	1,707	57
1997	1,967	125
1998	2,135	145
1999	2,162	139
2000	2,049	130
2001	2,029	111
2002	2,402	117
2003	2,180	171
2004	2,032	203
2005	2,262	201
2006	2,465	276
2007	2,615	301

Source: Author's own search in the Lexis Nexis data base. The search was conducte
November 2008 with the above stated English terms in 2,292 English publications.

Together with the idea of place competition, the idea of p
measurement of places has also been introduced. Besides other con
this has led to the creation of a number of benchmarking initiatives an
All these publications are based on the assumption that the idea of p

[4] See Bandura (2005) for a global overview of existing national indices.

measurement and benchmarking can be taken over from the field of business administration and applied on the regional level.

These indices consist mostly of a number of different indicators, providing best cases and worst cases and often coming up with some quick advice for policy-makers. Only limited attention has so far been paid to deconstructing these indices, examining their relationship with theory and critically evaluating their utility and robustness.

This is especially true with regard to their use as guidance for policy-makers who want to foster growth or employment with the help of competitiveness initiatives and policies not only on the firm level, but also on the national or regional level. In order to be able to assess the impacts of such initiatives and, at the same time, to evaluate the relative performance compared to peer-groups, there is a need for measuring competitiveness. Rankings here can help to condense complex characteristics into single ranks and, therefore, serve as an important basis for public discussions with non-academic audiences. This is perhaps why policy-makers make use of such rankings as the basis for initiatives for simply proving their point. This could be justifiable if rankings would not only be methodologically sound but would also be able to function as proxies for future economic performance. To evaluate these points is the aim of this thesis. It, therefore, looks at the usefulness as a policy-tool by analysing the theory and methodology behind it as well as the ability to predict economic performance. This is done with the help of a standardised research framework.

1.2 Research Objectives

The purpose of this dissertation is to evaluate the indices of competitiveness and draw conclusions with regard to their usefulness as a policy and analytical assessment tool. The goal is to give an overview of existing indices, find common grounds on relevant indicators and their grounding in theory, and to highlight methodologically robust approaches for predicting future economic success. This can be summarised as the following research questions:

a) What is the theoretical basis of regional competitiveness?

b) How do indices of competitiveness relate to theoretical concepts of competitiveness and which dimensions do they include?

c) What are the methodological differences between selected indices of regional competitiveness?

d) Are these indices transparent and sound and do they perform well as proxies for future economic performance?

1.3 Structure

The subsequent chapters explore these questions in turn and provide an overview of the ongoing debate, beginning with a critical examination of the competitiveness debate in the literature review. The discussion of place competitiveness in the literature review centres on benchmarking and how it is conducted in the context of places, the appropriate spatial level to address, the conceptualisation of place competitiveness, as well as on the attempts for measuring and benchmarking places with the help of indices (Boschma 2004; Bristow 2005a; Budd/Hirmis 2004; Camagni 2002; Kitson et al 2004; Krugman 2003; Martin 2005).

This thesis will, therefore, first introduce concepts of firm competitiveness before discussing concepts of competitiveness on the national and on the regional levels. Although these two spatial levels are different, it will also be made clear that concepts of competitiveness on the national level cannot clearly be distinguished from competitiveness concepts on the regional level. Concepts of competitive advantage such as Porter's cluster approach, for example, are applied on the national and regional level at the same time. Other approaches like the ability to innovate may come from the national level but are also applied on the regional level. The concepts of national competitiveness are introduced

following Trabold's (1995) structure, and the concepts of regional competitiveness following the structure of Bristow (2005a) and Martin (2004).

After this, it will be shown how benchmarking is taken over to the level of geographic places to come up with composite indices of regional competitiveness. In this context the process of constructing composite indices is displayed. It will be made clear that there is no single approach for constructing composite indices.

Based on the literature review, the research framework for this thesis is set out in chapter four. First, an overview on existing work in the field of index analysis is given to identify the gaps in current research, moving from there to give an overview on composite indices found in preparing this study. Those indices analysed in more detail are then introduced, together with some characteristics. The findings of the literature review and current studies are then summarised in the framework for the analysis of indices which will be the guideline for the rest of the thesis.

Coming to the heart of this thesis, indices of competitiveness are then analysed. This starts by comparing the different regional indices and working out differences and commonalities in index construction, the nature and scope of indicators, as well as geographic coverage. It is shown how differently these indices approach the measurement of competitiveness and produce their rankings.

In the next chapters the analysis will go into detail and will deconstruct six regional indices to provide greater transparency in their construction and the methodological approaches they employ. This will also show how sound these indices are from a theoretical basis and if they can function as proxies for future economic performance. As many indices were established relatively recently, the period of analysis is fairly short but robust enough to highlight some important discrepancies and limitations. The conclusion summarises the main findings and points to possible areas for future research.

2 Literature Review

The purpose of this chapter is to give an overview of the existing concepts of competitiveness on different levels and to summarise the debate around the meaning of place competitiveness. This focuses specifically on the concept of regional competitiveness which has become particularly prominent in academic and policy debates. It will be shown that the concept of competitiveness has evolved from the firm level and was then applied at the national and regional level. It will also be made clear that there is no consensus about what exactly place competitiveness is or what its determinants are. In addition to this, the debate on regional competitiveness is to large parts separated from regional science. This means the meaning of competitiveness as developing in practice and theories understanding firm and place competitiveness are separated.seperated. It will be argued that although place (regional) competitiveness can be a valid concept if factors are mobile, further theorising is needed and more references should be made to concepts of regional or urban science, especially in the case of city-regions with their agglomeration economies. This chapter will conclude with the notion that place competitiveness must be seen as a relative concept. It is, therefore, argued that today the notion of place competitiveness would be more appropriately placed within political science or marketing.

2.1 Firm Level Competitiveness

The literature review starts with the level of the firm as this was the starting point for the whole debate about place competitiveness. This can be observed by looking at different concepts of place competitiveness emphasising the importance of the firm for a place's competitiveness, i.e., asserting that a place is only as competitive as its firms will be. Often this is emphasised in the context of export performance.

When firms have to deal with competition in respective markets, this is referred to as firm level competitiveness or competitiveness at the microeconomic level. Firm level competitiveness in general is seen as relatively easy to observe (Bristow 2005a: 287), as firms face competition in their respective markets. They have to grow and the growth can be measured in turnover and market share; they have to be profitable, which can be measured in terms of profit; and they must successfully meet their customer's expectations, which can be measured by customer satisfaction. In short, the more competitive a firm is, the greater the market share[5] will be (Martin 2005: 2-1). Uncompetitive companies, therefore, could be identified by declining market shares and they would eventually go out of business. In general, indicators of competitiveness could be ratios dealing with productivity and profitability [6] (Marniesse/Filipiak 2004: 49).

To explain how competitiveness on the firm level can be achieved, business theory provides two general concepts: the market-based-view and the resource-based view.

The *market-based view* focuses on the environmental factors of a company to explain competitive advantage and goes back to the structure-conduct-performance-hypothesis, based on ideas of industrial organisation theory (Porter 1981). As the basic idea, the structure of a market has an influence on the companies and their conduct, which further leads to different performances, based on the ability to adjust the company's strategy in accordance with the market structures.

The *resource-based view* sees firm-level competitiveness as being based on the successful utilisation of internal resources. To gain competitive advantage, a company must ensure "that the relevant resources, whatever their nature, are specific to the firm and not capable of easy imitation by rivals" (Barney 1991[7]). These resources in addition, must have certain attributes to be a source of

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5 Even if this sounds logical and probably is, the simple equation of success with market share is not sufficient. Market shares can be gained via lower prices and, therefore, could lead to a situation where a company exceeds its market share at the cost of lower or no profits.

6 "Ratios plus précis concernant sa rentabilité, sa productivité et sa profitabilité"

7 Cited in Lockett/Thompson (2001: 725)

competitive advantage.[8] Therefore, the resource-based view focuses on a firm's resources, leaving aside market structures.

The following table summarises the two different concepts to explain firm competitiveness and compares them:

Table 2: Comparison of market-based view and resource-based view

Criteria	Market-based view	Resource-based view
Level of analysis	Industry (processes as black box)	Firm (environment as black box)
Source of competitiveness	Product-related cost or differentiation advantages, existing products	Utilisation of core competencies, ability to create future products
Factor of competitive advantage	Positioning of firm according to the market structure Exogenous factors	Internal resources Endogenous factors
Time period	Short-run	Long-run
Context	Dynamic context	Static context (black box), seen as given
Factor mobility	Perfectly mobile, homogenous	Immobile, heterogeneous

Source: Based on Barney (1991); Braun et al (2004); Lockett/Thompson (2001)

Of course these models of strategic management still assert that managers are able to easily adjust a company to make it more competitive just as in a cockpit. This is a notion highly questioned by organisational theorists: "writers such as Prahalad and Hamel remain dependent on the outmoded command and control model of management" (Scarbrough 1998: 230).

8 One of the currently popular approaches derived from the resource-based view, is the concept of core competencies, propagated by Prahalad/Hamel (1990).

Besides these two approaches for explaining firm competitiveness, Budd and Hirmis (2004: 1017) see the following disciplinary approaches as part of the debate on firm competitiveness:

- "Microeconomics and industrial organization.
- 'New competition'.
- Institutional economics.
- Economic retardation debate.
- Excellence and turnaround."

Here, it is important to distinguish first between competition and competitiveness. Firms compete for customers and resources in a contest with the most competitive firm being able to offer superior goods or services. Competition then refers to the quality and rivalry of such companies and their offerings within a market, a behavioural characteristic. Competitiveness refers to the outcome of such competition, a performance characteristic. The department of Trade and Industry in the UK then sums competitiveness up with "meeting customers needs more efficiently and more effectively than other firms." (Department of Trade and Industry 1998, cited in Budd/Hirmis (2004: 1016).

So, as firms compete for customers and resources and people compete for these jobs and goods, competition seems to be at the very heart of every capitalist society, if not of every society.[9] But significant questions arise as to whether places compete in the same way and what is meant by the term place competitiveness or regional competitiveness.

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9 One may say that socialist societies have no competition as there is a central planning of all activities and goods. This may be true in theory, but in practice even socialist societies foster competition among firms and people, e.g., via awards and medals. There may be a difference in the type of rewards (perhaps more non-pecuniary rewards like "collective combine of the year"), but there is still some kind of competition.

This is discussed in the next section in relation to nations. Different as they may be from the concepts of regional competitiveness, it will later be seen that there are considerable overlaps between the concepts of national and regional competitiveness.

2.2 Concepts of National Competitiveness

As mentioned above, there is no such thing as a competitiveness theory,[10] but different concepts trying to provide a framework for competitiveness. This is true on the national as well as the regional level. In the sections to come, broader concepts of competitiveness on the national level are presented, following the structure of Trabold (1995) who distinguished the four concepts discussed here: ability to sell, ability to earn, ability to adjust, and the ability to attract. This grouping provides a starting point for structuring the existing concepts.

2.2.1 Ability to Sell: Costs and Trade Performance

As regards the ability to sell nations may be viewed exactly as companies and it must be highlighted that nations are playing a zero-sum-game, that is, they compete internationally for market shares. "[A] country has become more or less competitive if, as a result of cost-and-price developments or other factors, her ability to sell in foreign or domestic markets has deteriorated or improved" (Balassa 1962: 26). Two strands here can be distinguished: price based and non-price-based competitiveness (Marniesse/Filipiak 2004; McFetridge 1995; Mitschke 2000).

10 Several authors provide overviews of different definitions of competitiveness. See, for example, Budd/Hirmis (2004); Cellini/Soci (2002); Gersmeyer (2003); Kitson et al (2004); Marniesse/Filipiak (2004); McFetridge (1995); Mitschke (2000); Lall (2001); Walter (2005).

Price Based Competitiveness

"Ask any good international macroeconomist what key variables they most want to know in assessing a country's overall macroeconomic position, and the "real" exchange rate [...] will often be near the top of the list" (Rogoff 2005: 104). Theorists who share this view seem to apply some kind of a business controlling approach which "focuses on the kinds of short-term macroeconomic management that affect relative prices of national goods and services relative to other countries" (Lall 2001: 1503). So, if home companies have problems selling their goods to foreign markets, the currency should be devalued and things will change for good as prices will be lower for foreign customers. To cite Boltho (1996: 2), "the desirable degree of international competitiveness in this context could be defined as the level of the real exchange rate which, in conjunction with appropriate domestic policies, ensured internal and (broadly defined) external balance." But, as Porter (1990b: 84) points out, many nations prospered despite appreciating currencies or high interest rates. Although this view was rejected by Daly (1993) who saw changes of trade flows based on exchange rate changes, devaluation must be seen as a double-edged sword. It could lower prices of export goods but at the same time increase prices of import goods. "Suppose that a country finds that although its productivity is steadily rising, it can succeed in exporting only if it repeatedly devalues its currency, selling its exports ever more cheaply on world markets. Then its standard of living, which depends on its purchasing power over imports as well as domestically produced goods, might actually decline" (Krugman 1994: 31).

Supporters of this idea also emphasize the importance of internal input prices, be it labour or other production factors, not clearly separable from the ability to attract view. They often argue that if costs are lower in a national economy, this would lead to a higher national competitiveness compared to other nations (absolute advantage). This is a direct application of firm competitiveness on the national level: lower cost is the basis of lower prices and leads to higher market shares. This asserts that demand price elasticity ε equals or is higher than one ($\varepsilon \geq 1$). Boltho (1996) calls this the "elasticity pessimism." At the level of the national economy, lower wages also can mean lower demand for the products these

companies want to sell. Indicators in use here are relative unit labour costs or terms of trade, i.e., export prices to import prices.

However, this view also neglects the structure of exports and the kind of dependency on these products on the world market (Boltho 1996: 8). There are goods which are locally bound and for which there will never be perfect competition on the world market, like oil or gas, as transportation costs – besides other factors – will limit trade and favour some nations.

Non-Price Based Competitiveness

This approach is also called the classic or traditional view. In the words of McFetridge (1995: 28): "Some of the measures of good national trade performance suggested in the literature are (a) a shift in export composition toward higher value added or high-technology products; (b) constant or increasing world market shares; and (c) a current account surplus."

Authors following the first measure like Magaziner and Reich (1982) point to the importance of high-tech industries and investments in technology for a nation to be competitive. However, as Krugman (1994) has shown, high value added can go back to the fact that some industries are simply more capital-intensive than others. Another problem here is the fact that only a few people are able to work in high-tech industries, as these industries require some special knowledge. Yet, in reality, coffee shops or retailers employ a lot of low-skilled workers and are necessary to keep unemployment low for all groups of workers. Discriminating some industries does not help.

The second definition (b) here is similar to the one of the OECD, which sees the competitiveness of a nation as "the degree to which it can, under free and fair market conditions, produce goods and services which meet the test of international markets, while simultaneously maintaining and expanding the real incomes of its people over the longer term" (OECD 1992: 237). One measure would be the share in world trade or world exports, measured, for example, with a constant market share analysis. However, as Krugman (1994) points out, for

some countries, exports stand only for a small fraction of GDP, which means these countries rely on home demand rather than external demand.

When following the third strand, a large account surplus is seen as a sign of strength, following the old mercantilist view of 'good' exports and 'bad' imports (Cellini/Soci 2002; Krugman 1996). The argument goes that countries with high exports are superior in some industries just because there is a high demand for these products. This helps an economy to prosper and can also help an economy to overcome a weak domestic demand.

However, an account surplus may also be a sign of national weakness, and a deficit at the same time a sign of strength, depending on the view one may have. To build up the balance of payments, surpluses in one or more sub-category must be balanced by deficits in one or more category. A surplus or deficit can just be a result of changes in exchange rates or interest rates and thus be unrelated to the strength of certain companies. "In sum, a current account deficit may be driven by fiscal or monetary policy rather than by an inherent failure of domestic firms in the traded goods industries to perform to international standards" (McFetridge 1995: 30).

Furthermore, if a company sells something abroad, it holds foreign currency, which, at some time, has to be exchanged for foreign goods, that is imports, as a country cannot use the foreign currency to buy goods in the home market. In contrast, capital imports can also be a sign of strength, as investors may think that a country is worth investing with a sufficient return on investment.

2.2.2 Ability to Earn: Productivity and Performance Orientation

Supporters of this view start by looking at the "results" of an economy as this will indicate the level of national competitiveness; that is., it is assumed that a higher degree of competitiveness leads to a higher GDP or income and, therefore, to a higher standard of living (Begg 1999; Budd/Hirmis 2004; McFetridge 1995). The source for this is seen in productivity gains (Porter 1990a).

When looking at this, one has to separate two definitions: one that focuses on the level of GDP per capita and one that focuses on GDP growth per capita. The level of GDP per capita, widely used when speaking about the well-being of nations, shows what is materially available for the people of a country. The growth rate of GDP per capita only shows the differences from previous periods. When comparing these two, one has to keep in mind that according to the catch-up hypothesis, countries with a lower GDP per capita can grow faster relatively more easily than those countries with a higher GDP. This is due to the fact that these countries have more and more easily accessible unutilised resources.

GDP per capita takes into account all measured material things like DVD players or cars. Non-material and non-tradable things like friendships, voluntary work or unpaid housework are not included, which is a point of criticism. In addition, higher GDP can also be based on non-welfare circumstances like higher criminal rates. Dunford (2004: 3) estimates the non-welfare share of GDP in the USA at around 7-8%. Again, the question is, whether competitiveness is really a proxy for standards of living (Bristow 2005b; Greene et al 2007; Morgan 2004). Even after accepting GDP as a proxy for competitiveness, the problem of inequality, that is, the distribution of income, remains an open but important question (Kim 2006). Even though these problems exist, GDP or per capita income growth "is the best indicator of national economic success. The most important source of per capita income growth is TFP [total factor productivity] growth. In practice, either per capita income or TFP growth will serve as an indicator of national competitiveness" (McFetridge 1995: 26).

After concentrating on the outcomes, another strand of literature focuses on the adjustment to changes, as this is seen as the determinant of competitiveness. Often this is based on the application of new (basic) technologies or innovations in general, which is described in the next section.

2.2.3 Ability to Adjust: Innovation and Flexibility

"The fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumers' goods, the new methods of production or transportation, the new markets, the new forms of industrial organization that capitalist enterprise creates" (Schumpeter 1942: 831). Based on this famous remark, the ability to adjust to changes in the environment is seen as being crucial for the competitiveness of nations as a whole. Two different concepts here can be summarized: the ability to adjust political procedures as well as the economic system as a whole (societal level), and the ability to adjust via innovations and technological change (business level). [11] These two go hand in hand as innovations will only be meaningful and can only be applied, if a society is "open" to such changes, be it economically or in general. This also stresses out the importance of free markets, open economies and entrepreneurship.

Open markets are then seen as the best precondition to allow economic adjustments when changes happen. This is true if someone follows the supply-side paradigm which emphasises the inherent stability and self-stabilising mechanisms of perfect markets. But this must be doubted when markets are imperfect, for instance, if information asymmetries exist or if human behaviour is not only purely rational but takes into account social norms.

To accept this view means nations that are at the forefront of innovations and cope with technological change via open and free markets, will be more competitive than others. They can apply these innovations and improve productivity or simply provide new products and employment possibilities. Nations that are able to innovate constantly are thus able to provide better-paid jobs as value-addition would be higher thanks to advances in technology (Magaziner/Reich 1982). Some researchers even argue that nations must, therefore, follow national strategies and engage in a "head to head" race in R&D (Thurow 1992).

This view usefully highlights the importance of innovation. Researchers such as Schumpeter (1939; 1942) have shown how important innovation is and how this

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11 This is why the 'ability to adjust' is also often termed the 'ability to innovate'.

can foster growth. However, a key question is to what extent a system can foster the ability to adjust and how innovations emerge. Evolutionary economists here point to the role of chance and path dependency in development processes (Boschma 2004). This means innovations must emerge not merely because more money is invested but also because of sheer luck. In addition, cultural influences are very important. But influencing culture not only takes some time but also proves to be very difficult. Nevertheless, few would doubt that innovations play a crucial role. In the end, the ability to adjust always comes to the micro-level of the firm on which these adjustments are made. Innovations there have to be transformed into products; that is, it all comes down to entrepreneurs in the Schumpeterian sense willing to take risks (Hospers 2006).

2.2.4 Ability to Attract: Place Attractiveness

Supporters here view competitiveness as the possibility to attract outside investments such as financial capital, but also human capital. Kovačič (2007: 555) states that "The economic prosperity of countries is associated with their ability to generate or attract economic activities" Hence, one of the most important single indicators to assess place attractiveness for investments is the level of foreign direct investments (FDI) (Gilmore et al 2003; Greene et al 2007; Morgan 2004; Müller/Kornmeier 2000). They assume that investors, when thinking about investing capital, will look for the best location to invest the money and will choose the place which will yield the highest possible returns. The inflows of capital from abroad, therefore, stand for competitiveness as the places with the highest possible returns will be more competitive and will consequently attract more investments. When following this view, by looking at the amount of FDI, one can assess the competitiveness of a country as this shows that investors are willing to invest in this country and see opportunities for future profits.

A general problem when interpreting the FDI numbers is the big mergers and acquisitions across different countries. This can be seen in the case of Germany, which has seen a net outflow of FDI from 1975 to 1999. In 2000, the take-over of

Mannesmann AG by Vodafone Air Touch plc changed this. Such effects have to be taken into consideration additionally.[12] Even if one just looks at measuring this, it is not without its problems as the definition of FDI is not clear across the different economies and data are often not available.

In addition to the four generic concepts of competitiveness, there are also concepts that cannot be grouped under one heading. In the following, two concepts of competitive advantage, Porter's diamond model and the generalised double diamond model, are discussed. Porter also stands out as, although his concept is named national competitive advantage, it deals with regional competitive advantage as well. This also stands out as Porter aims at understanding the determinants of competitiveness, while the concepts given above focus on the conceptualisation of the meaning of competitiveness.

2.2.5 The Concept of Competitive Advantage

Absolute, Comparative and Competitive Advantage

The starting point for many discussions on national competitiveness is absolute advantage, i.e. the ability to produce some particular good with a smaller total input of economic resources per unit of output than other economic actors. This is often mentioned when discussing the economic performance of developed countries against that of developing economies. The latter often have lower input prices – mostly lower labour costs – and therefore may have an absolute advantage. The argument then goes that there will be no advantage from trade as everything will be cheaper from this country with the lower costs. As intuitive as this may seem, this is not the full picture. Even such countries have to allocate their resources and will therefore engage in trade. This refers to the concept of comparative advantage.

12 Additional problems in the case of Germany are major changes in taxation which led to a higher inflow of FDI in 2004.

In economics, the term comparative advantage is well-known and used to explain why countries engage in trade, based on Ricardo's approach[13]. Within this framework, comparative advantage means the ability to produce some particular good at a lower opportunity cost than other economic actors can. This means that countries can benefit from specialisation and trade even that they have no absolute advantage. Trade therefore is not a zero-sum game and reflects differences in factor endowments. Limitations are the static view, the assumption of diminishing returns and similar technologies across nations (Kitson et al 2004: 992). The exchange rate then plays an important role as it will regulate prices and balance trade in the long run, together with price-wage flexibility.

In recent years, some authors have referred to the concept of competitive advantage to overcome the limitations of comparative advantage and to be able to explain economic performance. Porter's (1990) concept here is the most prominent one. The approach is centred around firms creating a competitive advantage in a certain field. This then emphasises the importance of productivity (Kitson et al 2004: 993). We will therefore look at the competitive advantage approach in more detail in the regional context but first will look at this in the context of national competitiveness.

Porter's 'Diamond' and National Competitive Advantage

Porter's approach has rapidly become one of the standard concepts[14] inasmuch as it has been widely cited and used in competitiveness policies and analyses around the world. His approach is based on a research project undertaken in the 1980s in ten industrialized nations and published in 1990 in his book *The*

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13 See Krugman's homepage http://web.mit.edu/Krugman/www/Ricardo.htm for an explanation of the model. Also see Ricardo (1817).

14 As Porter's approach emphasises the importance of locally concentrated, inter-related companies, this approach is also discussed in more detail on the regional level; therefore, there is a focus on some aspects relevant for the discussion of other related concepts of competitive advantage on the national level.

Competitive Advantage of Nations. The project aimed at explaining the competitive differences across nations and saw international trade and foreign direct investments as the prerequisites of a high productivity. The principal economic goal for every nation, according to Porter, "is to produce a high and rising standard of living" (Porter 1990a: 6), measured as national per capita income. This standard of living is dependent on productivity, meaning the "value of the output produced by a unit of labor or capital" (Porter 1990a: 6). He, therefore, chose the term 'competitive advantage' (of nations) rather than competitiveness. Porter notes that firms compete, not regions or nations, and introduced what he called the 'diamond' of competitive advantage, applying his framework on a national/regional dimension and combining microeconomic and macroeconomic determinants.

Porter especially highlights the importance of geographic concentration that is, clustering: "The process of clustering, and the intense interchange among industries in the cluster, [...] works best where industries involved are geographically concentrated" (Porter 1990a: 157). His intention was to explain why firms still seem to (geographically) concentrate in specific locations like the Silicon Valley, along the Route 128 or in Northern Italy. His explanation was that clusters "offer advantages in efficiency, effectiveness, and flexibility" (Porter 1998a: 80). The advantages of such a clustering stem from "the incorporation of firms into place-based networks involving trust, reciprocity, loyalty, collaboration, co-operation and whole raft of untraded interdependencies" (Taylor 2005: 4). Porter identified four factors of special importance, incorporating different existing approaches, as stated below:[15]

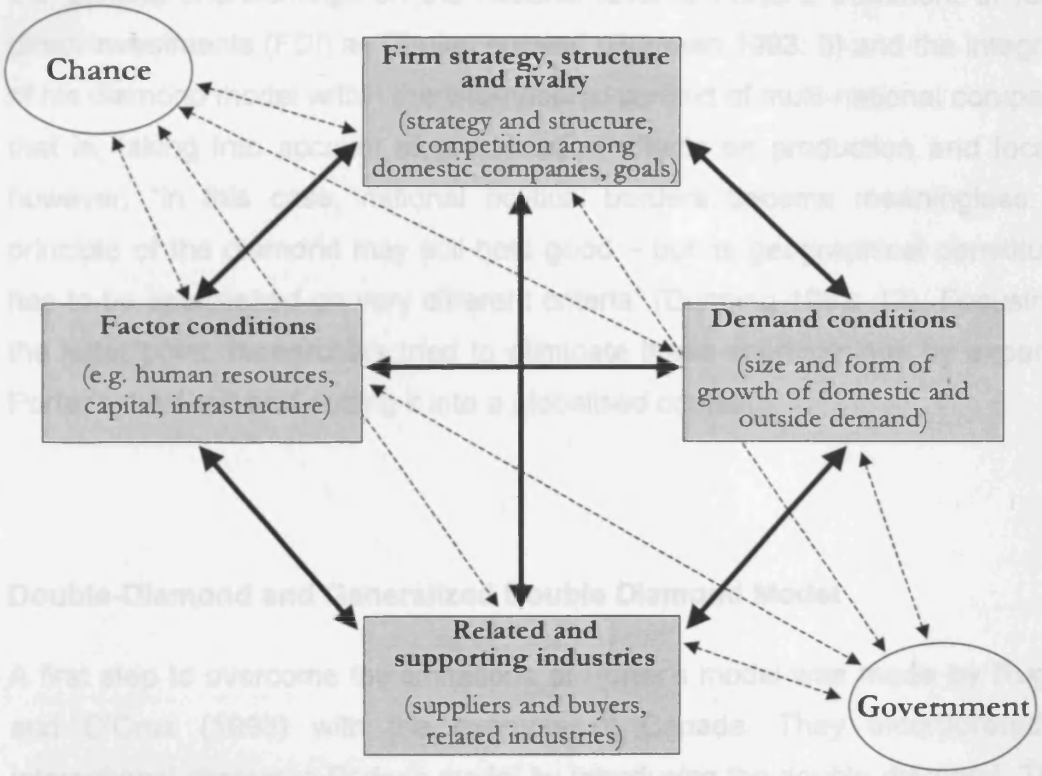
- Factor conditions, with references from classical/neo-classical economics
- Demand conditions, based on export base theory, product-cycle theory, Rostow's stages of growth
- Related and supporting companies, building on Marshall's industrial districts, polarization theory

15 See Enright (2003: 101); Gersmeyer (2004: 42, 211); Martin/Sunley (2001: 6); Porter (1990a).

- Firm strategy, structure and rivalry incorporating industrial economics, Schumpeter's work on innovation and entrepreneurship

The more intense and developed the four factors are, the better the performance of the companies within the cluster will be. In addition to these four factors, the role of government as well as the role of chance are emphasised, but not embodied in the actual diamond (Porter 1990a: 127, 1998b: 124). These two factors do not directly influence the other four factors, but influence the development of the other four determinants. These factors then form what is called a 'diamond', pictured below:

Figure 1: Porter's diamond



Source: Taken from Porter (1990a: 127)

Porter not only introduced the cluster approach to explain competitive advantages, but also put this approach within a theory of competitive development of national economies and distinguished four stages: factor-driven, investment-driven, innovation-driven and wealth-driven. The different stages reflect the characteristics of a nation and its clusters. The different stages are characterised by the characteristics of the industries, that is, the importance of the different sources of competitive advantage at that stage. Porter not only sees possible upgrading processes through the first three stages but also a process of drift and ultimate decline in the fourth stage (Porter 1990a: 545).[16]

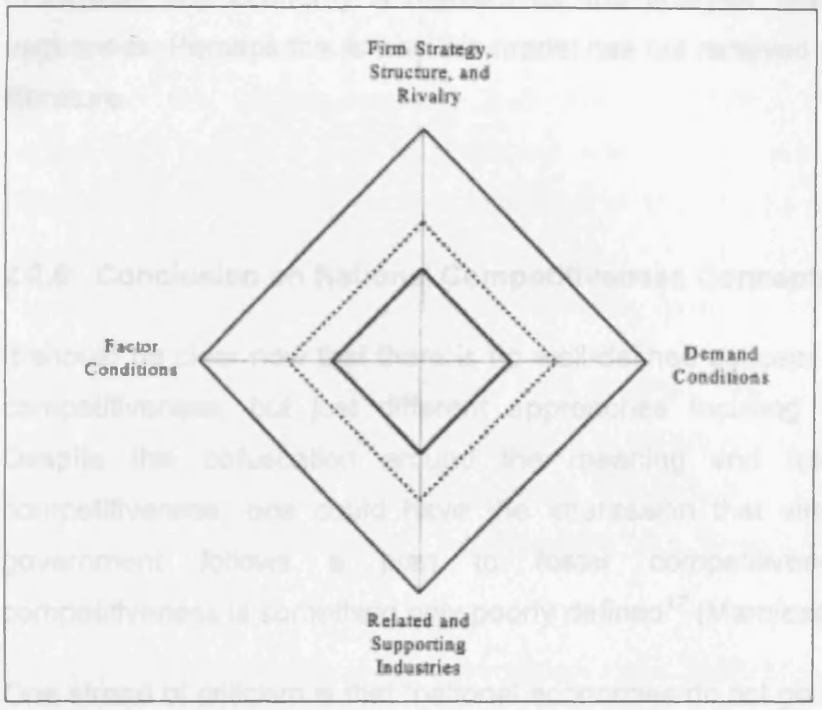
16 There are analogies with other stage theories. Porter himself points to Rostow and Vernon when explaining his own theory. He admits that Rostow's (1990) model "seeks to characterize economies more broadly" (Porter 1990a: 806). He points to Vernon's product-cycle theory (Vernon 1966; 1979) when emphasising the importance of innovation and sufficient home demand as an important pre-condition for the start of a new cycle.

While the incorporation of trust within his model offers clear advantages, one of the general shortcomings on the national level is Porter's treatment of foreign direct investments (FDI) as "Trojan horses" (Rugman 1993: 5) and the integration of his diamond model within the international context of multi-national companies, that is, taking into account of globalization effects on production and location; however, "in this case, national political borders become meaningless. The principle of the diamond may still hold good – but its geographical constituency has to be established on very different criteria" (Dunning 1993: 12). Focusing on the latter point, researchers tried to eliminate these shortcomings by expanding Porter's diamond and putting it into a globalised context.

Double-Diamond and Generalized Double Diamond Model

A first step to overcome the limitations of Porter's model was made by Rugman and D'Cruz (1993) with the example of Canada. They incorporated the international context in Porter's model by introducing the double-diamond. This is made by combining a domestic diamond with that of a relevant economy, the international diamond. This leads to the double-diamond, also representing international or multinational activities as shown below.

Figure 2: The generalised double diamond



Source: Taken from Moon et al (1998: 138)

The model looks just like Porter's but incorporates the domestic diamond (dotted line) and the international diamond (outer line), emphasising the importance of multinational activities: "The multinational activities include both outbound and inbound foreign direct investment (FDI)" (Moon et al 1998: 138). This differs from Porter's original model as the value added in a country may not only come from domestically owned companies but also from international companies. In addition, a cluster could incorporate more than one country as many companies have global operations nowadays.

This expanded and adjusted competitive advantage model has three major advantages compared with Porter's original model (Moon et al 1998: 148). Firstly, it incorporates multi-national firms; secondly, it is easier to operationalize; and thirdly, government activities are seen as an endogenous variable. In addition, the notion that clusters could stretch over more than one country could lead to situations where the whole world is part of a cluster as many companies have operations incorporating several continents. Drawing cluster and industry boundaries for the comparison still remains a difficult task and the linkages are

also not easy to assess. This could lead to multiple, not only double, diamonds if more than one economy is relevant for the analysis, leaving the model with vagueness. Perhaps this is why this model has not received much attention in the literature.

2.2.6 Conclusion on National Competitiveness Concepts

It should be clear now that there is no well-defined concept or theory of national competitiveness, but just different approaches focusing on certain aspects. Despite this obfuscation around the meaning and relevance of national competitiveness, one could have the impression that virtually every national government follows a plan to foster competitiveness. But national competitiveness is something only poorly defined[17] (Marniesse/Filipiak 2004: 43).

One strand of criticism is that "national economies do not go out of business such as uncompetitive firms" (Kitson et al 2004: 992). The question then is where the bottom line would be. "The bottom line for a corporation is literally its bottom line: if a corporation cannot afford to pay its workers, suppliers, and bondholders, it will go out of business . . . Countries, on the other hand, do not go out of business. They may be happy or unhappy with their economic performance, but they have no well-defined bottom line" (Krugman 1994).[18]

When nations are treated like companies, one assumes that they compete with similar products in the same market. In the case of companies, Boeing competes against Airbus in the large airplanes segment. They have the same possible customers and offer a similar solution. "But the major industrial countries, while they sell products that compete with each other, are also each other's main export markets and each other's main suppliers of useful imports" (Krugman 1994: 29). In the case of nations, this would mean that the UK would compete

17 "La compétitivité est une notion encore mal cernée."

18 This can be illustrated with the case of Argentina: in 2001, Argentina declared itself as being bankrupt and the bonds issued by the government were next to worthless. In 2006, Argentina still issued new bonds as investors trusted the government to now pay back the debts reliably. In a court decision, the German Federal Constitutional Court made clear that countries cannot declare bankruptcy against private persons but only against other countries (reference: 2 BvM 1-5/03, 1/06 u. 2/06; see also Handelsblatt 2007: 27).

against Germany in the market of GDP as this is the outcome of economic activity. It is often argued that nations are direct competitors for foreign direct investments if companies seek new business locations. But this is only a minor fraction of any bigger economy and often connected with subsidies or tax reductions. This is a kind of economic war and a zero-sum-game as many corporations will just take the subsidies and after some time leave for a new location. Economic development in the longer run should aim at a broader basis for development and not just focus on attracting foreign direct investments.

Within this context, authors often call for a strategic management on the national level, focusing, for example, on high value added activities or exports.[19] This sight is of limited help.[20] The danger here is that such rhetoric is used to justify protectionism and trade wars in a mercantilist way, leading to wealth losses on all sides in the long run.

Some authors (Cellini/Soci 2002; Krugman 1994; McFetridge 1995; van Suntum 1986) totally reject the application of the term competitiveness in the national context, with Krugman being the most prominent opponent. They argue that countries do not engage in trade as in a zero-sum game. Trade is not about absolute advantage and not about competitive advantage but about comparative advantage, that is the advantage in producing one good against another within an economy, based on Ricardo's (1817) concept. "Each country has a comparative advantage in some goods, a comparative disadvantage in others, no matter how efficient or inefficient it my be on average" (Krugman 2003: 17).

It can, therefore, be argued that national competitiveness could be better placed in political science or marketing. Similarly, Cohen (1994: 196) called the notion of national competitiveness in political statements without ever clearly defining it "metaphors, [trying] to encapsulate complicated matters for purposes of political mobilization."

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19 Typical publications here are Kotler et al (1997), 'The marketing of nations' or Thurow (1992) 'Head to head', emphasising national economic competition.

20 In addition, a large portion of the GDP is achieved in highly localized sectors and cannot easily be relocated to another country. Take coffee shops, restaurants and many services as examples.

Again, just as Krugman has argued, economists do not see national competitiveness as a valid concept and, therefore, pay next to no attention to it, although policy-makers still refer to it repeatedly.

After having discussed the different concepts of competitiveness on the national level and having showed that there is no consensus if national competitiveness has any meaning and, the discussion now focuses on regional competitiveness concepts, starting with a discussion on the role of regions.

2.3 Concepts of Regional Competitiveness

2.3.1 The Role of Regions

The Re-discovery of Regions

Recent years have witnessed the re-discovery of regions[21] in economic development literatures (Bristow 2005a; Kitson et al 2004; Lagendijk/Cornford 2000; Martin 2005; Morgan 2004; Ohmae 1995; Scott 1998). Often the claim is that regions are the more appropriate level to cope with global competition (Higgins/Savoie 1997; Storper 1997). As Martin (2005: 3) states: "It is at the regional (sub national) scale that many of the increasing returns that raise the productivity of firms and workers are created and are self-reinforcing. It is also at this scale that the 'soft' factors now increasingly believed to exert a significant influence on the performance of economic activity – such as social capital, institutional thickness, cultural facilities, and the like – tend to be embedded and are most amenable to policy support." This has come together with a trend to decentralise power as in the case of the UK. "[T]he Government believes that a successful regional and sub-regional economic policy must be based on building the indigenous strengths in each locality, region and county. The best

21 The term region here refers to a sub-national area and covers geographical scales such as sub-regional states, provinces, cities, city-regions, metropolitan areas, cantons, counties or local areas.

mechanisms for achieving this are likely to be based in the regions themselves" (HM Treasury 2001: vi).

This statement asserts first that the ability to compete successfully lies within every locality, that is, it is "predominantly endogenous to the region and reside in the institutional environment" (Bristow 2005a: 291), and secondly that regions are the most appropriate spatial scale to address the competitiveness issue.

Referring to the first, empirical findings that showed "a rate of regional convergence that is much slower than the rate proposed by orthodox neoclassical models" (Martin/Sunley 1998: 214) led to the idea that technological change and economic development are induced by previous economic conditions[22] and lie within a territory itself. These endogenous development approaches then put special emphasis on the potential for innovation or more broadly knowledge creation, as this is seen as one of the key drivers for economic development (Greene et al 2007; Lagendijk/Cornford 2000; Lovering 1999).

The importance of regions then stems from the hypothesised crucial role they play in fostering innovation and knowledge creation.[23] Several authors (Audretsch/Feldmann 1996; Camagni 2002; Cooke 1992; Cooke et al 1998; Porter 1994; 2002), therefore, concluded that the 'region' is becoming the 'crucible' of economic development; and [...] should be the prime focus of economic development (Lovering 1999). This is said because it is assumed that "knowledge and innovation have a strong social component and [...] are underpinned by spatially constituted norms, routines, and conventions" (Greene et al 2007: 3). These advantages on the local level stem seemingly from the "incorporation of firms into place-based networks involving trust, reciprocity, loyalty, collaboration, co-operation and whole raft of untraded interdependencies" (Taylor 2005: 4).

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22 Primary attempts to endogenise technological progress include Arrow (1962), introducing "learning by doing"; Lucas (1988) modelling human capital as the determinant factor of technical change and Romer (1986; 1994) including R&D in the production function.

23 The importance of agglomeration as a special form of regions was emphasised earlier by researchers like Vernon and the regional version of the product cycle hypothesis. (Vernon 1966; 1979)

The focus on regions was also derived from the observation that although space should not matter anymore in an era of globalisation, still there seems to be a tendency to concentrate in certain areas ('glocalisation'). This observation goes back to Marshall's (1920) work on locational choice and industrial districts or Perroux's (1955; 1983) work on leading sectors in economics.[24]

Agglomeration Effects

The question that becomes is what locational advantages can be observed for co-locating firms. Firms compete on prices or quality, i.e. non-price-characteristics. If economic activity is concentrated in certain places, this could have two causes (Schätzl 2003: 34): firstly, internal reasons (large scale economies),) and secondly, external reasons (agglomeration or urbanization economies). Internal reasons are due to the fact that companies can encounter lower costs per unit if they enlarge their operations and do not spread their operations over several places. External reasons are characteristics that are external to the company but influence their location decision.

These agglomeration economies emphasize the positive externalities or external economies of scale, scope or complexity based on co-locating in a particular area (Turok 2004: 1075). Budd and Hirmis (2004: 1024) see the following three types of agglomeration economies:

- Localization economies, i.e. advantages from joint location such as a pool of skilled labour or specialisations within an activity.
- Urbanization economies, referring to transport or communications facilities or municipal services advantageous to the firm.
- Activity-complex economies based on links from trading such as occurring within industrial complexes, e.g. supply-chains.

[24] Porter (1990a; 1994) took up these ideas and especially emphasised the importance of geographic concentration. His approach is discussed later.

These points are of special importance in the context of city-regions, also described as cities competing over locational assets (Budd/Hirmis 2004: 1021). This means that there is a certain degree of competition based on the locational advantages. City-regions then may attempt to "enhance their locational advantage by manipulating some of the attributes which contribute to their area's value as a location for various activities" (Gordon/Cheshire 1998). Recent discussions now focus on the 'soft' factors or dimensions behind such locational advantages. "[T]he argument is that in a globalized economy, the key resources for regional and urban competitiveness depend on localized processes of knowledge creation, in which people and firms learn about new technology, learn to trust each other, and share and exchange information (Malecki 2004).

Of course these locational advantages can turn into a disadvantage if for example higher traffic – as a consequence of attracting more labour – leads to more congestion or rents are rising, driving low-cost production out of the city. These are the kind of negative agglomeration effects which Hirschman (1975) described in the context of spreading growth spatially to urban areas[25]. The discussion on the role of such agglomerations for regional development, the driving forces as well as the explanation of certain patterns of spatial concentration goes back to Christaller (1966), Lösch (1954) or even von Thünen (1826) with modern approaches ranging from Marshall's (1920) industrial milieus, Perroux's (1955) growth poles or Friedman's (1972) core-periphery-approach, with the 'hottest' one being Porter's (1990) competitive advantage approach. All these explanation emphasise the importance of regional co-location and therefore the role of the local environment in regional development.

However, as Boschma (2004: 1011) states, "one should be cautious to overestimate the role of the local environment." Thus, whilst the local environment may be important, this environment is also shaped by the national or

25 Myrdal (1957) had a negative view on the spread of growth from centres to peripheries and argued for a stable imbalance also due tot he mobility of labour migrating to the growth centre.

super-national environment, especially in the case of basic regulations ('formal institutions'). Morgan (2004: 873), for example, argues there has been "a tendency to ignore or downplay the role of the national state", but also a tendency to downplay the role of "the public sector and the macro-economic dimension." "Despite the spreading out of functions, the sovereign state continues to play a major role in the modern world, and any claims about its imminent demise must be viewed with caution" (Scott 1998: 46).

Therefore, some like Martin/Sunley (2001) heavily criticise what Taylor (2005: 8) calls "[t]he Fetish of Proximity," especially when it comes to cluster promotion. They argue that there is no clear empirical evidence that proximity, at whatever geographical level, has to be limited to space as embeddedness can be spatially but also socially limited, within a certain culture (Taylor 2005).[26] Furthermore, it is not only not clear which spatial level is best to address, but in the case of innovation, "there is likewise little consensus about the role of the state in influencing technological innovations" (Sternberg 1996: 524).

In summary, the issue with the right spatial scale to address is that on the one hand, all economic activity is rooted in a local or regional system, the place where it is actually happening. This is why regions may be the right geographical scale. On the other hand, the precise role and significance of a region is not clear, as regions are stuck between the macro (national) level and the micro (firm) level (Budd/Hirmis 2004). This has to be taken into account when taking over the concept of competitiveness from the national to the regional scale. Again, it could be that the notion of the growing importance of regions may be more a political metaphor to please certain political groups[27] than a well-founded concept for regional development. In addition to this it could also be pointed to the current financial crisis, where even nation states have problems responding to it. Such issues are catastrophic impacts for regions and next to impossible to address on the regional level without a strong national government or supra-national co-operation.

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26 Hardill et al (2002) showed this for Asian businesswomen in the UK. These women were connected emotionally, not spatially.

27 One may think of regions aiming at seeking their independence as a sovereign state.

In the following sections, concepts of regional competitiveness are presented together with some criticism to give an overview of the debate. The grouping of these concepts follows the approach of Bristow (2005a) and Martin (2004) and tries to provide a comprehensive overview of the different strands of literature. In general, three broader strands of regional competitiveness concepts can be distinguished: microeconomic (productivity) and macroeconomic (attractiveness) approaches and those which combine both perspectives, such as Porter's competitive advantage approach.

2.3.2 Microeconomic Regional Competitiveness: Productivity

One concept of regional competitiveness starts by stating that the competitiveness of a region or a nation is analogous with the competitiveness of a firm[28] (Rousseau/Mulkay 2006: 3). In an analogy with the competitiveness of firms, these authors point to the importance of productivity on the regional level.

Many authors like Porter (1990a), therefore, mention productivity as the ultimate measure of competitiveness: "The appropriate definition of competitiveness is productivity" (Porter 2002: 3). This is also in line with economic theory, where virtually all economic growth theories see productivity growth as the basis for economic growth and productivity, therefore, is seen as the determinant of the standard of living. In analogy to firm level productivity, a region must also efficiently use its resources and shapes as a positive microeconomic environment for the companies within. "Competitiveness ultimately depends on improving the microeconomic foundations of competition" (Porter 2002: 5).

This means a region is more competitive if the companies within it are more competitive (Martin 2004), that is, if they have a higher productivity than other firms in other regions. One would then have to assess the competitiveness of a region's firms to derive a region's overall competitiveness.

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28 "La compétitivité d'une région ou d'une nation [est en] analogie avec la compétitivité d'une entreprise".

The main issue here is that though firms may be important for a region, regional competitiveness must mean more than just productivity; it must imply employment or distribution of incomes. "[T]he focus on productivity should not obscure the issue of translating productivity gains into higher wages and profits and, in turn, the analysis of institutional arrangements and market structures" (Martin 2004: 2-3).

Firms also have different goals than regions. For a firm, it could be plausible and necessary to cut wages in order to keep costs low. For a region, on the contrary, this could be a serious problem as lower wages could also mean lower local demand.

2.3.3 Macroeconomic Regional Competitiveness: Place Attractiveness

One of the most frequently used definitions for regional competitiveness is "the capability of a region to attract investments and keep firms with stable or increasing market shares in an activity" (Storper 1997: 264).

Supporters of this view see competitiveness as the possibility to attract investments from outside regions. Some authors like Florida (2002) focus on the human capital side and assume that regions – especially city-regions – have "to attract creative talent."[29] When emphasising the role of attracting "talent", i.e., human capital, this is not only done with respect to employees but also with respect to these "talents" as potential business founders (Florida 2002). The reason why some regions attract more "talents" than others is seen in the diversity of people. This shows the closeness to the concept of the ability to adjust, which –besides other things – calls for economies to be open to immigration.

One of the most important – but also one of a narrower definition – indicators to assess this kind of competitiveness is the level of foreign direct investment (FDI)

[29] It has to be said that many authors point to the importance of attracting talented and creative people without referring to competitiveness. Jacobs (1961) here can be seen as one of the first to call attention to the role of city-regions in attracting talents.

in the regional level, which is similar to the 'ability to attract' conception of competitiveness at the national level. It is assumed that investors, when thinking about investing capital, will look for the best location to invest the money and will choose the place which will yield the highest possible returns. The inflows of capital from abroad, therefore, function as a proxy of competitiveness as the places with the highest possible returns will be more competitive and, therefore, will attract more investments. One then must look at the different reasons for investing in a particular region.

The first reason could be vertical FDI: a company locates where costs per unit are lower than in the home market. This could lead to lower overall employment in the home region and, therefore, weaken an economy at first sight. It could also put pressure on the redundant workers and the wages or lead to higher unemployment in the home region.[30] But it could also lead to shifts of employment to other sectors or the creation of new enterprises, dependent on the functioning of market forces, i.e., the ability to adjust to changes.[31]

Another picture can be painted when thinking of horizontal FDI. Here, a company seeks new markets and, therefore, invests due to cultural differences. As stated in the EU Competitiveness Report of 2004 (European Commission 2004: 174) "Investing in especially influential regions, be it for R&D, production or distribution reasons, opens up a more efficient channel for companies to harness these forms of tacit knowledge from abroad." This could lead to even higher sales and higher returns for the people in the home country, and an overall positive effect for both regions.

Besides these economically-driven reasons for investing, there are also non-economic reasons, namely, trade distorting measures, forcing companies to invest in a specific region. One governmental restriction could be a minimum share of local production in a certain region when entering a foreign market. Although this may not be a greater problem in Western countries, "[s]till, it is a

30 This is known as cumulative causation theory (Myrdal 1957). Theories that address uneven development are Christaller's (1966) central place theory; Friedman's (1972) core-periphery approach or Hirschman's (1958) theory of unbalanced growth.

31 See Richardson's (1980) polarisation reversal theory.

reality in international markets and should be borne in mind when interpreting the results" (European Commission 2004: 174).

This makes clear that FDI alone is not a valid indicator for regional competitiveness as the reasons for investing can often be explained by other circumstances and not necessarily with a region's competitiveness. One would have to look at the composition of FDI and the individual reason for investing in that specific region, something seldom done. This is even more the case on the regional level. Here, data is hard to get but more importantly, the investment of a single company may change the whole picture and lead to huge variations over time.

Reichel (2002: 223) asserts that a considerable portion of the FDI of industrialized countries helps foster employment as the most important reason for FDI is the overcoming of policy restrictions or simply risk management. In addition to this, his analysis of empirical studies of FDI reasons indicate that two-third of all FDI come back to horizontal integration and only one-third to vertical integration (Reichel 2002: 217).[32]

Some also look at other factors like the bureaucratic burden –"ease of doing business" (The International Bank for Reconstruction and Development 2007). This concept also follows the microeconomic approach and assumes that what's good for companies in terms of input factor restrictions is good for a region and the people. One of the central recommendations then is to leave the markets to the private sector, following the neo-classical and supply-side theorists. That this view can be doubted should be clear by simply pointing to Keynes and other demand-side economists and theories or the rigorous assumptions of this paradigm. Firms do not only take into account restrictions but also market attractiveness as a whole which is also driven by prospects. But it is also clear that restrictions may hinder economic growth and entrepreneurship.

32 Müller and Kornmeier report similar findings, based on their own research of the Bavarian metal and electrical industry. See Müller/Kornmeier (2000).

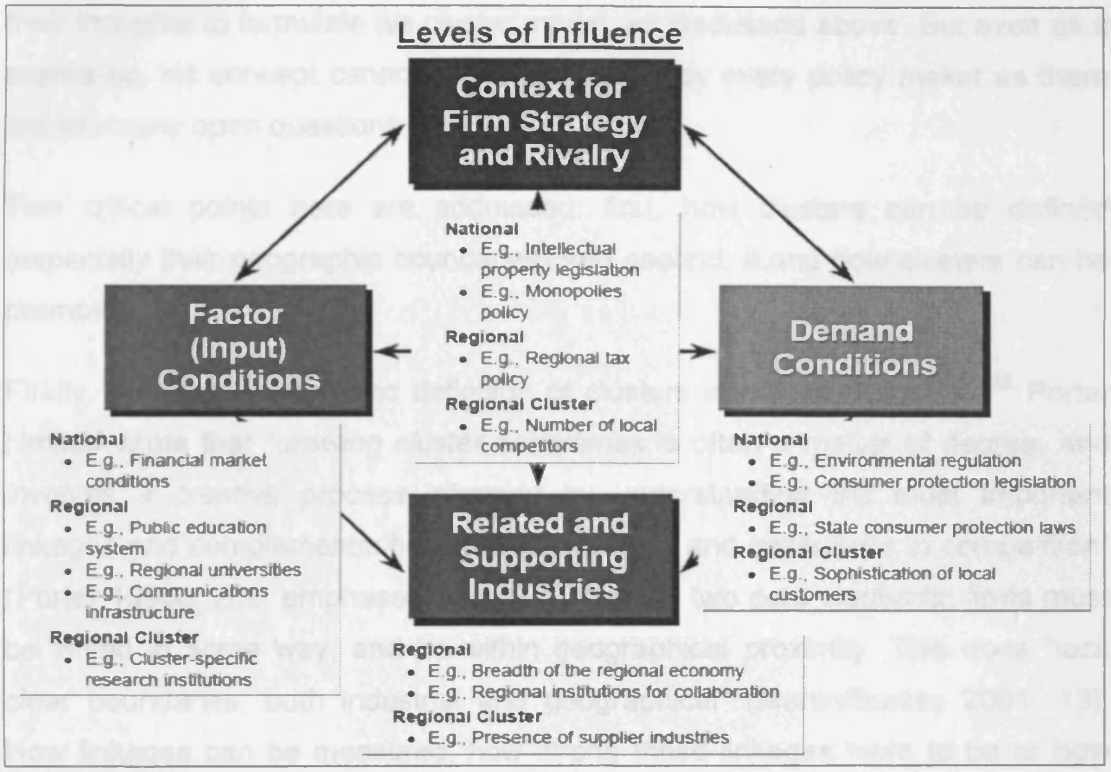
2.3.4 Competitive Advantage: Regional Competitiveness as Macroeconomic Performance

This concept takes into account both approaches, the microeconomic and macroeconomic levels, and defines regional competitiveness according to the "output" of a region. "A region is 'competitive', according to this view, when it has the conditions to enable it to raise its standard of living, or the ability to sustain 'winning' outcomes" (Bristow 2005a: 289). Therefore, regional competitiveness has to do with both firm-level competitiveness as well as the region's performance, meaning attractiveness for the regional environment.

As stated above, one of the most important approaches is Porter's approach, combining micro- and macroeconomic level features.[33] Although originally labelled "the competitive advantage of nations" (Porter 1990a), his focus has later shifted to the regional scale (Kitson et al 2004: 993). Porter also notes that firms compete, not regions or nations, and introduced a regional version of the 'diamond' of competitive advantage, which he uses in the context of regional competitiveness:

Figure 3: Determinants of regional competitive advantage

33 Other approaches deal with the knowledge-creation and the role of the local milieux. See Cooke et al (2001).



Source: Taken from Porter (2002: 25)

In short the approach postulated by Porter is export-oriented and focuses on per capita income as the measure for standard of living. Traded industries are then seen as fundamental to prosperity. "These industries sell products and services across regions and often to other countries. They locate in a particular region based not on resources but on broader competitive considerations, and employment concentration varies markedly by region. Examples of traded industries include aircraft engines and engine parts, motion picture and videotape production, and automobile assembly" (Porter 2003: 559).[34]

In conclusion, Porter's concept offers many useful insights on the (microeconomic) factors driving regional growth, like positive feedback effects between related or supporting companies or the importance of firm strategies. He also pointed to the important role of trust between different companies and the role of location. He mostly draws on the ideas of other researchers and combines

34 This emphasis on export-oriented industries is well-known from export base theory. See Higgins/Savoie (1997), also pointing to the limited empirical justifications for this emphasis, as they see many different determinants of regional development like governmental spending. Additionally, exports can also be seen as outcomes, not determinants.

their thoughts to formulate his cluster model, as discussed above. But even as it seems so, his concept cannot easily be applied by every policy maker as there are too many open questions.

Two critical points here are addressed: first, how clusters can be defined (especially their geographic boundaries) and second, if and how clusters can be promoted.

Firstly, the identification and definition of clusters is not an easy task.[35] Porter himself wrote that "*drawing cluster boundaries* is often a matter of degree, and *involves a creative process* informed by understanding the most important linkages and complementarities across industries and institutions to competition" (Porter 1998c: 202, emphases added).[36] He sees two core elements: firms must be linked in some way, and be within geographical proximity. This does "lack clear boundaries, both industrial and geographical" (Martin/Sunley 2001: 13). How linkages can be measured, how strong these linkages have to be or how specialised a group of companies has to be to constitute a cluster, are open questions. But if clusters cannot be properly defined, one cannot easily apply the concept nor compare – benchmark – different clusters (and their policies). This is perhaps why many studies come up with new clusters as "simple industrial concentration" (Engelstoft et al 2006: 83).

Secondly, the notion of the importance of clusters for boosting regional competitiveness has led to some absurd situations. Policy-makers tend to label all kinds of groups with the term cluster or even try to build clusters from scratch. But this is not what Porter was writing about--he identified clusters around the globe and aimed to explain why these companies have grouped. This is at first descriptive and inductive rather than prescriptive. Porter made clear that governments should follow policies "that create an environment in which companies can gain competitive advantage rather than those that involve government directly in the process, except in nations early in the development process" (Porter 1990b: 86).

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35 Engelstoft et al (2006) discuss methodological issues when identifying clusters.

36 Enright (2003: 102) found 11 dimensions, ranging from geographic scope over geographic span of sales to ownership structure, to characterize a cluster. Martin and Sunley state ten different definitions of the term cluster (Martin/Sunley 2001: 15).

The impression one can get here is that it is often "simply assumed ex ante that clustering or co-location is beneficial, and this has led to such arguments being viewed as a panacea for all regional problems" (McCann/Sheppard 2003: 656).

Together with the "flexible" definition of clusters, this has led to the universal application of the concept as "a regional version of the American Dream" (Martin/Sunley 2001: 48). The theoretical vagueness together with some striking results from case study regions could be seen as the reason why policy-makers – and the public – are blindly following: it is vague enough to be applied in a number of regions all over the globe but also can be verified by pointing to several case studies where "it is working". Martin (2004: 2-19) concludes that "[y]et ironically, the very vagueness of the cluster concept is probably a major reason why it has proved so influential, since it is sufficiently broad as to encompass a wide variety of cluster types, geographical scales, and theoretical perspectives, whilst situating competitiveness at the core of regional analysis."[37]

2.4 Growing Critique: Regional Competitiveness and Regional Science

The Meaning of Regional Competitiveness

It was made clear that "spatial competitiveness remains markedly under-theorised" (Greene et al 2007: 7). This has led some authors to be fatalistic about competitiveness: "One difference between development theory and competitiveness theory is that competitiveness theory brings us a new story about clustering and networking" (Kovačič 2004: 4). This connects back to the advantages of co-location. These positive effects have long been discussed in regional development (Budd/Hirmis 2004)[38]

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37 Yet ironically, Porter himself stated that he does not want to see his approach as a competitiveness approach but as a competitive advantage approach. This does not prevent him from being viewed as one of the competitiveness gurus.

38 See the appendix for an overview on regional development theories and chapter 2.3.1..

The point is that regional environments are indeed important influencing factors for companies although companies compete in markets, not regions. Knowing this, it is also the case that there are areas where places compete directly, as in the case of attracting talented people or investments. The latter is often taken as proof of the existence of competition between regions (Boschma 2004; Camagni 2002; Kitson et al 2004; Turok 2004) as can be observed when companies look for new production sites. In such a situation nations or regions also try to attract investors with tax reductions or other subsidies.[39] Such cost arguments may come up first when talking about competitiveness, but as could be seen above, this is only one facet of the competitiveness debate and offers no full explanation.[40]

Factor mobility remains the important variable in the competitiveness equation: "in the absence of factor movements, it makes almost no sense to talk about national 'competitiveness'" (Krugman 2003: 17). At the national level all goes back to comparative advantage, not absolute advantage but "at a regional level, however, the story changes drastically" (Krugman 2003: 18). If labour mobility is not perfect, regional competitiveness has some meaning (Camagni 2002; Krugman 2003) as people move more probably between regions than between nations. "Success for a regional economy, then, would mean providing sufficiently attractive wages and/or employment prospects and return on capital to draw in labor and capital from other regions. It makes sense, then, to talk about 'competitiveness' for regions" (Krugman 2003: 19).[41]

The best approach in this context may be to carefully make use of the word and define it as specifically as possible, bearing in mind that there is no general theory of competitiveness as there is no general theory of regional development.

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39 This is perhaps why discussions on taxes and labour costs are so prominent and often-cited in the context of competitiveness.

40 Interestingly, such debates come and go over the ages. Around 1900, societies in Britain were afraid of German (Williams 1896) or US American firms (McKenzie 1902) entering their respective market, just as 60 years later when Japanese firms entered the markets.

41 Of course one would have to take into account sunk-cost effects.

The consensus view of the elements of regional competitiveness based on Martin (2004: 2-2) then would be rising living standards or well-being, open market conditions and a sustainable situation with no short-term "wins."[42]

In this context phrases like 'winners' and 'losers' are often used. But this is misleading. If two regions grow at relatively fast rates, with one growing still faster than the other, in absolute terms both would be better off. There would only be a "relative loser" and a "relative winner" but no absolute winner or loser. Stating this, it is clear that "things are going to feel better" (Krugman 2003: 21) in regions that are said to be on an upswing even if that this is little more than a psychological effect. This perception is exactly where regional competitiveness can come into play as regional competitiveness is to a large extent about the perception of the "otherness" (Bellini et al 2008) of a region. Regional competitiveness then only has a meaning if regions are compared to each other. Regional competitiveness, therefore, is seen as a special aspect of regional development, an arena in which regions are compared to each other and are in competition for labour or financial capital dependent on the rate of mobility of these factors. This relative view is in line with Kovačič (2007) or Hospers (2006: 3), stating that "'regional competitiveness' [is] a relative concept, implying the need to compare with others" which then implies the need for benchmarking and indicators and indices. Competitiveness, therefore, can be seen as "a way of discussing the relative performance of economies in a benchmarking sense. It can help identify areas of the economy that are lagging behind but cannot explain the reasons for those lags" (Dunning et al 1998: 21). Explaining these lags would be left to regional development theories.[43]

This takes into account that competitiveness and its measurement may be of added value for the field of regional science. This is because there is a need to benchmark and learn from others as this might prove a good way of gaining some insights on the process of development.

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42 Even then it is assumed that liveability and well-being is solely connected with material things. This must be doubted (Bristow 2005b:45; Bristow/Wells 2005; Morgan 2004: 884).

43 See the appendix for an overview of current regional development theories and approaches.

To date, the different concepts of competitiveness add up to a confused picture. On the one hand, the firm is prioritised as this is seen as the level where wealth actually is created (Porter 1990a; Krugman 1994). On the other hand, authors point to the business environment, influencing firm performance (Cellini/Soci 2002). But firm performance itself cannot be explained yet. Even leaving this aside, one additional aspect is often not mentioned: The difference between comparing intra-national regions or inter-national regions, that is if regions within one nation or regions from different nations are compared[44]. This is an important distinction as on the national level exchange-rates are an important factor in balancing trade. Intra-regional trade can not be balanced with the help of exchange-rate changes, which is called the balance of payment-constraint (Budd/Hirmis 2004). This additionally has to be taken into account.

Again, much more work and theorisation is needed, also taking into account the role of chance. One, therefore, has to let go the command and control approach and see regions as what they are: complex systems of interacting elements.[45] Then, factors such as trust or culture and what people perceive have to be taken into account.

Regional Competitiveness and Ideology

As discussed earlier, there is a strong competitiveness hegemony that is not questioned the way it should be questioned (Bristow 2005). Even though some authors like Bristow and Wells (2005) or Lovering (1999) doubt this paradigm and provide possible alternatives, it is still widely applied uncritically. Many publications just seem to follow this paradigm by simply stating that regions – or places – are important and therefore competitiveness is crucial nowadays. This is

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44 More precisely we should distinguish between regions with the same currency and regions with different currencies as there are regions from different nations using the same currency as in the case of the European Monetary Union with the Euro or the West African Economic and Monetary Union with the West-African CFA-Franc.

45 This is done in approaches such as systems dynamics.

often done without ever clearly theorising what exactly is meant by this and how the mechanisms at force would be.

It is therefore necessary to critically examine the mass of regional indices to work out their grounding or non-grounding in theory and if there are any commonalities in the use of indicators and index construction techniques. The question is not only, how this benchmarking currently is undertaken, i.e., how regional competitiveness is being assessed and regions are compared to each other. The real question behind is how the authors of such indices sell their arguments and place their ideology in public explicitly and implicitly.

This is especially of importance as regional competitiveness is mostly about benchmarking and, therefore, ways have to be found to capture regional characteristics in a measurable way. Therefore, the following chapters deal with the measurement of competitiveness with the help of rankings. After looking at the theoretical grounds of regional competitiveness, it could be seen that the current approaches do not provide a strong conceptual basis for measuring competitiveness.

This may be due to the fact that economists do not pay attention to rankings or the notion of competitiveness. This is dangerous. First of all, leaving the field to the blind followers and mercantilists – as Krugman called them – will lead to more 'undertheorised' indices and policy recommendations. Secondly, policy makers may take the findings as granted and respond to them, particularly because of the media attention they receive. Researchers, therefore, must also find a way to be heard in public – besides the fundamental work on the theoretical basis – to break the competitiveness hegemony and start a discourse on how to help regions based on policies that take into account regional characteristics and not apply catch-all approaches from best cases for all kind of regions.

The discussion should also be brought back to regional development and not focus on regional competitiveness practices alone as this is just one specific area of regional science, focusing on benchmarking. It is, for example, still not clear

how to define well-being and measure it properly. As well-being is the central goal in life, this should be focused more.

In the following, this analysis focuses on the utility not only from a theoretical but also from a political standpoint, that is, if competitiveness indices can be seen as a meaningful tool from the perspective of policy-makers.

3 Benchmarking and Composite Indices

The following chapter gives an overview of benchmarking and indices as a mechanism for benchmarking places, closing with some pros and cons for the use of rankings. It will, therefore, first be shown that benchmarking is a necessary tool for businesses and public organisations. This is of importance as this is a way of getting external feed-back on one's own position as well as the specific strengths and weaknesses with respect to certain characteristics. Especially politicians need such feed-back as they have no possibility to get a feedback on their policies. It can be compared with getting grades in school. These grades or ranks help to condense the vast amount of information and, therefore, help to communicate complex issues with the help of a single grade, i.e., getting the message across to stakeholders. As these single ranks, grades or scores are coming from a black box, there is a need to unpack these boxes and look at how they are constructed. This chapter, therefore, provides an overview of current index construction techniques and the main issues when constructing such indices. This highlights that results of such benchmarking with the help of composite indices will mostly depend on the approach used to the weighting of factors, the kind of aggregation technique employed and the approach to the standardisation/normalisation of original data. It will be shown that index creation is not a clear science and that insufficient attention to date has been paid to the construction of indices and the application of alternative techniques. Mostly, authors focus on indicators and the theoretical frame when analysing composite indices. This is surprising as measurement should follow theory. One can observe a rush for measuring and benchmarking regions before even developing a sound theoretical and methodological framework. Evaluating indices by deconstructing them and understanding their role and utility, therefore, is essential and will provide relevant new insights for the discussion of regional competitiveness and its measurement. The following chapter lays the ground for understanding benchmarking and index construction before moving on to the evaluation itself.

3.1 Benchmarking Places

Benchmarking is a well-known tool in business with its origins in the 1950s (Sisson et al 2002: 5). It was carried over to the political arena in recent years, together with the New Public Management approach (see OECD 1996 for an earlier overview of initiatives). In general, there are three forms of benchmarking (Sisson et al 2002): performance benchmarking comparing outcomes, process benchmarking comparing efficiency, and strategic benchmarking comparing the driving forces behind the economic success.

The analogy with private sector management is clear: both look at outcomes of their operations, compare it against set targets and other entities and want to know more about the reasons for the differences. This is exactly what benchmarking aims for: "To identify best practices world-wide [...] to improve the competitive position of nations, industries and organizations through: knowledge of self, knowledge of others; incorporating the best in gaining superiority" (Kovačič 2007: 556).

This always means the definition of some sort of outcomes. In the private sector cash flow, profitability or costs are applied. When carrying over the benchmarking idea to the public sector, one faces the problem that there is nothing like an agreed on performance number. Whilst it is only human to 'dig deeper', one should also be cautious when generalising certain findings as there is no general theory of regional development or regional competitiveness to provide policy-makers with a consistent framework. Evidence-based strategy formulation has to be applied, based on some empirical case studies (Lagendijk/Cornford 2000; Lovering 1999; Martin 2005) or "best practice" (Hospers 2004; 2006). This is only natural as the emphasis on competitiveness leads to an interest in benchmarking as benchmarking is conducted to better understand competitive forces and the competition in general. Therefore, the best practise approach is universally applied to learn from the best performing regions.

In the case of cluster promotion, the unreflected application of these 'best case studies' by policy-makers is criticised strongly (Budd 2006; Hospers 2006;

Lagendijk/Cornford 2000; Lovering 1999). The problem here is that policy-makers set the regional framework based on the findings of best-practise-studies and chose one or more sectors for promotion, which often led to what Hospers (2004: 20) called "silicon somewheres". One can now observe that "[e]verywhere in Europe regions claim to aim for 'competitive advantage' by creating 'framework conditions' for the formation of 'high-tech clusters' and 'innovation systems'" (Hospers 2006: 3). This is also due to the fact that many claims about embeddedness or the role of the local milieu stem from findings of researchers analysing 'successful regions' and their local environment ('framework conditions'), looking for success factors.[46] As a result, a number of factors are identified, covering hard as well as soft factors (Cooke et al 2001; Gardiner 2003; Huggins 2003; Martin 2004; Porter 1994; 2002), ending up in a vast number of policy recommendations for other regions.

The methods of such empirical studies are also highly criticised (Boschma 2004; Bristow 2005; Lovering 1999). "[T]hey are usually based upon a non-representative sample of one observation; they are difficult to use even in comparative studies as they are treated as an essentially unique observation; and there is a tendency to use the same case study both to generate hypotheses as well as to test them" (Engelstoft et al 2006: 83). Building theories based on such studies then proves hard, if not impossible. Lovering (1999: 384) states that often case-studies come up with "a loose bundle of ideas, an accretion of notions gathered together because they seem to resonate and point to broadly similar policy implications somewhere on the horizon."

Another point of criticism is that such benchmarking often neglects spatial differences, which play an important role on the regional level. As Budd (2006: 15) put it: "The importance of the spatial structure to regional competitiveness cannot be underestimated. It determines regional capacity to absorb, or further growth. There are circumstances under which the spatial structure can retard or enhance regional development, particularly in the short run, where the spatial

[46] This is what Allen (2005: 3) calls the "'success story' bias": Most studies focus on successful regions and not on unsuccessful ones. In the case of indices this is not fully true as many publications include worst case studies.

structure affects the regional supply function of the significant factors of production."[47]

This has led to the conclusion that "[a]lthough policy makers may glean some relevant insights, even in this respect, doubts may be raised about the value of competitive benchmarking, either because such studies are spatially incomparable or because it simply promotes competitive place promotion" (Greene et al 2007: 2).

In the following section, the focus will be on composite indices for measuring competitiveness as a special kind of benchmarking.

3.2 Indices for Benchmarking and Measuring Competitiveness

As stated above, the increased popularity of composite indices is a special facet of the growing urge to benchmark regions against each other (Greene et al 2007).[48] Composite indices are "measure(s) of an abstract theoretical construct in which two or more indicators of the construct are combined to form a single summary score" (Carmines/Woods cited in Lewis-Beck 2004: 485). Saisana et al. (2005: 2) see credit indices as "attracting public interest by providing a summary figure with which to compare the performance across countries and their progress over time." Quite often the indices are functioning as a proxy for predicting or indicating future economic performance, just as in the case of the purchasing manager indices or for the longer run in the case of the Economic Freedom of North America report.

Therefore, they help simplifying complex measurement constructs and thus have considerable political appeal (Booysen 2002). As rankings are easy to communicate, they also get a lot of media attention and they are still a hot topic

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47 One may also include cultural differences as an important factor. See Higgins/Savoie (1997)

48 Some authors like Heilemann et al (2006) or Schütz et al (1998) see benchmarking as something "digging deeper" whereas rankings provide overviews. But as Heilemann et al (2006: 108) state, there is no sharp line.

even after so many years. This can be illustrated with the following table, displaying the number of citations of the two most prominent national indices.

Table 3: Media appearance of the WCY and the GCR 1996-2007

Name	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
World Competitiveness Yearbook (IMD)	39	86	110	93	112	105	104	120	141	146	208	187
Global Competitiveness Report (WEF)	56	123	128	173	130	131	175	209	266	262	353	363

Source: Author's own analysis with the help of Lexis Nexis database, in July 2008, covering 2,292 English publications and 148 German publications.

As can be seen, there is quite a hunger for such indices, be it from the media, the public in general or politicians.[49] "[T]he temptation of stakeholders and practitioners to summarise complex and sometime elusive processes (e.g. sustainability, single market policy, etc.) into a single figure to benchmark country performance for policy consumption seems likewise irresistible" (Saltelli 2008). However, looking at what 'successful' places on top of league tables do and then follow their track may only be an option at first sight. "Such competitor benchmarking tells us very little beyond the obvious" (Greene et al 2007: 14).

Even if someone decides to compare, due to the vast amount of different rankings, he still has to find the appropriate ranking. This may not seem to be problematic, but it involves an often implicit judgement: By choosing a specific ranking, one also chooses an underlying concept, being related to his own view. In concrete terms, should one refer to a ranking of good governance because he believes in social capital as an important factor or on one focusing on science and innovation because he has Schumpeter in mind? The subject of rankings stretches from tax climate (Atkins/Dubay 2007), science and technology (deVol et al 2004), over creativity (Adiarte/Stolarick 2003), to clusters (Porter 1990a). In

[49] A search on the website of the German government (www.bundesregierung.de) found 5 press releases for 2007 with references to competitiveness rankings such as the WEF and IMD's indices. On www.publications.parliament.gov.uk also four references for 2007 are found.

addition, some rankings like the one of Inc.com, Elsevier, or the Wirtschaftswoche are only produced for media purposes.

To close with Freudenberg (2003: 5-6), "Composite indicators should be identified for what they are – simplistic presentations and comparisons [...] in given areas to be used as starting points for further analysis." The following overview based on Saisana and Tarantola (2002) sums up the pros and cons for the use of rankings and composite indices.

Table 4: Pros and Cons for the use of composite indices

Pros:
▪ Rankings reduce complexity as they summarize complex issues
▪ Rankings are easy to interpret
▪ Rankings can guide public interest to specific areas
▪ Rankings can be guides for a political controlling of administrations by the public
Cons:
▪ Rankings may be too simplistic and too condensed
▪ Rankings give the feeling of an objective view, whilst they are built on subjective judgements
▪ Many pieces of information are lost in the aggregation process
▪ Risk of comparing 'apples to oranges'

Source: Author's own based on Saisana/Tarantola (2002: 5)

Of course the ranking results as well as the recommendations vary according to the focus of a ranking. This is not only because of the different scope of the indices but also because of the methodology for construction behind. "After all it is the methodologies used to get to the indicators that frame what the indicators are, who they are intended for an how they are intended to be 'used'" (Morse 2004: 3).

In order to fulfil minimum requirements from a scientific standpoint, according to van Suntum (2004: 4), competitive benchmarking in the form of composite indices[50] should be conducted only if

50 In this case, composite indices are defined as rankings based on more than one factor or indicator.

- It is clear what should be measured and how this can be measured;
- Single variables of the benchmarking are grounded in theory and ideally be of empirical significance, and,
- All variables are standardised and comparable.

How these requirements are translated when constructing a composite index is discussed in the next chapter.

3.3 Composite Index Construction

There are not many publications on the construction of composite indices as most authors concentrate on the choice of indicators (Kladroba 2005a: 99). However, as Freudenberg (2003) or Kladroba (2005b) have shown, the method of construction influences the outcomes and, therefore, must be analysed as well. In general, three core issues of index creation can be distinguished:[51]

- Theoretical framework and choice of indicators,
- Normalisation and standardisation of data, and
- Weighting and calculating the final score.

Typical issues associated with these points are discussed in more detail in the next chapters.

51 See Booysen (2002); Bowen/Moesen (2007); Freudenberg (2003); Giovanni et al (2005); Heilemann et al (2006; 2007); Kladroba (2005a); Saisana/Tarantola (2002). Additional points may be treatment of missing data, robustness testing, visualisation, inclusion of survey data, or sensitivity analysis.

3.3.1 Theoretical Framework and Choice of Indicators

Setting the Theoretical Framework

Every index should be based on a concept or placed within a theoretical framework. Therefore, the construction of indices should always start by setting out the concept and then selecting possible indicators (Kladroba 2005b).

As could be seen above, there are very different concepts of national and regional competitiveness and no catch-all approach that could function as the basis for all indices. This is perhaps why some of the indices are not placed within a specific theoretical framework but based on statistical analysis such as regressions. But even then one has to decide which indicators to include in the analysis before running the regression. This means the issue of placing an index within a sound theoretical framework still exists and must be addressed to not measure without theory (Kladroba 2004).

Choosing the Appropriate Indicators

Based on the theoretical framework, one has to choose the appropriate indicators that capture the full complexity of the concept behind.[52] Indicators by definition stand for something else, i.e., they indicate something else.[53] Coming from the broad theoretical concept, one has to choose the appropriate indicators that are able to transfer the concept into a measurable index and catch all relevant dimensions. The first problem then is to derive the relevant dimensions for the concept behind. Based on these dimensions, one has to think how to come up with an indicator covering this dimension. Besides the general problem when deriving indicators, the problem of data availability comes into play. Some facets may not be covered by existing statistics; so one might have to build up their own indicators. Together with this comes the discussion whether quantitative or qualitative data may be used. If some facets are not easy to observe, qualitative

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52 See the appendix for examples of how theories of regional development could be translated into indicators.

53 Probably the best known indicator is GDP, standing for economic wealth.

data may be the best to catch the information even though surveys have their own disadvantages.

The European Commission (2003) set out the following criteria for indicators[54] to be included in their structural indicators report, reflecting the main prerequisites for the development of indicators: "The indicators are: (1) easy to read and understand; (2) policy relevant; (3) mutually consistent; (4) available in a timely fashion; (5) available for most, if not all Member States, acceding and candidate countries; (6) comparable between these countries and, as far as possible, with other countries; (7) selected from reliable sources; and (8) do not impose too large a burden on statistical institutes and respondents." The main points from these criteria will form the basis for the development of the research framework for the evaluation of indicator quality.

Normalisation and Standardisation of Data

When dealing with raw data, at one stage one has to face the problem of non-comparability or outliers. If one simply adds up different indicators like 'inflation rate' and 'GDP', results would be biased, as numbers for GDP would be higher than for inflation rates. To overcome these problems, data must sometimes be standardised or normalised, i.e., absolute differences are reduced. There are several possible methods for the standardisation of original data.[55]

1. **Ranking**: One could rank the variables and then add up the ranks for the final index. Easy as this seems, this does neglect the intra-indicator distribution, i.e., the distance between the different values.

2. **Distance from Leader**: In order not to lose this information, the second possibility includes a linear re-scaling process. Here, one re-scales the values from 0 ("worst") to 100 ("best")[56] or vice versa:

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54 For other criteria for indicator selection see Booysen (2002); Morse (2004: 30); Heinemann et al (2004); Fisher (2005).

55 See Booysen (2002); Fisher (2005); Freudenberg (2003); Giovanni et al (2005); Matthes/Schröder (2004); Saisana/Tarantola (2002); Salzman (2003).

56 Some also take 10 or another number as the highest score.

$100\ (\frac{actual\ \ value}{\max imum\ \ value})$. Now, every value is expressed in relative terms and is comparable. The distance between the indicator absolute values is not now lost and outliers are within a certain band width.[57]

3. **Distance from Mean**: This is similar to the second method, but all values are expressed relatively to the mean which is set to 100 (or another value) with the following formula: $100\ (\frac{actual\ \ value}{mean\ \ value})$. This leads to an intuitive ranking with values above 100 indicating above-average performance and values below 100, below-average performance.

4. **Standard Deviation:** The most often applied method involves setting a mean and then re-scaling all values with a certain standard deviation. This is done by subtracting the mean for a single indicator from an entity's original value and dividing by the standard deviation for this variable. This is mostly combined with distance from leader and distance from mean methods.

5. **Classification**: Here, values are classified into different classes, e.g., 1 to 10. The classification can be done numerically with the help of thresholds (1 for all values from 0 to 49.9) or qualitatively ('low', 'medium', 'high') and then transferred into classes. Big differences are compressed, which in some cases may be advantageous.

A transformation[58] mainly means that the relative differences between the other values are smaller afterwards and the implicit weight is lower compared to other indicator values with a more even distribution. To cope with these outliers, some set a threshold below or above the original data for the lowest or highest score possible and do not include these data in the scaling process (Ochel/Röhn 2008). Alternatively, a logistic function can be used for the standardisation. The values are first transformed linearly and then inserted into a logistic function. This means

57 One variant would be to take into account the distance to the laggard, setting the lowest level to zero (min-max method). See Munda/Nardo (2003) for an example.

58 Techniques 2 to 4 are also classified as linear transformation techniques (Drews 2005).

distances to extreme values are compressed but values around the mean are stretched.

3.3.2 Deriving and Appling Weights

Weighting is perhaps the most controversial topic in index construction. This is due to the fact that ranking results are significantly influenced by the weights applied.[59] Two facets of weighting – deriving and applying weights – are discussed here, before moving on to the calculation of the overall ranking.

Deriving Weights

As a first step, one would have to look if and how weights – be it equal or unequal weights – could be derived. There is no general rule for deriving weights for composite indices, just methods discussed in the literature with their specific strength and weaknesses. The following widespread methods for deriving weights can be distinguished:[60]

1. **Purely theory-based:** Here, weights are derived from a certain theory or concept. It is clear that this is the best way from a scientific standpoint and at the same time the most difficult as it is not easy, if not impossible, to directly derive weights based on pure theory.

2. **Experts' opinion:** This is a variant of the first method, also known as budget allocation. Here, one or more experts are asked to weigh the indicators or sub-indices. This means the weighting is based on the experts' opinions and their theoretical standpoint. The decision could be based on the view of one or more experts, as part of an experts' panel. A

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59 In the appendix, the Olympic medal list of 2004 is included as an example. Three different rankings based on different aggregation rules and weightings are computed. It was found that more than three out of four nations change their position. Although these findings do change if only the first 10, 20 or 50 nations are analysed, the percentage of rank changes is never below 40%. This demonstrates the importance of finding the 'right' weights.

60 Other methods include Data Envelopment Analysis, benefit of the doubt, analytical hierarchy process or unobserved components model. These models sometimes – as in the case of DEA— do apply weights but do not work them out explicitly.

special form of experts' opinion would be to take into account public opinion by conducting surveys, by analysing existing studies or a conjoint analysis. The clear advantage lies in the flexibility and the usage of experience up to the 'wisdom of the crowd.' At the same time, the choice of experts could be biased. The judgement of these experts will always be subjective.

3. **Statistical analysis:** If the target variables are properly known and defined, one could apply a regression analysis to derive weights. Although this seems purely econometric, theory should provide the basis for the selection of indicators included in the analysis. Other techniques include principal component analysis and factor analysis. The latter two offer the advantage that they do not need a properly defined target variable. The weights for the index are based on the explanatory power of the variance in data. More objectively, the weights derived may not be consistent with the theoretical approach, challenging the authors and not providing causal explanations.

Very often, no consensus exists for deriving weights and "no weighting system is above criticism" (Booysen 2002: 127). One way of dealing with these issues is to test the robustness of an index with different weightings and weighting techniques. Another way could be to follow Bowen and Moesen (2007) using country or region-specific weights. This is done to "take account of a country's own choices and achievements" (Bowen/Moesen 2007: 6). In this case one would not apply one weighting scheme for all entities but individual ones.[61]

Applying Equal Weights

After having decided which weighting scheme to apply, one can now apply these weights on several levels: firstly, on the overall index levels for sub-indices and secondly, on the level of the single indicators when deriving a sub-index.

61 This is similar to another approach of looking at with which method an entity would achieve the highest scores. Data envelopment analysis could be seen as such a technique.

Equal weights are mostly applied based on experts' opinions. This is sometimes done as there is no theory or empirical judgement for unequal weights. This equal weighting is then seen as something neutral. For applying equal weights, the following methods can be distinguished:[62]

1. **Equal weights in one-level rankings:** Here, no sub-indices exist and the indicators directly form the overall index. This is often done with the intention of not 'influencing' the ranking results, or because one does not want to highlight specific characteristics or just for reasons of simplicity.

2. **Equal weights in multi-level rankings:** In this case, several sub-indices form the overall index. The indicators have equal weights within the sub-index and the sub-indices are equally weighted when forming the overall index. If all sub-indices consist of the same number of indicators, all indicators are weighted equally. If not, implicitly, unequal weights are derived.

Given below is an illustration of the consequences of both variants and the issue of implicit weights. Let's assume there is a simple ranking broken down into the three areas A, B and C. These areas itself are build on sub-indices A1, A2, B1, B2, B3 as well as C1 and C2. Below these, the single indicators are grouped. This translates into the following table:

62 See Booysen (2002); Bowen/Moesen (2007); Drews (2005); Freudenberg (2003); Giovanni et al (2005); Saisana/Tarantola (2002).

Table 5: Example with 'equal' weights on different levels

Indicator score	Name	Sub-index score	Name	Area index score	Name	Overall score
4	A1-1	4.0	A1	3.75	A	4.17
3	A1-2					
5	A1-3					
5	A2-1	3.5	A2			
2	A2-3					
4	B1-1	3.3	B1	3.50	B	
1	B1-2					
5	B1-3					
6	B2-1	3.7	B2			
2	B2-2					
3	B2-2					
4	B3-1	3.5	B3			
1	B3-2					
7	B3-3					
2	B3-4					
7	C1-1	7.0	C1	5.25	C	
3	C2-1	3.5	C2			
4	C2-2					
3.78		4.07		4.17		

Source: Author's own

As can be seen, the simple, non-weighted averages differ on the different levels. If the overall score is computed directly, the average of the single indicators would be 3.78, whereas after aggregation over two levels, it goes up to 4.17. This is due to the fact that indicator C1-1 alone forms the sub-index C1 and also influences the area index C so that the overall index is much higher despite the fact that all other areas and sub-indices are below the final score. If the value of C1-1 changes from 7 to 6, the overall score goes down to 4.0. If the same is done for B3-3, the final score does only change to 4.14. This means that implicitly, C1-1 has a much higher weight than the other indicators. Dependent on the levels of the ranking, unequal weights can be applied without explicitly putting weights on different indicators or sub-indices.

Applying Unequal Weights

If one wants to apply unequal weights, the following four methods can be distinguished:[63] The first two refer to implicit weights as the weights are not obvious on first sight, something shown in the above example. The last two refer to explicit weighting schemes, where weights are assigned on purpose.

1. **Unequal weighting with sub-indices and indicators:** If the sub-indices consist of a different number of indicators, those indicators forming the sub-index with the least number of indicators receive the highest implicit weight as their influence on the sub-index is the highest. Therefore, this is an implicit unequal weighting and mostly not intended by the authors.

2. **Unequal weights with similar indicators:** Sometimes equal weights are applied either for one-level rankings or multi-level rankings but still implicit weights can be witnessed. This is the case if similar indicators are included, measuring nearly the same. Freudenberg (2003: 12) illustrates this with the example of ICT readiness where "indicators relating to internet access, internet website and internet use overlap." This is a special form of implicit weighting not easy to assess.

3. **Unequal weighting on the level of sub-indices:** In this case indicators are weighted equally and then aggregated to sub-indices. These sub-indices are then explicitly weighted unequally. This could be done on several levels.

4. **Unequal weighting on the level of indicators:** Here, indicators explicitly receive different weights, sometimes then sub-indices are weighted equally or also unequally. This is also dependent on the ranking and if this is based on different levels or if overall scores are derived directly.

63 The possibility of putting fewer weights on indicators with the help of missing values or unreliable data was not included as this would skew the results. The problem of missing data or unreliable data can be solved differently.

3.3.3 Calculating the Final Score

Before coming up with the ranking, one has to calculate the final score, i.e., aggregating all data with equal or unequal weights. This can be done in a number of ways:[64]

1. **Absolute sum methods:** All scores, classes or the single ranks of the indicators are added up and then ranked (also known as Borda rule or sums of scores[65]). The (weighted) average could also be used. Although the aggregation can be done with or without normalisation and standardisation, outliers will influence the results significantly if values are not normalised.

2. **Relative sum method**: Final ranks here are obtained by expressing indicator results relative to a benchmark. Firstly, one could sum up the number of indicators above the mean and subtract the number of indicators below the mean (Copeland rule[66]). Secondly, one could also count the wins (called Kemeny or Condorcet-Kemeny-Young-Levenglick[67]) with or without applying weights. Another approach is to build on the ratios of actual indicator value – e.g. 6 – over the mean for the respective indicator, e.g. 4. The ratios – here 1.5 – are then summed up and divided by the number of (perhaps weighted) indicators.[68] This is not very robust in case of outliers but relative information is not lost.

3. **Functional calculation method:** This technique entails the use of a function. After a statistical analysis all indicator values are inserted in regression function, for instance, to come up with the final score and then

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64 See Booysen (2002); Freudenberg (2003); Giovanni et al (2005); Matthes/Schröder (2004); Saisana/Tarantola (2002)

65 See Kladroba (2005a) for more information

66 Ibid.

67 See Munda/Nardo (2003) for more information

68 Kladroba (2005a) and Giovanni et al (2005) suggest similar relative approaches, e.g., the Copeland rule. Here, one compares the performance of one entity of each of the other pairwise and counting the defeats and wins for each indicator. These ratios then are counted to rank the entities.

ranked based on this score. The function must not necessarily come from a statistical analysis as it could also be a causal function.[69]

Besides these, a number of other methods can be found in the literature.[70] These – although different – can also be grouped into one of the above groups.

3.4 Conclusion

It should be clear now that just as in the case of the theoretical basis for regional competitiveness, there is no single approach in constructing indices. As could be seen with the simple example above, such technical points can influence ranking results significantly. All of the above stated techniques at all the different stages have their strengths and weaknesses. Besides these technical points, the fundamental criticism against using composite indices still exists.[71] There may be good reasons for the use of certain techniques, but there are still issues not discussed above becoming clear just by looking that ordinal and cardinal numbers are treated the same way even that this is mathematically not correct, i.e. for coming up with an arithmetic mean[72]. Looking at all these open questions from the theoretical or technical area, the question must be answered if rankings then can really provide any insights into the mechanisms of development and place competitiveness.

After reviewing the literature one at least would expect transparency as to why these indicators exactly were chosen, which sources had been used, if adjustment had been made, how missing values or outliers have been treated, why certain techniques have been applied and so forth. This will be taken into account as evaluation criteria when deriving the research framework for the analysis.

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69 One example would be turnover - costs = profit.

70 See Giovanni et al (2005), Freudenberg (2003) or Saisana/Tarantola (2002).

71 This can also be seen later in the overview on existing studies in the field of composite indicators evaluation.

72 This is described in virtually all textbooks, e.g. Donnelly (2004: 19) or The Economist (Ed.) (2004: 61)

4 Research Design and Objective

In this chapter, the framework for the evaluation of indices is established. First, existing research in the field is included to get an overview of the methodologies and findings of these studies. These findings then can be taken into account when deriving the evaluation framework. This also allows scope for continuing the approaches applied and widening their scope if necessary. In some cases the methodologies are then carried over from the national to the regional level. These methodologies are combined with the findings from the literature on index construction and the literature on place competitiveness to come up with a broad approach on evaluating all relevant facets of the regional indices. This will – besides other things – include the methodology behind indicators applied as well as the predictive quality. These points will then be summarised within one framework. This framework will then be used to evaluate the different indices of regional competitiveness. The whole evaluation of predictive quality will be based on secondary data such as GDP or unemployment figures such as addressees of the rankings, which the public will also take into account. To ensure the data is comparable and reliable, only data from intergovernmental bodies such as the OECD or Eurostat are taken into account as these agencies will make sure the same definitions apply. As a starting point of this critical discourse, Bandura's (2005) paper, giving an overview of existing national indices, was taken, together with the findings of Greene et al (2006) and Fisher (2005) on the regional level. In addition to this, we conducted several searches with the help of internet search engines and searches at different libraries aiming at covering as many indices world-wide as possible. This rather broad approach has the advantage of also including relatively less well known indices which may afford new insights into index construction.

4.1 Existing Research in the Field of Index Analysis

Any research design should take into account existing research in the respective field of composite indices and their methodology. This is why this chapter starts with an overview of existing studies aiming at critically analysing composite indices in the field of index analysis. This means publications just introducing or giving an overview, e.g., as part of how an entity has succeeded, are not included. The following table gives an overview of the studies in this field together with some main characteristics.[73]

Table 6: Characteristics of existing studies on composite indices

Study authors	Object and aim	Level	Scope of indices analysed	Inclusion of background information	Indicator analysis	Index construction analysis	Analysis of predictive quality	Analysis of theoretical basis	Remarks
Peneder 1999	Discussion of four main issues of composite indices	-	-		x	(x)			Criticises on a more abstract and general level without pointing to a specific index
Greene et al 2007	Examine studies measuring city and city-region competitiveness	City, city-region	22		x				Give an overview on components and indicator areas included
Rogerson 1999	Attributes of quality of life	City	7	x	x				Mentions some other studies but does not analyse them. Strict quality of life focus.

[73] Brackets indicate cases where this characteristic is only covered partly or to a lesser extent.

Study authors	Object and aim	Level	Scope of indices analysed	Inclusion of background information	Indicator analysis	Index construction analysis	Analysis of predictive quality	Analysis of theoretical basis	Remarks
Drews 2005	Analysis of existing rankings and development of a new ranking for the Bertelsmann Foundation	Region, nation	7	x	x	x		x	In-depth analysis of the Global Competitiveness Report and the World Competitiveness Yearbook as part of a dissertation
Fisher 2005	Examines U.S. business climate rankings	Region	8	x	x	x		x	Detailed discussion of 'ideology' behind rankings; five rankings are analysed in more detail
Bandura 2005, Haller 2005 (for the update)	Gives an overview on composite indices	Nation	178	x	(x)				Short description of indices, no focus on development or competitiveness
Bellak/ Winkelhofer 1997	Evaluation of indices as part of an article on international competitiveness	Nation	3	x	x	x		x	Theoretical basis analysed in general
Besançon 2003	Overview on governance rankings	Nation	50	x					Short description of indices and links for further information
Blanchet 2006	Analysis of the Doing Business Reports 2005 and 2006	Nation	1	x	x			x	Regression analysis to analyse the explanatory power of several indicators
Booysen 2002	Overview and evaluation of development indices	Nation	20		x	(x)			Development focus, no inclusion of competitiveness indices

Study authors	Object and aim	Level	Scope of indices analysed	Inclusion of background information	Indicator analysis	Index construction analysis	Analysis of predictive quality	Analysis of theoretical basis	Remarks
Bowen/ Moesen 2007	Discussion of aggregation technique with respect to the Growth Competitiveness Index	Nation	1			x			Test alternative aggregation and weighting techniques
Gregoir/ Maurel 2002	Analysis of the Global Competitiveness Report 2001 together with some general thoughts on competitiveness	Nation	1	x		x		x	Also test alternative aggregation techniques and compare ranking outcomes
Hanke/ Walters 1997	Analysis of indices of freedom and competitiveness	Nation	5	x	x				Regression analysis for GNP per capita included
Heilemann et al 2006, 2007	Examine the quality of rankings as part of a report to the German minister of finance	Nation	3	x	x	x	x	x	In-depth analysis of Global Competitiveness Report, World Competitiveness Yearbook and Bertelsmann Standortranking
Kaplan 2003	Analysis of South Africa's ranks	Nation	2	x	(x)				Focus on technological capacity and performance
Kladroba 2005	Analysis of the methodology of the Bertelsmann Standortranking	Nation	1	(x)		x			Tests stability of outcomes with alternative aggregation techniques

Study authors	Object and aim	Level	Scope of indices analysed	Inclusion of background information	Indicator analysis	Index construction analysis	Analysis of predictive quality	Analysis of theoretical basis	Remarks
Kornmeier/ Müller 2000	Comparison of WEF's and IMD's report	Nation	2	x				x	Analysis is more for illustrative purposes
Kovačič 2004	Discussion of competitiveness and how it relates to development	Nation	2		(x)	x			Analysis with a focus on the Global Competitiveness Report
Lall 2001	Analysis of the Global Competitiveness Report 2000	Nation	1	x		x		x	In-depth analysis of approach and model
Lockwood 2004	Analysis of the Kearney/ Foreign Policy Globalization Index	Nation	1	x		x			Focus on index construction (robustness)
Matthes 2005	Comparison of Germany's ranks in different indices	Nation	7	x	(x)			(x)	Focus on showing rank differences for a number of countries across different indices
Morse 2008	Comparison of some development indices	Nation	3	x	x	x		x	Focus on development issues
Niwa 2005	Analysis of Science and Technology indicators with respect to Japan	Nation	1	x	x				Also creates a Science & Technology Index for 33 nations
Ochel/ Röhn 2006; 2008	Evaluation of national competitiveness rankings	Nation	5	x	(x)	x	x	(x)	Concept of competitiveness with respect to the ranking methodology analysed

Study authors	Object and aim	Level	Scope of indices analysed	Inclusion of background information	Indicator analysis	Index construction analysis	Analysis of predictive quality	Analysis of theoretical basis	Remarks
Oral/ Chabchoub 1996	Analysis of the World Competitiveness Report	Nation	1	x		x		(x)	Analysis of data standardisation and aggregation
Reichel 2002	Analysis of explanatory power and comparison of ranking results.	Nation	3	x	(x)	(x)	(x)		Mentions some points but no thorough analysis
Rößing 2005	Analysis of the Global Competitiveness Index	Nation	1	x	x	x		(x)	Additional analysis of Doing Business Report in the annex.
Rouvinen 2001	Analysis of Finland's position in different rankings	Nation	2	x		x			Discusses if Finland's top position is justified
Sachverständigenrat 2004	Overview as part of the yearly report to the German government	Nation	3	x				x	Theoretical basis analysed in general
Saisana/ Tarantola 2005	Overview on composite indicator construction	Nation, industry	24	x	(x)	x			Investigates several methods for aggregation and normalisation of data
Vartia/ Nikinmaa 2004	Compare Global Competitiveness Report and World Competitiveness Yearbook	Nation	2	x			x		Look at if rankings function as a proxy for future growth

Brackets indicate cases were this characteristic is only covered partly or to a lesser extend.

Source: Author's own

After looking at the existing studies in the field it was clear that only four of the 31 studies analysed aimed at looking at the predictive quality of the rankings and none of them on the regional level. The vast majority of the studies – 26 – include background information on the indices to some extent, e.g., information on the issuing organisation, its history and mission or information, on the history of the index and short biographical information on the authors if applicable. The analysis of indicator areas is covered by 20 studies, analyses of index construction are included in 19 reports, whereas the theoretical basis is analysed in 14 of the above studies.

After looking at the literature, it was clear there was no existing study analysing index construction, indicators, theoretical basis and predictive quality of regional indices within one framework. This is why the methodologies of the above studies are combined with findings from the literature on index construction and literature on regional competitiveness to come up with a broad approach aiming at evaluating all relevant facets of regional indices. This framework is outlined below.

4.2 Framework for the Analysis of Indices

The analysis is split into two parts, the comparative analysis of regional indices and the analysis on the level of the single regional indices. Both parts stem from the analysis of existing studies in the field and the analysis of literature on national and regional competitiveness including literature on composite index construction. When looking at the indices, the perspective of a policy-maker is taken into account. This means that it aims at capturing what would be necessary to assess and understand the different approaches in terms of transparency, the ideology behind it or the theoretical framework and its basis.

4.2.1 Comparative Analysis Framework

The comparative analysis – besides bibliographic information on the issue – starts with an overview of the indices found and includes the following key characteristics for a broader set of composite indices:

- Issuing frequency and year of first issue to see if it is regularly updated and if it has a longer history;
- Geographical scope to show on which regions an index focuses;
- Number of entities covered to see the broadness of the study;
- Number of indicators included to get an impression of the broadness of the index;
- Focus of report, e.g., if it has a focus on economic performance in general or competitiveness or something else. This shows if indices solely deal with competitiveness or if they also include other features of regions or particular challenges of a specific national environment.

This provides an overview of existing composite indices focusing on economic development or competitiveness and comparing spatial entities. As a starting point a long list of indices at the regional level can be derived.

From this long list, a short list is deducted, including only those indices with an explicit or implicit focus on regional competitiveness. Indices are then compared according to the above criteria as well as the following:

- their aim, that is to work out what an index wants to show and aims for when ranking regions;
- the inclusion of soft, i.e., survey data, to see firstly if indices rely on external data only or if they conduct their own survey, and secondly to show if the authors rely on hard data only or supplement the index with soft data;
- the underlying weighting scheme, to reveal if authors see some indicators or dimensions as being more important than others;
- the weighting basis to see how authors came up with the weights, e.g., if weights are derived from a special approach or from statistical analyses.

Following this, a comparison of indicators included is undertaken, grouping single indicators from the report under broader dimensions. This works out similarities or differences of the indices and provides us with an overview of how the different authors translate the concept of competitiveness into indicators and if there is something like a consensus view on which indicators to include. If, for example, there would be a consensus view, this would be in stark contrast to the confusion that can be observed when looking at the different theoretical approaches on place competitiveness. It would, therefore, indicate a bias towards certain dimensions.

This lays the ground for the in-depth analysis to provide readers not only with an overview of existing indices of regional competitiveness but also with an evaluation of their quality. This is why all indices analysed are tested against future economic performance and why their theoretical basis and single indicators is analysed against a set of quality measures as set out below.[74]

[74] This is only done in cases where entities are covered by more than one index and completes the single index analysis as set out below.

4.2.2 Single Index Analysis Framework

The second step involves an in-depth analysis of the above mentioned short-listed indices, based on the same framework. At first, the index and issues are described and the index deconstructed. Secondly, an evaluation of the index quality is carried out, looking at if they are transparent and if indicator values are comparable as well as accurate. Indicators should also reflect the theoretical basis and be meaningful. The index construction should allow a sound and logical ranking based on values that are made transparent and can be compared despite different units or data sources.

As indices mostly promise to come up with a ranking that reflects future performance, the predictive quality of rankings is analysed and tests for correlations with future economic growth and unemployment rates are undertaken. In order to evaluate the policy impacts of indices, an analysis of citations and references is also included as far as possible. The analysis, therefore, mostly relied on the Lexis Nexis data base which was accessible easily but at the same time cannot cover all citations and of course not their quality. Nevertheless, it is included as it can help indicate media attention and, therefore, points to the importance of an index. The conclusion summarises the findings and gives an overview with the help of an evaluation table. The framework is given here in more detail:

I. Description

a. *Background information*: For all indices included, background information such as the history of the index as well as information on the issuing organisation, necessary for the understanding of the index and the institution behind, is disclosed. This helps understand what the authors may have had in mind and what they may argue for. Here, it is also important which organisation is behind as these organisations follow specific missions, influencing the index construction.

b. *Theoretical framework*: Underlying definitions as disclosed by the issuers are included together with information on the concept(s) of competitiveness applied. This will again help understand where the authors stand and how they will come up with indicators supporting this framework. At this point, only the explicit statements will be analysed whilst later also the underlying – implicit – conception will be established. This is important also to show whether they follow a coherent framework or just measure based on an ad hoc approach.

c. *Indicators used:* All indices are deconstructed top-down and all indicators displayed together with information on how the index is constructed and how data is normalised if applicable. This has first a rather technical side when looking at how indices are constructed. The even more important part here is the analysis on the single indicator level as this shows how the choice of indicators relates to the theoretical framework i.e. if the single indicators are in line with any theory. If the authors did not include a specific theoretical framework, the analysis of single indicators will explicate the implicit framework and point to the ideology behind it.

II. Evaluation

a. *Overall clarity and transparency:* This evaluates the extent to which information on the construction and single indicators are disclosed. Ideally, a reader should be able to re-construct the whole index. This means information quality regarding indicator values (original and transformed) and data sources, theoretical framework and details on index construction is evaluated. A ranking is clear and transparent if all relevant information is easily available. This point is perhaps the most fundamental one as one can only assess the value of a certain index if it is clear what exactly was done and why.

b. *Comparability and Accuracy:* This is related to the fundamental issue in index construction which is to come up with comparable benchmarks. Key points here are firstly comparability on the level of single indicator values across the different entities, if data is based on the same indicator

definition, if indicator values take into account different entity sizes and if inflationary effects do not bias results. If applicable, the analysis also covered the questionnaire design and possible biases. Secondly, comparability of overall results over time will be evaluated, i.e., if readers can compare ranks over time. A ranking, therefore, is comparable over time, if the methods of index construction, the number of indicators applied and the number of entities included did not change or not too much over the years.[75]

c. *Indicator choice:* Indicators should reflect the theoretical framework and concept(s) behind.[76] It is, therefore, analysed how (sub-) indices and indicators relate to the theoretical framework of the index. In addition to this, it is analysed if there could be a bias towards certain dimensions, i.e., if different indicators measure the same thing in different ways, putting higher implicit weight on these areas. This is of special importance to be able to work out the ideology behind.

d. *Index construction:* Here, the rationale behind weights is worked out, the soundness of the aggregation technique and the normalisation and standardisation of data. Additionally it is looked at if the ranking on the level of the single indicator makes sense, i.e., if results could be biased due to false rank orders or transformations. Ideally, tests for robustness should be included to show consequences of different construction techniques. At least it should be explained why certain weights have been applied and how the indicators relate to the theoretical framework. This is the more technical side which could also bias results and may have some links to the theoretical framework.

e. *Predictive quality:* The ultimate test for every index is its ability to predict certain outcomes. Here, the relation to future regional GDP both gross and per capita[77] and employment/unemployment data is tested. These measures are taken as they are the most widely used ones to measure

75 See Heilemann et al (2006: 72)

76 As well as take into account the latest findings.

77 This is to reflect population growth effects.

development, at least economically. It is also the case that many indices claim to be able to predict economic performance. This is not to neglect the importance of other factors and target indicators. GDP and unemployment are not 'catching all' but are easily available and stand for important material needs of the public[78]. If the indices are meaningful in this sense, there should be a high and significant correlation between the rank of an entity and its performance over the next years. Ideally, such tests should also form part of the reports to provide the reader with this important information.

f. *Policy impact and media attention:* Here, citations in official political statements such as governmental web sites are taken into account. In addition, this thesis looks at citations in newspapers and journals as included in the Lexis Nexis data base. This is solely done for informational purposes and is not associated with the evaluation of the quality of the index as it is not possible to get a complete overview of the numbers of citations and the media attention in general. Besides this, such a quantitative approach does neglect the quality of certain citations.

III. Conclusion

The conclusion summarises the main points and includes an evaluation table which shows the results of the evaluation at a glance, not aiming at ranking the rankings. The information is condensed into three groups: + for a positive evaluation, o for a neutral evaluation, - for a negative evaluation. For the evaluation of the policy impact and media attention, the three levels 'high', 'low' and 'medium' are used. If findings are not substantial or valid, they are presented in brackets. This could be in cases where statistical analyses are based on small sample sizes or short time-spans.

This framework is summarised in the following table. This table will be provided for every index analysed at the end of each analysis.

Table 7: Summary evaluation table based on research framework

78 In addition, research shows the importance unemployment plays in explaining differences in subjective well-being. (Helliwell 2003)

Criteria
Overall clarity and transparency: Information given on ...
... original data
... transformed data
... theoretical framework
... competitiveness concept and underlying definitions
... sources for data
... exact indicator definition
... exact indicator units
... normalisation and transformation technique
... aggregation technique applied
... exact weights applied
Comparability
Index construction does not change too often
Indicators do not change too often
Sources and partners do not change too often
Indicators are similarly defined, i.e. use the same sources
Data reflect different entity sizes
Data is not biased by inflationary effects
If applicable: Survey results are comparable, i.e. based on a sufficient number of respondents, take into account cultural biases, and the 'right' people are interviewed
Indicator choice
Indicators correspond to theoretical framework
No implicit weights applied
Index construction evaluation
Rationale for weights disclosed
Meaningfull ranking orders (in general)
Standardisation and normalisation do not bias results
Aggregation does not bias results
Robustness tests conducted and included
Predictive quality evaluation
with respect to higher GDP growth rates
with respect to lower unemployment rates
if necessary: with respect to higher employment
Policy impact and media attention
Citations in official political statements
Citations in LexisNexis data base

Evaluation is done without using fixed and pre-defined grades.
'+' stands for positive evaluation, 'o' for a neutral evaluation, '-' for a negative evaluation; Information in brackets indicate non-substantial findings, i.e. based on small sample size; ? indicates missing information

Source: Author's own

This summary table will be the guideline for the analysis. Of course this framework cannot address all issues of composite indices, but it allows for comparisons and distinctions to be worked out. Again, it has also to be noted that

this work does not aim at grading the rankings but to create transparency and compare different rankings, aiming at answering the research questions stated above. The added value lies in the systematic comparison of regional indices not only with respect to characteristics like indicators chosen but also with respect to their predictive quality and the methodology and theory behind. It, for the first time, combines different methodologies of existing studies on different geographical levels under one heading, combining a quantitative statistical analysis with a qualitative content analysis. This will enable policy-makers and all relevant stakeholders to engage in a critical discussion on the utility of such indices.

4.3 Reflections on Chosen Research Approach

Applying Secondary Data

The study makes use of secondary data for the analysis, i.e., ranks taken from the rankings, GDP numbers and unemployment rates from international sources. This is done as such economic numbers cannot be derived by one's own survey as the effort would be too high. Relying on secondary data is a very efficient way for coming up with relevant data for analysis. In addition to this, if data is taken from one source such as Eurostat or the OECD, data will be comparable and reliable. The drawback is that special characteristics of interest for the study may not be available and that there is no chance of looking at the original data underlying the aggregated figure. In the case of this thesis, this is no problem and problems with data reliability can be overcome by not relying on the original national or regional data but by applying data from inter-governmental bodies such as OECD or Eurostat. These organisations make sure data is comparable and the same definitions are applied. It is also the case that stakeholders, interested in economic performance, would look at the same data and generally would not conduct their own survey. Applying the same data for this analysis makes it easy for them to directly transfer and apply these results for coming up with their own judgement or evaluation.

Subjectivity and Scope of Study

It is clear that there is the problem of subjectivity when analysing indices. This is multi-fold. Firstly, it is subjective in the way that as part of the analysis, indicators are grouped into broader dimensions based on a subjective judgement. Thus, problems can arise when some indicators do not fit adequately. Secondly, it is subjective as only indices that are published in English, German or French are included in the analysis.[79] Thirdly, it is subjective as, for the thesis, indices had to be analysed without having the possibility to discuss open questions with the authors, relying on the information in the reports or supporting documents.[80] To limit subjectivity in these areas, existing studies were used as guidelines and results from these analyses also taken into account and results compared with the findings of this thesis.

Another issue here is the approach to be as comprehensive as possible when looking for existing indices. For the overview, indices from all over the world were included. This means, on the one hand, that this gives a very broad overview of existing indices in the world and may come up with interesting findings and perhaps new ways on how to construct indices. On the other hand, as time for the analysis was limited, this means that a deeper discussion of the different indices was not possible. In addition, one additional potential disadvantage could also be to perhaps lose the focus on the really influential indices by including too many indices for the analysis. This is why we first start by giving an overview in the form of a table where a large number of indices are included with some information on the construction and scope. For the detailed analysis we focus on a sub-set of indices with a certain history and regular updates.

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79 Especially in the case of the Asian reports, this limited the analysis of the indices as well as the analysis of media attention as only some main findings are reported in English normally.

80 This study was discussed with the authors of the National Competitiveness Report in Korea, Robert Huggins and Mr. Lehmann at the Halle Institute of Economic Research (IWH) in Germany. The framework was also discussed at conferences in Warsaw, Nottingham and Dublin. In addition, authors in Singapore, Vietnam and China were contacted but did not respond and, therefore, these rankings could not be included in the analysis. In general, most authors were not co-operative in providing additional data, discussing open questions or providing more details in index construction.

This allows a much deeper discussion of the results and the characteristics found. Again, it would also have been advantageous to compare indices for single regions within one country. This would also mean more evaluation possibilities like interviews with policy-makers or stakeholders. Keeping this trade-off in mind, the approach taken firstly focuses on giving a broad overview of existing indices world-wide before looking at some indices in more detail. This will provide many new insights on the construction of indices and perhaps be an important stimulus from outside for the improvement of existing indices. But it could also be that this research may show that there are no such differences in the construction of indices. This then would mean that perhaps more theoretical work would be needed to come up with new methods for the construction of indices.

Data Availability

For the analysis of the *predictive quality*, data availability plays an important role as data on the regional level may not be available to compare regional outcomes with ranking results in different countries. In addition, it makes a difference if one compares real or nominal values, per capita or gross data and which time span is selected. Therefore, data on (regional) gross GDP as well as per capita, adjusted for inflation, is included. The minimum time period for analysis was set to five years, and, if possible, longer. This means reliability should be higher as influences such as chance or business cycle effects should be flatted out to a certain extent. To guarantee data consistency, whenever possible, only one source for the provision of regional data, such as Eurostat is used. Again, this is a disadvantage when comparing indices from all over the world as then different statistical definitions may be in use. A study looking only at regions from one country with just one national source for the statistical data may challenge the results of this thesis. The advantages from having indices from all over the world should outweigh such disadvantages.

For *deconstruction*, there was the general problem that many authors did not include the original data but just overall results, ranks or normalised values. This non-availability of information was an important limiting factor for the analysis as

– also due to the vast number of over 200 indices found in the first step – it was not possible to enquire all information even after contacting the authors. Therefore, the analysis mostly relied on the information included in the official reports. This was also done as ordinary readers will not have more information for their own judgement. In some cases it was not possible to get hold of certain reports as in the case of the World Competitiveness Yearbook. Some issues of this report were not available through public lending and prices were too high to purchase them. This limits the quality of analysis.[81] It would, therefore, also prove difficult to re-construct all indices which would have been of additional value and an important point of analysis. Thus, this thesis does not aim at re-constructing indices.

When analysing *media attention*, the analysis had to rely on the external data base Lexis Nexis or on search engines on web-sites in the case of parliamentary documents as original citations could not be looked up. The problem then also lies in applying the appropriate search terms as some may refer to an index with a different name.[82] These limitations were overcome by applying different and broad search terms and by reading the original sources. Besides this, simply counting the number of citations may neglect the different importance of the citations. This has to be taken into account and wherever possible, this was discussed in the particular sections.

81 The 2006 issue was the basis for the analysis as this was the last one freely available.

82 This can be seen in the case of the Bertelsmann 'Bundesländer im Standortwettbewerb' index. Often people just refer to it as the 'Bertelsmann ranking', the 'Bundesländerranking' or the 'Bertelsmann study'.

Other Issues

The results of this analysis could be biased by the initial level of GDP as regions with higher GDP may see lower growth rates in the future. Where possible, a homogenous sample with a comparable initial level of GDP was chosen and tested too. As unemployment is another important factor in economics and economic policy, the analysis also tested for relations to unemployment. If results were unclear, employment data was additionally included in the analysis. In addition to that, one could argue that GDP and unemployment data do not catch all of reality. This is certainly right. But as was stated above, these two measures are the most common ones for measuring material wealth[83]. As there could be other important variables to look at, a test of the relation of ranking results and house prices would be valuable. Unfortunately, regional data on house prices was only available for the UK and not for other regions, which is why this could not be tested except for the UK Competitiveness Index[84].

Analysing inter-national indices with intra-national ones could prove difficult as the balance of payment constraint for intra-national regions could bias results compared to regions from other nations. This should be no problem in the context of this analysis as we deconstruct different indices and do not look at the specific performance of single regions, although in the analysis of predictive quality, this could lead to biased results.

For a start, the findings of Bandura (2005), Fisher (2005) and Greene et al (2007) were taken as the basis. This allowed a specific search in archives and data bases such as the Lexis Nexis data base or at the British Library, combined with a free search using internet search engines. After two years, almost all indices

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83 In addition to this, the Eurobarometers no. 67 to 70 show us that asked, what people in the European Union worried most at the moment, worries about the economic situation as well as unemployment where always part of the top 5.

84 According to the German Federal Statistical Office there is a project aiming at building a database on house prices on the European level. So future research perhaps could conduct an analysis on the relation of ranking results and house prices.

listed as search results were already indexed in the data base which indicates that perhaps the most influential indices are included in this thesis.

The combination of literature analysis, statistical analysis and contextual analysis based on the existing research in the field provides a good basis for coming up with reliable and robust results and for offering new insights. This research, therefore, fills gaps left by the existing – only partial – studies.

In the next chapters, regional indices are analysed in detail.

5 Overview of Regional Composite Indices

In the following section, regional competitiveness indices are analysed in detail. The analysis starts by mentioning the key characteristics such as the number of indicators applied or the type of issuing organisation. Then, the dimensions covered by these indices are analysed.

5.1 Key Characteristics

This study found 57 regional composite indices with an economic focus. These are listed below together with some key characteristics to give an overview.

Table 8: Overview of composite indices found

Name	Author(s) and/or organisation	Issuing date/ frequency	Issuing entity type	National	Regional	Geographic focus	No. of entities covered in the latest report	No. of indicators in the latest report	Focus
Competitive Alternatives	KPMG	2002, 2004, 2006	PFP	x	x	World	137	27	Y
European Competitiveness Index	Robert Huggins	2004-	PFP/ PUB	x	x	Europe	118	16	YC
World Competitiveness Scoreboard	Institute for Management Development (IMD)	1996-2003-2006 for regional ranking	PFP	x	x	World	55	246	YC
World Knowledge Competitiveness Index	Robert Huggins	2002-2005, 2008	PFP/ PUB	x	x	World	145	19	YC
24 Large US Metropolitan Areas	Kresl/Singh 1999	1999	PUB		x	USA	24	16	Y
America's Best Cities & States: the Annual Gold Guide to Leading Rankings	National Policy Research Council	2004-?	PNP		x	USA	?	?	Y
America's best states for business	CNBC	2007-?	PFP		x	USA	50	40	Y
Annual Zaobao-NTU Competitiveness Ranking & Simulations for 31 Chinese economies	Kang et al 2006	2006-?	PUB		x	China	31	101	YC
Best Performing Cities	Milken Institute	2003-05, 2007 biennially	PNP		x	USA	379	9	Y

Name	Author(s) and/or organisation	Issuing date/ frequency	Issuing entity type	National	Regional	Geographic focus	No. of entities covered in the latest report	No. of indicators in the latest report	Focus
Best Places for Business and Career	Forbes / Milken Institute / Economy.com (since 2003)	1999-	PNP /PFP		x	USA	379	6	Y
Best States Ranking	Forbes	2006-	PFP		x	USA	50	30	Y
Booming Towns Study-Mark I	Champion/Green 1988	1985	PUB		x	UK	280	5	Y
Booming Towns Study-Mark II	Champion/Green 1988	1988	PUB		x	UK	280	10	Y
Bundesländerranking (Ranking German Länder)	INSM- Initiative Neue Soziale Marktwirtschaft (Initiative for a new social market economy)	2003-	PNP		x	D	16	87	YC
Bundesländerranking Österreich (Ranking Austrian Länder)	Wirtschaftskammer Tirol (Chamber of Commerce Tyrol)	2004	PNP		x	A	9	4	Y
Business Times-NTU Ranking Results on Overall Competitiveness of 35 States & UTs in India	Sen et al 2005	2005-?	PUB		x	India	35	>100	YC
China Urban Competitiveness Study 2007	Chinese Academy of Social Sciences	2007-?	PNP		x	China	?	?	Y
Chinese City Competitiveness	Chinese Academy of Social Sciences	2005-?	PUB		x	China	?	?	Y

Name	Author(s) and/or organisation	Issuing date/ frequency	Issuing entity type	National	Regional	Geographic focus	No. of entities covered in the latest report	No. of indicators in the latest report	Focus
Competitiveness Ranking of 40 US and 7 Canadian metropolitan areas	Kresl 2002	2004	PUB		x	USA/ CAN	47	3	Y
Correlating the knowledge-base with economic growth	Lever 2002	2002	PUB		x	Europe	23	7	Y
Cost of Doing-Business-Index	Milken Institute	2005-	PNP		x	USA	50	5	Y
Die Bundesländer im Standortwettbewerb ('Benchmarking German States')	Bertelsmann Foundation	2001- biennially	PNP		x	D	16	50	YC
Economic Freedom of North America	Fraser Institute, National Center for Policy Analysis	2002, 2004-2006	PNP		x	USA/ CAN	60	9	Y
Existenzgründerranking (Ranking entrepreneurship)	INSM- Initiative Neue Soziale Marktwirtschaft (Initiative for a new social market economy)	2007-?	PNP		x	D	97	6	YC
High Value Labor Quotient	Expansion Management	2003-	PFP		x	USA	362	7	Y
Hot Cities (Best cities for Entrepreneurs)	Entrepreneur / NPRC (National Policy Research Council)	1995-	PFP/ PNP		x	USA	1110	2	Y
Index of regional competitiveness for Finland	Huovari et al 2001	2001	PUB		x	SF	85	15	YC

Name	Author(s) and/or organisation	Issuing date/ frequency	Issuing entity type	National	Regional	Geographic focus	No. of entities covered in the latest report	No. of indicators in the latest report	Focus
Index of Regional Competitiveness in the UK	Cooke 2004	2004	PUB		x	UK	12	6	YC
Innovative Capacity Ranking: Spanish Regions	Zabala-Iturriagagoitia et al 2007	2007	PUB		x	E	17	31	Y
Improving City competitiveness in 23 Chinese cities through a better investment climate	Dollar et al 2004	2004	PUB		x	China	23	17	Y
Knowledge Worker Quotient: The Top Metros in the Knowledge Economy	Expansion Management	2003-annually	PFP		x	USA	362	?	Y
Local Enterprise Activity Potential index (LEAP)	Coombes/Raybould 1988	1988-?	PUB		x	UK	280	?	Y
Local Well-Being Index	Local Futures Group	2005, 2006	PFP		x	UK	352	+37	Y/S
Metro Area Competitiveness Report	Beacon Hill Institute	2001-2005	PNP		x	USA	50	39	Y
Metropolitan New Economy Index	Progressive Policy Institute (PPI)	?	PNP		x	USA	50	16	Y
North American Business Cost Review	Economy.com (Moody's) formerly Regional Financial Associates	1994-?	PFP		x	USA	414	4	Y

Name	Author(s) and/or organisation	Issuing date/ frequency	Issuing entity type	National	Regional	Geographic focus	No. of entities covered in the latest report	No. of indicators in the latest report	Focus
Objective Competitiveness - Ranking of EU Regions	Vicente y Oliva/ Marco Calvo 2005	2005	PUB		x	Europe	128	63	YC
Pinoy Cities on the Rise- The Philippine Cities Competitiveness Ranking Project	Asian Institute of Management	1999; 2002; 2003; 2005	PUB		x	The Philippines	65	68	Y
Porträt der Wettbewerbsfähigkeit österreichischer Bundesländer ('Portray of Austrian Länder')	Bachner 2005	2005	PUB		x	A	9	8	YC
Regionalranking	INSM-Initiative Neue Soziale Marktwirtschaft (Initiative for a new social market economy)	2006	PNP		x	D	435	47	Y
San Diego's Sustainable Competitiveness Index	San Diego Regional Economic Development Corporation/ San Diego Association of Governments	2001, 2005	PNP /PUB		x	USA	19	21	Y/E
Small Business Survival Index	Small Business & Entrepreneurship Council	1996-	PNP		x	USA	51	31	Y
Städteranking ('City ranking')	INSM-Initiative Neue Soziale Marktwirtschaft	2004-	PNP		x	D	50	104	Y
Standortradar ('Location radar')	Managementclub Austria	2006-	PNP		x	A	9	26	Y

Name	Author(s) and/or organisation	Issuing date/ frequency	Issuing entity type	National	Regional	Geographic focus	No. of entities covered in the latest report	No. of indicators in the latest report	Focus
State Business Tax Climate Index (SBCI)	The Tax Foundation	2003, 2004, 2006, 2007, 2008	PNP		x	USA	50	113	Y
State Competitiveness Report	Beacon Hill Institute	2001-	PNP		x	USA	50	42	YC
State Technology and Science Index	Milken Institute	2002, 2004	PNP		x	USA	50	75	Y
The Knowledge-Based Economy Index	Milken Institute	2000, 2001	PNP		x	USA	51	12	Y
The State New Economy Index	Kauffman Foundation since 2007, Progressive Policy Institute (PPI) for 1999 and 2002	1999;2002; 2007-	PNP		x	USA	50	26	YC
The Vietnam Provincial Competitiveness Index	US AID / VCC	2005-	PNP		x	Vietnam	64	64	YC
Toplocaties ('Top locations')	Elsevier (Journal) and Bureau Louter	2002-	PFP		x	NL	421	25	Y
Top 25 Cities for doing business in America	Inc (Journal)	2004-	PFP		x	USA	393	4	Y
U.S. Economic Freedom Index	Pacific Research Institute	1999; 2004	PNP		x	USA	50	143	Y

Name	Author(s) and/or organisation	Issuing date/ frequency	Issuing entity type	National	Regional	Geographic focus	No. of entities covered in the latest report	No. of indicators in the latest report	Focus
UK Competitiveness Index	Robert Huggins	2000-	PFP/ PUB		x	UK	12	15	YC
Urban Competitiveness Ranking	Deas/Giordano 2002	2001	PUB		x	UK	17	20	Y
Visa ideas happen index	VISA	2004	PFP		x	USA	50	3	Y
Zukunftsindex ("Future Index")	Prognos and Handelsblatt	2004, 2006, 2007	PFP		x	GER	439	29	YC

Note: ? indicates insufficient information.

Issuing entity type: PUB – public institution such as universities, academics or governmental organisations; PFP – private for profit organisation; PNP – private not-for-profit organisation.

Focus: E – Environmental Y – Economic ; YC – Economic competitiveness.

Source: Author's own

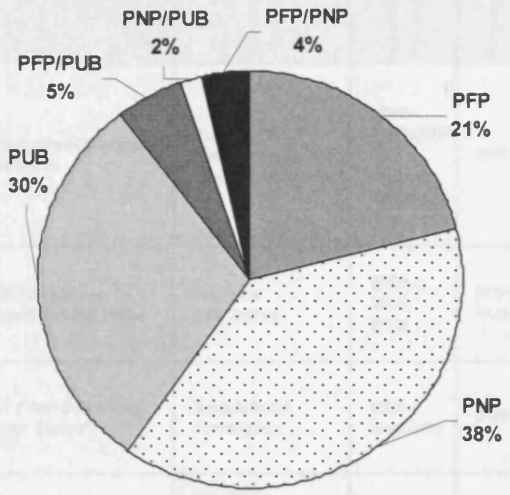
Of the indices above, only four rank regions and nations with 39 rankings had an explicit focus on competitiveness and 16 with a broader economic focus. One ranking – the Local Well-Being index – has an economic and social focus while the San Diego's Sustainable Competitiveness Index focuses on economic and environmental characteristics.[85]

85 Of course this does not mean that other indices do not include other indicators on social or environmental indicators. These two indices explicitly stated that they do have these foci.

The findings show that the majority of indices – 23 or 40 % of all indices – benchmark US states, followed by seven for the UK, 6 German regions and four benchmarking Chinese regions. Only eight or 14 % of indices benchmark regions from more than one country. On average, the indices found include 145.6 regions in their rankings. These rankings are built on 35.4 indicators on average.

Looking at the issuing organisations, it can be seen that, of the 57 indices found with an economic focus, most are issued by private not-for-profit organisations as shown in the figure below:

Figure 4: Type of organisations issuing composite regional indices



Source: Author's own

If the numbers are compared with the findings of Bandura (2005) on the national level, some differences can be observed. While the share of public organisations is the same, he found that almost half of the indices are issued by private for profit organisations (49%). Even if those six indices issued by different types of organisations are not taken into account, the share does only go up to 30%. The share of indices issued by private not-for-profit organisations also reveals a great difference. While Bandura (2005) found 25% of the national indices issued by this type of organisations, this study revealed a share of 38%.

Coming from this overview, only those indices with an explicit focus on regional competitiveness are included, indicated by a 'YC' in the table above. In addition only those with at least one ranking of 2002 or before to have a longer time-span are included for the analysis of the predictive quality. Reports must also have a ranking published not earlier than 2006 to make sure the report still is relevant, i.e., updated regularly over the last years. This leaves the following six indices for analysis:

Table 9: Overview on regional competitiveness indices analysed

Name / Category	Author(s) and/or organisation	Issuing date/ frequency	Issuing entity type	Geographic focus	No. of entities covered in the latest report	No. of indicators for the ranking	Inclusion of own survey data	Weights applied for overall index	Weighting Basis
World Competitiveness Scoreboard	Institute for Management Development (IMD)	1996-2003-2006 for regional ranking	PFP	World	55	246	Y	equal (implicitly non-equal)	A priori
World Knowledge Competitiveness Index	Huggins Associates	2002-2005, 2008	PFP/ PUB	World	145	19	N	non-equal	Regression based/DEA
BISW ("Benchmarking German States")	Bertelsmann Foundation	2001-biennially	PNP	GER	16	50	N	non-equal	Combinaton of regression-based and a priori
The State New Economy Index	Kauffman Foundation for 2007, Progressive Policy Institute (PPI) for 1999 and 2002	1999; 2002; 2007	PNP	USA	50	26	N	non-equal	A priori
State Competitiveness Report	Beacon Hill Institute	2001-	PNP	USA	50	42	N	equal (implicitly non-equal)	A priori
UK Competitiveness Index	Huggins Associates	2000-	PFP/ PUB	UK	12	15	N	equal (implicitly non-equal)	A priori

Note: Issuing entity type: PUB – public institution such as Universities, academics or governmental organisations; PFP – private for profit organisation; PNP – private not-for-profit organisation.
Inclusion of survey data: Y – 'Yes', N – 'No'

Source: Author's own

Three of the indices are published annually, one biennially and two irregularly. Looking at the index construction one can find that the World Competitiveness Scoreboard, the UK Competitiveness Index and the State Competitiveness Report apply an equal weighting scheme although due to the different numbers of indicators in the sub-categories, implicit weights are actually applied. All other indices explicitly weight indicators non-equally with emphasis on special areas.[86] Looking at how these weights are derived, it is obvious that two of the indices run regression analyses to come up with the appropriate weights, but most of the indices depend on expert opinion for deriving weights. The number of entities covered in the latest reports ranges from 12 to 145 with a mean of around 55.[87]

Most of the indices – four – focus on regions within one country with two benchmarking regions from around the world[88]. For coming up with the final ranking, the indices on average apply 66 indicators, ranging from 15 to 246 indicators.[89] In doing so, there seems to be a consensus view that only hard data should be included as only the authors of the World Competitiveness Scoreboard include survey data seeing it as a good way of assessing certain specific characteristics. Others like the authors of the BISW report favour "hard", that is, non-survey data as it is seen as being more reliable and comparable. In contrast to this, the authors use – external – survey data to determine the final weights of the sub-indices.

The overview also shows the implicit acknowledgement that a multi-dimensional approach is required since "competitiveness is not an attribute that can be measured directly" (Kresl/Singh 1999: 1018). Which dimensions are seen as necessary to cast competitiveness is analysed in the next chapter.

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86 The World Knowledge Competitiveness Index does not fit in here well as the final ranking is based on a Data Envelopment Analysis where weights are not explicitly assigned. But as this technique also puts weights on different characteristics, it is a kind of weighting scheme. This will be discussed later.

87 The World Competitiveness Scoreboard was not taken into account as the latest version does not include regions.

88 Results therefore could be biased by this due to the balance-of-payment constraint.

89 It has to be noted that this distribution is driven by the World Competitiveness Scoreboard with its 246 indicators. If not included, the number of indicators applied on average goes down to 30. The World Competitiveness Scoreboard was included here as the number of indicators in the respective years with the inclusion of regions was almost the same.

5.2 Comparison of Dimensions Included

The analysis starts with an overview of the dimensions included in the rankings to look for commonalities.

Table 10: Dimensions covered by the regional indices analysed

Dimension / Index name	World Competitiveness Scoreboard	World Knowledge Competitiveness Index	BISW ("Benchmarking German States")	The State New Economy Index	State Competitiveness Report	UK Competitiveness Index	Coverage
Natural Resources	(x)						17%
Economic performance	x		x	x		x	67%
Employment/unemployment	x	x	x		x	x	83%
Labour market regulations	x				(x)		33%
Labour cost	x		(x)				33%
Productivity	x	x				x	50%
High skilled employees (not specified further)	x			x			33%
Innovation capacity (patents, R&D expenditures)	x	x	x	x	x	x	100%
Quality of labour force	x	x	x	x	x	x	100%
Quality of educational institutions	x		x	(x)	x	x	83%
Political and social stability	x		x				33%
Savings rate (national or regional)	x				x		33%
Government debt (regional or local)	x		x		(x)		50%
Public administration (size or employment share)	x		x		x		50%
Bureaucratic burden	x		(x)	(x)			50%
Tax burden (corporate tax rate on profits)	x		x		x		50%
Physical infrastructure (rail, roads, ports etc.)	x				x		33%
Information and communications technology	x	x		x	x		67%
Entrepreneurship	x			x	x	x	67%
Firm performance and solvency			x	x			33%
Financial capital, e.g. private equity, FDI	x	x	x	x	x		83%
Exports (macro-level)	x		x	x	x	x	83%
Regional demand, purchasing power, earnings		x				x	33%
Poverty and inequality	x		x		x		50%
Inflation	x						17%
Health and sanitation	x				x		33%
Ecology	x				x		33%
Quality of life, well-being	x						17%
Corruption	x						17%
Crime			x		x		33%
Attitudes and values in general	x						17%
Population, population growth	(x)		(x)				33%

Note: Brackets used if indices apply special definitions not fitting perfectly.

Source: Author's own based on the latest version of the indices

As can be seen, there are some commonalities as fifteen out of the 32 dimensions are covered by at least 50% of the indices. Of these, 'innovation capacity' and 'quality of labour force' are covered by all indices. All dimensions only covered by one index are part of the World Competitiveness Yearbook. These dimensions include 'natural resources', 'inflation', 'quality of life' and 'attitudes and values in general'.

Three of the six chosen indices cover less than 50 % of the dimensions analysed. The World Knowledge Competitiveness Index even covers less than one quarter of the dimensions. This can be explained with the special focus on innovation and the knowledge base of an economy. The UK Competitiveness Index covers less than 30% of the dimensions also relying on innovation indicators with additional indicators in entrepreneurship, education, exports and economic performance. Interestingly, the State New Economy Index, also focusing on innovation and the New Economy covers more dimensions than the World Knowledge Competitiveness index – one third compared to less than one fourth. In contrast to this, the high coverage ratio of the World Competitiveness Yearbook can be explained by the vast number of indicators included (246), having no specific focus.

Now, the detailed discussion of regional indices will follow, starting with the two international rankings including regions from around the world. When doing so, special emphasis is put on the World Competitiveness Yearbook as this is the index with the highest number of indicators and the one with the longest history. At the same time many general issues can be discussed with the example of this report, also relevant for the analysis of other indices. This includes the use of survey data, hard data comparability or certain single indicators applied. If some issues are relevant for other indices too, references will be made to the respective sections of the analysis not to repeat similar points.

6 World Competitiveness Yearbook

6.1 Background information

The World Competitiveness Yearbook is published by the Institute for Management Development (IMD), an independent non-profit foundation and business education institution based in Switzerland. Since 1989 it has published a competitiveness report together with the World Economic Forum (WEF) before they both published their own ranking in 1996.

The first index issued without the WEF building on the model from 1995 and the experiences since 1989 was constructed by a team consisting of Christelle Décosterd, Stéphane Garelli, Madeleine Hediger, Madeleine Linard de Guertechin and Christine Travers. It was published to "enable decision-makers from all sectors of the economy, as well as political leaders, to understand and assess more easily and quickly each country's competitiveness profile, and where its strengths and weaknesses lie" (IMD 1996: 5).

They offer the WCY with the World Competitiveness Scoreboard (WCS) for sale at a price of around 800 CHF per single copy and also have different schemes for on-line access or multi-year subscriptions. This pricing and the price itself is in stark contrast to the other indices offered. The following addressees are seen by the editors:

- "The business community uses it as an essential tool in determining investment plans and assessing locations for new operations.
- Government agencies find important indicators to benchmark their policies against those of other countries and to evaluate performance over time.
- The academic world also uses the exceptional wealth of data in the WCY to better understand and analyze how nations (and not only enterprises) compete in world markets." (IMD 2008: 477)

In addition to the report, "the IMD's World Competitiveness Center offers workshops/training to better understand the complexity of competitiveness and share its knowledge on success stories and best practices" (IMD 2008: 479). This together with the high price could be a sign that the primary concern is with the business community and the provision of data about potential places for doing business.

The latest – 2008 – edition of the WCY covers 55 countries of which Peru was just added, up from 54 in 2007. From 2003 to 2006, the printed report also included a ranking of regions.[90] In 2006, the issue analysed,[91] the following nine regions were included: Bavaria (Germany), Catalonia (Spain), Ille-de-France (France), Lombardy (Italy), Maharashtra (India), Sao Paulo (Brazil), Scotland (UK), Zhejiang (China). All these regions where introduced in 2003, with the exception of Scotland which was introduced in 2004. The Rhone-Alps region was dropped in 2006.

The inclusion of regions was done because the IMD "believe[d] that regions promote their own competitiveness profiles and policies, which are not necessarily similar at a national level" (IMD 2006: 22). The IMD did not distinguish between regions and nations in calculating the overall ranking or defining competitiveness. Rather, regions were included "to show that many regions represent 'pockets of competitiveness' inside the nation" (IMD 2006: 22). Due to limited data availability, then, national data was used as a proxy. The theoretical framework was not adjusted to the regional level; all calculations were done in the same way as for nations. Technically speaking, regions were treated like independent nations.

All findings are presented in a short overview for all entities ranked, together with the main indicator values and ranks for the current year and overall ranks for the

90 Since the 2007 edition, regions are no longer included in the printed version, but rankings of regions are still undertaken and available upon request. This is why this report was included in the analysis.

91 The analysis was made on the basis of the 2006 edition as this is the last available printed edition which included regions. Wherever possible, updated information based on the 2008 issue was included.

last five years. In addition, the strengths and weaknesses are presented including a what-if simulation, where the worst indicator values are replaced by the mean.

6.2 Theoretical Framework

Definition of Competitiveness

The IMD (2008: 24) defines competitiveness as "the ability of a nation to create and maintain an environment that sustains more value creation for its enterprises and more prosperity for its people."

The aim of the report then is to "rank and analyze these environments" (IMD 2008: 24). The discussion of competitiveness within the report always comes back to this notion of the importance of an environment that promotes competitiveness. In the 2008 report – marking the 20th anniversary – a chapter on the history of the term and the index is included, together with a discussion of the critique on the concept of competitiveness.

The authors here see three strands of criticism: that competitiveness is reflected in exports; the term has no meaning as all is about productivity and that not nations but firms compete. Focusing on the latter point, they again emphasise the importance of the environment by stating that "enterprises compete, but so do nations in providing the right environment (legal, administrative, judicial and infrastructural)" (IMD 2008: 30). National competitiveness then is relevant "because markets are open" (Garelli 2008). This – besides other factors – assumes mobile enterprises, re-locating for the best environment or rational business-founders moving to other nations when looking for the right place, neglecting differences in value systems or culture.

It is also stated that competitiveness is not necessarily an indicator of wealth as wealth is based on past competitiveness (IMD 2008: 32). Neither is it about power, as this could be a combination of wealth and size, nor is it an indicator of economic performance as measured with GDP as many things like intangibles

are not covered by GDP. Therefore, the IMD refers to prosperity as the goal of every government and competitiveness as the source for it (IMD 2008: 32).

The authors believe that the competitiveness environment is shaped by four forces, characterising an economy (IMD 2008):

- Attractiveness vs. Aggressiveness
- Proximity vs. Globality
- Assets vs. Processes
- Individual Risk Taking vs. Social Cohesiveness

The relationship of these four forces and the balance within the four forces determines the competitiveness of a country. This view then translates into the fundamentals of competitiveness, setting the frame for measuring competitiveness under the four main principles: economic performance, government efficiency, business efficiency and infrastructure. The rationale behind these principles is set out in the box below.

Table 11: Principles of world competitiveness according to IMD

I Economic Performance

1. Prosperity of a country reflects its past economic performance.
2. Competition governed by market forces improves the economic performance of a country.
3. The more competition there is in the domestic economy, the more competitive the domestic firms are likely to be abroad.
4. A country's success in international trade reflects competitiveness of its domestic companies (provided there are no trade barriers).
5. Openness for international economic activities increases a country's economic performance.
6. International investment allocates economic resources more efficiently worldwide.
7. Export-led competitiveness often is associated with growth-orientation in the domestic economy.

II Government Efficiency

1. State intervention in business activities should be minimized, apart from creating competitive conditions for enterprises.
2. Government should, however, provide macroeconomic and social conditions that are predictable and thus minimize the external risks for economic enterprise.
3. Government should be flexible in adapting its economic policies to a changing international environment.
4. Government should provide a societal framework which promotes fairness, equality and justice while ensuring the security of the population.

III Business Efficiency

1. Efficiency, together with ability to adapt to changes in the competitive environment, are managerial attributes crucial for enterprise competitiveness.
2. Finance facilitates value-adding activity.
3. A well-developed, internationally integrated financial sector in a country supports its international competitiveness.
4. Maintaining a high standard of living requires integration with the international economy.
5. Entrepreneurship is crucial for economic activity in its start-up phase.
6. A skilled labor force increases a country's competitiveness.
7. Productivity reflects value-added.
8. The attitude of the workforce affects the competitiveness of a country.

IV Infrastructure

1. A well-developed infrastructure including efficient business systems supports economic activity.
2. A well-developed infrastructure also includes information technology and efficient protection of the environment.
3. Competitive advantage can be built on efficient and innovative application of existing technologies.
4. Investment in basic research and innovative activity creating new knowledge is crucial for a country in a more mature stage of economic development.
5. Long-term investment in R&D is likely to increase the competitiveness of enterprises.
6. The quality of life is part of the attractiveness of a country.
7. Adequate and accessible educational resources help develop a knowledge-driven economy.

Source: Taken from Garelli (2008)

Policy Advice

As an advice to policy-makers, the fundamentals conclude with the following ten golden rules of competitiveness, summarizing the debate (IMD 2008):

- Create a stable and predictable legislative environment.
- Work on a flexible and resilient economic structure.
- Invest in traditional and technological infrastructure.
- Promote private savings and domestic investment.
- Develop aggressiveness on the international markets as well as attractiveness for foreign direct investment.
- Focus on quality, speed and transparency in government and administration.
- Maintain a relationship between wage levels, productivity and taxation.
- Preserve the social fabric by reducing wage disparity and strengthening the middle class.
- Invest heavily in education, especially at the secondary level, and in the life-long training of the labour force.
- Balance the economies of proximity and globality to ensure substantial wealth creation, while preserving the value system that citizens desire.

Conclusion on Theoretical Framework

As could be seen above, the definition of competitiveness goes round the term 'prosperity' without ever clearly defining "prosperity". The question what exactly is meant by 'prosperity' remains unanswered.[92] On the enterprise level, the authors see it as the survival of competition and not becoming insolvent. On the national

92 They later even include success and see competitiveness as the key for achieving prosperity and success. An exact definition is not included. Also see Drews (2005: 302).

level, the authors point to GDP in the short-term, economic growth plus 'something else' in the long-term (IMD 2008: 32) and add to that "the definition of prosperity is strongly dependent on national value systems and therefore changes from one country to the other" (IMD 2008: 32). This would call for individual rankings based on the characteristics of a national value system, not for universal rankings.

In general, the views expressed refer to human capital theory or Schumpeter's creative destruction and innovation approach. This then can be seen as a "supply-side"[93] economics approach, focusing on the supply of right labour, ICT infrastructure and negative consequences of a high share of the state.

The principles outlined relate not only to one but several concepts of competitiveness: from the ability to innovate and place attractiveness (talent and resources are emphasised) to emphasising prosperity referring to the ability to earn.[94] Sometimes, the authors also point to Porter's approach (IMD 2008: 31; 33). In general, one can conclude that they centre on the firm and the national and regional environment helping them competing successfully. It can, therefore, be summarised as a combination of competitive advantage approach and a microeconomic view, emphasising the importance of the business environment.

Interestingly, the authors' first step was not to work out a theoretical framework but to "include on our radar screen all those issues, obvious and less obvious, which could have an impact on the competitiveness of a nation" (IMD 2008: 31). Concluding with Heilemann et al (2006) and Wignaraja and Joiner (2004), this resulted in a mix of different economic concepts, development theories and a vague approach when it comes to relevant factors. This leads to the impression that it aims at business managers first,[95] as they may be looking for information

93 Heilemann et al (2006: 53). See references to Milton Friedman, Thatcherism and Reaganomics.

94 The ability to sell view is also incorporated and reflected in the indicator choices. While export data are included, import data are not.

95 It is interesting that the authors did split the ranking according to population sizes into two parts in 2004 to better reflect the different groups of nations, but in 2005 returned to the single index structure "as readers demanded it" (Rosselet 2006). This shows that the IMD is not so much concerned with the right approach from an academic standpoint but more about pleasing the target audience.

on a vast number of indicators, but not so much for academics.[96] This impression is fortified by the fact that many indicators are included as background information and not taken into account for the aggregation.

6.3 Deconstruction

The index is made up of four competitiveness factors: economic performance, government efficiency, business efficiency and infrastructure. Each of these is broken down into five sub-factors incorporating a different number of single indicators. The four components and sub-factors are each weighted equally. Of the more than 320 indicators collected each year (331 for 2008), around 240 are taken into account for the overall ranking. They are first aggregated on the level of sub-factors, then on the level of competitiveness factors to eventually form the overall score as a percentage of the highest score. Around 110 indicators are collected through a survey of around 4,000 executives.

To compute the overall competitiveness index, the four areas ("competitiveness factors") stated above are broken down further into 20 sub-factors. These sub-factors consist of a different number of indicators ranging from four indicators for the sub-factor "prices" to 28 in the field of the sub-factor "domestic economy." This gives the single indicators very different implicit weights in the aggregation of the overall ranking, as the 20 sub-factors are equally weighted with 5%, independent from the number of indicators included.

In all, the 2006 index consists of 312 criteria from which 199 are "hard data criteria" and 113 survey data criteria. From these criteria, 126 hard data and 113 survey criteria are taken into account when creating the overall ranking of competitiveness. Other indicators are included as background information on the regions' and nations' position in the world.

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96 Drews (2005: 204) also shares this view. This can additionally be supported by the fact that indicators like 'Employer's social security contribution rate' or 'Employee's social security contribution rate' are included and ranked from zero upwards. This may be a 'good' point for business managers, but it is clearly not enough to outrank China and India over Germany or the United Kingdom just because they have no sufficient social security network.

The following table gives an overview of the number of indicators included in the WCY. In the first column, the competitiveness factor together with the number of indicators reported as well as the number of indicators included for the ranking are displayed. In the second column, the single sub-factors are displayed and the number of hard (h) and survey (s) variables computed in the ranking. The third column shows the weight of the respective sub-factor actually applied for the ranking whereas the last column shows the "original" weight, based on the number of indicators as a percentage of the total number of indicators in the ranking.[97]

97 Note that for the calculation of the final ranking, survey data, are weighted 0.5 while hard data are weighted 1. This is not reflected in the following table as this tables show the weights before any adjustments are made.

Table 12: Breakdown of competitiveness factors in the 2006 WCY

Competitiveness factor	Sub-factor	Applied weight	"Original" weight
Economic Performance 77 indicators reported, 39 Indicators applied 35 hard data, 4 survey data	Domestic Economy (7h, 1s)	5%	3.35%
	International Trade (10h, 0s)	5%	4.18%
	International Investment (10h, 3s)	5%	5.44%
	Employment (6h, 0s)	5%	2.51%
	Prices (2h, 0s)	5%	0.84%
Government Efficiency 72 indicators reported, 61 indicators applied 21 hard data, 40 survey data	Public Finance (6h, 1s)	5%	2.93%
	Fiscal Policy (6h, 3s)	5%	3.77%
	Institutional Framework (4h, 12s)	5%	6.69%
	Business Legislation (2h, 18s)	5%	8.37%
	Societal Framework (3h, 6s)	5%	3.77%
Business Efficiency 68 indicators reported, 60 indicators applied 22 hard data, 38 survey data	Productivity (2h, 2s)	5%	1.67%
	Labour Market (11h, 9s)	5%	8.37%
	Finance (9h, 9s)	5%	7.53%
	Management Practices (0h, 11s)	5%	4.60%
	Attitudes and Values (0h, 7s)	5%	2.93%
Infrastructure 95 indicators reported, 79 indicators applied 48 hard data, 31 survey data	Basic Infrastructure (9h, 6s)	5%	6.28%
	Technological Infrastructure (13h, 7s)	5%	8.37%
	Scientific Infrastructure (12h, 5s)	5%	7.11%
	Health and Environment (8h, 6s)	5%	5.86%
	Education (6h, 7s)	5%	5.44%

Source: IMD (2006)

The table shows that weighting the different competitiveness factors equally at first sight seems to be neutral as none of the different areas receives more weight than another. On second glance, one can clearly see that this leads to an implicit over- or under-weighting of the different sub-factors. This is due to the fact that the sub-factors consist of a different number of indicators. This can clearly be seen in the last column where the number of factors ranges from two

for prices to 21 for scientific infrastructure, meaning that an indicator in the sub-factor prices has a much higher weight in the overall weighting as an indicator under the sub-factor scientific infrastructure. This would mean that changes in the area of prices should have a much greater impact than a change in one of the indicators in the area of scientific infrastructure.

As the authors did not want to give too much weight to survey data, they decided to set the overall weights at one third. This means, for the aggregation of the single indicators on the level of the sub-factors, hard data indicators are given a weight of one, whereas survey data indicators receive a weight of 0.5. The consequences on the level of the four competitiveness factors depend on the original weights of survey data. In the case of government efficiency and business efficiency, this is an important change as around two third of the data are survey data before these adjustments are made.[98] Why a ratio of 1 to 0.5 was chosen is not explained in detail. The IMD (2008: 31) states that "[w]e conducted a "Delphi" type of analysis and came to the conclusion that a balance of 2/3 hard data and 1/3 opinion survey would be advisable . . . We felt that this issue was less essential as long as we used the same methodology over time to ensure comparability of results." This is also emphasised in the 1999 issue (IMD 1999: 49): "This one-third to two-thirds balance between hard and soft data is somewhat arbitrary . . . but . . . ensuring consistency and comparability."

In the next pages, the single indicators included in the 2006 report are displayed. The first column names the competitive factor, sub-factor or single indicator. In the second column, the aggregated number of indicators displayed in the report is included. Then, information is given on hard data displayed and hard data actually making up the final rankings. The same is done in column six for survey data. The last column lists the exact unit for the respective indicators.

98 On the level of sub-factors, this is even more important.

Economic Performance

Table 13: Economic performance indicators and sub-factors

Competitive Factor/ Indicator	Indicators displayed	Indicators included in the ranking	Hard data displayed	Hard data included	Survey data included	Unit
Economic Performance	**77**	**39**	**73**	**35**	**4**	
Domestic Economy	**28**	**8**	**27**	**7**	**1**	
Size	11	3	11	3	0	
GDP		x	x	x		Bn USD
GDP (PPP)		x	x	x		Bn USD
Private final consumption expenditure			x			Bn USD
Private final consumption expenditure			x			% of GDP
Government final consumption expenditure			x			Bn USD
Government final consumption expenditure			x			% of GDP
Gross domestic investment			x			Bn USD
Gross domestic investment		x	x	x		% of GDP
Gross domestic savings			x			Bn USD
Gross domestic savings			x			% of GDP
Economic sectors			x			% of GDP
Growth	7	3	6	2	1	
Real GDP growth		x	x	x		% change based on national currency in constant prices
Real GDP growth per capita		x	x	x		% change based on national currency in constant prices
Private final consumption expenditure - real growth			x			% change based on national currency in constant prices
overnement final consumption expenditure - real growth			x			% change based on national currency in constant prices
Gross domestic investement - real growth			x			% change based on national currency in constant prices
Gross domestic savings - real growth			x			% change based on national currency in constant prices
Resilience of the economy		x			x	... to economic cycles 1-weak to 6-strong
Wealth	6	2	6	2	0	
GDP per capita		x	x	x		USD per capita
GDP (PPP) per capita		x	x	x		Estimates: USD per capita at PPP
Private final consumption expenditure per capita			x			USD per capita
Governement final consumption expenditure per capita			x			USD per capita
Gross domestic investment per capita			x			USD per capita
Gross domestic savings per capita			x			USD per capita
Forecasts	4	0	4	0	0	
Forecast: real GDP growth			x			% change based on national currency in constant prices
Forecast: inflation			x			% change
Forecast: unemployment			x			% of total labour force
Forecast: current account balance			x			% of GDP / GNP
International Trade	**20**	**10**	**20**	**10**	**0**	
	20	10	20	10	0	
Current account balance		x	x	x		Bn USD
Current account balance			x			% of GDP
Balance of trade			x			Bn USD
Balance of trade			x			% of GDP
Balance of commercial service			x			Bn USD
Balance of commercial service			x			% of GDP
Exports of goods		x	x	x		Bn USD
Exports of goods		x	x	x		% of GDP
Exports of goods - real growth		x	x	x		% change based on USD values
Exports of commercial services		x	x	x		Bn USD
Exports of commercial services		x	x	x		% of GDP
Exports of commercial services - real growth		x	x	x		% change based on USD values
Exports breakdown by economic sectors			x			% of total export
Imports of goods & commercial services			x			Bn USD
Imports of goods & commercial services			x			% of GDP
Imports of goods & commercial services - real growth			x			% change based on USD values
Imports breakdown of economic sectors			x			% of total imports
Trade to GDP ratio		x	x	x		(Exports + imports) / (2 x GDP)
Terms of trade index		x	x	x		Unit value of exports over unit value of imports
Tourism receipts		x	x	x		Tourism receipts % of GDP

Competitive Factor/ Indicator	Indicators displayed	Indicators included in the ranking	Hard data displayed	Hard data included	Survey data included	Unit
International Investment	**17**	**13**	**14**	**10**	**3**	
Investment	15	11	12	8	3	
Direct investment flows abroad		x	x	x		bn USD
Direct investment flows abroad		x	x	x		% of GDP
Direct investment stocks abroad		x	x	x		bn USD
Direct investment stocks abroad - real growth		x	x	x		% change based on USD values
Direct investment flows inward		x	x	x		bn USD
Direct investment flows inward		x	x	x		% of GDP
Direct investment stocks inward		x	x	x		bn USD
Direct investment stocks inward - real growth		x	x	x		% change based on USD values
Balance of direct investment flows			x			bn USD
Balance of direct investment flows			x			% of GDP
Net positon in direct investment stocks			x			bn USD
Net positon in direct investment stocks			x			% of GDP
Relocation threats of production		x			x	1-threat to 6-no threat for the economy
Relocation threats of R&D facilities		x			x	1-threat to 6-no threat for the economy
Relocation threats of services		x			x	1-threat to 6-no threat for the economy
Finance	2	2	2	2	0	
Portfolio investment assets		x	x	x		bn USD
Portfolio investment liabilities		x	x	x		bn USD
Employment	**8**	**6**	**8**	**6**	**0**	
	8	6	8	6	0	
Employment		x	x	x		total employment in millions
Employment		x	x	x		% of population
Employment growth		x	x	x		estimate: % change
Employment by sector			x			% of total employment
Employment in the public sector			x			% of total employment
Unemployment rate		x	x	x		% of labour force
Long-term unemployment		x	x	x		% of labour force
Youth unemployment		x	x	x		% of labour force
Prices	**4**	**2**	**4**	**2**	**0**	
		2	4	2	0	
Consumer price inflation		x	x	x		average annual rate
Cost-of-living index		x	x	x		index of basket of goods&services in major cities excl. housing
Apartment rent			x			3-room apartment monthly rent in major cities, USD
Office rent			x			total occupation cost (USD per sqm per year)

Source: IMD (2006)

Government Efficiency

Table 14: Government efficiency indicators and sub-factors

Competitive Factor/ Indicator	Indicators displayed	Indicators included in the ranking	Hard data displayed	Hard data included	Survey data included	Unit
Government Efficiency	**72**	**61**	**33**	**21**	**40**	
Public Finance	**11**	**7**	**10**	**6**	**1**	
	11	7	10	6	1	
Government budget deficit/surplus			x			bn USD
Government budget deficit/surplus		x	x	x		% of GDP
Total general government debt			x			bn USD
Total general government debt		x	x	x		% of GDP
Total general government debt-real growth		x	x	x		% change (national currency)
Central government domestic debt			x			% of GDP
Central Government foreign debt		x	x	x		% of GDP
Interest payment		x	x	x		% of current revenue
Management of public finance		x			x	will over next two years 1-deteriorate to 6-improve
Total reserves		x	x	x		gold and official reserves
General government expenditure			x			% of GDP
Fiscal Policy	**14**	**9**	**12**	**6**	**3**	
	14	9	11	6	3	
Collected total tax revenues		x	x	x		% of GDP
Collected personal income tax			x			on profits, income, capital gains, % of GDP
Collected corporate taxes			x			on profits, income, capital gains, % of GDP
Collected indirect tax revenues			x			on goods and services, % of GDP
Collected capital and property taxes			x			% of GDP
Collected social security contribution			x			compulsory contribution, % of GDP
Effective personal income tax rate		x	x	x		% of income equal to GDP per capita
Corporate tax rate on profit		x	x	x		max. tax rate, calculated on profit before taxes
Consumption tax rate		x	x	x		standard rate on VAT/ GST
Employee's social security contribution rate		x	x	x		compulsory contribution % of an income equal to GDP per capita
Employer's social security contribution rate		x	x	x		compulsory contribution % of an income equal to GDP per capita
Real personal taxes		x			x	taxes 1-discourage to 6-not discourage people
Real corporate taxes		x			x	taxes 1-discourage to 6-not discourage entrepreneurial actions
Tax evasion		x			x	1-hampers to 6-does not hamper business activity
Institutional Framework	**16**	**16**	**4**	**4**	**12**	
Central Bank	7	7	4	4	3	
Real short-term interest rate		x	x	x		real discount / bank rate
Cost of capital		x			x	1-deters to 6-encourages business activities
Interest rate spread		x	x	x		lending rate minus deposit rate
Country credit rating		x	x	x		0-100 institutional investor magazine rating
Central bank policy		x			x	has a 1-negative to 6-positive impact
Exchange rate policy		x			x	1-hinders to 6-supports enterprise competitiveness
Exchange rate stability		x	x	x		parity change from national currency to SDR, 2005/2003
State Efficiency	9	9	0	0	9	
Policy direction of the government		x			x	policy direction is 1-not consistent to 6-is consistent
Legal and regulatory framework		x			x	1-restricts to 6-encourages enterprise competitiveness
Adaptability of government policy		x			x	is 1-low to 6-high
Government decisions		x			x	are 1-not effectively to 6-are effectively implemented
Political parties		x			x	1-do not to 6-do understand today's economic challenges
Transparency		x			x	1-poor to 6-satisfactory
Public service		x			x	is 1-not independent to 6-is independent from politicyl interference
Bureaucracy		x			x	1-hinders to 6-does not hinder business activities
Bribing and corruption		x			x	1-exist to 6-do not exist in the economy

Competitive Factor/ Indicator	Indicators displayed	Indicators included in the ranking	Hard data displayed	Hard data included	Survey data included	Unit
Government Efficiency	**72**	**61**	**33**	**21**	**40**	
Business Legislation	**20**	**20**	**2**	**2**	**18**	
Openness	7	7	0	0	7	
Customs' authorities		x			x	1-do not to 6-do facilitate the efficient transit of goods
Protectionism		x			x	1-impairs to 6-does not impair the conduct of your business
Public sector contracts		x			x	1-are not to 6-are sufficiently open to foreign bidders
International transactions		x			x	1-cannot to 6-can be freely negotiated with foreign partners
Foreign investors		x			x	1-are not to 6-are free to acquire control in domestic companies
Access to capital markets		x			x	1-is not to 6-is easily available
Investment incentives		x			x	1-are not to 6-are attractive to foreign investors
Competition and Regulations	10	10	2	2	8	
Government subsidies		x	x	x		to private and public companies, % of GDP
Subsidies		x			x	1-impair to 6-do not impair economic development
Competition legislation		x			x	1- is not to 6-is efficient in preventing unfair competition
Product and service legislation		x			x	1-does to 6-does not deter business activity
Price controls		x			x	1-affect to 6-does not affect pricing of products in most industries
Parallel econmoy		x			x	1-impairs to 6-does not impair economic development
Regulation intensity		x			x	1-does restrain to 6-doesn't restrain the ability of firms to compete
Ease of doing business		x			x	1-is not to 6-is a competitive advantage for your economy
Creation of firms		x			x	1-is to 6-supported by legislation in your economy
Start-up days		x	x	x		number of days to start a business
Labour Regulations	3	3	0	0	3	
Labour regulations		x			x	1-hinder to 6-do not hinder business activities
Umemployment legislation		x			x	1-does not to 6-provides an incentive to look for work
Immigration laws		x			x	1-prevent to 6-do not prevent firms from employing foreign labour
Societal Framework	**11**	**9**	**5**	**3**	**6**	
	11	9	5	3	6	
Justice		x			x	1-is not to 6-is fairly administered in society
Personal security and private property		x			x	1-are not to 6-are adequately protected
Risk of political instability		x			x	1-very high to 6-very low
Social cohesion		x			x	1-is not to 6-is a priority for the government
Income distribution-lowest 20%			x			% of household incomes going to lowest 20% of households
Income distribution-highest 20%			x			% of household incomes going to highest 20% of households
Discrimination		x			x	1-poses to 6-does not pose a handicap in society
Females in parliament		x	x	x		% of total seats in parliament
Female positions		x	x	x		% of total legislators, senior officials and managers
Gender income ratio		x	x	x		ratio of estimated female to male earned income globally
Harassment and violence		x			x	1-do to 6-do not destabilize the workplace

Source: IMD (2006)

Business Efficiency

Table 15: Business efficiency indicators and sub-factors

Competitive Factor/ Indicator	Indicators displayed	Indicators included in the ranking	Hard data displayed	Hard data included	Survey data included	Unit
Business Efficiency	**69**	**60**	**31**	**22**	**38**	
Productivity and Efficiency	**9**	**4**	**7**	**2**	**2**	
		4	7	2	2	
Overall productivity (PPP)		x	x	x		estimate: GDP (PPP) per person employed, USD
Overall productivity			x			GDP per person employed, USD
Overall productivity - real growth		x	x	x		estimate: % change of real GDP per person employed
Labour productivity (PPP)			x			estimate: GDP (PPP) per person employed per hour, USD
Agricultural productivity (PPP)			x			estimate: Related GDP (PPP) per person employed in agriculture, USD
Productivity in industry (PPP)			x			estimate: Related GDP (PPP) per person employed in industry, USD
Productivity in services (PPP)			x			estimate: Related GDP (PPP) per person employed in services, USD
Large corporations		x			x	1-are not to 6-are efficientby international standards
Small and medium-sized enterprises		x			x	1-are not to 6-are efficientby international standards
Labour Market	**21**	**20**	**12**	**11**	**9**	
Costs	4	4	4	4	0	
Compensation levels		x	x	x		estimate: Total hourly compensation for manufacturing workers (wages + supplementary benefits), USD
Unit labour costs in manufacturing sector		x	x	x		% change
Remuneration in services professions		x	x	x		gross annual income incl. supplements such as bonuses, USD
Remuneration of management		x	x	x		total base salary plus bonuses and long-term incentives, USD
Relations	5	5	2	2	3	
Working hours		x	x	x		average number of working hours per year
Labour relations		x			x	1-hostile to 6-productive
Woker motivations		x			x	1-low to 6-high
Industrial disputes		x	x	x		working days lost per 1,000 inhabitants per year (average 2001-2003)
Employee training		x			x	1-is not a to 6-is a high priority in companies
Availability of Skills	12	11	6	5	6	
Labour force		x	x	x		employed and registered unemployed (absolute numbers)
Labour force		x	x	x		% of population
Labour force growth		x	x	x		% change
Part-time employment		x	x	x		% of total employment
Female labour force		x	x	x		% of total labour force
Foreign labour force			x			% of total labour force
Skilled labour		x			x	1-is not to 6-is readily available
Finance skills		x			x	1-are not to 6-are readily available
Brain drain		x			x	1-hinders to 6-does not hinder competitiveness in your economy
Foreign high-skilled people		x			x	1-are not to 6-are attracted by the business environment of your economy
International experience		x			x	...of senior mangement in general 1-low to 6-significant
Competent senior managers		x			x	1-are not to 6-are readily available

Competitive Factor/ Indicator	Indicators displayed	Indicators included in the ranking	Hard data displayed	Hard data included	Survey data included	Unit
Business Efficiency	**68**	**60**	**30**	**22**	**38**	
Finance	**20**	**18**	**11**	**9**	**9**	
Bank Efficiency	9	7	5	3	4	
Banking sector assets		x	x	x		% of GDP
Credit		x			x	1-does not to 6-does flow easily from banks to business
Number of credit cards issued		x	x	x		per capita
Credit card transactions			x			Number of transactions per capita
Investment risk		x	x	x		Euromoney country credit-worthiness scale from 1-100
Venture capital		x			x	1-is not to 6-is easily available for business development
Banking and financial services		x			x	1-do not to 6-do support business activities efficiently
Retail banking			x			Population / number of bank offices
Banking regulation		x			x	1-hinders to 6-does not hinder competitiveness in your economy
Stock Market Efficiency	8	8	5	5	3	
Stock markets		x			x	1-do not to 7-do provide adequate financing to companies
Stock market capitalisation		x	x	x		Bn USD
Stock market capitalisation		x	x	x		% of GDP
Value traded on stock markets		x	x	x		USD per capita
Listed domestic companies		x	x	x		Number of listed domestic companies
Stock market index		x	x	x		% change on index in national currency
Shareholders' rights		x			x	1-are not to 7-are sufficiently protected
Financial institutions' transparency		x			x	1-is not to 7-is sufficiently implemented in your economy
Finance Management	3	3	1	1	2	
Cash flow		x			x	1-insufficient to 7-sufficient to allow companies to self-finance
Corporate debts		x			x	1-restrains to 7-does not restrain the ability of firms to compete in your economy
Factoring		x	x	x		% of merchandise exports
Management Practices	**11**	**11**	**0**	**0**	**11**	
		11	0	0	11	
Adaptability of companies		x			x	...to market changes are 1-low to 7-high in your economy
Ethical practices		x			x	1-are not to 7-are implemented in companies
Credibility of managers		x			x	1- is not to 7-is widely acknowledged in the economy
Corporate boards		x			x	1-do not to 7-do supervise the management of companies effectively
Auditing and accounting practices		x			x	1- are not to 7-are adequately implemented in business
Shareholder value		x			x	1-is not to 7-is efficiently managed
Customer satisfaction		x			x	1-is not to 7-is emphasized in your company
Entrepreneurship		x			x	Entrepreneurhip of managers 1-is not to 7-is widespread in your economy
Marketing		x			x	1-is not to 7-is conducted efficiently by firms in your economy
Social responsibility		x			x	Of business leaders is 1-low to 7-high towards society
Health, safety & environmental concerns		x			x	1-are not to 7-are adequately addressed by management
Attitudes and Values	**7**	**7**	**0**	**0**	**7**	
		7	0	0	7	
Attitudes toward globalization		x			x	Are generally 1-negative to 7-positive in your economy
Image abroad		x			x	...of your nation/region 1-discourages to 7-encourages business development
National culture		x			x	... is 1-closed to 7-open to foreign ideas
Flexibility and adaptability		x			x	... of people in your economy are 1-low to 7-high when faced with new challenges
Need for economic and social reforms		x			x	... is 1-not to 7-is generally understood by people of your society
Valuea of society		x			x	1- do not to 7-do support competitiveness
Corporate values		x			x	1- do not to 7- do sufficiently take into account the values of employees

Source: IMD (2006)

Infrastructure

Table 16: Infrastructure indicators and sub-factors

Competitive Factor/ Indicator	Indicators displayed	Indicators included in the ranking	Hard data displayed	Hard data included	Survey data included	Unit
Infrastructure	**95**	**83**	**64**	**52**	**31**	
Basic Infrastructure	**22**	**15**	**16**	**9**	**6**	
		15	16	9	6	
Land area			x			Square kilometer (1,000)
Arable land		x	x	x		Square meters per capita
Urbanisation		x			x	Urbanisation of cities 1-drains to 6-does not drain economic resources
Population - market size		x	x	x		Estimates in million
Population under 15 years			x			% of total population
Population over 65 years			x			% of total population
Dependency ratio		x	x	x		Population <15 and >65 years old, divided by active population (15 to 64 years)
Roads		x	x	x		Density of the network km per sqkm
Railroads		x	x	x		Density of the network km per sqkm
Air transportation		x	x	x		Number of passengers carried by main companies
Quality of air transportation		x			x	1- deters to 6-encourages business development in your country
Distribution infrastructure		x			x	... of goods and services is 1- inefficient to 6-efficient
Water transportation		x			x	1- does not to 6-does meet business requirements
Maintenance and development		x			x	1-are not to 6-are adequately planned and financed
Energy infastructure		x			x	1-is not to 6-is adequate and efficient in your economy
Total indigenous energy production			x			Milions MTOE
Total indigenous energy production per capita			x			Milions MTOE per capita
Total indigenous energy production		x	x	x		% of total requirements in tons of oil equivalent
Total final energy consumption			x			Milions MTOE
Total final energy consumption per capita			x			Milions MTOE per capita
Energy intensity		x	x	x		Commercial energy consumed for each USD of GDP in kilojoules
Electricity costs for industrial clients		x	x	x		USD per kWh
Technological Infrastructure	**20**	**20**	**13**	**13**	**7**	
		20	13	13	7	
Investment in telecommunications		x	x	x		% of GDP
Fixed telephone lines		x	x	x		Number of main lines per 1,000 inhabitants
International fixed telephone costs		x	x	x		USD per 3 minutes in peak hours to USA (for USA to Europe)
Mobile telephne subscribers		x	x	x		Number of subscribers per 1,000 inhabitants
Mobile telephne costs		x	x	x		USD per 3 minutes in peak hours (local)
Communication technology		x			x	1-does not to 6-does meet business requirements
Computers in use		x	x	x		Worldwide share
Computers per capita		x	x	x		Numbers of computers per 1,000 people
Internet users		x	x	x		Number of internet users per 1,000 people
Internet costs		x	x	x		Costs for 20 hour dial-up per month, USD
Broadband subscribers		x	x	x		Number of subscribers per 1,000 inhabitants
Broadband costs		x	x	x		USD per 100/kbits/s per month
Information technology skills		x			x	1-are not to 6-are readily available
Technology cooperation		x			x	... is 1-lacking to 6-developed between companies
Development and application of technology		x			x	1-are not to 6-are supported by the legal environment
Funding for technological development		x			x	1- is not to 6-is generally sufficient
Technological regulation		x			x	1-hinders to 6-supports the development of business
High-tech exports		x	x	x		M USD
High-tech exports		x	x	x		% of manufactured exports
Cyber security		x			x	1-is not to 6-is being adequately addressed by corporations

Competitive Factor/ Indicator	Indicators displayed	Indicators included in the ranking	Hard data displayed	Hard data included	Survey data included	Unit
Infrastructure	**95**	**79**	**64**	**48**	**31**	
Scientific Infrastructure	**22**	**17**	**17**	**12**	**5**	
		18	17	12	5	
Total expenditure on R&D		x	x	x		M USD
Total expenditure on R&D per capita			x			USD per capita
Total expenditure on R&D		x	x	x		% of GDP
Business expenditure on R&D		x	x	x		M USD
Business expenditure on R&D		x	x	x		% of GDP
Total R&D personnel nationwide		x	x	x		Full-Time work Equivalent (FTE)
Total R&D personnel nationwide per capita		x	x			Full-Time work Equivalent (FTE) per 1,000 people
Total R&D personnel in business enterprise			x			Full-Time work Equivalent (FTE)
Total R&D personnel in business per capita			x			Full-Time work Equivalent (FTE) per 1,000 people
Basic research		x			x	1-does not to 6-does enhance long-term economic development
Science degrees			x			% of total first university degrees in science and engineering
Scientific articles		x	x	x		Scientific articles published by origin of author
Science in schools		x			x	1-is not to 6-is sufficiently emphasized
Youth interest in science		x			x	1-is not to 6-is strong
Nobel prizes		x	x	x		Awarded in physics, chemistry, physiology or medicine and economics since 1950
Nobel prizes per capita		x	x	x		Awarded in physics, chemistry, physiology or medicine and economics since 1950 per million people
Patents granted to residents		x	x	x		Number of patents granted to residents (average 2000-2002)
Securing patents abroad		x	x	x		Number of patents secured abroad by country residents
Intelectual property rights		x			x	1-are not to 6-are adequately enforced in your economy
Number of patents in force		x	x	x		Per 100,000 inhabitants
Patent productivity		x	x	x		Patents granted to residents / R&D personnel in business ('000s)
Legal environment		x			x	1-hinders to 6-supports scientific research
Health and Environment	**17**	**14**	**11**	**8**	**6**	
		14	11	8	6	
Total health expenditure		x	x	x		% of GDP
Public expenditure on health			x			% of total health expenditure
Life expectancy at birth		x	x	x		Average estimate
Healthy life expectancy			x			Average estimate
Medical assistance		x	x	x		Number of inhabitants per physician and per nurse
Health infrastructure		x			x	1-does not to 6-does meet the needs of society
Urban population			x			% of total population
Human Development Index		x	x	x		Combines economic, social and educational indicators-1 highest
Health problems (AIDS, Alkohol, drug abuse etc.)		x			x	1-do to 6-do not have a significant impact on companies
Paper and cardboard recycling rate		x	x	x		% of apparent consumption
Waste water treatment plants		x	x	x		% of population served
Carbon dioxide emissions		x	x	x		Carbon industrial emission in metric tons per one million USD of GDP
Ecological footprint		x	x	x		Area units per person, hectares of biologically productive space
Sustainable development		x			x	1-is not to 6-is a priority in your economy
Pollution problems		x			x	1-do to 6-do not seriously affect your economy
Environmental laws		x			x	1-hinder to 6-do not hinder the competitiveness of businesses
Quality of life		x			x	... in your economy is 1- low to 6-high
Education	**14**	**13**	**7**	**6**	**7**	
		13	7	6	7	
Total public expenditure on education		x	x	x		% of GDP
Pupil-teacher ratio (primary education)		x	x	x		Ratio of students to teaching staff
Pupil-teacher ratio (secondary education)		x	x	x		Ratio of students to teaching staff
Secondary school enrollment		x	x	x		% of relevant age group receiving full-time education
Higher education achievement		x	x	x		% of population that has attained at least tertiary education for persons 25-34
Educational assessment			x			PISA survey of 15-years old
Educational system		x			x	1-does not to 6-does meet the needs of a competitive economy
University education		x			x	1-does not to 6-does meet the needs of a competitive economy
Illiteracy		x	x	x		Adult (over 15 years) iliteracy rate as a % of population
Economic iteracy		x			x	1-low to 6-high among the population
Education in finance		x			x	1-does not to 6-does meet the needs of enterprises
Language skills		x			x	1-are not to 6-are meeting the need of enterprises
Qualified engineers		x			x	1-are not to 6-are available in your labour market
Knowledge transfer		x			x	1-is lacking to 6-is highly developed between companies and universities

Source: IMD (2006)

After making transparent how the index is built up, the index is evaluated based on the research framework set out above.

6.4 Evaluation

6.4.1 Clarity and Transparency

The overall transparency is relatively high as all criteria are listed in the annex in the original form, not including transformed values. This is perhaps because business managers use the index as a way to assess different business locations and, therefore, need the original data.

The theoretical framework and all relevant information on standardisation, normalisation, aggregation, weights and so on, have been outlined in separate chapters since 2001.[99] Therefore, it is possible to re-construct the index, although the exact standardisation and aggregation is not included. The report is transparent in general and it is clear what data was aggregated. There are some points like more details on the survey or some missing exact sources, but as Heilemann et al (2006)[100] have shown, there is the possibility of re-constructing the index with few deviations from the original ranking.

6.4.2 Comparability

Comparability over Time

The following table gives an overview of some characteristics of the yearbook over the last ten years to show how the report differs from year to year:

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99 Details on the standardisation of data were not included in the reports before.

100 Despite several attempts, it was not possible to get more background information or get hold of the newer reports from 2007 or 2008 without purchasing them. The authors were contacted and asked for the relevant methodology chapter and some additional information – e.g., which indicators formed part of the ranking in 2007 and 2008. The information received was not sufficient.

Table 17: Main characteristics of the WCY 1999-2008

Year	# of indicators displayed	# of indicators applied	# of sub-categories	# of surveyed managers	# of entities
1999	288	246/250[101]	8	4,160	47
2000	290	249	8	3,263	47
2001	286	224	4	3,678	49
2002	314	243	4	3,532	49
2003	321	243	4	4,256	59 (8 regions)
2004	323	241	4	4,166	60 (9 regions)
2005	314	241	4	4,000	60 (9 regions)
2006	312	239	4	4,055	61 (8 regions)
2007	323	246	4	3,700	55
2008	331	-	4	3,500	55
Mean	310.2	219.3	-	3,831	-
Range	45	25	-	993	14
Standard Deviation	16.3	7.6	-	340.3	-

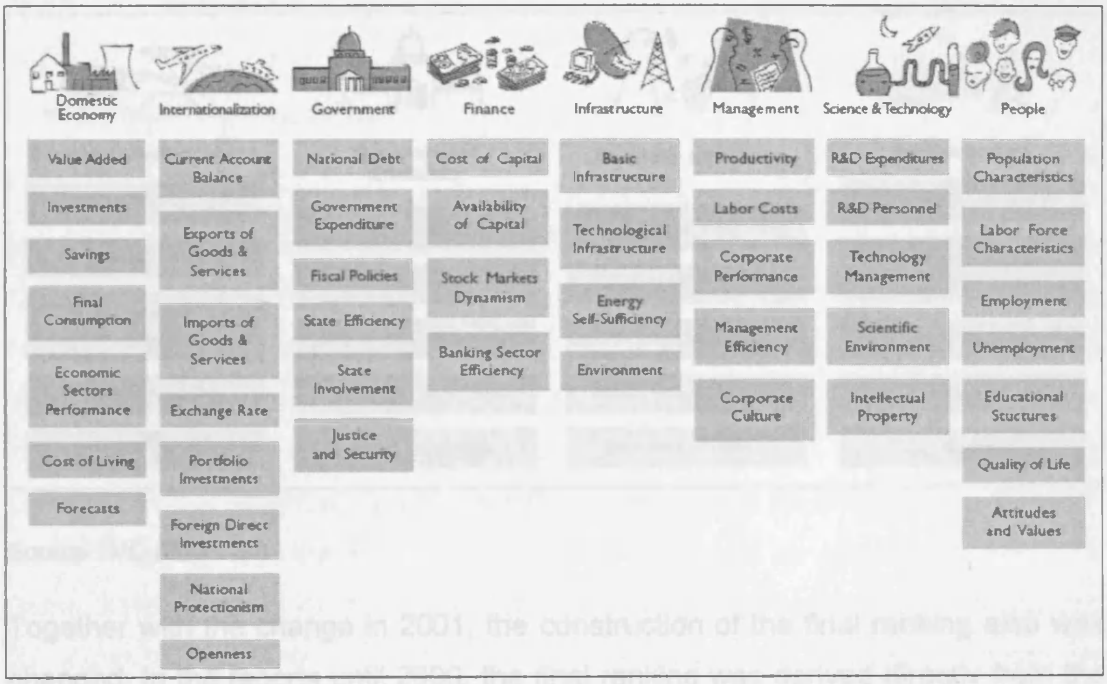
Source: Author's own based on the respective issues

It can be seen that the number of indicators applied when constructing the final index did change considerably over the ten years, as well as the number of indicators applied when aggregating the final score although not that much. The number of entities included also changed significantly over the years. The latter means that the eighth rank in 1999 is not easily comparable to the eighth rank in 2006, the high-point in the number of entities. A simple comparison of ranks over the years must, therefore, be treated with caution.

With respect to the sub-factors disclosed in the table, the analysis now focuses on how the index construction changed over time. From 1996 to 2000, the index was built on eight competitiveness factors, as stated below:

101 On page 49 of the 1999 report, 246 indictors are stated, a page later 250 indicators.

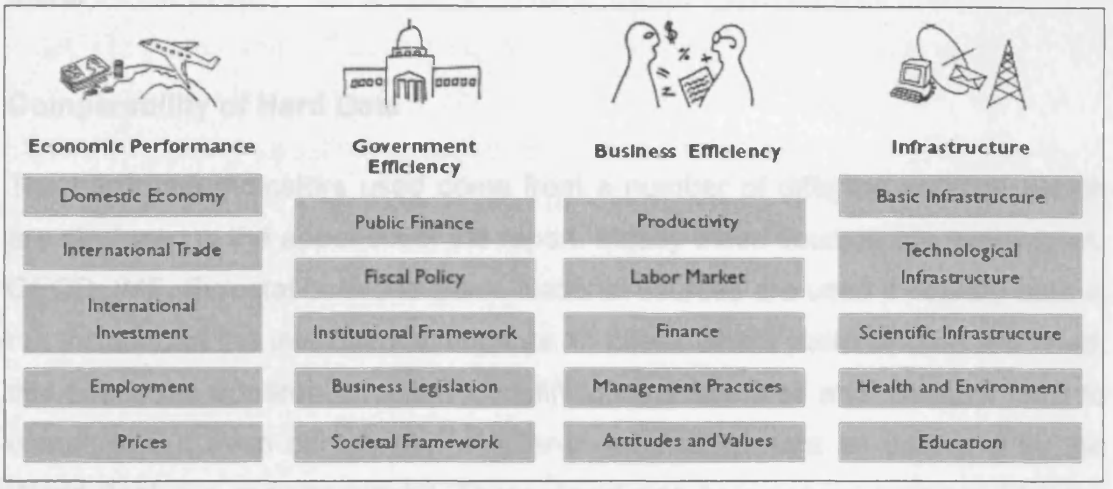
Figure 5: Competitiveness input factors until 2000



Source: IMD (2000: 57)

These factors were re arranged and newly grouped under four competitiveness factors in 2001. Since then, the framework remained unchanged, despite changes in the number and inclusion of single indicators within the sub-categories.

Figure 6: Competitiveness input factors since 2001



Source: IMD (2006: 20)

Together with the change in 2001, the construction of the final ranking also was changed. In the reports until 2000, the final ranking was derived directly from the single indicators. This meant the weight of the eight factors was dependent on the number of indicators grouped under this sub-category. Since 2001, the four factors each comprise of five sub-categories, weighted equally. This leads to an implicit weighting of the 20 sub-categories, dependent on the number of indicators under each sub-category. This was done to improve reliability of results and ensuring high comparability despite changes in the number of indicators (IMD 2005: 621). Although this is right for index construction in general, changes in some categories like prices still influence the overall ranking easily as there are only two variables listed under this sub-category, influencing comparability.

Although some major changes in index constructions were made in 2001, comparability is relatively high as the sub-categories did not change in the same way. Problems occur when comparing ranks or scores. The number of entities ranked as well as the number of indicators used change often. At the same time, the form of the ranking changed as in 2003 two rankings – one for entities with more than 20 million inhabitants and one for the others – were included. This makes it hard to compare these rankings with the others. But as in 2004 one

ranking was included and computed back for 2003, this issue is not relevant any more.

Comparability of Hard Data

The hard data indicators used come from a number of different sources, which are disclosed in the appendix of the report. Mostly these sources are well-known: OECD, IMF, Eurostat or World Bank. National sources are used if country data is not included in the international sources. In cases where national data are used, this poses the apparent problem of definitional differences and makes it hard to compare. But even comparison of inter-governmental data as collected by the World Bank e.g. may be biased. There would also be a special problem if for the same indicator different sources are used as it should be hard to maintain the same standards.[102] For the sub-factor Economic Performance, it was found that 27 of the 35 hard data indicators use data from more than one source. While this may be a simple necessity from a practical viewpoint, this poses a problem from a statistics' viewpoint. If inter-governmental data is used together with national data, corrections may have been made differently and the data, therefore, may not have the same definitional basis. This makes it hard to compare data.

Indicators should not be biased within the respective issue. This means that data should be properly defined and assessed in the same way across the different countries. This should be the case as the IMD has an exclusive net of around 50 partner institutions which saw only minor changes over time. This includes chambers of commerce, regional development agencies, investment agencies or universities among others.[103]

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102 Heilemann et al (2006: 73) point to some problems and the authors of the WEF's index state that "hard data, still depend to a great extent on surveying techniques." (World Economic Forum 2005: 470)

103 The combination of chambers of commerce, universities and other organisations could be a source for differences in indicator value calculation (Heilemann et al 2006: 36) as some of these partners are lobbying and others have an academic interest. Examples could be labour costs or the share of the state.

Special issues arise in the field of public fiscal data, e.g., when comparing the share of the state.[104] Some countries have private health care systems, like the USA, others like the UK have a public health system.[105] This automatically leads to a "better" ranking with respect to the share of the state for the USA, although it does say nothing about the quality of the services.[106] These indicators, therefore, are not comparable from one country to the other and should be treaded with caution.[107]

Another problem arises with time-lags. Some institutions may need longer time to report data. For the WCY 2006, 113 indicators were from 2006 (all survey data) 100 indicators were from 2005, 62 from 2004, 29 from 2003, three from 2002 and one from 2001. This poses some problems since the same sub-index data could be three years older compared to the other data.

Data should also be adjusted to size, i.e., to be in relative terms. Of the variables where 'size matters'[108], 35 were expressed in absolute terms and 80 in relative terms. Interestingly, the report often includes the absolute value first and then also the same indicator in relative terms,[109] putting implicit weight on these indicators. This issue is also relevant when looking at GDP data as only real GDP data is comparable with respect to inflationary effects. Unfortunately, nominal GDP is included as an indicator together with ratios where GDP is the denominator like in the trade-GDP ratio. An additional problem occurs for countries where capital is held by foreign people or companies and the extent of economic activity within geographic boundaries differs from the extent of economic activity of the 'inhabitants'. In these cases GDP sometimes is much

104 This is not a discussion about the "right" share of the state but about comparability of figures.

105 The WCY discloses two indicators in this field: Total health expenditure as % of GDP and public expenditure as % of total expenditure. The latter could be used for correcting such issues but does not form part of the ranking.

106 These problems occur in a number of different fields such as public private partnerships or the accounting of subsidies vs. direct tax reductions. See Heilemann et al (2006: 116) for a discussion.

107 Even within countries there may be differences; for example, Massachusetts has a health care system covering the whole population (at least in theory) while other US states do not have such a system.

108 Indicators like corporate tax rates, consumption taxes or social security contributions were not included as there is no problem with absolute vs. relative data.

109 Examples are FDI, GDP or exports.

higher than GNP – or vice versa – and, therefore, numbers may be hard to compare.[110]

Comparability of Survey Data

Survey data has a clear advantage —as time-lags are shorter, data can be collected on nearly every topic and expert-knowledge can be included. There are also some problems, however, which include choosing experts, the response rate, cultural biases and limited answering possibilities.[111] In the following, the focus will be on the matter of comparability, which also includes, to a certain extent, the discussion of indicator quality.

The IMD surveys executives from participating countries in top and middle management, mainly alumni from the IMD (IMD 2005: 622). This is done with the help of a 113-point questionnaire and an item range from 6-best to 1-worst. The number of persons asked – 4,000 for 2005 – is proportional to the GDP of the respective entity. This means that for countries like the Czech Republic or Hungary, six or seven people did answer the questions.[112] While it may be efficient to ask only a few people, taking into account the opinion of a handful of people is not very reliable. Validity and objectivity may also be low because firstly only six persons are asked and if only one person is replaced, results can change significantly. Secondly, and more generally, as solely business managers are asked, they will always lobby for their interests, which means data is not objective but biased.

These issues are exemplified with the indicator 'bureaucracy', displayed below for five countries from 1999 to 2005.

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110 Exemplary countries with higher GDP than GNP are Ireland or Chile. Countries with higher GNP than GDP are Kuwait or Saudi Arabia.

111 One issue of additional importance in the context of composite index construction is the dealing with ordinal scales. These issues will be addressed in the chapter on the indicators of the WCY.

112 Numbers based on an analysis by Drews (2005: 206).

Table 18: National survey data for 'bureaucracy'

Country / Year	HUN	% change	USA	% change	GER	% change	UK	% change	CZE	% change	Highest value	Lowest value	Range
1999	3.88		3.86		2.79		3.80		2.36		7.45	1.17	6.28
2000	4.00	3.1	4.66	20.7	3.55	27.2	4.24	11.6	2.58	9.3	7.70	1.27	6.43
2001	3.21	-19.8	3.73	-20.0	3.87	9.0	3.14	-25.9	2.57	-0.4	6.69	1.54	5.15
2002	3.63	13.1	4.67	25.2	2.77	-28.4	2.94	-6.4	3.00	16.7	7.46	1.11	6.35
2003	3.64	0.3	4.33	-7.3	1.96	-29.2	3.25	10.5	2.61	-13.0	6.98	0.85	6.13
2004	2.42	-33.5	4.51	4.2	2.10	7.1	2.51	-22.8	2.25	-13.8	6.41	0.58	5.83
2005	2.77	14.5	3.37	-25.3	2.23	6.2	2.48	-1.2	2.89	28.4	6.71	0.73	5.98
Mean	3.36	-3.73	4.16	-0.41	2.75	-1.35	3.19	-5.69	2.61	4.55			
Range	1.58		1.30		1.91		1.76		0.75				
StDev	0.59		0.51		0.73		0.65		0.27				

Question: Bureaucracy ... 1-does hinder ... to ... 6-does not hinder business development; transformed to a 0 to 10 scale

Source: IMD (1999 to 2005)

As can be seen, even the highest actual values are far from the highest possible value, ten. When looking at the values for the five countries, it is obvious that they vary quite considerably with standard deviations ranging from 0.27 to 0.73 and annual changes of sometimes more than 25 %. It is unrealistic to think that bureaucracy changes so drastically from one year to the other as, for example, in the case of the USA from 1999 to 2002. There is not much information on the number and selection of respondents but sometimes just six or seven people answer the questionnaire; this means that comparability and validity could be low.

Despite the changes within a country, there are also issues with the perception itself, a form of cultural bias. In the case of Germany, the figures show that the German respondents ranked Germany at the 43rd position out of 60 for 2005 and always lower than Hungary or Czech Republic in the 1999 to 2006 period. If the numbers are compared with the Doing Business Index as another proxy for bureaucracy,[113] a different picture is revealed. In the 2005 to 2008 rankings, Germany was ahead of Hungary and Czech Republic. For 2009, it ranked 25th,

113 Of course this index – ranking economies on their ease of doing business – also relies on subjective data in a more formalised and standardised way. Nevertheless, it has its own limitations. The numbers are taken from http://www.doingbusiness.org/MethodologySurveys/.

while Hungary was ranked 41st and Czech Republic 75th.[114] This "perception bias" or "home bias"[115] has to do with incidences overlaying a rational judgement. Associated with that, there is the general problem that people do judge the respective country without having sufficient knowledge for being able to answer all the questions asked.[116] Unfortunately, the authors do not include information on response rates for every question, or the exact distribution across sectors. This makes it hard to evaluate the quality of the survey.[117]

These issues together with the fact that alumni of the IMD are asked lead us to summarise that the overall quality and the comparability of the survey must be doubted. This does not mean that the answers may not prove helpful for business managers as these just want to know what their peers think. Again, this leads us to the conclusion that the report may be more of interest for business managers than for academics or policy-makers. The authors themselves do limit the meaningfulness of the questionnaire as they state that the survey highlights "competitiveness as it is perceived" (IMD 2008: 31).[118]

In conclusion, comparability of survey data over time and across different entities in general is not high[119] and it must be doubted that the survey results help explaining competitiveness.

114 For 2009, USA ranked 3rd, United Kingdom 6th.

115 In a survey of 1,200 managers from ten nations, Respondents ranked Germany 2nd, only after China and together with Switzerland. The survey asked respondents to grade the other nations according to their competitiveness. This is just another hint that survey results must be treated with caution. See Heß (2008)

116 Lall (2001: 1516) also includes the problem of (implicit) benchmarks used by the respondents when assessing the local characteristics.

117 A process of self selection could take place, meaning that only those who believe competitiveness has any meaning or have enough time to answer the questions respond.

118 This is perhaps also a reason why they limit the overall weight of the survey indicators to one third.

119 This is not a specific problem of the IMD index but of all indices including survey data.

Evaluation of Regional Data

For survey data, the main points have been discussed above and hold true for the regional data as well. Especially, detailed information on the number of respondents on the regional level is missing. If results for the indicator 'bureaucracy' on the regional and national level are examined, this translates into the following table:

Table 19: Regional and national survey data for 'bureaucracy' in comparison

Country / Year	BAV	% change	GER	% change	ILL	% change	RHO	% change	FRA	% change	MAH	% change	IND	% change
2003	1,46		1,96		2,44		2,69		2,76		2,69		2,16	
2004	2,52	72,6	2,10	7,1	2,31	-5,3	2,17	-19,3	2,77	0,4	2,08	-22,7	2,86	32,4
2005	2,24	-11,1	2,23	6,2	2,88	24,7	3,70	70,5	2,83	2,2	2,73	31,3	2,69	-5,9
2006	2,71	21,0	2,71	21,5	3,05	5,9	-	-	2,84	0,4	3,17	16,1	2,79	3,7
Mean	2,23	27,49	2,25	11,62	2,67	8,42	2,85	25,59	2,80	0,96	2,67	8,23	2,63	10,06
Range	1,25		0,75		0,74		1,53		0,08		1,09		0,70	
StDev	0,55		0,33		0,35		0,78		0,04	1,04	0,45	27,81	0,32	19,95

Question: Bureaucracy ... 1-does hinder ... to ... 6-does not hinder business development; transformed to a 0 to 10 scale
Notes: BAV-Bavaria; FRA-France; GER-Germany; ILL-Ille de France; IND-India; MAH-Maharashtra; RHO-Rhone-Alps

Source: IMD (2003; 2004; 2005; 2006)

Besides the high deviations for some years – Bavaria in 2004 or Rhone-Alps for 2005 – it is interesting to look at the differences in the perception of bureaucracy on the national and regional level. This may be dependent on the autonomy of the regions, but in general, most laws still come from the central government whereas most regulations will occur on the local level.[120] The differences may stem from actual differences of bureaucratic burdens, the change of survey respondents, regional events biasing the results or other influencing circumstances. As long as it is not clear how respondents are chosen or how a high quality is made sure, it is not possible to evaluate these indicators properly.[121]

As stated above, if no regional data was available, the authors included proxied data for the construction of the 2006 index. "These proxies are calculated on the basis of either a) the ratio of the region in the total national GDP, or b) the ratio of

120 This is at least the case for Germany.

121 See Heilemann et al (2006: 78) for a similar conclusion.

the region in the total national population, depending on the criterion that is being measured" (IMD 2006: 502). This resulted in a total of 95 proxy indicators, with the following distribution for the actual indicators building the index over the four competitiveness dimensions:[122]

- Economic Performance: 26 out of 39 indicators applied
- Government Efficiency: 2 out of 61 indicators applied
- Business Efficiency: 14 out of 60 indicators applied
- Infrastructure: 18 out of 79 indicators applied

This means that from the total of indicators included in the report, 30.5% are proxied compared to 25.1 % for the indicators applied for the ranking. In the area of economic performance, these proxied values stand for 66.7 % of the indicators. Interestingly, for some indicators proxies are used even that regional data may be available. Data on real GDP growth for instances is included for regional economies, but real GDP growth per capita is proxied based on the ratio of the region in the national GDP.[123] This is also the case for pupil-teacher ratio for Bavaria.[124]

122 All proxied indicators are included in the appendix. This does not mean that other indicator values are not sometimes proxied for some regions as can be seen in the area of pupil-teacher ratio (4.5.03).

123 Other examples include GDP per capita, exports, imports or employment which are all available for German Bundesländer and mostly also for European regions. This can be seen when looking at other regional indices.

124 It has to be noted that German Bundesländer has wide-ranging autonomy in two fields: education and security. It is, therefore, more than surprising to not include regional data here.

Comparison of Ranking Results

Below are the ranking results for the regions included in the 2003 to 2006 reports.[125]

Table 20: Regional ranking results of the WCY 03- 06

Region	Rank 03	Rank 04	Rank 05	Rank 06	Mean	Range
Bavaria	31	20	18	16	21.3	15
Catalonia	28	27	32	34	30.3	7
Ille-de-France	24	32	33	28	29.3	9
Lombardy	36	46	41	50	43.3	14
Maharashtra	44	38	42	37	40.3	7
Rhone-Alps	32	37	34	-	34.3	5
Sao Paulo	43	47	43	48	45.3	5
Scotland	-	36	35	30	33.7	6
Zhejiang	38	19	20	33	27.5	19
Number of entities:	59	60	60	61		

Source: IMD (2004; 2005; 2006)

As can be seen, there is a great deal of variance. As an example, the Zhejiang region was ranked 38th in 2003 and 19th a year later. When looking at the reasons for this change, it was found that especially in the area of business efficiency Zhejiang was ranked 3rd after 43rd in 2003, performing especially better in areas with a higher weight on survey indicators. This can be illustrated in the area of 'Management Practices', where only survey variables are taken into account. Here, the ranks vary from 45th 2006 to first 2004. In addition to the above analysis of survey data on bureaucracy, the survey differences show how subjective data can influence the index values and produce great variances.

To sum up, the treatment of regions as smaller 'pockets of competitiveness' is not convincing. This has to do with the fact that some regions actually have the

125 The ranks are not expressed in relative terms as the number of entities does not change a lot over the years, making the ranks comparable over this time span.

power to change their environment, while others are simply administrative units with limited powers. The second point is the use of proxies for more than every fourth indicator. This biases results towards the national findings. Finally, comparability of data cannot be evaluated in full as details on the survey of regional characteristics such as the number of respondents are not disclosed. When looking at some snapshots, it can be seen that there is a great deal of variance. This leads us to the conclusion that the overall comparability of regional ranking results is not satisfactory.[126]

6.4.3 Indicator Choice

In this section, a discussion of some of the indicators constituting the ranking[127] will be included. Together with this, it will be looked at how they relate to the theoretical framework of the index and if the indicator has any meaning with respect to the underlying concept of competitiveness will be dealt with.

This does not include all single indicators but just some of the more noticeable ones to highlight some key points.[128] The focus here is on hard data as there is not enough information on the survey conducted.[129]

- **Foreign vs. domestic debt**: It may be sound to distinguish between two creditors as, for instance, domestic debt does not establish dependencies. But how should one interpret the ranking? Estonia, for example, ranks first in domestic debt, having only foreign debts (ranked 18th). It is not clear what this means from a competitiveness standpoint. In addition as could be seen when the Euro was introduced, technical manipulations like the ones conducted in the case of Greece are relatively easy.

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126 The comparability and availability of regional data is the reason why regions are no longer included in the printed reports according to an email conversation with a team member.

127 These indicators are all included in the current reports of 2006, 2007 and 2008.

128 Note that many of the indicators included in the WCY ranking are also included in the other indices and, therefore, discussed later in the respective chapters. One can use the index in the appendix to find other indicators of interest.

129 Some issues concerning the survey have already been discussed above.

- **Number of credit cards issued**: There is no information what is meant by including the number of credit cards per capita. Besides this, one would like to know how they treat electronic cash cards or debit cards in general. If the ranking results are analysed, it can be seen that the UK – together with Scotland – is heading the list. It cannot be said if a rise in the number of credit cards would raise overall competitiveness and thus advice should be given to do so.

- **Labour cost**: This is included with a number of different indicators such as compensation levels and unit labour costs, ranked from lowest to highest costs. This is a typical cost-argument indicator building on the assumption that the lower the cost, the higher competitiveness will be. As could be shown in the literature review, this is too narrow, but can be part of an assessment of the national environment.

- **Social security contribution**: This can also be viewed as a kind of cost-argument-indicator, supplementing the labour cost indicators. Here, entities are ranked according to the level of contributions – both employee's and employer's contributions. The highest rank goes to the lowest contribution rate. The rationale behind could be the same as for labour costs. From this view, social security contributions pose an extra burden for employers and employees and may reduce growth dynamics. From the standpoint of business managers, this view is correct as such contributions increase labour costs. With the numbers included, they can calculate total labour costs, taking into account direct and indirect costs. From an academic standpoint, this is rather one-sided (Drews 2005: 205). As social security systems vary across the globe, a ranking simply on the contribution rate can not be helpful. The quality of the system should also be taken into account, as well as how the social security systems helps in maintaining a skilled and healthful labour force, able and motivated to work. These effects on competitiveness have also to be taken into account.[130]

130 Such points are later addressed in the report, e.g., in the sub-factor "Health and Environment".

- **Part-time-employment:** The reason for the inclusion of this indicator is hard to understand without any background information. As countries with a higher proportion of part-time workers are ranked higher, a higher proportion of part-timers are seen as being positive. This could be because it shows female participation as female workers are more likely to work part-time. It could also be seen as a sign of quality of life – trading income or working-time versus free-time voluntarily. It could also signal flexibility, contributing to a higher competitiveness. At the same time, it could be seen as a negative indicator with people non-voluntarily working part-time or having several part-time jobs – referred to as low labour utilisation. After looking at the literature and studies in this field, motives for working part-time are not clear.[131]

- **Factoring:** Factoring is another good example for business practices applied in the context of competitiveness. Factoring may be sound to gain liquidity and reduce process costs. From a marketing perspective, the inclusion of this indicator may help assess new markets for companies providing factoring services. But in the context of competitiveness, there is no link whatsoever. At least, no link is provided either in the report or in the literature how this relates to the theoretical framework.[132]

- **Population – market size:** For this indicator, the same is true as for factoring: it may be interesting if one wants to assess potential markets, but entities are ranked based on their absolute population. This cannot be changed easily. From a theoretical perspective, the inclusion may have some meaning as a proxy for attractiveness or the size of the talent pool. But policies to boost market size will prove difficult for governments. Therefore, smaller countries will never climb up the ladder and be able to obtain higher ranks.

- **Air transportation:** While access to transportation is an important factor for economic development, it is not clear if and to what extent air

131 See Buddelmeyer et al (2008) for a discussion of motives.

132 This is perhaps a proxy for the development stage of the capital markets or abilities of enterprises.

transportation does account for. It could be seen as a proxy for the openness of an economy together with having access to the 'outer world'. But to a certain extent, the importance of air transportation may also depend on the size of an entity, its geography, population density or availability of high-speed train connections, making flights obsolete. These points should be taken into account. The indicator should also reflect freight, not only passengers. If included with passenger data, it would be more of an indicator for air pollution or carbon emission levels.

- **Electricity costs:** Although clearly important for business – depending on the industry, prices should be adjusted to purchasing powers. How this is positioned within the theoretical framework is not clear. If electricity costs are important to enterprises depends on two things: The industry and kind of products and the ability to turn higher costs into higher prices without losing customers.[133]

- **High tech exports:** This is a common indicator for non-price-competitiveness. As discussed above, it is not clear if this has any meaning with respect to economic development. Not all are able to work in such an industry, for example.

- **Computers in use:** This indicator is expressed in terms of the world wide share. This means values stand for the share of the respective entity in the global market. This explains why more than half of the entities have an indicator value of below one. Raising this share will prove extremely hard. To be sound from a competitiveness perspective, the authors should provide a clear link from the quantity of computers to the overall competitiveness.[134] In addition, the distribution of these computers as well as the possibilities to work with them must be taken into account.

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133 One could also add that an enterprise could be part of a domestic competition or international competition.

134 The one laptop per child campaign is a good case for this point. There are many critics of the project as the simple formula more computers = more development does not hold true in reality. See Schaumburg (2003) for a discussion of the effects of computers on schooling quality and teaching.

- **Total R&D personnel nationwide:** As with many of the above indicators, this indicator is helpful for businesses looking for R&D personnel, but not of help from a competitiveness standpoint. The central problem is that entities are ranked according to the number of personnel. This means, smaller countries or regions cannot rank highly. Major improvements are also not possible.

- **Patents granted:** From a theoretical point of view, patents could be seen as a sufficient proxy for innovation and the ability to innovate. Here, a number of special issues arise. First of all, there is the problem that not all patents granted have any value or lead to turnover. Sometimes managers just push patent numbers by patenting 'everything under the sun'.[135] Another point is the fact that nowadays, many companies do not apply for patents as this would point competitors to certain characteristics and disclose too man information.[136] Finally, incremental changes and the flow of innovations across national borders can not be captured by such a (domestic) measure (Lall 2001: 1513). But as the authors have to measure innovation as part of the index, this indicator is perhaps the best to get easily together with R&D spending to catch this characteristic.

- **Patent productivity**: Defined as patents granted to residents / R&D personnel in business ('000s), this assumes first that patents come from the R&D personnel (in business) and excludes efforts of ordinary workers and academics. It also brings in problems of the indicator patents granted, which has been discussed above.

- **Total public expenditure on education**: This indicator firstly assumes that more money can help raise the educational level, which can be doubted.[137] Secondly, private expenditures are not included. Especially in countries with a large private school sector, this will bias results.[138] This

135 Hewlett Packard under Carla Fiona is one example. See Mintzberg (2004: 378)

136 In addition, time-lags between invention and then application and granting pose problems.

137 Lee/Barro (2001: 466), although their own findings suggest positive effects of expenditures.

138 One could argue that it is better to get pupils though a public school system as some may not be able to pay for private schools. Although this is true, it also depends on the kind of system. If vouchers are used, this could be overcome. But this is discussed controversially.

should be taken into account. Nevertheless, it is clear that this indicator can be a proxy for human capital.

- **Pupil-teacher-ratio:** This indicator assumes that smaller class sizes are better in terms of later success of the pupils. This is not clear as some findings suggest,[139] although it has to be said that evidence seems to point to a positive relation. The problem when measuring such characteristics is to make sure all numbers are comparable, i.e., they have the same definitional basis.

It could be seen that many indicators refer to completely different concepts of competitiveness. Therefore, it is not possible to evaluate how exactly they relate to the concept behind the WCY as there is no background information on this issue. In addition, if some of the indicators are compared with the latest findings in the literature, it has to be concluded that the relation to the improvement of competitiveness – something implicitly adherent in every indicator – is not clear.

Many points still remain open, such as why 'education on finance' was included as an indicator but not the broader 'education on economics'. Looking at these indicators could be a task for further research in this field.

Having discussed some specific indicators, the following chapter deals with the issue of implicit weights that might be applied in the ranking.

Implicit Weighting

Implicit weights could be the result of three phenomena. Firstly, implicit weights could occur within one sub-factor through the inclusion of similar indicators, secondly the number of indicators across the sub-factors could differ and thirdly, implicit weights could occur by measuring the same phenomenon with similar indicators across different sub-factors, despite the equal weighting of the 20 sub-factors.

139 The study by Lee/Barro (2001) found a positive relation for pupil-teacher ratios. At the same time they also emphasise the importance of family backgrounds.

If a look at the number of indicators constituting the sub-factors is taken, it can be seen that they vary considerably. Table 12 above shows the distribution of indicators over the 20 sub-factors. As can be seen, the number of indicators included stretches from two for 'prices' to 21 for 'scientific infrastructure'. This means that although the sub-factors are weighted equally, a change in the prices category is more likely to influence the overall ranking than a change in one of the 21 indicators for scientific infrastructure. This is the case as only the sub-factor rankings are taken into account when constituting the final score, no matter how many indicators are behind the different sub-factor rankings.

Looking for the second reason, it can be seen that many indicators correspond to a similar dimension in the index or are just variants of other indicators. As an example, variants of GDP data applied when aggregating the final index are included: GDP, GDP (PPP), real GDP growth, real GDP growth per capita, GDP per capita, GDP per capita (PPP).[140]

The question here is if it is really necessary to include these variants.[141] As this competitiveness factor is labelled economic performance and the sub-factor domestic economy, it would be perhaps enough to just include half of the indicators and delete the nominal values.[142] This would mean putting more weight on the remaining three indicators to come closer to the weights put on the indicators under the sub-factor prices. The same can be said for international trade, where six different types of indicators measuring exports are included out of ten indicators in total. Four of the ten indicators are built on absolute values, biasing values towards larger countries. Again, by expanding the number of indicators, the implicit weights for the single indicators go down. This may not seem important, but if the sub-category prices is analysed, one can see that this category just consists of two indicators. It would be easy to include variants of

140 A similar case can be observed when looking at 'Information and Communications Technology'. Here, out of 20 indicators, 12 are on PC, internet and telephones.

141 This is besides the issue of including absolute values (bn USD) for many indicators.

142 The question is if it has any additional informational value to see a ranking based on GDP with the USA on first rank. How could a nation like Denmark ever 'climb up' the ladder? Therefore, the ranking just tells us that the US economy is so much bigger than the one of Denmark or the other countries. Per capita values would be more interesting and meaningful in this case. The same problem occurs when rankings are constructed according to the size of the labour force as this is dependent on the population.

these two indicators such as core and non-core inflation values. Having six GDP variants compared to two inflation indicators indeed influences the results.

It was also looked at the second source for implicit-weights if similar indicators are included in different sub-factors or competitiveness factors. No such bias on the level of the competitiveness factors was found. When looking at the classification, it is not clear why 'Health and Environment' is subsumed under the same heading, or why female participation indicators are not part of the factor 'Business Efficiency' – just as social responsibility is included – but part of 'Governmental Efficiency'. As stated earlier, this could also be an area for further research.

6.4.4 Index Construction

Rationale for Weights

As was stated above, the WCY is based on 20 sub-factors, weighted equally. Therefore, the authors do not apply explicit weights for the aggregation of data. The rationale behind is that "this approach improves the reliability of the results and helps ensure a high degree of compatibility with past results. Statistics are sometimes prone to errors or omissions. Locking the weights of sub factors has the same function as building "fire barriers"; it prevents problems from spreading in a disproportionate way" (IMD 2006: 20).

Therefore, it can be concluded that weights – or in this case equal weights – are not assigned based on a certain concept of competitiveness but just for ease of comparability over time.

Index Aggregation

The overall ranking is derived by following four main steps:

1. Standardisation: All original values are standardised and normalised with the following formula:

$$STD_i = \frac{x - \bar{x}}{S}$$

With x = original value; $\bar{x}$ = average value; S = standard deviation

If lower values are positive, the STD values are multiplied with -1. Missing data is set to zero for the aggregation.

Note that all survey variables are stretched from the original 0-6 scale to the 0-10 scale first.

2. Sub-factor ranking: Weighted average is calculated for every 20 sub-factors by dividing the weighted sums of the STD values by the weighted sum of the number of indicators, applying a weight of 1 for hard data and 0.5 for survey data.

3. Competitiveness-factor ranking: The average for all four competitiveness factors is computed based on the five sub-factors assigned, giving equal weights to all sub-factors. Then, the highest value is set to 100, the lowest to 0 and all other values expressed relatively to these two bounds.

4. Computing the final score: The results in the four competitiveness factors are averaged with equal weights. Again, the highest value is set to 100 and all values expressed relatively to this benchmark. These scores are the basis for the final ranking.

The standardisation is done with the help of a linear transformation technique, the standard deviation technique. This allows to compare and aggregate data for different indicators. At the same time, information on distances is not lost completely and outliers are compressed to reduce their influence. Therefore, the technique does not lose this information too early like many other indices as it does not calculate with ranks but with scores. Information on original ranking order is not lost and expressing the final ranking scores relative to the benchmark – which is set to 100 – is consistent with the notion of competing with other

nations and regions and very illustrative. At the same time, this creates the impression that all countries and regions should follow the leader's track, which is simply not possible and has been shown for many cases in the single indicator analysis section.

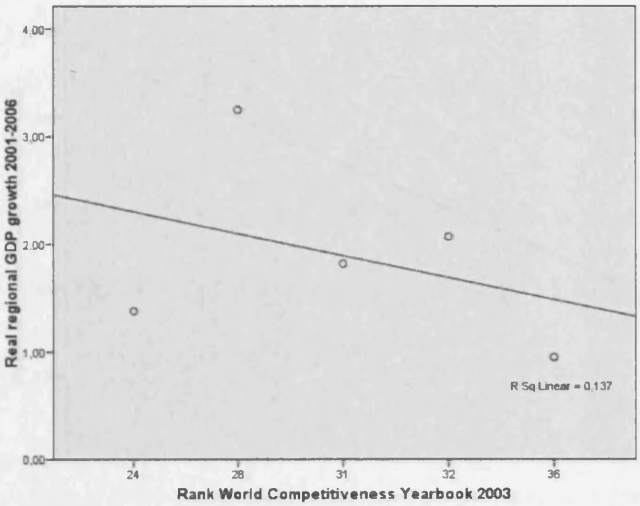
Robustness tests or statistical test of the explanatory powers of adding additional variables are not included in the report. According to Lall (2001:1508), it would prove difficult to "verify the analysis and choice of relevant determinants" as the IMD does not properly define prosperity. Robustness tests conducted by Heilemann et al (2006) show that changes in the aggregation and weighting have a considerable effect on the ranking results. The greatest rank changes occurred when only hard data was aggregated. This led to differences of 7.8 ranks on average. If the size bias is eliminated, the ranks of the larger entities do change by two ranks on average. The same is true if implicit weights are corrected or if all variables are aggregated directly. This supports the findings of the indicator analysis.

6.4.5 Predictive Quality

As regions were not included before 2003, the regional ranking results from the 2004 issues and real GDP growth over the period of 2001 to 2006 for the European regions Bavaria, Bavaria, Catalonia, Ille-de-France, Lombardy, and Rhone-Alps are included. These regions were chosen as they have a comparable level of GDP.[143]

[143] It has to be noticed that this analysis is more an illustrative one and findings have to be treated with caution as the sample size is not sufficient and the time span rather short. This is why regional GDP and unemployment have been included. The whole analysis is just illustrative.

Figure 7: WCS regional ranking results vs. GDP growth 2001-2006

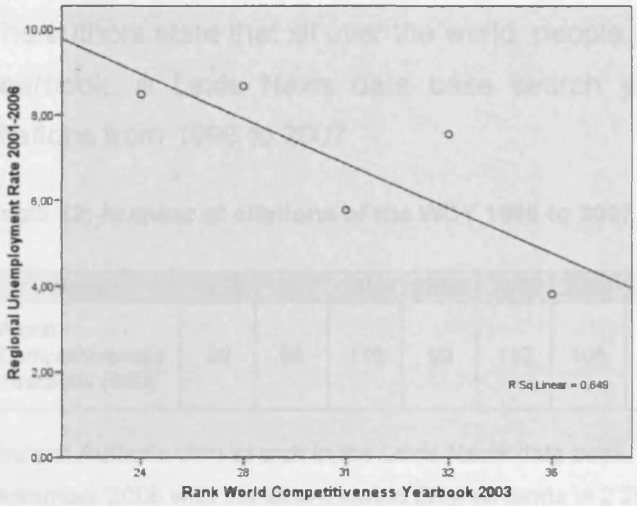


Source: Author's own based on data from IMD (2004) and Eurostat

As can be seen from the picture, there is a negative tendency. The correlation analysis shows a correlation of -.300 with no significance. It is, therefore, concluded that higher regional ranking results seem to be correlated with higher GDP growth, although with no significance.

The next section looks at correlations of ranking results with unemployment rate over the 2001 to 2006 period.

Figure 8: WCS regional ranking results vs. unemployment rate 2001-2006



Source: Author's own based on data from IMD (2004) and Eurostat

Again, there seems to be a correlation between higher ranks and lower unemployment rates. This time the correlation of -0.800 is very high but still not significant.

Table 21: Spearman rank correlations

		Real regional GDP growth 2001 2006	Regional unemployment rate 2001-2006
Rank World Competitiveness Yearbook 2003	Correlation Coefficient	-.300	-.800
	Sig. (1-tailed)	.312	.052
	N	5	5

Source: Author's own, with data from IMD (2004) and Eurostat

Again, it must be stated that the sample size is very low and the results can only be illustrative. If the findings of this study are compared with the one of Berger and Bristow (2008), it can be seen that the findings for regions are similar to the ones on the national level, keeping in mind the very small sample size.

6.4.6 Policy Impact and Media Attention

The authors state that all over the world, people pay attention to the results of the yearbook. A Lexis Nexis data base search yielded the following number of citations from 1996 to 2007

Table 22: Number of citations of the WCY 1996 to 2007

Name	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
World Competitiveness Yearbook (IMD)	39	86	110	93	112	105	104	120	141	146	208	187

Source: Author's own search in the Lexis Nexis data base. The search was conducted in November 2008 with the above stated English terms in 2'292 English publications

Besides these citations in publications, there are a number of references from officials around the world: Thailand's prime minister in June 2008 wanted to lift Thailand's position to the top 20 by 2012,[144] the German government points to the 2007 results to show how their reforms have helped Germany[145] and in UK parliament the early day motion from 15 November 2006 directly refers to the worsened ranking, calling for action to improve the competitiveness of the country.[146]

Many governments on the national and regional levels also order special reports of the yearbook, which also is an indicator of the importance of the ranking. This includes Oman, United Arab Emirates with its regions Abu Dhabi and Dubai, Kazakhstan, several regions of Malaysia, Ille-de-France and Galicia.

These examples show how influential the reports are and how they shape the political agenda.

144 www.boi.gov.th

145 www.bundesregierung.de

146 http://edmi.parliament.uk. In total, the search for World Competitiveness Yearbook found 29 sources with this term on the parliament's publications website.

6.5 Conclusion

Since the first edition, the WCY was seen as an either "highly authoritative - or somewhat suspect, depending on your stance - ranking of international economies" (The Financial Times 1995). The framework, definitions and 'golden rules' show a very broad approach and even that the IMD's definition of competitiveness does emphasise the ability to earn, the explanations incorporate a bundle of ideas from economic development and economics in general. This is in line with the aim of the report to rank and analyze environments for competitiveness. It is hard to criticize this framework as it has everything in it. On the other hand, this leads to an arbitrary definition which is contrary to the rather strong statement that competitiveness "is the most powerful tool to understand our brave new world" (IMD 2008: 34).

It is a good source of information hard to get elsewhere and within one publication. The combination of quantitative and qualitative data also is a possible way of dealing with the problem of data availability and data comparability as the IMD always asks the same questions all over the world. But at the same time this is dangerous as the ranking of a country could be relying on the opinion of handful of managers each with their own values and intentions (IMD 1996: 11). For managers looking for business sites or data for strategic decision making, it may prove valuable, even that survey data may not be comparable or consistent. From an academic standpoint the 'catch-all approach' makes it hard to draw any conclusions from it.

When looking at the indicators one has to ask why often performance indicators such as GDP are included and not separated from influencing factors such as taxes. This is a mix of outcome factors and input factors, hindering the analysis (Drews 2005; Lall 2001; Wignaraja/Joiner 2004). Therefore, causal relations should be at the centre of the report, not just collections of relevant factors.

On the single indicator level, one could see that many indicators are not justified with respect to the theoretical framework and readers are not provided with information why certain indicators are included and on what grounds. Therefore one has to be sceptical on the inclusion of many indicators. Often indicators are

meaningful on first sight but not that authoritative on second sight. After looking at the literature in the field and newest findings, some indicators must be treated with caution, even with respect to the construct of competitiveness. Associated with this is the fact that the indicators are referring to different concepts of competitiveness and therefore lead to a mish-mash of concepts when aggregating the final score (Wignaraja/Joiner 2004: 4).

The authors in the 2008 edition stated that "the report only provides a picture based on statistics and surveys, and reality might prove to be slightly different" (IMD 2008: 31). This is probably a very big understatement.

When looking at the predictive quality on the regional level in terms of future economic growth, the simple analysis indicates that the index performs poorly.[147]

Below are the results of the analysis in the form of a summary table:

Table 23: Summary evaluation table WCY

147 An analysis on the national level revealed similar results. See Berger/Bristow (2008: 17)

Criteria	WCY
Overall clarity and transparency: Information given on ...	
... original data	+
... transformed data	-
... theoretical framework	+
... competitiveness concept and underlying definitions	+
... sources for data	+
... exact indicator definition	+
...exact indicator units	+
... normalisation and transformation technique	o
... aggregation technique applied	o
... exact weights applied	o
Comparability	
Index construction does not change too often	o
Indicators do not change too often	o
Sources and partners do not change too often	o
Indicators are similarly defined, i.e. use the same sources	o
Data reflect different entity sizes	-
Data is not biased by inflationary effects	o
If applicable: Survey results are comparable, i.e. based on a sufficient number of respondents, take into account cultural biases, and the 'right' people are interviewed	-
Indicator choice	
Indicators correspond to theoretical framework	o
No implicit weights applied	-
Index construction evaluation	
Rationale for weights disclosed	+
Meaningfull ranking orders (in general)	+
Standardisation and normalisation do not bias results	+
Aggregation does not bias results	+
Robustness tests conducted and included	-
Predictive quality evaluation	
with respect to higher GDP per capita growth rates	(o)
with respect to lower unemployment rates	(+)
if necessary: with respect to higher employment	
Policy impact and media attention	
Citations in official political statements	high
Citations in LexisNexis data base	high

Evaluation is done without using fixed and pre-defined grades.
'+' stands for positive evaluation, 'o' for a neutral evaluation, '-' for a negative evaluation;
Information in brackets indicate non-substantial findings, i.e. based on small sample size;
? indicates missing information

7 World Knowledge Competitiveness Index

7.1 Background information

The World Knowledge Competitiveness Index (WKCI) was initiated by Robert Huggins and Hiro Izushi and is since published together with changing co-authors. The first report was published 2002 in conjunction with Robert Huggins Associates and updated in 2003, 2004 and 2005 with no updates in 2006 and 2007. In 2008, the report was published in conjunction with the Centre for International Competitiveness at the University of Wales Institute, Cardiff. It is available free of charge for downloading.

The first issue aims "to analyse some of the core factors that will underly the future development of regional knowledge-based economies" (Huggins/Izushi 2002: 3). They further state that it "is our aim in this report to explore the relative knowledge capacity and capability across the world's best performing regions" (Huggins/Izushi 2002: 6). The therefore base their model on the assumption that knowledge is the most important factor of regional development.

Robert Huggins is well-known for his reports on UK competitiveness and European competitiveness besides the WKCI. He also authored special reports such as for the South East England Development Agency. Robert Huggins Associates is a private consultancy with a focus on competitiveness and economic development. It aims to "provide futures forecasting and planning analysis that takes a detailed, yet realistic, view of the developments underlying growth at the global, regional, and local level" (Huggins et al 2002: 59). Since the latest report in 2008, Robert Huggins Associates is no longer mentioned in the report.

The report itself consists of the overall ranking and the five area rankings, displayed separately. In addition, the methodology and data sources are displayed. The findings are not displayed for every region but just as a summary for every area of the overall index, highlighting some findings and best cases.

7.2 Theoretical Framework

Definition of Competitiveness

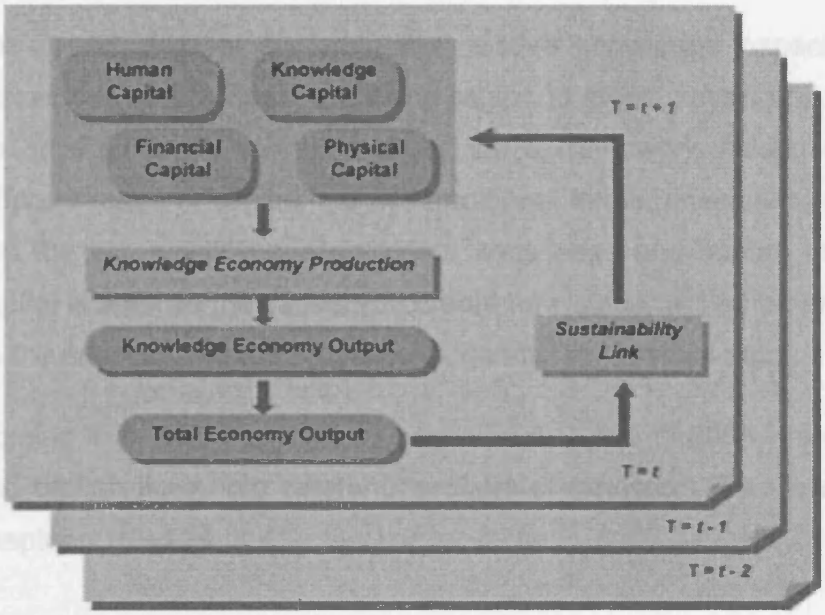
As the title of the report implies, the framework for the WKCI refers to the knowledge base of an economy, defined as "the capacity and capability to create and innovate new ideas, thoughts, processes and products, and to translate these into economic value and wealth" (Huggins et al 2008: 1).

Besides this, competitiveness is defined as "the capability of an economy to attract and maintain firms with stable or rising profits in an activity, while maintaining stable or increasing standards of living for those who participate in it" (Huggins et al 2008: 1).[148] Thus, the authors state that this competitiveness should be measured in terms of the assets of an economy, the business environment. They, therefore, also point to competitive advantages a region has to achieve. Creativity, knowledge and environmental conditions are then seen as proxies for the measurement of competitiveness, pointing explicitly to the work of Porter (1990) and Thurow (1992). This is why they focus on the knowledge base and knowledge-based sectors such as "high-technology manufacturing and knowledge-based services such as telecommunications, IT services, and research and development activities" (Huggins et al 2008: 1).

The authors point to the innovation cycle and the findings of human capital theory and endogenous growth theories, emphasising the knowledge component. This basic setting is transformed into a model with four key components: capital inputs, knowledge economy production, and regional economy outputs and a sustainability link. This is pictured below.

148 This is the same definition as in the UK Competitiveness Index. See Huggins/Day 2006.

Figure 9: Knowledge economy concept



Source: Taken from Huggins et al (2008: 2)

Policy Advice

There is no clear advice or key points to stick to from a policy perspective. Instead, the authors make their point by referring to their framework as outlined above. Coming from this, one can draw conclusions for policy-makers, such as investing in human capital, but these pieces of advice are not stated explicitly. Instead the authors in the 2002 issue have pointed to two core drivers of knowledge-based growth: a combination of improvement of information and communication technology infrastructure as well as the mobilisation of human capital resources together with investments in R&D by business, accompanied by investments in education (Huggins/Izushi 2002: 4).

Conclusion on Theoretical Framework

The report aims at exploring the relative knowledge capacity and capability across the world's best performing region to identify strengths and weaknesses. To be able to do so, the authors set a framework, taking into account four different forms of capital: the two traditional forms, financial and physical capital, and the two newly modelled forms, knowledge and human capital. Knowledge capital is seen as the capacity to create new ideas, while human capital is viewed as the capacity to transform knowledge into commercial value.

Coming from this model, four – expanded to five in 2004 – areas are extracted and broken down into different numbers of indicators. This is shown in the next chapter.

7.3 Deconstruction

The following table shows the indicators included in the 2002 and 2003/04 report.

Table 24: Structure of the WKCI 2002 and 2003/04

Human Capital Components	Economic activity rate
	Number of managers per 1,000 inhabitants
	Employment in IT and computer manufacturing per 1,000 inhabitants
	Employment in biotechnology and chemicals per 1,000 inhabitants
	Employment in automotive and mechanical engineering per 1,000 inhabitants
	Employment in instrumentation and electrical machinery per 1,000 inhabitants
	Employment in high-tech services per 1,000 inhabitants
Knowledge Capital Components	Per capita expenditures on R&D performed by government
	Per capita expenditures on R&D performed by business
	Number of patents registered per one million inhabitants
Regional Economy Outputs	Labour productivity
	Mean gross monthly earnings
	Unemployment rates
Knowledge Sustainability	Per capita public expenditures on primary and secondary education
	Per capita public expenditures on higher education
	Secure servers per one million inhabitants
	Internet hosts per 1,000 inhabitants

Source: Huggins/Izushi (2002: 13)

In 2004, two new indicators were added to the existing 17: one in the area of Knowledge Sustainability and one in the new area of Financial Capital Components. The structure of the 2004 and 2005 report is shown below.

Table 25: Structure of the WKCI for the 2004 and 2005 issue

Human Capital Components	Economic activity rate
	Number of managers per 1,000 inhabitants
	Employment in IT and computer manufacturing per 1,000 inhabitants
	Employment in biotechnology and chemicals per 1,000 inhabitants
	Employment in automotive and mechanical engineering per 1,000 inhabitants
	Employment in instrumentation and electrical machinery per 1,000 inhabitants
	Employment in high-tech services per 1,000 inhabitants
Knowledge Capital Components	Per capita expenditures on R&D performed by government
	Per capita expenditures on R&D performed by business
	Number of patents registered per one million inhabitants
Regional Economy Outputs	Labour productivity
	Mean gross monthly earnings
	Unemployment rates
Knowledge Sustainability	Per capita public expenditures on primary and secondary education
	Per capita public expenditures on higher education
	Secure servers per one million inhabitants
	Internet hosts per 1,000 inhabitants
	Broad band access per 1,000 inhabitants
Financial Capital Components	Per capita private equity investment

Source: Huggins (2004: 9-10)

For the 2008 index, neither the structure nor the number of indicators did change. The denominator in the field of Human Capital Components was changed from inhabitants to employees "as the latter shows a more accurate density of specific employment types in comparison to the total" (Huggins et al 2008: 5). No other changes were made.

After a look at the structure of the index, now the index is evaluated based on the above stated research framework.

7.4 Evaluation

7.4.1 Overall Clarity and Transparency

The overall clarity and transparency is relatively high as all transformed values are available for downloading. This allows a deeper look at the sub-factors. The main point may lie in the technique for the computation of the final index. It is hard to evaluate or even to understand what exactly is done when variables are normalised with the help of factor analysis. In addition, the Data Envelopment Analysis technique used to come up with the final ranking cannot be evaluated from the outside and remains a black box. Therefore, it is not easily possible to re-construct the index and sub-factor rankings.

The data sources are listed with the internet addresses, but not under each indicator. This means one cannot directly see which of the institutions has provided which information. Besides this, indicators are in general defined properly and the exact units of the original data are displayed. Exceptions are the number of patents registered and number of managers. In the latter case it is not clear what exactly is meant with the word 'manager'. An exact definition should be included in the report.

The theoretical framework is disclosed in detail and illustrated with additional figures. Articles on special topics as well as a bibliography help understand the framework. This does not include a broader debate on the topic and framework.

7.4.2 Comparability

Comparability over Time

To be able to compare ranking results over time, changes in the structure of the ranking should be kept to a minimum. The following gives an overview of the changing structure of the reports since 2002.

Table 26: Main characteristics of the WKCI 2002-2008

Year	# of indicators applied	# of sub-categories	# of entities
2002	17	4	90
2003	17	4	125
2004	19	5	125
2005	19	5	125
2008	19	5	145

Source: Author's own creation, based on Huggins/Izushi (2002); Huggins et al (2003); Huggins et al (2004); Huggins et al (2005); Huggins et al (2008).

The changes made in the 2004 report make it hard to compare results over time as the number of indicators has gone up by two which in relative terms means by more than 20%.[149]

In addition to this, the changes in the number of entities (from 90 in 2002 over 125 2004 and 2005 to 145 in 2008) covered also make it hard to directly compare absolute ranks over time.

The change in partners for issuing the reports should not influence comparability. While all earlier issues were published by Robert Huggins Associates, the 2008 issue was published by the Centre for International Competitiveness of the University of Wales Institute, Cardiff.

149 The authors also state that this may cause major changes in the rankings, but see more advantages than disadvantages (Huggins 2004: 12). Rank changes caused by the new structure are subsequently marked to highlight such effects.

Comparability of Data

The report is built on hard data only, taken from various sources.[150] As the report does not include the exact source for every index, it is not possible to evaluate this in more detail. But as the sources are grouped under geographical units such as North America or Europe, it is clear that different sources for the same indicators have been used for the provision of data. This means that the probability of definitional differences tends to be high and comparability negatively influenced by this.

All data is adjusted to the size of the regions and always expressed in relative terms such as per capita or per 1,000 inhabitants. Absolute values are only taken if they are meaningful, e.g., in the case of labour productivity.

Comparison of Ranking Results

Below are the ranking results for all issues of the WKCI since 2002.

150 Unfortunately, there is not sufficient information on the exact year the data was gathered. Only one hint in the data source's section indicates that data from 2003 and earlier are also taken into account (Huggins et al 2008: 33).

Table 27: WKCI ranking results in comparison

Region	Rank WKCI 2002	Rank WKCI 2003	Rank WKCI 2004	Rank WKCI 2005	Rank WKCI 2008	Mean	Range
Akron, US	N.a.				81		
Atlanta-Sandy Springs-Marietta, US	N.a.	22	31	35	95	45.8	73
Austin-Round Rock, US	N.a.	2	9	19	42	18.0	40
Baltimore-Towson, US	N.a.			27	49	38.0	22
Boston-Cambridge-Quincy, US	N.a.	3	2	2	2	2.3	1
Bridgeport-Stamford-Norwalk, US	N.a.				4		
Buffalo-Niagara Falls, US	N.a.	33	28	25	59	36.3	34
Charlotte-Gastonia-Concord, US	N.a.	30	36	41	67	43.5	37
Chicago-Naperville-Joliet, US	N.a.	19	17	28	46	27.5	29
Cincinnati-Middletown, US	N.a.	28	18	36	89	42.8	71
Cleveland-Elyria-Mentor, US	N.a.	34	33	39	62	42.0	29
Colorado Springs, US	N.a.				26		
Columbus, US	N.a.	29	29	30	78	41.5	49
Dallas-Fort Worth-Arlington, US	N.a.	13	21	21	52	26.8	39
Denver-Aurora, US	N.a.	6	14	14	45	19.8	39
Detroit-Warren-Livonia, US	N.a.	14	12	15	15	14.0	3
Durham, US	N.a.				25		
Grand Rapids, US	N.a.	9	3	6	13	7.8	10
Greensboro-High Point, US	N.a.	35	41	40	39	38.8	6
Hartford, US	N.a.	7	5	4	3	4.8	4
Houston-Sugar Land-Baytown, US	N.a.	32	25	26	70	38.3	45
Indianapolis, US	N.a.	24	26	32	64	36.5	40
Jacksonville, US	N.a.	47	59	63	106	68.8	59
Kansas City, US	N.a.	25	32	42	86	46.3	61
Las Vegas-Paradise, US	N.a.	53	72	68	109	75.5	56
Los Angeles-Long Beach-Santa Ana, US	N.a.	21	11	10	11	13.3	11
Louisville, US	N.a.	39	49	53	94	58.8	55
Memphis, US	N.a.	52	53	61	90	64.0	38
Miami-Fort Lauderdale-Miami Beach, US	N.a.	62	67	69	115	78.3	53
Milwaukee-Waukesha-West Allis, US	N.a.	27	27	24	44	30.5	20
Minneapolis-St. Paul-Bloomington, US	N.a.	5	10	13	21	12.3	16
Nashville-Davidson—Murfreesboro, US	N.a.	42	47	59	92	60.0	50
New York-Northern New Jersey-Long	N.a.	11	13	12	35	17.8	24
Oklahoma City, US	N.a.				122		
Orlando-Kissimmee, US	N.a.	40	56	60	103	64.8	63
Oxnard-Thousand Oaks-Ventura, US	N.a.				17		
Philadelphia-Camden-Wilmington, US	N.a.	26	16	17	33	23.0	17
Phoenix-Mesa-Scottsdale, US	N.a.	36	30	38	58	40.5	28
Pittsburgh, US	N.a.	38	35	43	72	47.0	37
Portland-Vancouver-Beaverton, US	N.a.	16	20	18	22	19.0	6
Providence-Fall River-Warwick, US	N.a.				8		
Raleigh-Cary, US	N.a.	8	22	31	66	31.8	58
Richmond, US	N.a.	31	37	33	71	43.0	40
Riverside-San Bernardino-Ontario, US	N.a.			16	32	24.0	16

Region	Rank WKCI 2002	Rank WKCI 2003	Rank WKCI 2004	Rank WKCI 2005	Rank WKCI 2008	Mean	Range
Rochester, US	N.a.	4	7	9	50	17.5	46
Sacramento-Arden-Arcade-Roseville, US	N.a.	17	8	11	18	13.5	10
Salt Lake City, US	N.a.	23	24	34	80	40.3	57
San Antonio, US	N.a.	43	43	47	88	55.3	45
San Diego-Carlsbad-San Marcos, US	N.a.	10	6	7	10	8.3	4
San Francisco-Oakland-Fremont, US	N.a.	1	1	3	5	2.5	4
San Jose-Sunnyvale-Santa Clara, US	N.a.			1	1	1.0	0
Sarasota-Bradenton-Venice, US	N.a.				114		
Seattle-Tacoma-Bellevue, US	N.a.	12	4	5	7	7.0	8
St. Louis, US	N.a.	41	42	49	91	55.8	50
Tampa-St. Petersburg-Clearwater, US	N.a.	45	61	64	98	67.0	53
Virginia Beach-Norfolk-Newport New,	N.a.	48	48	48	60	51.0	12
Washington-Arlington-Alexandria, US	N.a.	20	23	23	41	26.8	21
Alberta, Canada		61	80	98	85	81.0	37
British Columbia, Canada	58	88	96	105	112	91.8	54
Manitoba, Canada		82	92	100	118	98.0	36
Ontario, Canada	48	65	63	66	76	63.6	28
Quebec, Canada		81	78	85	83	81.8	7
Saskatchewan, Canada		86	100	104	121	102.8	35
Brussels, Belgium	80	56	51	45	47	55.8	35
Vlaams Gewest, Belgium	85	101	90	79	73	85.6	28
Baden-Württemberg, Germany	69	67	55	54	55	60.0	15
Bayern, Germany	68	73	70	65	63	67.8	10
Berlin, Germany	66	92	87	87	111	88.6	45
Bremen, Germany	77	79	98	95	93	88.4	21
Hamburg, Germany	62	55	75	76	82	70.0	27
Hessen, Germany	70	76	71	67	77	72.2	10
Niedersachsen, Germany	82	107	105	103	116	102.6	34
Nordrhein-Westfalen, Germany	81	95	97	94	113	96.0	32
Saarland, Germany	84	111	113	111	133	110.4	49
Schleswig-Holstein, Germany	78	112	111	109	129	107.8	51
Denmark	60	71	62	51	36	56.0	35
Estonia					137		
Noreste, Spain		118	115	108	127	117.0	19
Comunidad de Madrid, Spain	86	99	99	92	125	100.2	39
Ile de France, France	63	54	34	29	29	41.8	34
Centre-est, France		105	82	82	87	89.0	23
Southern and Eastern, Ireland					84		
North West, Italy		110	104	101	100	103.8	10
Lombardia, Italy	89	89	93	84	96	90.2	12
North East, Italy		106	114	107	119	111.5	13
Emilia-Romagna, Italy	90	98	107	102	117	102.8	27
Central, Italy		116	116	114	126	118.0	12
Lazio, Italy	88	113	110	106	123	108.0	35
Lithuania					139		

Region	Rank WKCI 2002	Rank WKCI 2003	Rank WKCI 2004	Rank WKCI 2005	Rank WKCI 2008	Mean	Range
Luxembourg	67	44	65	58	34	53.6	33
Latvia					141		
North, Netherlands	79	100	103	89	65	87.2	38
East Netherlands					61		
West, Netherlands	64	80	84	77	19	64.8	65
South, Netherlands	72	75	68	50	68	66.6	25
East, Austria	71	78	76	70	79	74.8	9
West, Austria	75	87	95	90	97	88.8	22
Etela-Suomi, Finland		37	19	20	23	24.8	18
Lansi-Suomi, Finland					40		
Pohjois-Suomi, Finland					20		
Stockholm, Sweden	22	18	15	8	6	13.8	16
Ostra Mellansverige, Sweden					57		
South, Sweden		72	52	46	38	52.0	34
Smaland med oarna, Sweden		83	88	97	101	92.3	18
West, Sweden		69	44	37	16	41.5	53
Eastern, UK	56	84	50	62	54	61.2	34
London, UK	50	68	46	56	102	64.4	56
South East, UK	51	77	40	55	74	59.4	37
South West, UK					105		
Scotland, UK		104	89	83	124	100.0	41
Switzerland	25	49	45	44	28	38.2	24
New South Wales, Australia	61	96	83	91	104	87.0	43
Victoria, Australia		97	79	88	99	90.8	20
Western Australia		94	85	93	108	95.0	23
New Zealand		108	108	110	134	115.0	26
Tochigi, Japan		50	58	73	37	54.5	36
Tokyo, Japan	54	15	38	22	9	27.6	45
Kanagawa, Japan	76	63	77	81	24	64.2	57
Toyama, Japan		64	66	80	30	60.0	50
Shizuoka, Japan		60	57	71	51	59.8	20
Aichi, Japan		58	60	75	56	62.3	19
Shiga, Japan		46	39	57	12	38.5	45
Kyoto, Japan	83	74	94	96	43	78.0	53
Osaka, Japan	74	66	81	72	31	64.8	50
Seoul, Korea		117	109	120	107	113.3	13
Ulsan, Korea		109	101	113	69	98.0	44
Hong Kong	87	102	106	118	120	106.6	33
Singapore	65	90	74	78	27	66.8	63
Taiwan		103	102	99	53	89.3	50
Shanghai, China		121	119	112	110	115.5	11
Beijing, China		120	117	119	135	122.8	18
Tianjin, China		122	121	122	130	123.8	9
Guangdong, China					131		
Jiangsu, China					138		
Zhejing, China					140		

Region	Rank WKCI 2002	Rank WKCI 2003	Rank WKCI 2004	Rank WKCI 2005	Rank WKCI 2008	Mean	Range
Shandong, China					142		
Mumbai, India		124	123	123	143	128.3	20
Bangalore, India		125	124	124	145	129.5	21
Hyderabad, India		123	125	125	144	129.3	21
Number of entities included:	90	125	125	125	145		

Note: US Metro Areas have been re-defined before the 2005 issue. The authors did reflect these changes from the 2005 report on and computed back rankings only until 2003. This is why the 2002 ranks for these regions are not included.

Source: Datasheet for the 2008 report Huggins et al (2008); Huggins/Izushi 2002

As can be seen from the tables, there is a lot of change in the ranking, with an average rank range of around 31.6 ranks over the years.[151] The regions included in the ranking are chosen based on their relative GDP, i.e., those regions are chosen with the highest output per capita in the world. In addition to this, some regions with high potential or high growth rates are also included, e.g., Asian regions or East European regions.

7.4.3 Indicator Choice

Relation to Theoretical Framework

The index has a clear focus on the knowledge economy and human capital. This is reflected in the choice of indicators. In general the indicators selected directly relate to the framework as set out above. Despite this theoretical link, indicators are chosen if they are available for all regions, can function as indicators of strengths and weaknesses, and if they "go beyond the usually narrow focus on macroeconomic performance" (Huggins et al 2008: 4). Now the single indicators of the 2008 issue are outlined and their values briefly discussed.

Human capital components are captured with the help of indicators measuring typical knowledge-based businesses.

151 This number has to be viewed in the light of different number of regions included in the ranking. Interestingly, the average range does only change to 29 if the 2002 issue with just 90 regions is excluded.

- **Employment in certain sectors, e.g., IT, biotechnology or high-tech services:** These indicators can be found in a number of indices measuring either New Economy characteristics or the knowledge base. These are common for capturing the ability to innovate or ability to adjust, aiming at 'upgrading' economic activities. This also goes back to the concept of non-price competitiveness: economies able to permanently innovate can stand the price competition by offering goods with a higher 'value', i.e., novelty products. This then also enables companies to pay higher wages as the value added is higher. Here, the rationale behind is the assumption that spill-overs with positive effects for the rest of the economy are more likely to occur in these sectors. Although this assumption may be meaningful, many spill-over effects take place accidently as well as innovation often depends on chance (Boschma 2004). Besides this, classification of companies into the different sectors proves difficult as many companies are highly diversified.

- **Economic activity rate:** This indicator – also known as participation or employment rate – is part of many indices. Low activity rates here are seen as a sign of weakness, indicating a lack of social and economic inclusion. One issue here is the fact that the economic activity rate only measures the percentage of working population economically active, not how intensely they work, i.e., their volume of work. It could be the case that many people are working part-time and, therefore, are counted as economically active but would like to work more hours. In the context of knowledge economy, it would also be interesting to assess the quality of these people, not only the quantity of work. But still, this is one of the best indicators available for measuring economic participation.[152]

- **Number of managers:** This indicator tries to capture the concentration of knowledge workers in a region. The problem here is that one does not know what exactly is meant by managers. If this is left aside, there are still some problems on the regional and local level as many managers commute from outside regions, mostly rural areas, sometimes more than

152 Another point would be the discussion about the role work plays for the pursuit of happiness, something discussed by authors like Rifkin (1995).

two driving hours away from their private home.[153] On a more abstract level, the question is how to take into account differences in executive levels in companies. Some countries tend to favour flat hierarchies with a low level of managers and a large control span, whereas other have strict and multi-level organisations with a number of different hierarchies and a relatively small control span. Of course, countries with a lot of self-employed persons would also be favoured. This could be a supportive circumstance like in the case of the creative class-type self-employed - i.e., freelancers or digital bohéme – or low-skilled self-employed like hot-dog sellers or window cleaners.

Knowledge capital components are captured with the help of indicators measuring typical knowledge-capital inputs and outputs.

- **R&D expenditures by government and business:** R&D expenditures are measured on the level of the government and on the level of business. As the authors note, there are some disadvantages these two indicators have. Firstly, if innovation is not counted in terms of expenditures and secondly the mix of industries affects the ranking. This mix is also dependent on the stage of development and the wage level. Nevertheless these indicators are widely used as there are no better ones – besides patent numbers – to capture innovation and invention activities. It could be worth expressing R&D expenditures in percentage of GDP as this would take into account the level of development.

- **Number of patents registered:** Despite the problems discussed earlier in the chapter on the WCY, here, it is not clear, which patents are taken into account. It seems that the numbers of the US and European patent offices are taken into account.

153 This may not be a major problem for regions like the German Länder or the whole of Norway or Denmark, but even then the case of Hamburg or Berlin shows that many live outside the region they actually work.

Regional economy outputs are captured with the help of indicators measuring typical output indicators.

- **Labour productivity:** Labour productivity is measured per employee which means that longer working hours can bias the results, just as the authors state: "[I]t should be noted that a significant proportion of the difference reflects additional hours of work per employee" (Huggins/Izushi 2008: 26). In addition, labour displacements can bias results as the level of GDP could be stable, but the number of employees going down. This means that recessions labour productivity could go up, even that overall GDP is going down. This measurement bias should be taken into account and reduced by taking into account labour displacement effects. Besides these issues, it is not clear which values are taken into account, .e.g., PPP adjusted, nominal or real numbers. PPP numbers could be used to benchmark numbers for the same year, but not to measure changes over time and across different entities. Thus, this information should be included in the report. In general, productivity is one of the determinants of wealth and highly recognized as one of the central indicators for measuring competitiveness (see e.g. Krugman 1994; Porter 1990).

- **Mean gross monthly earnings:** This indicator can be seen as a good proxy for wealth or quality of live as people with higher earnings could spend more. Unfortunately, the exact definition is not included, e.g., how inflationary effects are taken into account.

- **Unemployment rates:** As unemployment is seen as one of the most important threads to people around the world (Rifkin 1995), this is a sound indicator if definition across the entities is always the same. Of course this measures nearly the same thing as economic activity rate. The economic activity rate measures the total utilisation of labour, i.e., how many people are actually engaged in the production of goods and services. Unemployment rates in contrast measure how many people are not employed and – dependent on the definition – are actively looking for work. Unemployment rates therefore can be low even that the economic activity rate at the same time may be low, too. So the two can be seen as

complementary indicators. Just like with many other indicators, the exact definition is not included.[154] Especially when looking at unemployment rates across different countries, the kind of measurement influences the numbers enormously. In addition to this, the indicator should also be complemented with information on the working hours. This is because people could be employed but not fully so that they want to work more hours.

Knowledge sustainability captures how sustainable the creation of new knowledge is. It consists of the following indicators:

- **Public expenditures on primary and secondary education and public expenditures on higher education:** Whilst it is right trying to capture the quality of schooling as a kind of sustainability measure, problems of capturing this solely monetarily are already discussed above.[155]

- **Secure servers per one million inhabitants:** If one assumes that it is better for an entity to have a high level of e-commerce, such a proxy could have some meaning, if data is comparable and available on the regional level. As the authors state, the latter is not the case. This is why they took into account national data. While it would be understandable that this is perhaps the only way to take into account these indicators, it is not what one would expect from a regional ranking. Beside s this indicator, data on internet hosts and broadband access are also only available on the national level, something that highly influences the rankings. This is because of the fact that of the 19 indicators, three are based on national data and two – public expenditures on primary, secondary and higher education – (according to the authors) are set by national budgets. This means that over a fourth of the indicators cannot be influenced by regions directly. This is something readers should bear in mind.

154 It is only stated that official statistics are used (Huggins/Izushi 2008: 28).

155 See the WCY chapter.

- **Internet hosts per 1,000 inhabitants and broadband access per 1,000 inhabitants:** These are also seen as proxies for the readiness of a society and the possibility of flows of knowledge. While this could be true, one will ultimately witness a convergence towards a number close to 100% in the near future, just as with mobile phones or fax machines. Data quality cannot be evaluated as the exact sources are not stated. Again, this limits the analysis as the exact survey methods would be of special interest.

Financial capital components currently is measured with the help of

- **Private equity investment:** This indicator is intended to capture the "availability of private equity to businesses [...] as a measure of financial capital availability" (Huggins et al 2008: 24). Again, the exact definition of the indicator is not included. It would be of special importance to know which kind of funding possibilities are taken into account and how this data was gathered.[156] Besides this, the amount of financial capital available could be high but still not sufficient to match demand. How this is taken into account, remains an open question.

Implicit weighting

As the ranking is not built on weights but derived with the help of a Data Envelopment Analysis (DEA), no implicit weights can be observed. Of course the index is 'biased' towards indicators of innovation, knowledge and human capital. But this is exactly what the authors wanted, i.e., a kind of explicit weighting.

156 The authors state that data quality was poor, especially for countries like India and China.

7.4.4 Index Construction

Rationale for Weights

As for weighting, the WKCI uses a quantitative analytical technique – Data Envelopment Analysis (DEA) – to come up with the final ranking. This means, no weights are assigned a priori. Instead, DEA seeks to find a combination of all indicators that come up with the maximum weighted sum possible when combining all indicators to one score.

Index Aggregation

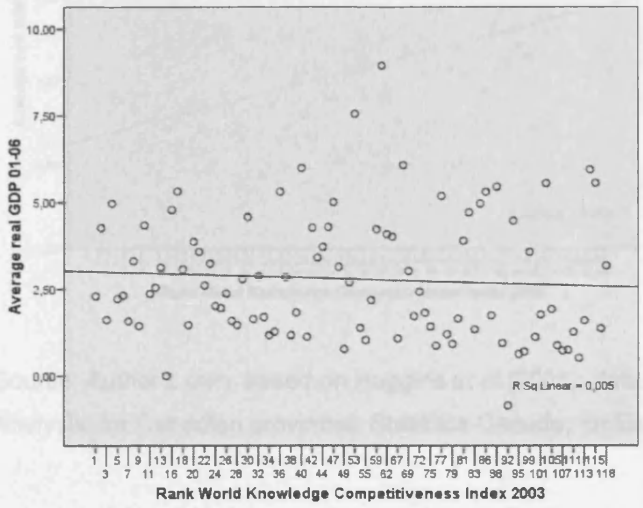
As a first step, all data are normalised by converting all original values to a mean of zero and a variance of one. Then, a factor analysis is applied to look at the underlying structure of the data, i.e., relations. This factor analysis helps not only to find out common dimensions of – on first sight – unrelated data, but also to come up with a score for every region – called case. These scores are the basis for the sub-factor rankings in every five areas.

The sub-rankings in the five areas are then aggregated to one single ranking score. This is done with the help of a Data Envelopment Analysis (DEA). This leads to a composite ranking which is based on the maximum possible score for a respective region and composite scores for all other regions. This is repeated for every region so that there are as many rankings as regions included. Then, the geometric mean of all the scores obtained is taken. These scores – between 0 and 1 – are then converted so that the average is set to 100 and the range reflects the original variance. This is seen as offering a more intuitive understanding of the scores, i.e., poor performance as scores below 100 and better performance with scores above 100.

7.4.5 Predictive Quality

In order to analyse the predictive quality of the WKCI, the correlation of the 2003[157] ranking results with real GDP, real GDP per capita as well as unemployment rates are tested. The sample included 95 European and North American regions.

Figure 10: WKCI 2003 ranking results vs. real GDP growth



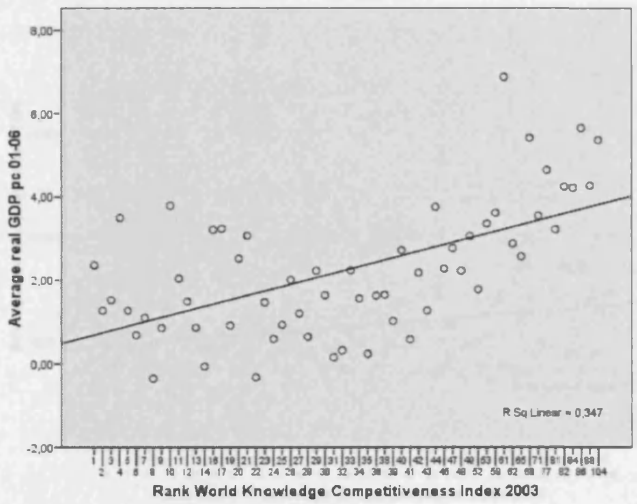
Source: Author's own, based on Huggins et al (2005); data for US regions: Bureau of Economic Analysis; for Canadian provinces: Statistics Canada; for European regions: Eurostat.

As the analysis shows, there seems to be a slight negative tendency, implying that higher ranks are associated with higher real GDP growth over the 2001 to 2006 period. But the correlation of -0.153 is relatively low and not significant.

157 2003 was taken as the basis as the US metropolitan areas were re-classified in 2004. Therefore, the definitions of regions in the 2002 issue are not comparable with the others. The authors computed back the scores for the newly defined MSA regions for 2003 and 2004 but not for 2002. Not including the US regions would have biased results as these 49 regions make up nearly 40% of the sample.

The relation with per capita values are also tested and displayed below, based only on a sample of 70 regions due to data availability.

Figure 11: WKCI 2003 ranking results vs. real GDP per capita growth



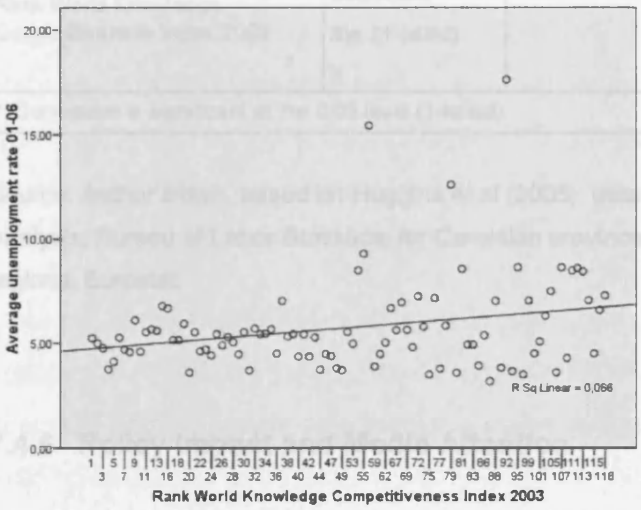
Source: Author's own, based on Huggins et al (2005); data for US regions: Bureau of Economic Analysis; for Canadian provinces: Statistics Canada; for European regions: Eurostat.

This yields a different result. Here, higher ranking results are correlated with lower GDP per capita growth rates (Spearman's rank correlation: .219, significant on the five per cent level).[158]

158 As this analysis was based on a smaller sample of 70 regions, not incorporating 25 European regions due to data availability, an additional analysis based on this smaller sample was also carried-out, looking for relations with real GDP and unemployment. The correlation with GDP is now at -.004 (-.153 before). It was also attempted to look at the average values for the US regions and the rest of the sample. This separation was done as the US regions lead the ranking. The US regions have an average GDP growth rate of around 3.01 compared to 2.62 for the rest of the sample. The average GDP per capita growth rate is at 1.65 for the US regions and 2.79 for the rest of the sample size. This means that the differences could go back to population growth as the US population growth with 1.4% from 2001 to 2006 was higher than population growth in Europe (0.36%) and Canada (0.89%).

The relation with unemployment rates over the 2001 to 2006 period is also tested below.

Figure 12: WKCI 2003 ranking results vs. unemployment rate



Source: Author's own, based on Huggins et al (2005); data from US regions: Bureau of Labor Statistics; for Canadian provinces: Statistics Canada; for European regions: Eurostat

As can be seen, higher ranks are associated with higher unemployment rates over the six-year period with a rank correlation of .193, significant on the five per cent level. This means that the ranking is a proxy for future unemployment, although a relatively weak one.

Table 28: Spearman rank correlations

		Average real GDP 01-06	Average real GDP pc 01-06	Average unemployment rate 01-06
Rank World Knowledge Competitiveness Index 2003	Correlation Coefficient	-.153	.219*	.193*
	Sig. (1-tailed)	.070	.034	.030
	N	95	70	95
*. Correlation is significant at the 0.05 level (1-tailed).				

Source: Author's own, based on Huggins et al (2005); data for US regions: Bureau of Economic Analysis, Bureau of Labor Statistics; for Canadian provinces: Statistics Canada; for European regions: Eurostat.

7.4.6 Policy Impact and Media Attention

The index is cited in 32 sources according to the Lexis Nexis data base, not counting double-entries. Of these, 27 citations in journals and newspapers are listed in the Lexis Nexis database, not counting double-entries. Three entries are policy statements such as the one from the City of Stockholm referring to the WKCI findings. Two citations are public relations by the authors and the publishing institution. When looking at the media attention in general, it is interesting that the citations come from around the world. The report is cited in Singapore, China and Korea. Citations also include countries such as South Africa, USA, Sweden and Great Britain. This is a very broad response keeping in mind the short history of the ranking, although it is clear that 32 citations are not that many.

7.5 Conclusion

The World Knowledge Competitiveness Index is a well-designed index when it comes to the kind of aggregation technique. It applies no fixed weights but its overall ranking is based on the outcomes of a Data Envelopment Analysis. This makes it less vulnerable to criticism in this area. The theoretical basis is placed

within creativity, knowledge and environmental conditions as proxies for the measurement of competitiveness.

On the level of single indicators, there are two points worth noting. Firstly, data sources are missing very often. This makes it hard to evaluate data quality, especially when it comes to data comparability. Secondly, in many cases national data or indirectly national data is applied instead of regional data. This means that over a fourth of the overall ranking is driven by national data. It is clear that when benchmarking regions is attempted, one would expect regional data to have a strong effect on the results.

Looking at the predictive quality, one can see that the index performs poorly with respect to regional real GDP and regional GDP per capita, keeping in mind that this was neither tested with the full sample of 95 regions nor against initial level of GDP due to data availability. With relation to future unemployment, it can function as a proxy, although as a weak one. Media attention, on the other hand, shows that the report has its niche with 32 citations. This is even more interesting as the report has no long history and citations come from around the world.

Below are the results of the analysis in the form of a summary table:

Table 29: Summary evaluation table WKCI

Criteria	WKCI
Overall clarity and transparency: Information given on ...	
... original data	-
... transformed data	+
... theoretical framework	+
... competitiveness concept and underlying definitions	+
... sources for data	o
... exact indicator definition	-
...exact indicator units	-
... normalisation and transformation technique	+
... aggregation technique applied	+
... exact weights applied	equal
Comparability	
Index construction does not change too often	o
Indicators do not change too often	o
Sources and partners do not change too often	?
Indicators are similarly defined, i.e. use the same sources	?
Data reflect different entity sizes	+
Data is not biased by inflationary effects	?
If applicable: Survey results are comparable, i.e. based on a sufficient number of respondents, take into account cultural biases, and the 'right' people are interviewed	
Indicator choice	
Indicators correspond to theoretical framework	+
No implicit weights applied	N.a.
Index construction evaluation	
Rationale for weights disclosed	N.a.
Meaningfull ranking orders (in general)	+
Standardisation and normalisation do not bias results	+
Aggregation does not bias results	?
Robustness tests conducted and included	-
Predictive quality evaluation	
with respect to higher GDP per capita growth rates	-
with respect to lower unemployment rates	o
if necessary: with respect to higher employment	
Policy impact and media attention	
Citations in official political statements	low
Citations in LexisNexis data base	medium

Evaluation is done without using fixed and pre-defined grades.
'+' stands for positive evaluation, 'o' for a neutral evaluation, '-' for a negative evaluation; Information in brackets indicate non-substantial findings, i.e. based on small sample size; ? indicates missing information

8 Bundesländer im Standortwettbewerb

8.1 Background Information

"Die Bundesländer im Standortwettbewerb"[159] ranking is published by the Bertelsmann Foundation, a Foundation of the Bertelsmann media group. The Bertelsmann Foundation is seen as a neo-classical think-tank aiming at fostering the reformation of the public sector and at reducing the tax burden. The Bertelsmann Foundation, founded 1977, "promotes," according to its mission statement, "social change through project work that focuses on ensuring society's long-term viability." The foundation also publishes a public debt monitor, ranking German States according to their public debt, not taking into account the way the money is spent.

The first report was the outcome of a project initiated 1999 by the Bertelsmann Foundation, lead by Eric Thode and later by Thorsten Hellmann. The first index published in 2001 was constructed by a team of researchers at the University of Würzburg, chair of economics, Professor Dr. Norbert Berthold and Stefan Drews. The team at the University of Würzburg consisted of Norbert Berthold, Sascha von Berchem, Rainer Fehn, Lilia Heckle, Michael Neumann and Oliver Stettes together with Eric Thode of the Bertelsmann Foundation.

The aim was firstly to show differences of the Länder in three policy areas of economic, social and employment policies. Secondly it aimed at identifying best practises, giving policy-makers valuable insights and recommendations for coming up with their own successful policies (Drews 2005: 234).

The report includes two rankings: a success index (SI) and an activity index (AI). The report of the German private non-profit think tank has been published every other year since 2001. Although the ranking was initiated in 1999 and first published in 2001, all rankings are calculated back to 1986.

The 2007 report does no longer include the two overall indices and, therefore, no explicit overall ranking. Instead, rankings for the sub-rankings in the three areas

159 "Benchmarking German States"

of the former activity index are disclosed. The authors state that this is done to draw more attention to the analysis of the 16 regions and the recommendations. Therefore, the report includes the profiles for all 16 Bundesländer analysed with an overview of the relative performance, current trends, possible explanations and recommendations. The report is included in the analysis although the 2007 issue consists of six (sub-) rankings and not two overall rankings.

8.2 Theoretical Framework

Definition of Competitiveness

As the authors state on-line, "In this age of globalization, nations are not the only ones competing against each other for jobs and mobile capital-regions and states are increasingly doing so as well. Benchmarking German states as business sites in the form of state-to-state comparisons can stimulate reform of economic and labour market policies and promote an atmosphere of "learning from the best" as a way of gaining a competitive edge." This is in line with the reputation of the Bertelsmann foundation as supporting supply-side economics. The ranking itself does not refer to an explicit concept of regional competitiveness. Instead, an econometric approach is applied based on the above outline.

Policy Advice

Most of the recommendations made by the authors are based on concepts many would label neo-liberal or classical/neo-classical, calling for more reforms in the labour market, stricter budget policies and social security reforms that put more pressure on beneficiaries and lead to a lower share of the state (Rötzer 2004). These advices are not made in general but for every German state, at the end of each state's chapter. In general, the importance of innovations and education is emphasised as well as the importance of low public debt burdens.

Conclusion on Theoretical Framework

As the report does not refer to any concept and does not include a theoretical framework, there are no references to concepts. From the indicators included one could see a tendency for the ability to attract, sometimes also mentioned in the report (Bertelsmann Foundation 2005: 11, 21, 26; Bertelsmann Foundation 2007: 1). From a more general point of view, a tendency for "supply-side factors" like human capital, innovation, the burdens of public debt or labour force costs can be observed.[160]

8.3 Deconstruction

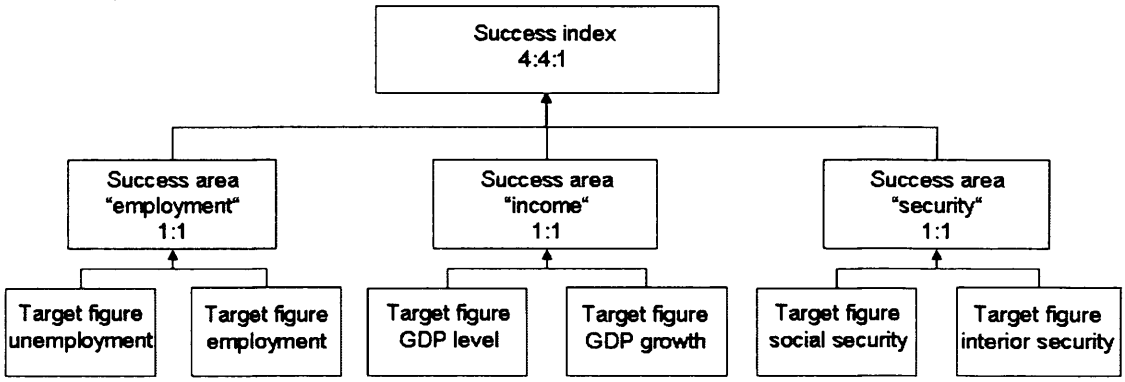
The report as introduced in 2001 consists of the two indices, success and activity, of the German Länder, analysed separately below.

Construction of Success Index

The success index measures the current level of 'success' in terms of income, employment and security. These three factors consist of six variables, namely GDP level and GDP growth for income, unemployment rate and employment rate for employment as well as people living on social security and the number of unsolved crimes in the field of security. These six sub-factors are weighted 1:1 for building the score in the three areas of income, employment and safety. These areas then are finally weighted 4:4:1, based on results of previous econometric analysis of migration movements of workers and by taking into account polls. The final SI is constructed as follows:

160 This can also be concluded from the fact that the Bertelsmann Foundation supports the Initiative Neue Soziale Marktwirtschaft (Initiative for a new social market economy).

Figure 13: Construction of success index as of 2001



Source: Based on Bertelsmann Foundation (2001)

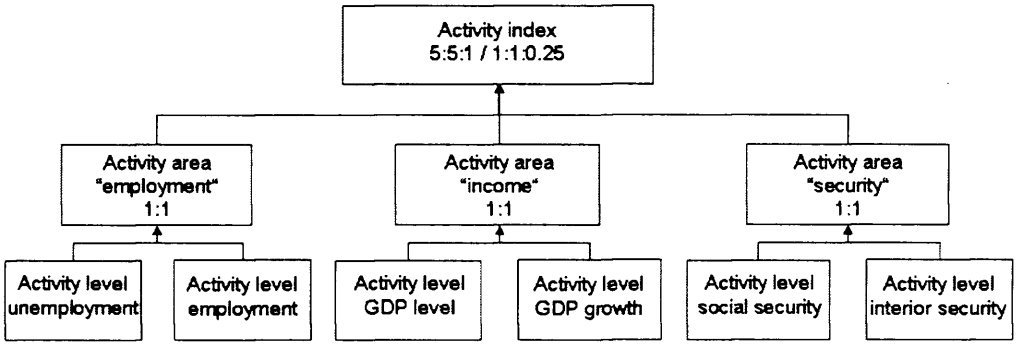
The indicators of the success index – as well as the ones of the activity index – were chosen based on existing studies and own analyses. Besides the current level of 'success', the authors wanted to measure what the regions actually did to sustain their position. This is why they also introduced the activity index.

Construction of Activity Index

The activity index aims at measuring what a German State does to successfully compete with other regions. Interestingly, this assumes that a German State actually can promote change and has the power to implement policies to foster competitiveness. In fact, the German States have next to no power for changing the political framework except for education and interior security.

The activity index is built in the same way as the success index, incorporating the same sub-ranking and areas ("activity levels"). The final score for the AI is derived by weighting the three sub-rankings 1:1:0.25 for 2003 and 2005 and 5:5:1 in 2001 as shown below.

Figure 14: Construction of activity index



Source: Based on Bertelsmann Foundation (2001)

In contrast to the success index, the authors also included indicators influencing the six target indicators of the activity index. Here, the results of an econometric analysis are applied. The authors looked at which factors correlate with the six variables of the indices with the help of a fixed effects panel analysis. Based on the results, the 41 factors and their weights were taken into account for the creation of the activity index, discussed in the next chapter.

The factors and their weight constituting the activity index are displayed for the 2001 edition as this is the issue for the analysis of predictive quality.[161]

161 For regression analysis, interior security is proxied with the number of unsolved crime, social security is proxied with the number of social welfare recipients.

Table 30: Influencing indicators of the BISW 2001 report

Indicator	Area and weight					
	Unemploy-ment 16.7%	Employ-ment 16.7%	GDP level 16.7%	GDP growth 16.7%	Interior Security 16.7%	Social security 16.7%
Apprenticeship position: supply and demand ratio	+ 30.9%	+ 24.9%				
Number of insolvencies per 10,000 companies	- 20.0%					- 12.5%
Regional share in world trade (population adjusted)	+ 10.2%		+ 0.2%			
School lessons taught	+ 9.0%					
Horizontal subsidy payments to/from other Laender (Euro per inhabitant)	+ 5.4%			- 48.9%		
Interest expenditures to tax income ratio	- 5.2%					
Public employment (% share of total employment)	+ 5.2%	+ 2.7%	- 8.4%			+ 37.6%
Vertical subsidy payments to/from other Laender (Euro per inhabitant)	+ 4.3%	+ 4.4%	+ 12.4%	- 13.5%	+ 0.4%	
Active labour market programs spendings per unemployed person	+ 4.0%	+ 1.9%	+ 1.2%			+ 16.8%
Trade tax (level)	- 3.4%					
Social security expenditures per unemployed person	- 1.7%	- 1.6%	- 1.7%		- 14.5%	- 8.2%
Higher education expenditures	+ 0.6%	+ 0.3%	+ 3.9%	+ 1.6%	- 0.7%	
Youth employment rate		+ 20.5%				
Percentage of second sector workers		+ 19.4%				
Percentage of part-time workers		+ 5.3%	+ 11.7%			
School lessons taught per student		+ 4.8%				
New patents (per million employed)		+ 3.6%				
Public interest burden ratio		- 3.1%				
Employees per enterprise		+ 2.3%	- 14.7%			
Female labour participation rate		+ 2.3%				
Political stability		+ 1.5%				
Annual public payroll costs (% of total spendings)		+ 1.4%		- 4.7%		
Social security density			- 19.6%			
R&D spendings (Euro per inhabitant)			+ 17.4%			
Members of a sport club (per 1,000 inhabitants)			+ 7.3%		+ 14.6%	
Foreign direct investments (Euro per inhabitant)			- 0.9%			
Share of people leaving school without a degree			- 0.6%			
Share of investments of total public budget				+ 9.8%		
Share of self-employed				+ 9.3%		
Share of investments of private companies (% of total turnover)				+ 9.1%		
Number of graduates from higher education institutions				+ 3.1%		+ 4.5%
Share of first sector (% of total employment)					+ 35.7%	
Hegemony change					- 14.1%	
Share of youth population					- 12.4%	
Average length of administrative court cases					- 4.0%	
Average length of criminal court cases					- 3.5%	
Quality of secondary modern school (school-leavers without degree)					- 0.5%	
Student-teacher ratio						- 17.0%
Population density						+ 3.2%
People with a secondary modern school-degree (% of total population)						+ 0.2%

Source: Author's own based on Bertelsmann Foundation (2001)

The BISW is now evaluated based on the above outlined framework.

8.4 Evaluation

8.4.1 Overall Clarity and Transparency

All original values are included in the reports, together with an exact definition and some additional remarks. In addition to this the construction of the two indices is explained in separate methodological chapters. Sometimes the authors refer to older issues where these topics are discussed and disclosed in more detail. This is the case for the whole methodology on deriving the overall weights for the indices as well as the steps and results of the regression analyses. Here, additional information could be helpful for those who do not have access to the respective issue. For ease of re-constructing it should be possible to reconstruct both indices.

8.4.2 Comparability

Comparability over Time

The six main indicators building up the sub-rankings in both indices do not change over time. Changes are only made for the activity index whose composition does change based on regression analyses carried out for every update. Therefore, the results are not fully comparable.[162]

After a deeper look at the indicators applied in 2001, 2003 and 2005, it can be seen that most of the indicators were included in all reports and changes are only minor from 2003 to 2005. This is shown in the following table.

[162] Dependent on the quality of the statistical analysis, the extent to which the included indicators can explain variations should be the same.

Table 31: Inclusion of indicators for the BISW index 2001 to 2005

Indicator	2001	2003	2005
Apprenticeship position: supply and demand ratio	x	x	x
Number of insolvencies per 10,000 companies	x	x	x
Regional share in world trade (population adjusted)	x	x	x
School lessons taught	x		
Horizontal subsidy payments to/from other Laender (Euro per inhabitant)	x	x	x
Interest expenditures to tax income ratio	x	x	x
Public employment (% share of total employment)	x	x	x
Vertical subsidy payments to/from other Laender (Euro per inhabitant)	x	x	x
Active labour market programs spendings per unemployed person	x	x	x
Trade tax (level)	x	x	x
Social security expenditures per unemployed person	x	x	x
Higher education expenditures	x	x	x
Youth employment rate	x	x	x
Percentage of second sector workers	x	x	x
Percentage of part-time workers	x	x	x
School lessons taught per student	x		
New patents (per million employed)	x	x	x
Public interest burden ratio	x	x	x
Employees per enterprise	x		
Female labour participation rate	x	x	x
Political stability	x		
Annual public payroll costs (% of total spendings)	x	x	x
Social security density	x		
R&D spendings (Euro per inhabitant)	x	x	x
Members of a sport club (per 1,000 inhabitants)	x	x	x
Foreign direct investments (Euro per inhabitant)	x	x	x
Share of people leaving school without a degree	x	x	x
Share of investments of total public budget	x	x	x
Share of self-employed	x	x	x
Share of investments of private companies (% of total turnover)	x		
Number of graduates from higher education institutions	x	x	x
Share of first sector (% of total employment)	x	x	x
Hegemony change	x		
Share of youth population	x		
Average length of administrative court cases	x	x	
Average length of criminal court cases	x	x	x
Quality of secondary modern school (school-leavers without degree)	x		
Student-teacher ratio	x	x	x
Population density	x		
People with a secondary modern school-degree (% of total population)	x		

Source: Author's own based on Bertelsmann Foundation (2001; 2003; 2005)

The number of indicators increased at the same time from 40 in 2001 over 44 in 2003 to 47 in 2005. As some indicators like horizontal subsidies have weights of more than 25% in the 2001 ranking, this could to some extent compensate the

negative effects from the weighting changes and, therefore, lead to higher comparability.

The weighting for the activity index changed over the years. In 2001, the three sub-rankings were weighted 5:5:1 while in 2003 and 2005 the weighting was 1:1:0.25. Although this could lead to some changes, the weight for the third activity area changed only from 11.11% to 9.09%. This should not cause too much variation.

Comparability of Data

Data should be comparable as only sources from national agencies are taken into account. In addition, only 14 of the indicator values taken from the regression analysis are built on more than one source of information. When looking at the six overall indicators (i.e. target indicators or activity areas) included in both rankings, it was shown that all rely on information from more than one source. Therefore, it is not clear if some of the variables are defined differently. But still, these data are taken from German agencies. This should minimise possible differences in definitions.[163]

In addition to this, all data in the report are size-adjusted, i.e., in relative terms. This is mostly done by relating the absolute values with population sizes. Although this minimises possible biases, another problem still occurs: comparing bigger states with city-states, namely with Berlin, Bremen and Hamburg. These three cities are also states and, therefore, are compared to the other, bigger states like Bavaria or Saxony. Crime rates or social security expenditures are, therefore, biased as rural areas are missing for the three city states.[164]

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163 Another issue could be the usage of forecast values. For the construction of the 2003 ranking, 2002 data was used as well as forecast values for 2003 and 2004. But as these forecasts are used for all indicators and by the same authors, this should not bias results, although – due to a lack of information- this cannot be justified further.

164 This bias is at some points addressed in the report.

Comparison of Ranking Results

The following look at the activity index results over the years shows that there is a lot of change in ranking positions.

Table 32: BISW activity index ranking results in comparison

Region	1999	2001	2003	2005	Average	Span
Baden-Württemberg	2	2	2	1	1.8	1.0
Bayern	1	1	1	2	1.3	1.0
Berlin	13	11	13	14	12.8	3.0
Brandenburg	11	16	15	12	13.5	5.0
Bremen	16	12	11	11	12.5	5.0
Hamburg	14	9	5	9	9.3	9.0
Hessen	10	8	7	5	7.5	5.0
Mecklenburg-Vorpommern	12	14	16	16	14.5	4.0
Niedersachsen	4	5	5	4	4.5	1.0
Nordrhein-Westfalen	7	7	6	6	6.5	1.0
Rheinland-Pfalz	3	3	3	3	3.0	0.0
Saarland	15	6	9	8	9.5	9.0
Sachsen	9	13	10	10	10.5	4.0
Sachsen-Anhalt	8	15	14	15	13.0	7.0
Schleswig-Holstein	5	4	4	7	5.0	3.0
Thüringen	6	14	12	13	11.3	8.0

Source: Author's own based on Bertelsmann Foundation (2001; 2003; 2005)

The average span for the four years is 4.1 which is relatively high, compared to the span of 2.1 found for the success index over the years.

Table 33: BISW success index ranking results in comparison

Region	1999	2001	2003	2005	Average	Span
Baden-Württemberg	3	3	3	3	3.0	0.0
Bayern	2	2	2	2	2.0	0.0
Berlin	13	14	13	15	13.8	2.0
Brandenburg	14	11	15	14	13.5	4.0
Bremen	5	5	5	6	5.3	1.0
Hamburg	1	1	1	1	1.0	0.0
Hessen	4	4	4	4	4.0	0.0
Mecklenburg-Vorpommern	16	15	14	16	15.3	2.0
Niedersachsen	8	6	10	10	8.5	4.0
Nordrhein-Westfalen	7	7	8	9	7.8	2.0
Rheinland-Pfalz	6	9	7	5	6.8	4.0
Saarland	12	10	6	7	8.8	6.0
Sachsen	10	12	11	11	11.0	2.0
Sachsen-Anhalt	15	16	16	13	15.0	3.0
Schleswig-Holstein	9	8	9	8	8.5	1.0
Thüringen	11	13	12	12	12.0	2.0

Source: Author's own, based on Bertelsmann Foundation (2001; 2003; 2005)

Despite the span in both indices, the Länder ranked on top do not change a lot over the years. Most of the changes happen in the middle-ranked regions.

8.4.3 Indicator Choice

Relation to Theoretical Framework

As the report does not refer to a certain theoretical framework, it was not possible to evaluate the indices with respect to the theoretical framework. Therefore, only the overall indicators of the two indices in the three areas are included as these indicators are justified by the authors as being causal variables for determining competitiveness and future economic prospects. In addition to this it is hypothesised that these indicators can be influenced by the German states. With the exception of the last two indicators, this must be doubted. Competition for business sites in Germany takes place on the local level as the communities levy business taxes. The states may influence the business climate to a certain

degree and may also provide subsidies,[165] but not that they are in full command of the business conditions.

Employment consists of two variables: 'Unemployment rates' and 'total employment'. From the perspective of attracting workers – stated as the rationale for including this area – the indicator is very important as people connect unemployment with lower living quality (Di Tella/Mac Culloch 2006; Frey/Stutzer 2005). Besides attracting workers, unemployment is included to catch under-employment in a state whereas total employment indicates the level of employment reached. Although there is a difference between the two indicators, they will be highly correlated and one may ask why to include both.

- **Unemployment rate:** Unemployment rates generally are 'easy' to manipulate as first only official data are taken into account. People not willing to register are not counted and those not being able to work, due to illness, handicaps or when in a qualification program, are not considered. The authors do recognise these issues and also count hidden unemployment with the help of a survey. Therefore, the numbers are more trustworthy. When coming back to causal relations, this indicator is not meaningful as high unemployment figures are the result of slow economic growth and not a cause. In fact, many countries saw high levels of unemployment and at the same time high growth rates, as in the case of Germany.

- **Total employment**: From a worker's perspective people will more likely take into account unemployment instead of employment data. The advantage with employment is that this figure is more accurate and less prone to manipulations.

Income is included to capture economic opportunities, economic abilities and dynamics. The authors state that higher GDP levels and higher GDP growth will attract workers from other regions. Therefore, the two indicators are consistent with this statement. This is then measured with the two indicators 'GDP per

165 Other examples would be airport expansions like in the case of Hessen, providing funding and authorisation for the enlargement of the Frankfurt airport.

capita' and 'GDP growth'. Whereas the latter indicates dynamics and current success, also dependent on the starting level, 'GDP per capita' reflects past success.

- **GDP level:** This is one of the most prominent measures and mostly seen as the ultimate goal of economic development. As discussed above, GDP catches all economic activities within a certain geographic area. This does not necessarily translate into a higher quality of life or happiness, but, to a certain degree, it is seen as a pre-requisite. In relation to the German state, a special problem has to be faced as five of the states and parts of Berlin are only part of the market system since 1990, and still lagging behind due to the socialist system in place for 40 years. Therefore, it is only natural that these states have lower levels of GDP. In addition to this, Germany has three city-states: Berlin, Bremen and Hamburg. As these are magnets for commuters; they naturally – with the exception of Berlin – are more prosperous than the other states with their rural areas. This also has to be taken into account.

- **GDP growth:** This indicator measures the change of GDP per capita from one year to the other. As with GDP, history plays an important role. As some states have a lower level of GPD per capita, one would expect to grow faster than the other states, according to the catch-up hypothesis. This is what can be observed in the period of 1991 to 2004 when looking at the data charts of the 2005 report. The Eastern states on average grew at 2.62 %, while the average for Germany was at 1.45 % over that period.[166] These are effects that can bias results.

Security is interpreted as social security and interior security, with respect to crime. This is included as this also will indicate attractiveness for workers as seen by the authors. Therefore, the two indicators are in line with the author's framework.

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166 Although it must be stated that since 1999 the Eastern states lag behind the average German growth rate.

- **Social security:** This indicator measures how threatened people are to lose their position in society and become poor. This is seen as more familiar than crime. The indicator is defined as the number of people living from welfare aid (in German called 'Hilfe zum Lebensunterhalt')[167] having their own independent household per 1,000 inhabitants. While this indicator on first sight may be meaningful, problems arise as the social security system in Germany saw many reforms in recent years. Most people will not directly 'fall back' from earning their own income to this level.[168] Therefore, this thread is more hypothetic. In addition, numbers have gone down so markedly that they can hardly be interpreted as the unemployment benefits for the long-term unemployed will provide income for the most people as long as they are registered. The numbers, therefore, to a certain degree depend on the willingness to work and the capability to work, i.e., counting the old, sick, handicapped or 'lazy' inhabitants. This is also admitted by the authors (Bertelsmann Foundation 2005).

- **Interior security/crime:** This is the only indicator fully in the hand of the states as policy and interior security are part of the state's power. The indicator is defined as the number of unsolved crimes per 100 inhabitants. Again, the city states will be disadvantaged as cities in general face higher crime rates than rural areas.[169] This is also considered by the authors and stated in the chapters on the single states (Bertelsmann Foundation 2005: 31). Problems here also arise if people in some states report crime more often than in others. In addition, this does not take into account that some crime is viewed as more threatening, e.g., homicide or robbery. In general, it still holds true that lower crime rates will be viewed as higher living quality.

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167 This is the amount of money people receive if they are not able to live from their own income and are not registered as being unemployed, long-term or short-term. This is the lowest level of social security one can receive if they are not homeless and even if they are unwilling to work.

168 In fact, one would first receive around 60% of the last net income as unemployment benefits ('ALG I'), then a benefit 20% above the welfare aid and then welfare aid as meant above.

169 The average indicator value for the three city-states from 1991 to 2004 was at 8.8 while the average of all German states was at 3.9.

The three areas and the six indicators are included as surveys and migration flows have indicated to do so. Most of the variables are not determinants of competitiveness but are measures of economic prosperity. In this case this is no problem as the authors aimed at illustrating living quality with these indicators. Causal relations are mapped with 40+ indicators influencing the activity index.

Implicit Weighting

No implicit weighting was found. This should not be surprising as the inclusion of indicators on the first level is based on a regression analysis. This could lead to a bias towards certain dimensions, but this would still be justified by the explanatory power of the indicators. On the second level, the six variables in the areas employment, income and security are always built on two indicators. In all three areas the two indicators refer to the same dimension, weighting all indicators equally or on the level of the two final indices weighted unequally intentionally, based on literature analysis and surveys conducted.

8.4.4 Index Construction

Rationale for Weights

The BISW is built on the findings of econometric analyses and surveys to derive the appropriate weights. The weights on the first level – only in the case of the activity index – are derived from a regression analysis. The weights on the second level 1:1 for every area are set by the authors. This is done to come up with a neutral weighting. This is not justified further. On the level of the final indices, the weights – 4:4:1 and 5:5:1 – are based on analyses of migrations within Germany as well as surveys. After looking at existing monthly surveys (voice option) asking for the most important problems in Germany, the authors came up with a weight of 40% for employment and income and around 20% for security. As these surveys yielded different results for different periods – e.g., the

weight for security went down to 13% in one period of 13 months – the authors decided to also look at migration flows (exit option). Therefore the authors conducted a regression analysis coming up with the following weights: 44.8% for employment, 42% for income and 12.8% for security. Taking into account both results, i.e., weights based on the survey and weights based on the regression analysis), the authors decided to apply a weighting of 4:4:1. This process has been relatively transparent and sound, although one cannot easily justify the analyses or the original data.

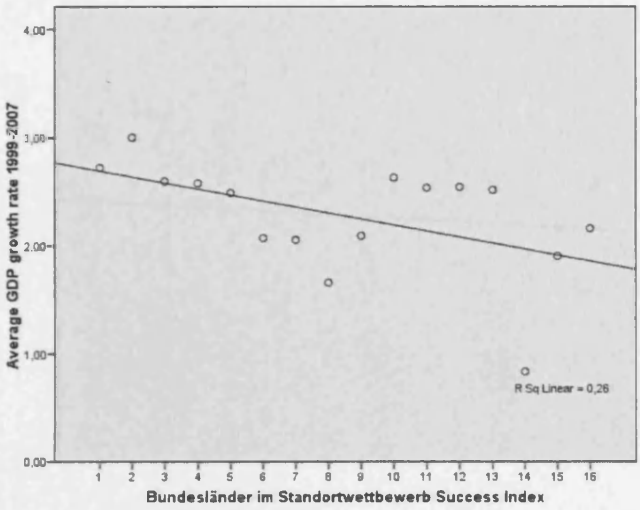
Index Aggregation

To be able to compare the different indicator areas, the original data for all indicators are first transferred into a scale from 1 for the lowest performer to 10 for the best performer. This is done for a period of three years and leads to a sub-ranking for all factors which then form the final score for the success index and activity index, which is the weighted average of the area rankings and sub-rankings.

8.4.5 Predictive Quality

To get an impression on the predictive quality of the two indices, attention was paid to the relation between the ranking results of the 2001 report, covering the 1995 to 1998 period and the average regional GDP growth of the German Bundesländer from 1999 to 2007.

Figure 15: BISW SI ranking results 2001 vs. future growth

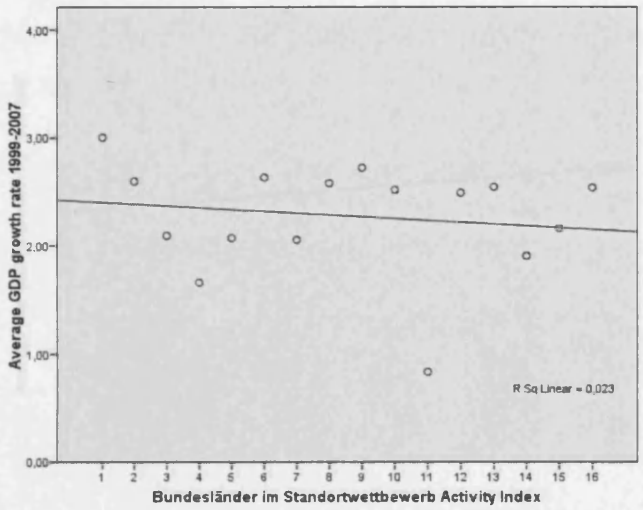


Source: Author's own with data from Bertelsmann Foundation (2001) and Statistisches Bundesamt

It can be seen that there is a negative tendency between the ranks and future GDP growth with some outliers, indicating that the SI ranking can be seen as a proxy for future growth. This can be verified with the Spearman rank correlation of -.541, significant on the 5 % level.

For the activity index, the picture is a little bit different, as can be seen below.

Figure 16: BISW AI ranking results 2001 vs. future growth

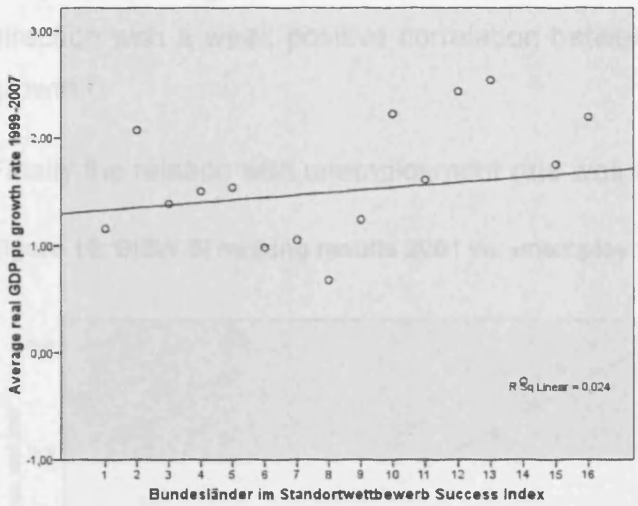


Source: Author's own with data from Bertelsmann Foundation (2001) and Statistisches Bundesamt

Here, there seems to be no clear tendency. One would expect a negative tendency, indicating that regions with a higher rank grow at higher rates. Although the direction of the relation is negative, it is neither a strong correlation, nor significant.

Checking against GDP per capita, it can be seen that in the case of the success index the analysis comes up with completely different results.

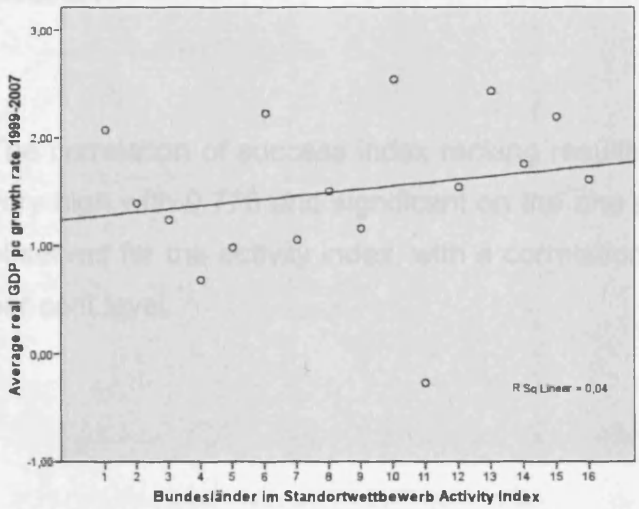
Figure 17: BISW SI ranking results 2001 vs. GDP per capita



Source: Author's own with data from Bertelsmann Foundation (2001) and Statistisches Bundesamt

Higher ranks are correlated with lower GDP per capita growth rates with a Spearman rank correlation coefficient of 0.239. In the case of the activity index, the same can be said with a Spearman rank correlation coefficient of 0.338.

Figure 18: BISW AI ranking results 2001 vs. GDP per capita

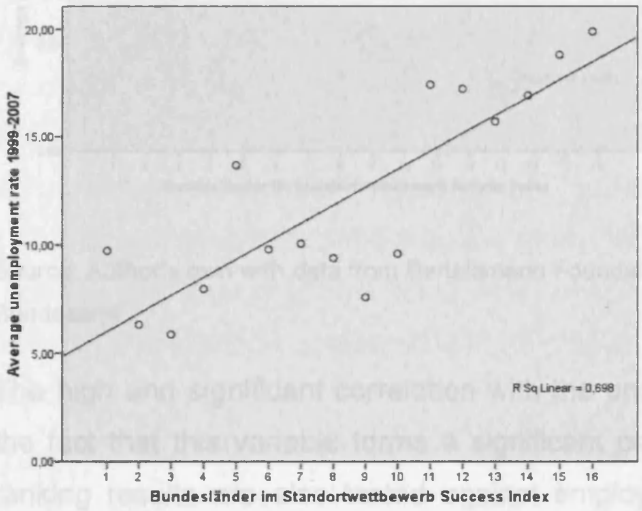


Source: Author's own with data from Bertelsmann Foundation (2001) and Statistisches Bundesamt

When looking at the relationship to real GDP per capita growth, as shown above, the picture changes for both indices as the correlation then 'points' into the wrong direction with a weak positive correlation between the ranking results and future growth.

Finally the relation with unemployment rate was tested as displayed below.

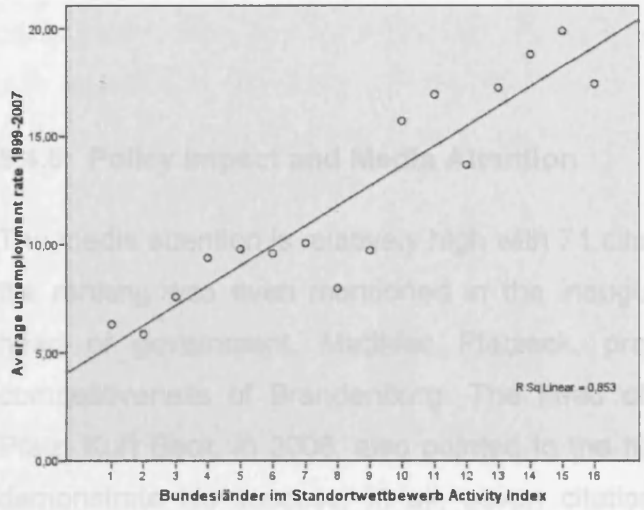
Figure 19: BISW SI ranking results 2001 vs. unemployment rate



Source: Author's own with data from Bertelsmann Foundation 2001 and the Statistisches Bundesamt

The correlation of success index ranking results with the unemployment rates is very high with 0.776 and significant on the one per cent level. The same can be observed for the activity index, with a correlation of 0.929, significant on the one per cent level.

Figure 20: BISW AI ranking results 2001 vs. unemployment rate



Source: Author's own with data from Bertelsmann Foundation (2001) and Statistisches Bundesamt

The high and significant correlation with the unemployment rate may be due to the fact that this variable forms a significant part of the index. This is why the ranking results are also tested against employment change, displayed in the following table.

Table 34: Spearman rank correlation for the BISW indices

		Average real GDP growth 1999-2007	Average real GDP per capita growth 1999-2007	Average rate of unemployment 1999-2007	Average rate of employment change 1999-2007
Rank Bundesländer im Standortwettbewerb Success Index	Correlation Coefficient	-541*	.329	.776**	-.567*
	Sig. (1-tailed)	.015	.106	.000	.011
	N	16	16	16	16
Rank Bundesländer im Standortwettbewerb Activity Index	Correlation Coefficient	-.215	.338	.929**	-.501*
	Sig. (1-tailed)	.212	.100	.000	.024
	N	16	16	16	16

**. Correlation is significant at the 0.01 level (1-tailed).
*. Correlation is significant at the 0.05 level (1-tailed).

Source: Author's own with data from Bertelsmann Foundation (2001) and Statistisches Bundesamt

Although the correlation is not as high as with average unemployment rate and significant on the 5 % level, the correlation seems to verify the ranking results

being significant for both indices. Again, it has to be stated that employment forms part of the index and, therefore, correlations should be high and significant.

8.4.6 Policy Impact and Media Attention

The media attention is relatively high with 71 citations from 2001 to 2007. In 2003 the ranking was even mentioned in the inaugural speech by the Brandenburg head of government, Matthias Platzeck, proving his point concerning the competitiveness of Brandenburg. The head of the government of Rheinland-Pfalz, Kurt Beck, in 2006, also pointed to the high ranking in the BISW index to demonstrate his success. In all, seven citations of the 71 are statements of politicians proving their point with the study. When looking at the distribution of citations, it can be seen that the number of citations reached a new high-point in 2007 with 23 citations compared with 32 citations in total for all the previous three reports.

8.5 Conclusion

In conclusion, the index offers a mixed picture in relation to predictive quality. Whilst both indices are a predictor of future employment changes and unemployment rates, there is a mixed picture for predicting future growth. Both indices cannot function as a proxy for future GDP per capita growth, although the success index has a high correlation with regional GDP growth, significant at the one per cent level. Interestingly this is not the case for the activity index.

The underlying econometric analysis as the basis for the weighting of the variables overcomes the problem of deriving weights as it offers an econometric explanation. But as the authors point out in the report, problems of causality and endogeneity still remain. Therefore, the authors could face the problem of measuring without theory.

As the authors state no theoretical foundation as the basis for choosing indicators, it can only be speculated what kind of approach lies behind. From other publications and lobbying work, there can be seen a tendency to supply-side economics, stressing out the importance of labour-force flexibility and low shares of the state. But this is very general and based on other publications as well as the overall tendency.

Below are the results of the analysis in the form of a summary table:

Table 35: Summary evaluation table BISW

Criteria	BISW
Overall clarity and transparency: Information given on ...	
... original data	+
... transformed data	+
... theoretical framework	(-)
... competitiveness concept and underlying definitions	(-)
... sources for data	+
... exact indicator definition	+
...exact indicator units	+
... normalisation and transformation technique	+
... aggregation technique applied	+
... exact weights applied	+
Comparability	
Index construction does not change too often	+
Indicators do not change too often	o
Sources and partners do not change too often	+
Indicators are similarly defined, i.e. use the same sources	+
Data reflect different entity sizes	+
Data is not biased by inflationary effects	+
If applicable: Survey results are comparable, i.e. based on a sufficient number of respondents, take into account cultural biases, and the 'right' people are interviewed	
Indicator choice	
Indicators correspond to theoretical framework	N.a.
No implicit weights applied	N.a.
Index construction evaluation	
Rationale for weights disclosed	+
Meaningfull ranking orders (in general)	+
Standardisation and normalisation do not bias results	+
Aggregation does not bias results	+
Robustness tests conducted and included	-
Predictive quality evaluation	
with respect to higher GDP per capita growth rates	-
with respect to lower unemployment rates	+
if necessary: with respect to higher employment	+
Policy impact and media attention	
Citations in official political statements	high
Citations in LexisNexis data base	medium

Evaluation is done without using fixed and pre-defined grades.
'+' stands for positive evaluation, 'o' for a neutral evaluation, '-' for a negative evaluation; Information in brackets indicate non-substantial findings, i.e. based on small sample size; ? indicates missing information

9 State New Economy Index

9.1 Background Information

The State New Economy Index (SNEI) was first published in 1999 by the Progressive Policy Institute (PPI). The second edition in 2002 was also published by the PPI before one of the authors left the organisation. The 2007 edition was then published by the Kauffman Foundation and The Information Technology and Innovation Foundation, both private US non-profit organisations.

The team constructing the first issue in 1999 consisted of R.D. Atkinson, R.H. Court and J.M. Ward of the Progressive Policy Institute. The Progressive Policy Institute's mission according to its web-site "is to define and promote a new progressive politics for America in the 21st century. Through its research, policies, and perspectives, the Institute is fashioning a new governing philosophy and an agenda for public innovation geared to the Information Age." This mission as based on the belief "that America is ill-served by an obsolete left-right debate that is out of step with the powerful forces re-shaping our society and economy. The Institute advocates a philosophy that adapts the progressive tradition in American politics to the realities of the Information Age and points to a "third way" beyond the liberal impulse to defend the bureaucratic status quo and the conservative bid to simply dismantle government. The Institute envisions government as society's servant, not its master -- as a catalyst for a broader civic enterprise controlled by and responsive to the needs of citizens and the communities where they live and work."

The aim of the report then was "to outline a state-level public policy framework aimed at promoting fast and widely shared economic growth" (Atkinson et al 1999: 3).

The Kauffman Foundation, established in the mid 1960s, is committed to fostering "a society of economically independent individuals who are engaged citizens, contributing to the improvement of their communities"

(www.kauffman.org). Therefore, the foundation is well-known for fostering entrepreneurship. The Kauffman Foundation supports the report financially.

The Information Technology and Innovation Foundation, as the publishing organisation, focuses on the promotion of innovation, productivity and digital economy issues. It was founded in 2006 and sees technological innovation as the key for economic progress.

The report is published free of charge for downloading and is also available as a hard copy for 5 USD. The target groups are policy makers at the federal and state level who should better understand the types of public policies needed to foster innovation and productivity.

9.2 Theoretical Framework

Definition of Competitiveness

The report officially benchmarks the economic transformation in the states and, therefore, just discloses the current picture with respect to this transformation in the New Economy era. The New Economy phenomenon is then seen as a "global, entrepreneurial and knowledge-based economy in which the keys to success lie in the extent to which knowledge, technology, and innovation are embedded in products and services" (Atkinson/Correa 2007: 3). No other theoretical approach or definitions are stated. The authors at some points refer to competitiveness, such as in the 2007 issue: "States face a new imperative to boost the competitiveness of their economies not just relative to each other, but to other nations" (Atkinson/Correa 2007: 51). This shows that the authors have in mind a micro-economic definition, centring on firm performance, even though officially they just want to disclose the current state of economic transformation.

Policy Advice

In the last chapter, before going into detail for the 2007 results, the authors summarize their findings and give an advice on how a "progressive, innovation-oriented public policy framework designed to foster success in the new global economy" (Atkinson/Correa 2007: 11) could be achieved, concluding with the following nine key points (Ibid.):[170]

1. Align incentives behind innovation economy fundamentals.
2. Co-invest in an innovation infrastructure.
3. Co-invest in the skills of the workforce.
4. Cultivate entrepreneurship.
5. Support industry clusters.
6. Reduce business costs without reducing the standard of living
7. Boost productivity.
8. Reorganize economic development efforts.
9. Enlist federal help.

They promise that "states that focus their policy efforts in these areas will be well-positioned to experience strong growth, particularly in per capita incomes" (Atkinson/Correa 2007: 11).

When looking at earlier reports, it can be seen that this advice did change over time. In 2002 the advice led to eight key points (taken from Atkinson 2002: 5):

170 Interestingly, in 1999 they had five key points, in 2002 eight, and now again nine.

1. Focus on the quality, not just the quantity of jobs.
2. Know your state's function in the global economy.
3. Get smart about business incentives.
4. Co-invest in the skills of the workforce.
5. Co-invest in an infrastructure for innovation.
6. Support industry clusters.
7. Boost quality of life.
8. Help more regions succeed in the New Economy.

This advice was different from that advocated in the 1999 issue (Atkinson et al 1999: 4):

1. Co-invest in the skills of the workforce.
2. Co-invest in an infrastructure for innovation.
3. Promote innovation- and customer-oriented government.
4. Foster the transformation to a digital economy.
5. Foster civic collaboration.

Conclusion on Theoretical Framework

As could also be seen by analysing the dimensions covered, the SNEI is a relatively narrowly defined index concentrating on growth factors like IT, high-tech skills, and patents. Keeping this in mind, even though there is no explicit reference to any concept of competitiveness, it can be concluded that implicitly,

the report follows the ability to adopt and the ability to innovate, reflecting a macro- and at the same time a microeconomic view.

The aim of the report according to the web-site is to examine "the degree to which state economies are knowledge-based, globalized, entrepreneurial, information technology-driven and innovation-based". This is a clear focus on the ability to innovate following the supply-side paradigm compared to the other indices analysed in the overview chapter.

When looking at the policy advice it is interesting how politicians should change their policies within 10 years quite drastically. While in 1999 collaboration was inevitable, by 2002 and 2007 it was not. Providing advice on how to foster transformation in 1999 but not later is understandable as at that time the transformation was under way and no longer a point that needed special attention. Of the different advice given, only two points - co-invest in the skills of the workforce and in an infrastructure for innovation – are included in all reports. From 2002 to 2007, 'boost quality of life', 'focus on the quality of jobs' and 'help more regions succeed' were deleted. Other advice such as 'get smart about incentives' and 'know your state's function' were just re-phrased in 2007.

9.3 Deconstruction

Based on the concept disclosed above, a number of indicators were chosen to catch all necessary aspects of the transformation to the New Economy. These indicators and the structure are outlined below.[171]

171 Changes in weights are displayed afterwards.

Table 36: Structure of the State New Economy Index 1999

Area	Indicator	Weights
Knowledge Jobs		**2.50**
	Office jobs	0.75
	Professional and managerial jobs	0.75
	Education level	1.00
Globalization		**2.00**
	Export orientation	1.00
	Foreign direct investments	1.00
Dynamism and Competition		**3.00**
	Gazelles	1.00
	Churn	1.00
	Initial public offerings	1.00
Digital Transformation		**4.00**
	Classrooms with internet	0.33
	Teachers with email	0.33
	Teacher tech training	0.33
	Adults on internet	1.00
	Digital government	1.00
	'.com' domain names	1.00
Innovation Infrastructure		**4.00**
	High-tech workers	0.75
	Scientists and engineers	0.75
	Patents	0.75
	R&D	0.75
	Venture capital	1.00

Source: Author's own, based on Atkinson et al (1999)

For the 2002 issue, the number of indicators was expanded to 21 with five new indicators added ('IT professionals', 'manufacturing workforce education', 'farms and technology', 'manufacturing and technology', 'broadband') and one indicator deleted ('office jobs'). In the case of 'technology in schools', the former indicators 'classrooms with internet', 'teachers with email' and 'teacher tech training' were condensed into one indicator. The exact weights are not disclosed; so it can only be guessed from the fact that the three indicators each had a weight of 33.3% in 1999 that they could be weighted equally.

In addition to this, two categories were re-named ('digital transformation' and 'innovation infrastructure') and also some of the indicators just changed their name ('education level', 'adults on internet', 'high-tech workers').

The composition for the 2002 issue is displayed below.

Table 37: Structure of the State New Economy Index 2002

Area	Indicator	Weights
Knowledge Jobs		**3.25**
	IT professionals	0.75
	Managerial, professional, technical jobs	0.75
	Manufacturing workforce education	0.75
	Workforce education	1.00
Globalization		**2.00**
	Export orientation	1.00
	Foreign direct investments	1.00
Dynamism and Competition		**3.00**
	Gazelles	1.00
	Churn	1.00
	Initial public offerings	1.00
Digital Economy		**4.50**
	Online population	0.75
	'.com' domain names	0.75
	Technology in schools	0.50
	Digital government	0.50
	Farms and technology	0.50
	Manufacturing and technology	0.50
	Broadband	1.00
Innovation Capacity		**4.00**
	High-tech employment	0.75
	Scientists and engineers	0.75
	Patents	0.75
	R&D	0.75
	Venture capital	1.00

Source: Author's own based on Atkinson (2002)

In 2007, this structure was again modified. This time, seven new indicators were added and two deleted, yielding the following composition.

Table 38: Structure of the State New Economy Index 2007

Area	Indicator	Weights
Knowledge Jobs		**4.50**
	IT professionals	0.75
	Managerial, professional, technical jobs	0.75
	Workforce education	1.00
	Immigration of knowledge workers	0.50
	Manufacturing value-added	0.75
	High-wage traded services	0.75
Globalization		**2.50**
	Export focus of manufacturing and services	1.00
	Foreign direct investments	1.00
	Package exports	0.50
Economic Dynamism		**4.25**
	Gazelle' jobs	1.00
	Job churning	0.75
	Fastest growing firms	0.50
	Initial public offerings	0.75
	Entrepreneurial activity	0.75
	Inventor patents	0.50
Digital Economy		**3.85**
	Online population	0.75
	Internet domain names	0.60
	Technology in schools	0.50
	E-Government	0.50
	Online agriculture	0.50
	Broadband telecommunications	1.00
Innovation Capacity		**4.00**
	High-tech jobs	0.75
	Scientists and engineers	0.75
	Patents	0.75
	Industry investment in R&D	1.00
	Venture capital	0.75

Source: Author's own, based on Atkinson/Correa (2007)

The focus now lies on the evaluation of the index based on the research framework.

9.4 Evaluation

9.4.1 Overall Clarity and Transparency

Every report includes the data sources, meaning that one can look up the original data. All single indicators are introduced under the respective sub-index. This includes the exact indicator definition as well as two sections why this indicator was chosen and what the rankings show. Data are then shown for the top five and the top five movers with the help of a table. A map then shows data for all the states, grouped into four percentiles.

The theoretical framework – accompanied by some articles on the New Economy – as well as index construction are outlined in separate chapters. Normalisation, aggregation, weighting methodology and changes in index construction are also included. This allows one to gain a deeper understanding of the index. However, some information on the weights applied is missing. The authors do only state that the weights reflect overall importance and correlations with other indicators, but the information on how they came up with the exact weights is missing.

9.4.2 Comparability

Comparability over Time

As could be seen above, index composition changed significantly over time. The changes in index composition are summarised below.

Table 39: Changes in index composition of the State New Economy Index

Year	# of indicators applied	# of new indicators	# of deleted indicators
1999	19	N.a.	N.a.
2002	21	5	2(5)
2007	26	7	2

Note that in 2002 three indicators were condensed into one. This is expressed in brackets.

Source: Author's own, based on Atkinson et al (1999); Atkinson/Correa (2002; 2007).

It is clear that with such fundamental changes,[172] it becomes next to impossible to compare ranking results over time. This is also what the authors admit: "[A] state's movement to a higher or lower overall rank between the years does not necessarily reflect changes in its economy" (Atkinson/Correa 2007: 11).

Comparability of Data

The report builds on hard data, taken from a broad range of official and (some) private sources. As all of the regions are states of the USA, only data from US sources are taken into account. This means that data definitions should not vary across the different states and agencies. Problems could occur if indicator values come from more than one source. This is the case for five of the 26 indicators of the 2007 issue.

Time-lags pose another source for low comparability. Some indicators are built on data from different years. For the 2007 issue, six indicator sources were from 2006, 14 from 2005, seven from 2004, six from 2003 and one from 2002. When looking at intra-indicator distribution, it was found that seven indicators incorporate data from different years. This means that around one fourth of the indicators are influenced by time differences in data topicality.

172 Changes in weights are analysed below. In addition, changes in the definition of indicators also occurred, for instance, for internet domains. In 1999 and 2002 only .com domains had been taken into account. In 2007, .com, .net and .org domains were also counted. The same is true for technology in schools where indicator definition changed over time.

The data incorporated reflects size effects as no absolute values are used to compute the ranking without adjusting to population size or other characteristics. This can be seen in the case of manufacturing exports where industry sizes are adjusted so that single firms like Boeing in Washington cannot influence the ranking too much.

Comparison of Ranking Results

What follows are the ranking results for 1999, 2002 and 2007 in comparison:

Table 40: Comparison of the State New Economy Index ranking results

State	Rank 1999	Rank 2002	Rank 2007	Range
Alabama	44	47	46	3
Alaska	13	31	13	18
Arizona	10	16	22	12
Arkansas	49	48	47	2
California	2	3	5	3
Colorado	3	4	9	6
Connecticut	5	7	6	2
Delaware	9	9	7	2
Florida	20	18	23	5
Georgia	25	22	18	7
Hawaii	26	35	41	15
Idaho	23	20	24	4
Illinois	22	17	16	6
Indiana	37	36	31	6
Iowa	42	38	38	4
Kansas	27	29	34	7
Kentucky	39	42	45	6
Louisiana	47	45	44	3
Maine	28	25	32	7
Maryland	11	5	3	8
Massachusetts	1	1	1	0
Michigan	34	23	19	15
Minnesota	14	13	11	3
Mississippi	50	49	49	1
Missouri	35	24	35	11
Montana	46	37	42	9

State	Rank 1999	2002	Rank 2007	Range
Nebraska	36	33	28	8
Nevada	21	32	27	11
New Hampshire	7	15	13	8
New Jersey	8	6	2	6
New Mexico	19	27	33	14
New York	16	10	10	6
North Carolina	30	26	26	4
North Dakota	45	44	37	8
Ohio	33	30	29	4
Oklahoma	40	34	40	6
Oregon	15	11	17	6
Pennsylvania	24	19	21	5
Rhode Island	29	21	15	14
South Carolina	38	41	39	3
South Dakota	43	43	48	5
Tennessee	31	39	36	8
Texas	17	14	14	3
Utah	6	12	12	6
Vermont	18	28	20	10
Virginia	12	8	8	4
Washington	4	2	4	2
West Virginia	48	50	50	2
Wisconsin	32	40	30	10
Wyoming	41	46	43	5

Source: Author's own, based on Atkinson et al (1999); Atkinson/Correa (2002; 2007)

It can be seen that there is a lot of variation in the results with a range of 6.5 on average. As the rankings are not comparable, no conclusions can be drawn from this. The ranking results cannot be compared as the 1999 results were not computed back like the 2002 ranking.

9.4.3 Indicator Choice

Relation to Theoretical Framework

Just like the World Knowledge Competitiveness Index, the SNEI has a clear focus on the knowledge economy and human capital. This is reflected in the choice of indicators. In general the indicators selected directly relate to the framework as set out above. In the following, the single indicators of the 2007 issue and their values are briefly discussed.[173]

Knowledge jobs are captured with the help of indicators measuring typical knowledge-based businesses and work force characteristics. The report here follows an ability to adjust and the ability to earn view.

- **IT professionals,** defined as employment in IT occupations, and in non-IT industries as a share of total jobs. This is seen as a proxy for how traditional industries make use of IT. This does relate to the theoretical framework and on first sight, the logic behind seems to be meaningful. Problems occur if traditional firms have outsourced IT departments to specialised IT firms. These firms are not taken into account. Not counting IT industry means that states with a high share of IT industry – perhaps due to the fact that they have outsourced their IT – will receive lower scores.

- **Managerial, professional, technical jobs,** defined as managers, professionals, and technicians as a share of the total workforce. First of all, this indicator catches three different types of jobs, only loosely connected. Besides this, seeing managerial jobs as proxies for the New Economy may be misleading. As the authors state, managerial jobs declined since 1999. If they are to be seen as a proxy for the New Economy, this would mean that the New Economy has declined since 1999. This would be in contrast to the whole report. In general, this indicator measures the shift from traditional jobs and, therefore, indicates

173 Note that many of the indicators discussed here are also included in the WKCI and, therefore, discussed in the respective chapter.

change in technology utilisation as well as change in corporate organisation. This could not only be connected with the New Economy but with a more general trend, e.g., indicating automation efforts in all industries.

- **Workforce education,** defined as the weighted measure of the educational attainment (advanced degrees, bachelor's degrees, associate's degrees, or some college coursework) of the workforce. This is seen as a proxy for knowledge and labour mobility. This seems to be the case, although one cannot simply look at the degree without looking at the quality of the degree. Of course, this proves difficult to undertake; so this is perhaps one of the best and easiest ways to capture knowledge. The indicator, therefore, does relate to the underlying concept of the index.

- **Immigration of knowledge workers,** defined as the average educational attainment of recent migrants from abroad. This counts educational attainment of people having at least lived abroad for one year before. Migrants are then categorised: those with less than a high school degree received a value of 9 years, high school degrees 12 years, those with some college or an associate's degree earn 14 years, bachelor's degrees 16 years and postgraduate degrees 18.95 years. The definition of migrants is relatively broad with just one year. This could also catch natives who went abroad, e.g., for studying. It might be that this is what the authors also want to take into account to assess attractiveness in general. The indicator relates to the concept behind the index, although it is not without questions. Northern states and states like Hawaii receive high scores. As these states share no border with Mexico, they may simply not be prone to illegal, unskilled immigration. Therefore, the indicator could implicitly measure the effect of (illegal) immigration, not only knowledge workers inflows.[174]

- **Manufacturing value-added,** defined as the percentage of a state's manufacturing workforce employed in sectors in which the value-added

[174] All states sharing a border with Mexico rank below 32 and receive scores below the US average. If California would not be included, all states would rank in the forties.

per production hour worked is above – at least by ten per cent – the sector's national average. This indicates where productivity is higher and where investments in new machinery could be higher. Therefore, the relation to the theoretical framework of the index is clear. Looking at the ranking, it seems that states with concentrations in certain industries or even with one large employer – Boeing in the case of Washington – tend to rank higher. The authors also assume that such industries are either capital-intensive or produce technically-complex goods. As already discussed, Krugman (1994) found no evidence for the latter assumption.

- **High-wage traded services,** defined as the share of employment in traded service sectors in which the average wage is above the national median[175] for traded services. The authors assume that under the New Economy services are growing and that the IT improvements allow for additional services to be traded to outside regions that in former times were bound locally, such as banking or book selling. While it is clear that IT now allows for trading with distant regions, it is not clear that the growth in services goes back to the New Economy, as the share of services increased even before the 1990s and 1980s. The indicator is in line with the overall concept and indicates new business possibilities as well as undergoing transformations in the states.

Globalization captures how the economy in general is becoming more global due to new technological possibilities and other transformations. The report here follows an ability to earn and the ability to attract view.

- **Export focus of manufacturing and services,** defined as the value of exports per manufacturing and service worker. This indicator should stand for the interdependencies in the New Economy and new business possibilities for selling goods and services abroad, using new technology. While this relates to the overall concept, the importance of exports in

175 There is no information on why the median is applied in this case and not the average as for manufacturing value-added.

general is not that clear. Coming back to export base theory or the cluster concept, it is clear that exports are the main source of higher wages. Looking at the literature, authors like Krugman (1994; 1996) doubt that exports are really that important for an economy.[176] The other issues are definitional or measuring issues. It is not explained why the authors do analyse states and then only take into account a state's export to foreign countries but not to other US regions. From a state's perspective, both are exports. Coming back to measuring exports, one can see that services are not included to the same extent as manufacturing. But as the New Economy is also about a shift to services, this would be of major importance. The author states that this is due to data limitations. This clearly limits the explanatory power of the indicator.

- **Foreign direct investments,** defined as the percentage of each state's workforce employed by foreign companies. States on top of the ranking have a higher share of workers paid by foreign companies. It can be doubted if such a ranking is meaningful in general, as this would discriminate regions with a strong 'endogenous' base. Keeping in mind the theoretical framework, this indicator can function as a measure of interdependency and integration in the global value-chain. Looking at the numbers, it could be seen that the importance of foreign companies is not that high, with an average of around three per cent of the workforce employed and the highest share being 5.25%. This is why it must be doubted if this indicator is meaningful, as in every state more than 94% of all workers are employed by home companies.

- **Package exports,** measured as the number of UPS packages exported per worker. While this is a creative way of capturing integration in the global economy and export orientation, the indicator and its underlying rationale are irritating. The authors write that "[i]nternational trade in services [...] has increased significantly in the last decade" (Atkinson/Correa 2007: 30), but then move on to take into account UPS packages, surely not containing packed services. Packages could be a

176 Of course this is not to say that exports are not important at all.

trace left by services, but this could also be the case for letters. Of course one would have to check against packages carried by other parcel services. The irritation also stems from another fact: if packages are a sign of service exports there should be a relation to the export focus. But this is not the case. The correlation – as stated by the authors – is at -0.01. Of the ten top-performers in this field, only two are also top-performers in the export focus indicator. Several explanations for this exist –from private packages sent, over the influence of foreign-owned companies' headquarters to sending low-value goods. Therefore, the value of the indicator must be doubted.

Economic dynamism captures the dynamism affecting the states with six indicators. The report, therefore, follows an ability to adjust and the ability to innovate view.

- **'Gazelle' jobs,** measured as jobs in gazelle companies (firms with annual sales revenue that has grown 20 per cent or more for four straight years) as a share of total employment. Such an indicator is a clear measure of dynamism at first sight. The only issue could be the fact that the authors count the number of jobs. This means that those companies are favoured that need a lot of employees for their business. Especially in the case of high-tech companies, the number of jobs created in early stages may not be that high before being able to fully market the business idea. After all, the indicator can be seen as a meaningful one and in line with the overall concept.

- **Job churning,** defined as the number of new start-ups and business failures, combined, as a share of the total firms in each state. This means the more failures a state would experience, the higher the rank would be. This is at least surprising as normally one would see rankings placing those regions on top with a low level of business failures. This is done as the authors want to capture dynamism and not employment effects or other characteristics. Although this may be an indicator of dynamism, the

value of this indicator must be doubted and policy-makers may not want to join the 'top performer' in this area.

- **Fastest growing firms,** defined as the number of Deloitte Technology Fast 500 and Inc. 500 firms as a share of total firms. This is a similar indicator to the 'Gazelle' firms as both measure growth of fast-growing firms. The fastest growing firms as defined by Deloitte and Inc. are those with a revenue growth of at least 200 % over four years. The authors simply take the number of firms incorporated within a certain state and divide this by the total number of firms in the state. The problem lies in the original list of the two original rankings. For to be in the Inc. 500, a company with more than 600,000 USD in the base year has to apply, while for being part of the Deloitte Technology Fast 500, firms must have current revenues of more than 5m USD and are picked by the team. This means that many companies not applying for the Inc. 500 will not be part of the ranking, even though they grow fast enough. This limits the scope of the indicator. In addition to this, the indicator favours small states with a relatively small base of firms as the denominator is based on the total number of firms in a state.

- **Initial public offerings,** a weighted measure of the number and value of initial public stock offerings of companies as a share of total worker earnings. This composite indicator is based by adding up the figures over a three years period with a weight of 0.70 put on the number of IPOs and a weight of 0.30 put on the value of the IPOs. Again, one can only speculate why worker earnings are taken as the denominator. For the indicator in general, only 'official' deals of public limited companies (PLC) are taken into account. This limits the explanatory power of the indicator if many companies grow fast and are successful without going public.

- **Entrepreneurial activity,** measured by the adjusted number of entrepreneurs starting new businesses. This is an indicator from another study of the Kauffman Foundation, the Kauffman State Index of Entrepreneurial Activity. This measures all new firms as a share of total adult population of a state. The results are adjusted to take into account

fast growing environments where more opportunities exist. This is a meaningful measure of dynamism, in line with the overall concept. Details on the kind of data gathering of the Kauffmann Foundation's index would be good to be able to see if this is without biases.

- **Inventor patents,** captured by the number of independent inventor patents per 1000 people. The issues have already been discussed in the WCY section and the WKCI section. Issues include the value of patents, problems arising from disclosing information for patenting and the fundamental critique of innovation as an evolutionary process with incremental changes, not patentable.

Digital economy captures the characteristics of a digital society in private and business. Here, the focus lies on the ability to adjust and the ability to innovate view.

- **Online population,** defined as internet users as a share of the population: while it is useful to know how many people are online, the reasons for this can be completely different. This could range from online-gaming to gambling, emailing, adult entertainment, chatting and dating. Of course, all these activities need some economic transactions, leading to business opportunities. The report here assumes that the more people are online, the more opportunities exist. This is in line with the underlying concept, although the relation to competitiveness is vague.

- **Internet domain names,** measured as the number of internet domain names (.com, .net, and .org) per firm. This could capture online business, but still leaves aside those many companies that set up 'local' web-sites for their customers abroad, e.g., .nl or .fr, not counting to the score. This effect is not mentioned in the report and may bias results. Besides this, one would have to look at why so many web-sites have been registered and what exactly businesses do with their web-sites. Registering a number of web-sites could have reasons beyond the obvious, such as 'occupying' addresses for limiting possible competition. It could also be the case that a

company may have just one web site where all the traffic is channelled. To cite the authors, "It is not entirely clear what drives the number of domain name registrations in a state" (Atkinson/Correa 2007: 40). Why they did include the indicator anyway is an open question.

- **Technology in schools,** a weighted measure of three factors measuring computer and internet use in schools. As pointed out earlier, it is not clear if more technology helps in school as the kind of teaching also has to change to fully utilise potential gains. But, as evidence suggests some positive effects, e.g., on literacy (McKenzie 2002), this indicator can be included, especially if one simply wants to measure the spread of such technologies. This is why this indicator – and the three measures behind – is in line with the overall concept.

- **E-government,** a measure of the utilisation of digital technologies in state governments. The authors see three positive effects from e-government: cost savings, service quality increases and fostering of new technology among the residents. The first may be clear, while it is unclear how service quality will increase by using the internet. It could have to do with the fact that people can do things from home and whenever they want to as well as perhaps experience faster replies. The fostering of new technologies may be unrealistic. It could also be logic to conclude that if people have access to the internet, they can use e-government resources, not the other way round. The exact effects are not yet clear and data is not gathered concisely (Dada 2006; Lonti/Woods 2008: 11). If one simply wants to measure the penetration of a new technology in the governmental area, this could be a valid indicator. If this relates to higher competitiveness remains an open question as this would also be dependent on the overall quality of public services and the bureaucratic burdens, both on- and off-line.

- **Online agriculture,** measuring the percentage of farmers with Internet access and using computers for business: this indicator is a composite score of access and utilisation of computers and internet. The authors see this as an indicator on how far the New Economy influences even the most

traditional industries. This is in line with the assumption that the New Economy will transform society. The value from a competitiveness standpoint remains unclear.

- **Broadband telecommunications,** a weighted measure of the deployment of residential and business broadband lines. It is a composite score of business broadband access – receiving a weight of 2.0 – and private broadband access, receiving a weight of 1.0. Just as in the case of the online population, one would have to find out the main motivation why people chose broadband. Without knowing more about the motives, it is of no value. In the longer run, one will ultimately see a convergence towards a number close to 100%, just like in the case of land lines. Then, explanatory power would be limited. Until then, it could be an indicator of possible business opportunities but with perhaps only marginal differences on top of the rank.

Innovation capacity captures how effectively capital and new ideas are utilised, and how innovations are embraced. This clearly follows the ability to innovate view.

- **High-tech jobs,** defined as jobs in electronics manufacturing, software and computer-related services, telecommunications, and biomedical industries as a share of total employment. This indicator is included as high-tech jobs are seen as the key driver of innovation. Besides the issues mentioned above in the WKCI section, the authors admit that "the high-tech sector does not add a disproportionate number of jobs" (Atkinson/Correa 2007: 46). The ranking is built on the number of jobs in high-tech, which is not consistent with this statement. In addition, high-tech jobs are also included as they pay high wages. The average wages of high-tech-jobs are then compared with the average of all jobs in the USA. But this is misleading as one should control for education and include only such jobs that need a comparable level of skills.

- **Scientists and engineers,** defined as scientists and engineers as a percentage of the workforce. These two groups are included as they 'fuel' the engine of growth, i.e., technology and research-based companies (Atkinson/Correa 2007: 47). How the indicator is separated from the high-tech jobs indicator, is not included. The rationale itself seems logic as innovation can be a source of economic growth. If this means the more scientists, the better, remains an open question as the quality of these people also plays a major role, not to mention the role of chance.

- **Patents,** measured as the number of patents issued to companies or individuals per 1,000 workers. Patent issues have already been discussed.

- **Industry investment in R&D,** measured by industry-performed research and development as a percentage of total worker earnings. While R&D is at the heart of innovations and economic growth, it remains an open question why public investments are not taken into account, too. This is even more interesting as many universities and public institutions are at the forefront of R&D. Besides this, again it is not explained while total worker earnings are the denominator.

- **Venture capital,** defined as venture capital invested as a share of worker earnings. Financial capital definitely is a major limitation off funding and badly needed by new businesses. Despite this, venture capital is a special form of funding and not the only one. It is, therefore, necessary to also include such information in an index measuring economic transformation. The denominator is not the usual suspect GDP but worker earnings. It is not stated why this was done or which advantages the authors see. The rationale behind could be that – dependent on the level of worker earnings – more funding is needed to cover personnel costs. But this is only speculative. Another question, just like in the section on WKCI, would be to assess if the level of funding is sufficient. This is not addressed yet.

Implicit Weighting

Implicit weights do not seem to bias the index in general. There are four areas where there could be distortions. Firstly, under knowledge jobs, the indicator 'managerial, professional and technical jobs' and under innovation capacity the indicators 'high-tech jobs' and 'scientists and engineers' seem to incorporate scientists and engineers, putting emphasis on these two groups. Secondly, individual patents are first incorporated in the indicator 'inventor patents' under economic dynamism and later under 'patents' in the area of innovation capacity. This also puts more weight on the number of patents issued to individuals. Thirdly, IT jobs are counted under 'managerial, professional and technical jobs' as well as under 'IT jobs', again putting more weight on this kind of employment. Fourthly, fast growing companies are captured under 'Gazelle jobs' and under 'fast growing companies'. The difference here is that 'Gazelle jobs' capture jobs created and 'fast growing companies' just count the number of firms.

9.4.4 Index Construction

Rationale for Weights

In addition, these were weighted "according to their relative importance and so that closely correlated indicators do not bias the results" (Atkinson 2007: 73). More details are not disclosed. Interestingly, the authors did change their opinion on the relative importance of the single indicators quite often, as can be seen below.

Table 41: Overview on weight changes from 1999 to 2007

Area	Indicator	1999	2002	2007
Knowledge Jobs		**2.50**	**3.25**	**4.50**
	Office Jobs	0.75		
	IT professionals		0.75	0.75
	Managerial, professional, technical jobs	0.75	0.75	0.75
	Workforce education	1.00	1.00	1.00
	Manufacturing workforce education		0.75	
	Immigration of knowledge workers			0.50
	Manufacturing value-added			0.75
	High-wage traded services			0.75
Globalization		**2.00**	**2.00**	**2.50**
	Export focus of manufacturing and services	1.00	1.00	1.00
	Foreign direct investments	1.00	1.00	1.00
	Package exports			0.50
Economic Dynamism		**3.00**	**3.00**	**4.25**
	Gazelle' jobs	1.00	1.00	1.00
	Job churning	1.00	1.00	0.75
	Fastest growing firms			0.50
	Initial public offerings	1.00	1.00	0.75
	Entrepreneurial activity			0.75
	Inventor patents			0.50
Digital Economy		**4.00**	**4.50**	**3.85**
	Classrooms with internet	0.33		
	Teachers with email	0.33		
	Teacher tech training	0.33		
	Online population	1.00	0.75	0.75
	Internet domain names	1.00	0.75	0.60
	Technology in schools		0.50	0.50
	E-Government	1.00	0.50	0.50
	Online agriculture		0.50	0.50
	Manufacturing and technology		0.50	
	Broadband telecommunications		1.00	1.00
Innovation Capacity		**4.00**	**4.00**	**4.00**
	High-tech jobs	0.75	0.75	0.75
	Scientists and engineers	0.75	0.75	0.75
	Patents	0.75	0.75	0.75
	Industry investment in R&D	0.75	0.75	1.00
	Venture capital	1.00	1.00	0.75

Source: Author's own, based on Atkinson et al (1999); Atkinson/Correa (2002; 2007)

Of the fifteen indicators included in all rankings, only eight do not change their weight over the years. If these changes are based on new findings and if so, on which grounds, is not disclosed. This leaves the impression of an arbitrary weighting scheme.

Index Aggregation

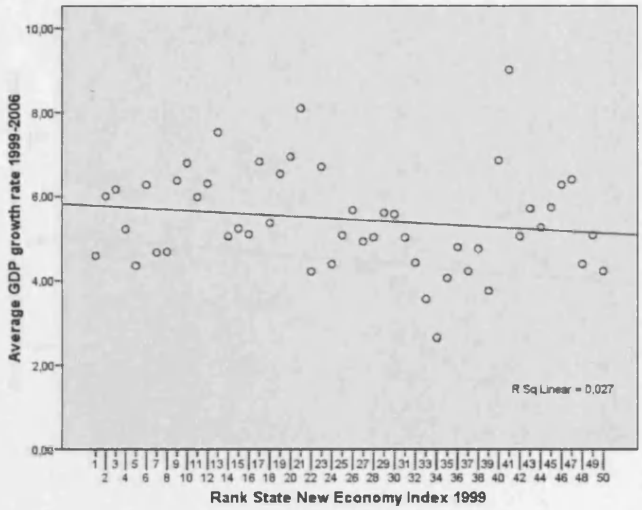
The index aggregation methodology did not change much over the three issues. The raw scores are first normalised with the help of standard deviations and the national mean, resulting in negative ('under-performing') and positive ('over-performing') scores relative to the mean. Then, ten points – six points in 1999 – are added to all scores to come up with positive scores.

These scores are then summed up to the sub-ranking, taking into account the weights assigned. The final score then is derived by the weighted sum of the five categories, divided by the highest score in each area of the sample. This means the final score is a percentage of the highest score achieved in each category and must be between 0 and 100%.

9.4.5 Predictive Quality

The analysis builds on the 1999 ranking results and looked at how they relate to GDP growth over the period of 1999 to 2006.

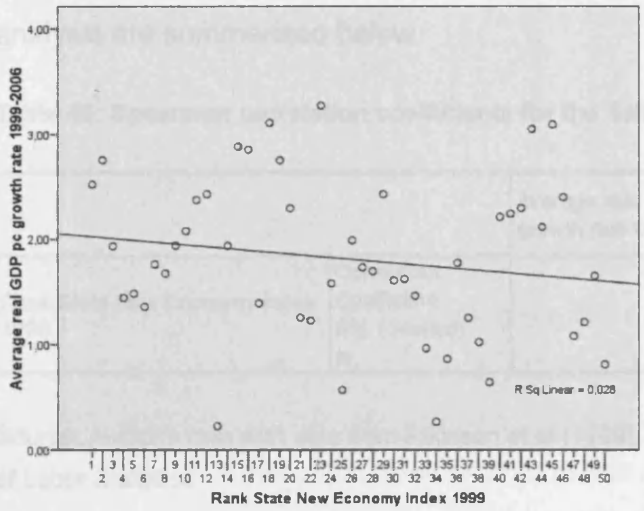
Figure 21: SNEI ranking results vs. GDP growth



Source: Author's own with data from Atkinson/Correa (2002) and Bureau of Economic Analysis

No clear tendency can be taken from the figure, but a look at the Spearman rank correlation shows that there is a slight non-significant negative correlation of -0.189 between the ranking results and real GDP growth over that period. This can be confirmed by looking at the relation with real GDP per capita over the 1999-2006 period.

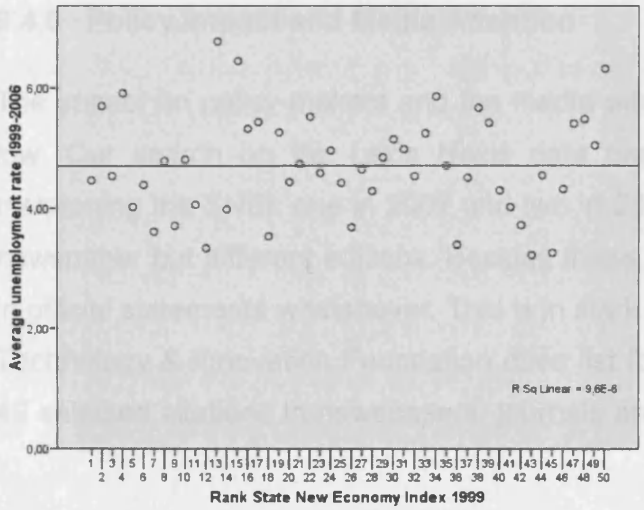
Figure 22: SNEI ranking results vs. GDP per capita growth



Source: Author's own with on data from Atkinson/Correa (2002) and Bureau of Economic Analysis

The rank correlation of ranking results and real GDP per capita growth is around the same (-0.191). For the 20 states with the lowest GSP in 1999, this correlation was stronger with -.298 and for the sample with the highest levels of GSP even at -.424 and significant at the five per cent level. If one additionally looks at the relation with unemployment, a similar picture is revealed.

Figure 23: SNEI ranking results vs. unemployment



Source: Author's own with data from Atkinson/Correa (2002) and Bureau of Labor Statistics

The ranking results are not a proxy for future unemployment; the correlation coefficient is next to zero (0.026) and not significant. The results of the correlation analysis are summarised below.

Table 42: Spearman correlation coefficients for the SNEI

		Average real GDP growth rate 01-06	Average real GDP growth rate pc 01-06	Average unemployment rate 01-06
Rank State New Economy Index 1999	Correlation Coefficient	-.189	-.191	.026
	Sig. (1-tailed)	.094	.092	.428
	N	50	50	50

Source: Author's own with data from Atkinson et al (1999), Bureau of Economic Analysis, Bureau of Labor Statistics

Interestingly, the results above do match the findings reported in the 2007 issue. The authors disclose a correlation of 0.440 for ranking results – measured as scores – and state per capita income between 1999 and 2005. This is in line with the findings, although the correlation found in this analysis is much weaker. Unfortunately, the authors do not include any information on the significance of that correlation.

9.4.6 Policy Impact and Media Attention

The impact on policy-makers and the media attention the index receives is very low. Our search on the Lexis Nexis data base found only three references mentioning the SNEI: one in 2007 and two in 2002, these two being in the same newspaper but different editions. Besides these, there were no references found in official statements whatsoever. This is in stark contrast to what The Information Technology & Innovation Foundation does list for media coverage. No less than 49 selected citations in newspapers, journals and other media are listed on-line.

This would mean one of the highest media coverage of all reports besides the WCY.[177]

9.5 Conclusion

The report is one of the not frequently updated ones and with a specific focus on the transformation of states in the New Economy. Therefore, the dimensions included are very narrow compared to 'catch-all indices'. The indicators always centre on economic transformation and dynamism as well as knowledge creation and innovation. It could be that such a ranking can provide more insights and deeper analysis than one with a vast number of indices. But it is also seen that the ranking results cannot function as a proxy for future growth. One would expect that states at the top of economic transformation would see higher growth rates, but there is a rather weak correlation of around -0.190. This correlation is weak as well as insignificant. With respect to unemployment also, the same can be said. Here, the correlation coefficient is not only lower but next to zero (0.026) and still not significant.

An interesting point worth noting is the fact that the authors of the first report wrote that "[i]t is not intended to rank state business climates, economic performance, or economic development capacities or policies in the *traditional sense* [emphasis added]" (Atkinson et al 1999: 4). Of course, the authors rank states later in the report, e.g., according to their policies with respect to e-government or technology in schools. This is perhaps why this statement was only included in the first report. In addition to this, the authors also include phrases like winners, just like in the traditional sense of ranking: "States with the most innovative, customer-oriented institutions (businesses, non-profits, and governments alike) will be the winners in the New Economy" (Atkinson et al 1999: 39). The report also is full of best cases and exemplary characteristics, just as a typical ranking aiming at benchmarking. It cannot be seen what should be 'non-traditional' besides the New Economy phenomenon.

177 Unfortunately there is no official information on the media coverage from the other indices. The Lexis Nexis data base seems not to be sufficient enough.

This is perhaps adding to the impression that the authors aim at giving an overview of the state of economic transformation in the states, but at the same time refer to state competitiveness.

In general, the report must be handled with care. The authors have in mind a micro-economic definition, centring on firm performance, even though officially they just want to disclose the current state of economic transformation. It therefore presents a broad snapshot of the spread of New Economy phenomena, picturing economic transformation. When looking at it from a policy-maker perspective, it must be concluded that, firstly, the construction of the ranking as well as the indicators applied change very often so that comparability is limited. Secondly, predictive quality with respect to GDP and unemployment is low.

Below are the results of the analysis in the form of a summary table:

Table 43: Summary evaluation table SNEI

Criteria	SNEI
Overall clarity and transparency: Information given on ...	
... original data	sources
... transformed data	o
... theoretical framework	o
... competitiveness concept and underlying definitions	-
... sources for data	+
... exact indicator definition	+
... exact indicator units	+
... normalisation and transformation technique	+
... aggregation technique applied	+
... exact weights applied	+
Comparability	
Index construction does not change too often	-
Indicators do not change too often	-
Sources and partners do not change too often	o
Indicators are similarly defined, i.e. use the same sources	+
Data reflect different entity sizes	+
Data is not biased by inflationary effects	+
If applicable: Survey results are comparable, i.e. based on a sufficient number of respondents, take into account cultural biases, and the 'right' people are interviewed	
Indicator choice	
Indicators correspond to theoretical framework	+
No implicit weights applied	o
Index construction evaluation	
Rationale for weights disclosed	+
Meaningfull ranking orders (in general)	+
Standardisation and normalisation do not bias results	+
Aggregation does not bias results	+
Robustness tests conducted and included	-
Predictive quality evaluation	
with respect to higher GDP per capita growth rates	o/-
with respect to lower unemployment rates	-
if necessary: with respect to higher employment	
Policy impact and media attention	
Citations in official political statements	low*
Citations in LexisNexis data base	low*

Evaluation is done without using fixed and pre-defined grades.
'+' stands for positive evaluation, 'o' for a neutral evaluation, '-' for a negative evaluation; Information in brackets indicate non-substantial findings, i.e. based on small sample size; ? indicates missing information

* The official media coverage as monitored by the authors lists 49 references.

10 State Competitiveness Report

10.1 Background information

The Beacon Hill Institute at Suffolk University in Boston first published the State Competitiveness Report (SCR) in 2001. It was later renamed the Metro Area and State Competitiveness Report as from 2002 on it also included a ranking of the 50 largest metropolitan areas. Since 2006, both rankings are published separately.

The first issue in 2001 was constructed by Jonathan Haughton and Vadym Slobodyanyuk, greatly informed by the work of Michael Porter. The aim was to spark "a needed debate on why some states are far more competitive than others and why some have a worse, or better, reputation than they deserve." (Haughton/Slobodynanyuk 2001: 1).

The Beacon Hill Institute, founded in 1991 as a research institution, is linked with the Department of Economics at Suffolk University in Boston. Its focus lies on providing economic and statistical models for policy analysis. According to its web-site, it is "grounded in the principles of limited government, fiscal responsibility and free markets [...] to examine and influence public policy".

Until 2006, every report contained a chapter on the discussion of state competitiveness and a comparison of existing reports for measuring competitiveness. This comparison is done with respect to the number of variables and areas covered. Since 2007, the meaning of state competitiveness still forms part of the report, but not to the same extent. The main part of the report is the section with detailed tables for all states in the form of a SWOT analysis with advantages on the left and disadvantages on the right. Under these two headings, all sub-ranking results and the rank in all the variables are listed.

The report is available as a downloadable file for free; the current 2008 version was published on 19 November 2008.

10.2 Theoretical Framework

Definition of Competitiveness

In the view of the editors, "a state is competitive if it has in place the policies and conditions that ensure and sustain a high level of per capita income and its continued growth" (Haughton et al 2008: 5). This stresses out the view of competitiveness as an aggregate of microeconomic firm performance limited by the business environment. This is what the authors see as the most important determinant of regional prosperity: "The states of the United States all face the same macroeconomic conditions set at the top – national fiscal, monetary and trade policy; where they differ from one another is in their microeconomic policies such as tax and regulatory regimes, their provision and emphasis on education, and their attractiveness to business. These policies matter." (Haughton et al 2008: 7)

The authors also claim that they are inspired by Porter's view as expressed in the Global Competitiveness Report (see Porter 2000). Therefore, they build their index on Porter's diamond and come up with nine groups of indicators. This is one of the rare cases where an index is firmly grounded in one concept of competitiveness: Porter's competitive advantage approach with an additional emphasis on the attractiveness of a region.

Policy Advice

The authors give no concrete advice but rather write that "[A] state needs to be able to attract and incubate new businesses and to provide an environment that is conducive to the growth of existing firms" (Haughton/Slobodynanyuk 2001: 5). This means to focus on the business environment without going into detail. The authors instead suggest that every policy-maker should read the report carefully and with respect to the own state's strengths and weaknesses, and then focus on what they see as the most important characteristics as policy-makers "are in a better position to identify what needs to be done, in order of priority, to improve the position of their states" (Haughton et al 2008: 10).

Conclusion on Theoretical Framework

As the ultimate measure, the authors see higher real gross state product per capita – and associated with this – personal income as the outcome of higher competitiveness. This even leads the authors to quantify the consequences of score changes with the help of a regression analysis so that policy-makers can judge the consequences of their own policy measures. This leads to advice such as in the case of California 2001. An increase in three fields – infrastructure, fiscal policy and human resources – to the national average would lead to an increase of personal income in the state of around 550 USD. It is clear that such black-white advice must be doubted.

10.3 Deconstruction

The State Competitiveness Index 2008 is built up on eight sub-indices, each with a different number of indicators to form the sub-index ranking. The total number of indicators increased from 38 in 2001 to 43 in 2007. These indicators are from different sources and solely based on 'hard' data. In addition to these, in earlier reports an opinion survey for eight states was included but did not form part of the overall ranking.

The following table lists all variables included in the reports since 2001. The indicators are displayed together with the assumed influence on regional competitiveness being negative (-) or positive (+) as stated by the authors. Changes in indicator definitions are ear-marked 'o'.

Table 44: Variables included in the SCR indices since 2001

Indicator	2001	2002	2003	2004	2005	2006	2007	2008
State tax revenues / gross state product (-)	x	x	x					
Workers' compensation collections/employment (-)	x	x	x					
Bond rating (composite of S&P's and Moody's, scale 1-25) (+)	x	x	x	x	x	x	x	x
Budget surplus as % of gross state product (+)	x		x	x	x	x	x	x
Average benefit for first payment for unemployed (-)	x		o	x	x	x	x	x
Reported crime per 100,000 inhabitants (-)	x		x					
% change in crime index, 1998-1999 (-)	x	x	x	x	x	x	x	x
Murders per 100,000 inhabitants (absolute or indexed) (-)	x	x	x	x	x	x	x	x
% of households with installed phones (+)	x		x	x	x	x	x	x
% of households with computers (+)	x	x	x					
% of households with internet access (+)	x	x	x					
Air passengers per capita (+)	x	x	x	x	x	x	x	x
Travel time to work (-)	x	x	x	x	x	x	x	x
Rental costs for 2-bedroom apartment (-)	x		o	x				
% of population without health insurance (-)	x	x	x	x	x	x	x	x
% of population aged 25 and over that graduated from high school (+) (2002 total population)	x	o	o	x	x	x	x	x
% of labour force represented by unions (-)	x	x	x	x	x	x	x	x
Unemployment rate (-)	x	x	x	x	x	x	x	x
% of population / students (since 2004) enrolled in degree-granting institutions (+)	x	x	x	o	x	x	x	x
% of adults in the labour force (+)	x	x	x	x	x	x	x	x
Infant mortality rate in deaths per 1,000 live births (-)	x	x	x	x	x	x	x	x
Non-federal physicians per 100,000 inhabitants (+)	x	x	x	x	x	x	x	x
% of population born abroad (+)	x	x	x	x	x	x	x	x
NSF funding for R&D per capita (+)	x		o					
NIH support to institutions in the state, per capita (+)	x	x	x	x	x	x	x	x
Patents per capita/per 100,000 inhabitants (+)	x	x	x	x	x	x	x	x
Science and engineering graduate students per capita (+)	x	x	x	x	x	x	x	x
Science and engineering degrees awarded per capita (+)	x		x	x	x	x	x	x
Scientists and engineers as % of labour force (+)	x	x	x	x	x	x	x	x
High-tech companies as % of companies in the state (+)	x		x					
Deposits in commercial banks and savings institutions, per capita (+)	x	x	x	x	x	x	x	x
Venture capital available per capita (+) (2002 denominator: GMP)	x	o	o	x	x	x	x	x
Exports per capita, $ (+)	x	x	x	x	x	x	x	x
Incoming foreign direct investment per capita, $ (+)	x		x	x	x	x	x	x
Employer firm births per capita (+)	x	x	x	x	x	x	x	x
Employer firm termination per capita (+)	x		x					
Toxic release inventory, on and off-site (-)	x	x	x	x	x	x	x	x
Electricity prices, USD/million british thermal units (-)	x	x	x	x	x	x	x	x
Academic R&D per $1,000 GSP (+)		o		o	x	x	x	x
State bond rating (+)		x						
Unemployment payments per unemployed worker (-)		o						
Violent crimes per 100,000 inhabitants (-)		x						
Thefts per 100,000 inhabitants (-)		x						
Mass transit availability (+)		x						
Median household gross rent (-)		o						
High school finishers as % of 18-year olds (+)		x						
High-tech payroll as % of total payroll (+)		x						
Cost of living (-)		x						
Cognetics entrepreneurial hot spot index (+)		x						
New publicly traded companies (+)		x						
Pollution standards index (-)		x						
Serious pollution days p.a. (-)		x						
State and local taxes per capita / income per capita (-)				x	x	x	x	x
Workers' compensation premium rates (-)				o	x	x	x	x
Full-time-equivalent state and local government employees per 100 residents (-)				x	x	x	x	x
Crime index per 100,000 inhabitants (-)				x	x	x	x	x
The BGA Integrity Index (+)				x	x	x	x	x
High-speed lines per 1000 inhabitants (+)				x	x	x	x	x
Median monthly housing costs (-)					x	x	x	x
% of students at or above proficient in mathematics, grade 4 public schools (+)				x	x	x	x	x
% of total wage and salary jobs in high technology industries(+)				x	x	x	x	
IPO (a weighted measure of the value and number of initial public stock offerings of companies as a share of Gross State Product) (+)				x	x	x	x	x
Minimum wage (-)				x	x	x	x	x

Source: Author's own based on Haughton et al (2008); Haughton/Sirin (2003; 2004); Haughton/Slobodynanyuk (2001); Tuerck et al (2006)

The structure and variables included in the 2008 report are displayed below,

Table 45: Variables included in the SCR 2008

Government and Fiscal Policy	State and local taxes per capita / income per capita(-)
	Workers' compensation premium rates (-)
	Bond rating (composite of S&P's and Moody's, scale 1-25) (+)
	Budget surplus as % of gross state product (+)
	Average benefit per first payment for unemployed (-)
	Full-time-equivalent state and local government employees per 100 residents (-)
Security	Crime index per 100,000 inhabitants (-)
	% Change in crime index, 2005-2006 (-)
	Murders index per 100,000 inhabitants (-)
	The BGA Integrity Index (+)
Infrastructure	% of households with installed phones (+)
	High-speed lines per 1000 (+)
	Air passengers per capita (+)
	Travel time to work (-)
	Electricity prices per million BTU (-)
	Median monthly housing costs (-)
Human Resources	% of population without health insurance (-)
	% of population aged 25 and over that graduated from high school (+)
	Unemployment rate, not seasonally adjusted (-)
	% of students enrolled in degree-granting institutions per 1000 (+)
	% of adults in the labor force (+)
	Infant mortality rate in deaths per 1,000 live births (-)
	Non-federal physicians per 100,000 inhabitants (+)
	% of students at or above proficient in mathematics, Grade 4 public schools (+)
Technology	Academic R&D per $1,000 GSP (+)
	NIH support to institutions in the state, per capita (+)
	Patents per 100,000 inhabitants (+)
	Science and engineering graduate students per 100,000 inhabitants (+)
	Science and engineering degrees awarded per 100,000 inhabitants (+)
	Scientists and engineers as % of labor force (+)
	Employment in high-tech industry as a % of total employment (+)
Business Incubation	Deposits in commercial banks and savings institutions, per capita (+)
	Venture capital available per capita (+)
	Employer firm births per 100,000 inhabitants (+)
	IPO (A weighted measure of the value and number of initial public Stock offerings of companies as a share of Gross State Product) (+)
	% of labor force that is represented by unions (-)
	Minimum wage (-)
Openness	Exports per capita, $ (+)
	Incoming foreign direct investment per capita, $ (+)
	% of population born abroad (+)
Environmental policy	Toxic release inventory, pounds/1000 sq. miles (-)
	Carbon emission per 1000 sq miles (-)
	Air quality (% good average days) (+)

Source: Haughton et al (2008)

The State Competitiveness Report is now evaluated with the help of the known framework.

10.4 Evaluation

10.4.1 Overall Clarity and Transparency

The report consists of two major sections: an introductory section with the overall findings and the methodology behind and the section with the findings for the 50 states. The main section of the report is the section with detailed tables for all states in the form of a balance sheet, with competitive advantages on the left and competitive disadvantages listed on the right. Under these two headings, all sub-ranking results and the rank in all the variables are listed. If a state's rank is below 21 it is listed as an advantage, if below 30 as a disadvantage. The raw data for the indicators are not included; what are provided are only the transformed index scores for every indicator. In addition, it is not stated how missing data are treated of if there are missing data. An important point is that in many cases a significant portion of the 43 variables are not included in the state overviews. This could simply mean the indicators are neither seen as an advantage nor a disadvantage or there are no data for these states. This important question should be answered within the report as well as the sources for all the data. Indeed, data sources have not been included since the 2003 report. And even then, the numbers do not add up to the 38 indicators as firstly only 36 sources for the indicators are included and secondly, one source is dated 2004 (rent for 2-bedroom apartment). In addition to this, the indicator 'incoming FDI per capita' was not included but only 'outgoing FDI per capita'. There is no information in the two indicators "percentage of households without health insurance' and 'NSF funding for R&D per capita'. Readers would expect more accurate information.

Coming to the introductory section, a lot of information is missing. The report does not list all variables and the state values but only the sub-index scores and ranks. It is, therefore, not possible to gain a deeper look at the original or even transformed values to verify certain points or to simply re-construct the index. The rationale for the inclusion of certain indicators, the weighting and the structure, are not sufficiently explained. To conclude, overall clarity and transparency is low and many open questions remain.

10.4.2 Comparability

Comparability over Time

To be able to compare ranking results over time, changes in the structure of the ranking should be kept to a minimum. The following table gives an overview of the changing structure of the reports since 2001.

Table 46: Main characteristics of the SCR indices since 2001

Year	# of indicators applied	# of new indicators	# changes in indicator definition	# of deleted indicators	# of sub-categories	# of entities
2001	38	-	-	-	9	50
2002	42	14	5	10	9	100 (50 Metro Areas)
2003	38	10	5	14	9	100 (50 Metro Areas)
2004	42	7	3	3	8	100 (50 Metro Areas)
2005	42	1	0	1	8	100 (50 Metro Areas)
2006	42	0	0	0	8	50
2007	42	0	0	0	8	50
2008	43	1	0	0	8	50

Note: Change in indicators is a subset of new indicators if the 'new indicator' catches a similar characteristic but with a different definition, such as median monthly housing costs v median monthly gross rent.

Source: Author's own based on Haughton et al (2008); Haughton/Sirin (2003; 2004); Haughton/Slobodynanyuk (2001); Tuerck et al (2006)

The changes made in the structure of the report make it hard to compare results over time as the number of indicators has gone up and down by five indicators over time, with the new high-point in 2008 with 43 indicators. In relative terms this means a change of more than 10% for the total number of indicators. Even more importantly, in some years around a half of all the indicators were changed, i.e., deleted or included. The most obvious changes happened from 2002 to 2004, with the outstanding issue of 2002. Since 2004, changes are on a much lower level with no changes in 2006 and 2007. This makes it hard to compare results over time.

The changes in the number of entities do not affect comparability, as metro areas and states are ranked separately.

Comparability of Data

It first has to be stated that since 2003, no information on the data sources and the exact indicator definitions has been included. It is, therefore, not possible to evaluate data comparability in full. As the index is ranking only US states, one would assume that only US data sources are taken into account.[178] This then would mean that definitional differences and data collection errors should be kept to a minimum, although this cannot be ruled out. When it comes to time lags in data collection, it is also made use of the 2003 index. Of the 38 indicators in the report, 16 are from 2002, eleven from 2001, four from 2000, three from 1999-00, one from 1999 and one from 2004.[179] This is a rather long time span of six years. This does not influence comparability of data as all data for the indicators come from the same year, but from a standpoint of overall data quality and meaningfulness it must be questioned if an index for 2003 with less than a half of the indicators from 2002 may be labelled up-to date.

178 This is what could be witnessed in the 2003 report.

179 There are only 36 indicators included in the data charts section.

Comparison of Ranking Results

The ranking results since the 2001 issue are compared below.

Table 47: SCR ranking results in comparison

US state	Rank 2001	Rank 2002	Rank 2003	Rank 2004	Rank 2005	Rank 2006	Rank 2007	Rank 2008	Mean	Range
Alabama	45	42	43	47	43	47	48	48	45.4	6
Alaska	22	34	25	27	9	14	13	24	21.0	25
Arizona	41	42	44	32	22	16	19	22	29.8	28
Arkansas	47	49	47	45	48	46	46	43	46.4	6
California	10	16	19	22	26	20	24	25	20.3	16
Colorado	6	4	11	5	6	4	3	4	5.4	8
Connecticut	8	5	9	15	21	24	25	21	16.0	20
Delaware	1	1	1	18	23	21	27	19	13.9	26
Florida	36	39	36	29	28	27	33	32	32.5	12
Georgia	35	40	34	25	27	30	31	37	32.4	15
Hawaii	43	45	48	46	45	42	40	45	44.3	8
Idaho	12	11	14	14	14	6	5	5	10.1	9
Illinois	39	33	40	39	35	33	36	33	36.0	7
Indiana	27	20	30	42	46	45	44	36	36.3	26
Iowa	16	12	16	17	15	18	18	12	15.5	6
Kansas	23	14	17	10	13	17	17	18	16.1	13
Kentucky	38	37	35	38	39	39	39	38	37.9	4
Louisiana	48	47	45	49	50	48	50	49	48.3	5
Maine	19	24	27	36	38	36	35	26	30.1	19
Maryland	20	19	18	19	10	23	23	28	20.0	18
Massachusetts	2	2	2	1	1	1	2	1	1.5	1
Michigan	26	30	23	24	30	34	41	30	29.8	18
Minnesota	9	9	7	4	7	9	6	7	7.3	5
Mississippi	50	50	50	50	49	50	49	50	49.8	1
Missouri	24	20	24	20	17	31	26	29	23.9	14
Montana	31	31	21	28	33	28	15	10	24.6	23
Nebraska	15	17	15	6	8	11	11	14	12.1	11

US state	Rank 2001	Rank 2002	Rank 2003	Rank 2004	Rank 2005	Rank 2006	Rank 2007	Rank 2008	Mean	Range
Nevada	46	46	46	37	34	29	28	15	35.1	31
New Hampshire	7	8	8	7	3	3	9	17	7.8	14
New Jersey	29	26	26	44	36	43	43	42	36.1	18
New Mexico	42	41	37	33	44	38	29	34	37.3	15
New York	34	32	31	34	40	35	38	35	34.9	9
North Carolina	28	35	33	26	25	26	30	27	28.8	10
North Dakota	21	18	28	11	5	5	4	3	11.9	25
Ohio	32	36	38	43	42	44	45	44	40.5	13
Oklahoma	44	44	42	35	41	40	32	40	39.8	12
Oregon	13	10	13	16	19	15	14	8	13.5	11
Pennsylvania	37	27	29	30	32	32	34	39	32.5	12
Rhode Island	25	29	22	31	31	25	21	31	26.9	10
South Carolina	40	38	41	40	29	37	42	46	39.1	17
South Dakota	17	23	10	23	12	8	8	11	14.0	15
Tennessee	30	22	39	41	37	41	37	41	36.0	19
Texas	33	28	32	21	20	22	20	23	24.9	13
Utah	11	13	4	2	2	2	1	2	4.6	12
Vermont	5	7	6	8	18	12	12	13	10.1	13
Virginia	14	15	12	9	11	10	16	16	12.9	7
Washington	4	3	5	3	4	13	7	6	5.6	10
West Virginia	49	48	49	48	47	49	47	47	48.0	2
Wisconsin	18	25	20	13	16	19	22	20	19.1	12
Wyoming	3	6	3	12	24	7	10	9	9.3	21

Source: Author's own based on Haughton et al (2008); Haughton/Sirin (2003; 2004); Haughton/Slobodynanyuk (2001); Tuerck et al (2006)

As can be seen from these tables, there is a lot of change in the ranking results with a range of 13.4 on average and a standard deviation of 7.2. None of the states changes its rank over time, with a concentration of rank ranges in the distribution between 11 and 19 ranks range.

10.4.3 Indicator Choice

Relation to Theoretical Framework

As the ranking is set within a clear framework, one can now evaluate how the chosen indicators relate to the framework and if they are meaningful.

In the 2001 report, the authors included information on why a specific indicator is included. In the 2008 report none of this background information is included; the 2006 report even has no overview table on the indicators applied. Even when information is provided, this reveals not more than just the rough idea behind. This can be illustrated with the case of the share of high-tech companies, 2007 defined as % of total wage and salary jobs in high technology industries. In 2001, there is just the assumptive statement that it is better to have a strong high-tech sector (Haughton/Slobodyanyuk 2001: 14). For the share of foreign-born inhabitants, it is assumed that this is a proxy for motivation with no further explanation. These issues come together with mixing of outcome variables and input variables in the ranking (Fisher 2005).

Now, the single indicators of the 2008 edition of the report are discussed. It has to be noted that as no information is disclosed on the single indicators and the rationale behind, this only relies on the information given in the 2001 edition as in that issue, indicators are explained in more detail. This could only be done for indicators that are part of the 2001 and 2008 issues.

Government and Fiscal Policy should reflect that businesses are attracted by moderate taxes and fiscal discipline. This clearly follows the ability to attract view and also refers to the price-competitiveness concept. The indicators included are:

- **State and local taxes per capita / income per capita (-):** The authors hypothesise that the lower the taxes, the higher regional competitiveness would be. This is clearly in line with the overall framework for the index but evidence on the relation of taxes and competitiveness – measured with GPD for example – is not that clear (Fisher 2005). For example, the WEF's ranking was revised in 2003 to reflect that higher taxes and higher

shares of the state are only negative if this money is wasted (Sala-i-Martin 2004: xiii) but can be beneficiary if money is well-invested, e.g., for infrastructure or education. The authors also state that besides companies, workers will also be attracted by lower taxes. This would mean that population changes in those states with lower taxes should be higher. This was tested with a simple correlation analysis to test the relation of the 1990 to 2000 population change and the average marginal income tax rate between 1989 and 1999.[180] As can be seen, the relation is negative, indicating that lower taxes are associated with higher population changes, but the relation – measured with Pearson's correlation coefficient is not that strong with 0.259, although significant on the five per cent level. These findings were tested with a sample including states with less than 2m inhabitants as well as with a sample of states between 2m and 10m inhabitants. The results do neither support the authors' assumption nor the opposite view.[181]

- **Workers' compensation premium rates (-):** Again, this indicator is clearly based on the ability to sell view with emphasis on price-based competitiveness. Of course, employers will take into account salaries and compensations as a cost component for the overall calculation. But social security has to be paid, one way or the other. Even more, social security can be viewed as a supportive characteristic for competitiveness as people could be higher motivated than without a social security system in place. This indicator is in line with the overall framework as this puts emphasis on the supply-side and cost arguments.

- **Bond rating (composite of S&P's and Moody's, scale 1-25) (+):** This is an interesting argument: The authors state that businesses are more likely to be attracted and will have better growth perspectives if the bond rating for the state will be higher. Here, a problem of causality comes into play:

180 Data was taken from the 2002 Economic Freedom of North America Report and the Census Bureau.

181 For the 'middle-sized' state sample (between 2m and 10m inhabitants), the correlation coefficient then goes down to -0.085 and is no longer significant. The mean marginal income tax rate for smaller states (below 2m inhabitants) is at 5.49, compared to 5.21 for all states. Spearman correlation coefficient for the small states sample is at -0.332, with no significance.

Bond ratings will be higher if the tax base is robust and economic outlooks positive. Rating agencies, therefore, take into account the financial strengths of the corporations within an entity as they provide jobs and pay taxes. One, therefore, could also state that higher bond ratings are an outcome of past competitiveness and do not indicate future competitiveness. To conclude with Fisher (2005: 32): "the direction of causality is ambiguous."

- **Budget surplus as percentage of gross state product (+):** Problems with causality can also be witnessed for this indicator as budget surpluses are an outcome of past competitiveness or economic success in the state. It does not say anything about future success. The only point could be that budget surpluses signal the possibility that taxes will be more likely to be lowered than increased, which is what the authors 2001 wrote. But the effect for companies will be dependent on the kind of taxes a state levies: direct or indirect taxes, corporate or private taxes. This should be taken into account. Besides this, budget surpluses could also be a burden as more groups could be lobbying for funding.

- **Average benefit per first payment for unemployed (-):** It is assumed that higher benefits increase business costs as the reservation costs will be higher. A typical assumption going back to the cost-arguments of the ability to sell under price competition. As was discussed above, this assumption only holds true if elasticity is greater than one, i.e., demand directly responds to price changes. This cannot be verified. In addition to this, business costs always have to be viewed with respect to productivity. An additional point may also be that higher payments for the unemployed could actually lead to higher worker motivation. One only has to point to the Danish 'flexicurity' unemployment system with its high benefits for the unemployed and the high pressure on the jobless for finding new jobs.

- **Full-time-equivalent state and local government employees per 100 residents (-):** The indicator may be intended to measure the share of the state or a state's overhead. Besides the assumption that there is only 'bad'

overhead,[182] this indicator proves a burden for the smaller states. This can be illustrated with the following example. Assume every state has to have a governor and two senators to be able to constitute a state. No other overhead exists; the states operate at the best possible efficiency. Now, take the numbers for say, California (roughly 34m inhabitants), Iowa (around 3m inhabitants), Rhode Island (roughly 1m inhabitants), South Carolina (around 4m inhabitants) and Texas (roughly 21m inhabitants). This yields the following scores for the single state:

Table 48: Exemplary scores for state employees per 1m residents

State	Population	Employees	Employees per 1m residents score	Rank (lowest first)
California	34m	3	0.09	1
Iowa	3m	3	1.00	4
Rhode Island	1m	3	3.00	5
South Carolina	4	3	0.75	3
Texas	21m	3	0.14	2

Source: Author's own based on data from the Bureau of Economic Analysis

The example illustrates that even when all states operate extremely efficiently, smaller states would have no chance for climbing up the ranks. This goes back to the point that states cannot operate without any employees, i.e., values cannot go down to zero. Therefore, the indicator – or more precisely its construction – only makes sense, if entities with similar sizes are compared or if e.g. the number of 'minimum necessary employees' are excluded from the analysis. In its current version, the indicator construction makes no sense, although it is in line with the overall framework, emphasising a small share of the state.

182 As Fisher (2005) noted, this includes kindergarten teachers and snow plough drivers.

Security is included as states will be more attractive when crime rates are low and officials can be trusted. This takes into account that institutions, trust and quality of life play an important role in life. It can be part of the ability to attract view, if 'soft' factors are taken into account. In addition, trust and institutions are also incorporated in Porter's (1990) cluster approach. The indicators are:

- **Crime index per 100,000 inhabitants (-), % change in crime index, 2005-2006 (-) and murders index per 100,000 inhabitants (-):** These indicators are included as high crime rate makes it more difficult to attract workers from out of the state. Of course, public safety will play a role in a worker's decision to move to a new employer. It is, therefore, consistent with the framework to include such an indicator. The problem is to assess how important it really is and to separate perception of crime and actual crime rates. As research suggests, "[p]erceptions of crime were more important in understanding satisfaction with the area than area crime rates and individual victimisation" (Christmann/Rogerson 2004: 4). Therefore, measuring official crime rates may not be sufficient, but perhaps one of the more easily available indicators.

- **The BGA Integrity Index (+):** The Better Government Association (BGA) integrity index is a component index consisting of 50 indicators weighted equally, measuring "the relative strength of existing laws that promote integrity in each of the fifty states" (BGA 2002: 2). The underlying hypothesis is that states with higher rankings are more trustworthy, having higher integrity businesses can trust on. This could be an important source for competitiveness as well as development in general as businesses favour reliable and stable business environments, reducing uncertainty. It is, therefore, consistent with the overall framework. It has to be added that there might be other indicators for integrity or corruption the authors should look for.

Infrastructure refers to the more basic things of a society. The authors here want to include how easy commuting is, if households are on-line and how expensive housing and electricity are. The latter two refer to the cost-arguments, while the

other indicators are seen as indicating accessibility. This could refer to the competitive advantage approach, although vaguely. The indicators in detail:

- **Percentage of households with installed phones (+):** "Access to phones is a measure of the accessibility of households to each other and to business" (Haughton/Slobodyanyuk 2001: 13). While it could be interesting to look at the accessibility, it is not clear why competitiveness in an area should be higher if people explicitly make their calls over installed phones instead of using their mobiles or IP phones.[183] In fact most business people these days will use their mobiles instead of their installed phones. In a time of 3G, this measure, therefore, seems a little bit out-moded. In addition, this could be a measure causing competitiveness as phone lines could drive economic growth and foster participation, but it could also be the other way round: because of higher income, people can afford installed phones.[184] The underlying assumption still is that this indicator can capture accessibility and that this kind of accessibility counts. This needs some more verification and further explanation also because there will be a convergence towards 100%. Differences then would be marginal.[185]

- **High-speed lines per 1,000 (+):** This is a typical measure either for the New Economy, innovation or e-readiness. The report here assumes that the more people are online, the more opportunities for businesses exist. This is in line with the underlying concept, although the relation to competitiveness is vague. One would have to look at what people actually do on-line. Internet could simply be another form of media consumption or new gaming potentials. Again, one will eventually see a convergence towards 100% in the long run and, therefore, few deviations.

- **Air passengers per capita (+):** Again, a measure for connectedness and accessibility. Airports are important for certain industries, for sure, but

183 In fact, in many low-developed countries the use of mobile phones had an important impact on economic development.

184 In these days, costs for an installed phone are that low that one can hardly image that a great proportion of people could not afford one.

185 In 2001, the lowest ranking state Arkansas had a proportion of 88.6%, while the highest ranking state, Maine, had a proportion of 97.87%, with a mean of around 94%.

even these days, companies located in remote places do not have airport access.[186] Despite this, from an attractiveness standpoint, airport connections may be an advantage for 'selling a place'.[187] When looking at the numbers one may be surprised as New York with three major international airports is ranked 17th with Hawaii ranked 1st, Nevada ranked 2nd and Alaska 3rd. Being a spot for tourists, having a small population, being densely populated or being an island state helps a lot to be ranked on top. Again, one cannot draw any direct implications for competitiveness. Besides the quantities, one would also know how it is taken into account what kinds of flight connections are offered. Are these low-cost-carrier-type connections targeting day tourists and Eastern European workers or business flights? Are their many smaller airports just like in Northern Canada or major hubs like JFK, Heathrow, Frankfurt or Atlanta? This is important information one cannot find in the numbers.

- **Travel time to work (-)**: This is included to capture traffic and congestion. While at a time of just in time manufacturing this could be a real burden to businesses, the relation with worker's motivation is not that clear. The authors claim that long travel times to work discourages workers from locating in state. This could be true, although longer travel times to work could simply be the worker's choice as they perhaps do not want to move away from their home and, therefore, commute over long distances. If one assumes that travel time to work is discouraging workers, the question then is if this can be measured accurately on the state level. Analysis on the MSA level could better capture traffic flows. From a worker's perspective, looking at the numbers, one can hardly draw any conclusions from it. Knowing that travel times to work are shorter in Alaska (16.7 minutes in 2001) than in Florida (21.8 minutes in 2001) is not helpful when comparing potential places to work, e.g., Fairbanks v Miami. In addition to this, when looking at the numbers, one can see that the shortest travel time in 2001 was measured in North Dakota with 13 minutes and longest travel time in New York with 28.6 minutes. This means less than half an

186 The Smart car factory in Alsace may be a current example.

187 Substitutes for this could be high-speed railway links.

hour between the first and the last in the pack. While this is a lot in relative numbers, the question must be asked if this really matters for commuters.

- **Electricity prices per million BTU (-):** This is included as it is a business cost for companies residing in a certain state. While it is true in general that electricity price is a cost component, there is no doubt that all businesses are prone to higher electricity prices. This is not only dependent on the share of electricity costs in the total costs, but also on the elasticity of demand and the kind of competition. As mentioned above, nominal prices do not help, too.

- **Median monthly housing costs (-):** This is a typical example for the mix of causal and outcome variables. On the one hand, higher housing costs reflect higher demand and implicitly higher income. On the other hand, higher housing costs may also discourage workers from locating there even if wages may be higher as they only look at the prices and do not relate this to income levels. One, therefore, would have to look at why housing costs are lower or higher. These could be an outcome of past economic success – higher income, based on better paid jobs. It is, therefore, not accurate to include this indicator in an index explaining future competitiveness. Additionally, it is then not accurate to hypothesise that lower housing costs are more attractive, as this implicitly means that income levels are lower. The negative relation of the indicator is, therefore, not indicating higher attractiveness but lower attractiveness and not in line with the theoretical framework.

Human Resources capture the attractiveness of the labour force to businesses. This clearly builds on the human capital theory, incorporated as factor conditions in the competitive advantage approach. It, therefore, fits with the overall ability to attract view, underlying the whole index. Some of the indicators like infant mortality rates are included to indicate a state's commitment in this field.

- **Percentage of population without health insurance (-):** Looking at why the authors included this indicator, one may be surprised at finding the

state where "[a] large number of uninsured suggests that health costs are being passed on to taxpayers and that the health care system is overburdened" (Haughton/Slobodyanyuk 2001: 14). They are concerned with taxes being increased due to higher costs for health care. What might be more important would be to look at the relation of health care with the 'quality' of the work force. By fighting infectious diseases or depressions people actually are able to work. Following a pure cost argument, it is of course true that if many people have no health insurance, this can place a real burden on the state budget. Independent of the rationale for including this indicator, one can assume that the negative direction of impact on competitiveness seems to be meaningful and in line with the overall framework. Even more so if following the pure cost argument.[188]

- **Percentage of population aged 25 and over that graduated from high school (+):** This is a typical indicator for capturing the quality of a work force. Relation with competitiveness seems to be clear and literature suggests that education plays an important role for future economic success. It is, therefore, meaningful and in line with the overall framework as businesses will take a look at education when assessing different business sites.

188 Although one could also argue that if people have their own private health insurance, they still need to earn for it and include these costs when negotiating wages. Indeed, costs will occur and businesses will be affected, one way or the other.

- **Unemployment rate, not seasonally adjusted (-):** Unemployment is an outcome of lower competitiveness and, therefore, should not be included in an index aiming at illustrating causal relations, just as one can find in the UK Competitiveness Index. Besides this, unemployment rates can be manipulated and also depend on the kind of benefits and the willingness of workers to register as unemployed.

- **Percentage of students enrolled in degree-granting institutions per 1000 (+):** This is another indicator for the quality of the work force. It could be meaningful to capture different aspects of education with different indicators to reflect the different aspects of human capital. It is, therefore, in line with the framework and meaningful.

- **Percentage of adults in the labour force (+):** This indicator is included as "The more adults in the labor force, the more workers that can be employed" (Haughton/Slobodyanyuk 2001: 14). This is a sub-group of the total labour force, not including the younger potential workers. As there is no more information, it has to be concluded that this means that all people between 15 and 20 are not included in this sample. Just as unemployment rates, this is an outcome variable, not a cause variable and should not be included in the index.

- **Infant mortality rate in deaths per 1,000 live births (-):** Infant mortality rate is a measure also included in the millennium development goals, monitoring progress. Here the hen-and-egg problem strikes again: are infant mortality rates down after a certain level of economic wealth was created or do infant mortality rates decline and then the economy takes off? Just as Fisher (2005) suggested, one would point to the first supposition as sufficient levels of capital are needed to lower mortality rates at least until a certain level of income has been reached.[189] This indicator, therefore, can be seen as an outcome of past economic

189 The relation of personal income per capita against infant mortality was also tested and a correlation of 0.051, not significant, was found. This could be due to the high level of income.

success, not a cause.[190] As the authors included the indicator to indicate problems of health care, an indicator better capturing health issues as suggested by Heinemann et al (2004) could be the number of healthy years.

- **Non-federal physicians per 100,000 inhabitants (+):** This is another measure for the health system. As logical as it seems, the simple hypotheses, the "more doctors there are in the state, the stronger the health care system" (Haughton/Slobodyanyuk 2001: 14), can be questioned. If stronger simply means more money spent, then it can be accepted, but if stronger means an efficient and effective health system, one would have to disagree. Until a certain level, it may be true that more doctors help 'more'. But after that, the relation is not that clear. To test this relation, the 2001 values of this indicator were checked and infant mortality rate was taken. The Pearson correlation coefficient is -0.291 and significant on the five per cent level. This indicates that the more doctors are around the lower infant mortality rates will be, although the relation is not very strong. This can be seen as proof to a certain extent; more doctors may be helpful, but not to the full extent.

- **Percentage of students at or above proficient in mathematics, Grade 4 public schools (+):** This captures the quality of work force more directly than just by looking at graduate numbers. Although it can be discussed if looking at mathematical skills is the only way of capturing the quality, one can agree with Fisher (2005) that this is a meaningful indicator and a causal variable of competitiveness. This is because the quality of work force captures human capital qualitatively and, therefore, can be an important factor for future economic performance. It is also in line with the overall framework.

190 An indicator causing infant mortality could be toxic releases or pollution as such characteristics can lead to serious diseases.

Technology is included because the "development and application of technology has been central to economic development" (Haughton et al 2008: 8). This is in line with neoclassical growth theory and emphasised in virtually all concepts of competitiveness, especially in the ability to innovate and the ability to attract view.

- **Academic R&D per $1,000 GSP (+):** This is seen as an indicator of high-tech start-ups and innovation in general. This indicator may be meaningful in general. One simply does not know what kind of academic R&D is taken into account and where data comes from. It is, therefore, not possible to fully evaluate this indicator.

- **NIH support to institutions in the state, per capita (+):** The National Institute of Health distributes funding of around 28bn USD a year to research institutions in the states. It could signal high quality research centres. The indicator is in line with the overall framework and although the values will be biased to a certain extent by the size of the state, still it is meaningful. The only issue with this is the fact that only biomedical research is funded. While this is surely something important, it is a bit narrow.[191]

- **Patents per 100,000 inhabitants (+):** This indicator has already been discussed as part of the analysis of the World Competitiveness Yearbook. Issues include good reasons to not patent, neglecting incremental changes, or increasing patent numbers by trying to patent ordinary characteristics also. But it has also to be admitted that this indicator is perhaps the best to get easily. It could be improved by not only taking into account national data but tried patent numbers.

- **Science and engineering graduate students per 100,000 inhabitants (+), science and engineering degrees awarded per 100,000 inhabitants (+) and scientists and engineers as percentage of labor force (+):** These three measures aim at mapping the size of the high-tech sector and if there are labour shortages for high-tech companies. In

[191] In earlier years, this indicator was accompanied by the indicator 'National Science Foundation funding'.

general, this indicator is meaningful and in line with the framework, although one should also include other graduate numbers, not only from science and engineering, as innovations can stem from different sectors. To a certain extent, other sectors are included, as 'NIH support' and 'academic R&D' are also included as indicators. But these three are not directly comparable.

- **Employment in high-tech industry as a percentage of total employment (+):** "The stronger the high-tech sector, the better the prospects for economic growth" (Haughton/Slobodyanyuk 2001: 14). While it is true that a high-tech sector may have a positive effect on the competitiveness, in general, to focus only on the high-tech sector is too narrow. Together with the other indicators, the picture is more likely to be completed, but still, indicators are defined differently and, therefore, cannot be puzzled together easily. Besides the more general points already discussed in the context of other indices, it is simply not stated which industries are taken into account.

Business Incubation is a sub index aiming at mapping entrepreneurship and entrepreneurship potential. It is in line with the ability to attract (firms and funding) and the

- **Deposits in commercial banks and savings institutions, per capita (+):** Deposits are included as this is first an indicator of financial strength and, therefore, for financial capital available for investments. Second, it is seen as an indicator for a sound financial industry. The problem here is that this is a measure of outcome, not a causal measure of competitiveness. In addition the soundness of a financial industry will not only be determined by the deposits per capita. It is, therefore, not meaningful to include this indicator.

- **Venture capital available per capita (+):** Funding is crucial for business, as discussed in detail above. The indicator is, therefore, meaningful and important, with a possible bias for smaller states. The point here is that

one does not know enough about the data itself. When looking at the 2001 data, it strikes that data is missing for seven states. Unfortunately there is no information on the 2008 data.

- **Employer firm births per 100,000 inhabitants (+):** "A higher rate of business births is a particularly clear sign of a competitive environment" (Haughton et al 2008: 8). This can be true, but does not have to be as there are two broader groups of entrepreneurs: necessity-driven and opportunity-driven (Minniti et al 2005: 13). While the authors may have the latter in mind, many entrepreneurs just feel the pressure to start their own business.[192]

  In addition, many businesses may not fall into the 'Google-Yahoo-Microsoft' category but in the kind of 'Fish&Chips-Kebap-snack' category, employing just one person with a low or even no formal education. Knowing the exact definition and data source here would be of special interest. Besides this, the number of new firms may signal dynamism, but the sheer number may still be irrelevant if not a significant number of people are employed, now or later. This should be taken into account.

- **IPO (A weighted measure of the value and number of initial public Stock offerings of companies as a share of Gross State Product) (+):** This indicator is identical with the IPO indicator in the State New Economy Index. Explanatory power may be limited if many companies grow fast and are successful without going public. In general, it could be meaningful to catch dynamism in an economy with the limitation of only including companies that go public.

- **Percentage of labor force that is represented by unions (-):** This normally is a typical indicator of the supply-side paradigm, following the neo-classical view as unions are seen as rigidities to the labour market. The authors earlier saw union membership as deterring potential investors and grouped it under human resources. While the authors re-grouped the

192 The findings of the GEM-consortium indicate that for the USA only around ten per cent of the entrepreneurs are necessity-driven. This is in line with the findings for high-income countries in general. See Minniti et al (2005).

indicator in 2004, it is still supposed to negatively influence competitiveness. There is no information given on what ground this assumption is made, although it could be a potential business cost. It is, therefore, in line with the framework.

- **Minimum wage (-):** As minimum wages are set at the federal and state level, there are different levels of minimum wages in the states. Unfortunately, there is no rationale included for this indicator, so one can only speculate what kind of mechanisms the authors see at work. In economics, minimum wages are one of the most controversially discussed topics. Even that some studies seem to support minimum wages, most of the evidence still points to the negative consequences of minimum wages, especially for the lower-skilled (Sachverständigenrat 2004: 711). From an employer's perspective minimum wages could play a role for those in certain sectors where wages are low. For most of the sectors minimum wages should not be relevant. Nevertheless, higher minimum wages can potentially increase business costs and therefore be a burden for firms. Again, all comes back to price elasticity and a firm's position in the market. The indicator, therefore, is in line with the framework and has a meaning for at least some sectors.

Openness is included as it is hypothesised that open economies are more productive. It is, therefore, taken into account how connected a state is with the rest of the world (not with other states). This connectedness would be a characteristic of the competitive advantage approach.

- **Exports per capita, $ (+):** This is a clear indicator for the ability to sell, just as stated by the authors. It is, therefore, questionable why it is included in an index aiming at mapping indicators causing economic growth. Exports can be taken as indicators for current competitiveness, when following the ability to sell view and, therefore, are not a causal indicator, but an output-indicator. This can be found in the UK

Competitiveness Index discussed below. Exports are also discussed above in the context of the SNEI and the WCY.

- **Incoming foreign direct investment per capita, $ (+):** The view that FDI is a prerequisite of high productivity goes back to Porter's (1990) competitive advantage approach. This also follows the ability to attract view, indicating that investors from abroad are favouring those regions with the highest possible yields. The authors did include them as they add up to the capital stock and are therefore a major source for economic development. While this may be true, comparison of levels of FDI are hard to justify as they are highly influenced by business cycles and single transactions (Heinemann et al 2004). It is also no sound indicator of future economic growth as the numbers are based on past expectations. A causal relationship with future competitiveness is therefore hard to establish. Together with the problems of comparing data, this leaves not the impression of a meaningful indicator, although it is in line with the framework.

- **Percentage of population born abroad (+):** This indicator is included on the grounds that the share of foreign-born people indicates high motivation in the total labour force. There is no rationale included, nor studies supporting this view. The authors, therefore, could include the relation with productivity, survey results or any other measure of motivation. One could here argue that motivation is one thing, but skills and knowledge another. As the authors also include many indicators on measuring human capital qualitatively, one would know if every illegal and highly-motivated worker in the Southern states raises overall motivation. In short, this is not a good indicator for the connectedness as one always has to look at the motivation to immigrate.

Environmental Policy is seen as the last area determining the attractiveness of a state for workers but also for businesses. These indicators include:

- **Toxic release inventory, pounds/1000 sq. miles (-):** This indicator forms part of the sub-index environmental policy since 2001. It is included as it is hypothesised that the more toxic materials are released, the higher the business costs will be and the less attractive a state will be. Although one may sympathise with this view, it is not clear that companies really do take this into account when looking for business sites. Of course, the indicator's rationale is in line with the overall framework of the index.

- **Carbon emission per 1000 sq miles (-) and air quality (% of good average days) (+):** While air quality was just added in 2008, carbon emissions were added in 2004. Both indicators catch pollution in a state. These are included as this will – besides other things – determine the attractiveness for workers and investors. This is an interesting statement as just a few lines earlier it was stated that higher business costs will frighten off potential investors. Now, with respect to pollution, one can read that this is not a burden but a factor positively related to the competitiveness of a state. One may not disagree with this as quality of life certainly is important and long-term effects of lax environmental policies can be more costly. It is simply not consistent with the cost argument stated earlier, although consistent with the ability to attract view. The change of attitude on environmental issues is even more surprising as in 2001, electricity prices have been introduced as part of the environmental policy sub-index with a negative effect on business. This was done as "environmental policies that increase the price of electricity . . . discourage business investment" (Haughton/Slobodyanyuk 2001: 15). The authors certainly changed their mind. It would still be interesting to have the exact indicator definition, though.

To summarise the analysis, it can be concluded that in almost every sub-index the authors emphasise how this sub-index area determines the attractiveness of a state and that these indicators are causing higher or lower competitiveness. It can be stated that the index clearly follows the ability to attract view, with

analogies to the competitive advantage approaches. This is sometimes combined with cost arguments of classical economists.

Implicit weighting

As the overall ranking results are the simple average of the eight sub-rankings and these in turn are the average of the respective number of variables, indicators receive different implicit weights. The implicit weights range from 1.56 % for the eight variables in the area of human resource and 6.25 % in the area of environmental policy (two variables). Despite the claim that the authors apply a "democratic" – i.e., equal – weighting scheme, it is surprising that they implicitly apply unequal weights and do not mention this.

When looking at index construction over the years, it is also obvious how often indicators were re-grouped. Although this does not change the weighting directly, it does influence the weights of the single indicators. This can be illustrated with the changes in the 2004 report, the last report that mark major changes. In 2004, the number of categories was changed from nine to eight by eliminating the sub-index 'domestic competition'. In addition to that, the sub-index 'finance' was named 'business incubation'. This analysis will, therefore, only include those indicators whose change of sub-index was not directly affected by the structural changes. This leaves three out of six indicator changes not directly triggered by the change in structure: 'electricity prices', 'average benefit per first payment for unemployed' and 'percent of labour force born abroad'.

In the 2003 report, 'electricity prices' was one of two indicators in the sub-index 'environmental policy'. In 2004, it moved to 'infrastructure'. This meant a change in weight from 50% (one of two indicators) to 16.7% (one of six indicators). The indicator 'average benefit per first payment for unemployed' moved from 'human resources' 2003 to 'government and fiscal policy' 2004, changing weight from 10% (one of ten indicators) to 16.7% (one of six indicators). The indicator 'percent of labour force born abroad' moved from the sub-index 'human resources' 2003 to 'openness' 2004. This meant an increase in weight from 10% (one of ten indicators) to 33.3% (one of three indicators). There was no explanation included on why this was done or what the rationale behind was.

Besides this, some indicators such as in the field of technology catch nearly the same characteristics, putting even more implicit weight on these. In 2002, crime was counted three times: violent crimes, murder, thefts and crime index change. As the whole sub-index was about security, it is more than questionable if it really helps to double-count. The same can be found in the sub-index environmental policy. Here, of four indicators, two are measuring pollution: pollutions standard index and serious pollution days per year, giving pollution an implicit weight of 50% of the index.

Together with the issue of re-grouping different indicators under different sub-indices, this adds up to an arbitrary implicit weighting, biasing results.

Normalisation additionally takes out some weight as indicators with greater variance would influence the ranking more if not normalised. This is something done intentionally. Perhaps differences in ranking results due to different normalisation techniques could be tested and included in the reports.

10.4.4 Index Construction

Rationale for Weights

All indicators or more precisely the sub-rankings are weighted equally. These weights are not deducted from a theoretical framework or based on statistical analysis, but applied because it is transparent and simple. To take the words of the authors, this "is of course arbitrary (although reasonable)" (Haughton/Slobodyanyuk 2001: 8).

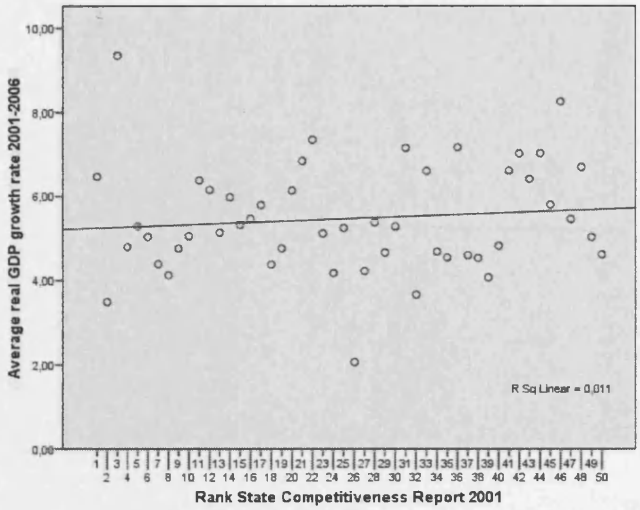
Index Aggregation

The index uses normalised scores, to be able to compare the different results. Therefore, each variable was normalised to the mean of five and the standard deviation of one. The range then was set from zero (worst) to ten (best). This was also done on the sub-rankings and overall ranking level. This means that all indicators have the same range and no indicator value can influence the overall ranking just because of a failed distribution. The ranking results then represent the simple average of the eight sub-rankings and these in turn the normalised average of the respective number of variables.

10.4.5 Predictive Quality

The analysis was based on the 2001 results and looked at the relation with average real GDP growth between 2001 and 2006.

Figure 24: SCR ranking results vs. real GDP growth

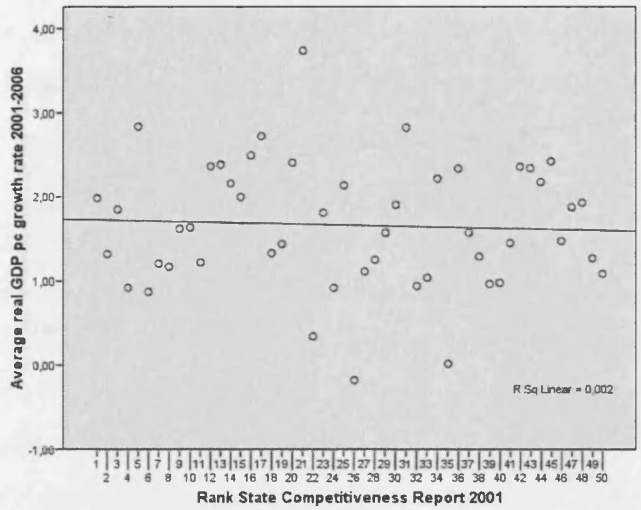


Source: Author's own based on data from Haughton/Slobodyanyuk (2001) and the Bureau for Economic Analysis

The figure shows a slight positive tendency for the two variables, which is further verified after looking at the Spearman rank correlation. The correlation coefficient is 0.126 and not significant, meaning there is no strong relation between the 2001 ranking results and GDP growth over the then following six years. Not only is the relation not strong, it also 'points' in the wrong direction as higher ranks are associated with lower growth rates.

This first impression changes a bit when looking at real GPD per capita growth for the respective period.

Figure 25: SCR ranking results vs. real GDP per capita growth

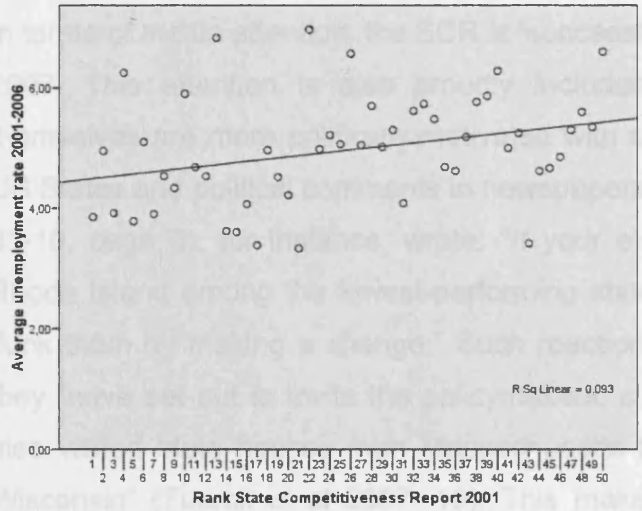


Source: Author's own based on data from Haughton/Slobodyanyuk (2001) and the Bureau for Economic Analysis

Here, the correlation is negative, 'pointing' to the right direction, but very weak with just -0.028. Again, there proves to be no strong correlation between the ranking result and economic performance. This can also be said for the sample with the 20 states with the highest level of GSP (correlation of -.168). Nevertheless, the picture changes if we look at the correlation of the 20 states with the lowest level of GSP and economic growth. Here, Spearman rank correlation is at -.471, significant on the five per cent level.

When a test against unemployment was conducted, the result was more promising, as can be seen below.

Figure 26: SCR ranking results vs. unemployment rate



Source: Author's own based on data from Haughton/Slobodyanyuk (2001) and the Bureau for Economic Analysis

The correlation was not only significant on the one per cent level but also positive and at 0.360, not that weak. Here, the ranking results may be used as a proxy.

Table 49: Spearman correlation analysis results for the 2001 SCR

		Average real GDP growth rate 01-06	Average real GDP growth rate pc 01-06	Average unemployment rate 01-06
Rank State Competitiveness Report 2001	Correlation Coefficient	.126	-.028	.360**
	Sig. (1-tailed)	.192	.425	.005
	N	50	50	50
**. Correlation is significant at the 0.01 level (1-tailed).				

Source: Author's own based on data from Haughton/Slobodyanyuk (2001) and the Bureau for Economic Analysis

Summarising the findings, the table shows that the predictive quality of the ranking is poor when it comes to future GDP growth. Only when it comes to predicting unemployment rates can the index function as a proxy although not a strong one if results are compared with the other index evaluations.

10.4.6 Policy Impact and Media Attention

In terms of media attention, the SCR is 'successful' with 30 citations from 2001 to 2007. This attention is also proudly included in the reports. The citations themselves are more politically-motivated with several press releases issued by US States and political comments in newspapers. The Providence Journal (2006-01-10, page 5), for instance, wrote: "If your elected officials insist on keeping Rhode Island among the lowest-performing states, this November is the time to flunk them by making a change." Such reactions are what the authors want as they "have set out to invite the policymakers, citizens and the media [...] [and] also visited state houses from Massachusetts to Rhode Island and Arizona to Wisconsin" (Tuerck et al 2007: 10). This makes this ranking one of the most directly aiming at politically influencing the debate and therefore the most potentially populist one, too.

10.5 Conclusion

Compared to the ambitions set out on the web-site and the report, the index produces disappointing results measured as future growth. As could be seen, the ranking cannot function as a proxy for future growth. The ranking may be correlated to current levels of GDP as emphasised in the report, but not with future growth. This falls far short compared to the author's own definition of competitiveness as higher GDP per capita. Interestingly, the correlation with future unemployment is significant, although not very strong.

Adding to this, overall transparency is not satisfying as the original data are not included and, therefore, cannot be verified by third parties. There are also no reasons given why certain indicators are included and on what grounds different – implicit – weights have been assigned. The theoretical basis remains vague and authors more than once point to Porter (1990) that they are 'inspired'. How this translates into the ranking is not explained.

What is also striking is the mix of causal and outcome variables. While in some cases – like the UK Competitiveness Index – this is intended, the authors here distinguish between the outcome of competitiveness "measured by higher levels of real Gross State Product (GSP)" (Haughton et al 2008: 7) and influencing variables (Ibid.). In contrast to that, a mix of causal and outcome variables in the index can be found.

From a theoretical standpoint, it is interesting how the authors – officially grounding their index on Porter's competitive advantage approach – in earlier editions saw 'electricity prices' as an indicator for 'environmental policy' and later in 2004 stated that the same indicator is an important indicator for 'infrastructure'. This change must be induced by a change in the theoretical framework, otherwise it would be arbitrary. The reader, therefore, would expect an explanation for the changes and about on what grounds these changes are made. This information is not included anywhere.

Overall, it must be doubted that the State Competitiveness Report can be used as a guide for public policy: comparability over time is low, the inclusion of data is not justified further, and index construction is changed over time and the predictive quality low.

Below are the results of the analysis in the form of a summary table:

Table 50: Summary evaluation table SCR

Criteria	SCR
Overall clarity and transparency: Information given on ...	
... original data	-
... transformed data	-
... theoretical framework	-
... competitiveness concept and underlying definitions	o
... sources for data	-
... exact indicator definition	o
...exact indicator units	o
... normalisation and transformation technique	o
... aggregation technique applied	+
... exact weights applied	+
Comparability	
Index construction does not change too often	o
Indicators do not change too often	-
Sources and partners do not change too often	?
Indicators are similarly defined, i.e. use the same sources	?
Data reflect different entity sizes	+
Data is not biased by inflationary effects	+
If applicable: Survey results are comparable, i.e. based on a sufficient number of respondents, take into account cultural biases, and the 'right' people are interviewed	
Indicator choice	
Indicators correspond to theoretical framework	?
No implicit weights applied	o/-
Index construction evaluation	
Rationale for weights disclosed	-
Meaningfull ranking orders (in general)	?
Standardisation and normalisation do not bias results	+
Aggregation does not bias results	+
Robustness tests conducted and included	-
Predictive quality evaluation	
with respect to higher GDP per capita growth rates	-
with respect to lower unemployment rates	o/+
if necessary: with respect to higher employment	
Policy impact and media attention	
Citations in official political statements	medium
Citations in LexisNexis data base	medium

Evaluation is done without using fixed and pre-defined grades.
'+' stands for positive evaluation, 'o' for a neutral evaluation, '-' for a negative evaluation; Information in brackets indicate non-substantial findings, i.e. based on small sample size; ? indicates missing information

11 UK Competitiveness Index

11.1 Background Information

The UK Competitiveness Index (UKCI) was introduced in 2000 based on work of Philip Cooke, Nick Clifton and Robert Huggins. The ranking was first issued as a working paper 2001 "to assess the relative economic competitiveness of regions and localities in the UK by constructing a single index that reflects, as fully as possible, the measurable criteria constituting 'area competitiveness'" (Cooke et al 2001: 5). The 2002 index was then published as part of a journal article and the 2005 index was the first issue to be published as a separate report, including an additional analysis for 1997. It was later updated in 2006 and 2008.

The report consists of two rankings, one on the regional level with 12 regions and one on the local level with UK cities, metropolitan boroughs and urban wards.[193] The 2008 issue – the first published in conjunction with the Centre for International Competitiveness at University of Wales Institute, Cardiff – benchmarks 12 NUTS 1 regions and 408 UK localities (down from 432 in 2006).

The report is edited by Robert Huggins and was formerly published by Robert Huggins Associates, a private consultancy based in Wales. The consultancy has a relatively long history of publishing composite indices such as the UK CI or the World Knowledge Competitiveness Index.

The indices and accompanying data are now freely available on the internet, although hard copies are still sold together with data CD ROMs.

The reports first disclose information on the overall rankings on the regional and local level before going into detail for every indicator. Findings are not discussed for every region but just some highlights in the context of the single indicators included.

193 There is also a report on the state of urban Britain, published in 2002 with a similar methodology.

11.2 Theoretical Framework

Definition of Competitiveness

When defining place competitiveness, the authors explicitly follow the macroeconomic definition as set out by Michael Storper (1997). They see competitiveness "as the capability of an economy to attract and maintain firms with stable or rising market shares in an activity, while maintaining stable or increasing standards of living for those who participate in it" (Huggins/Day 2006: 43).

This capability is then seen as being rooted in an economy's knowledge-base and related sectors. "These sectors can be categorised as strong-demand activities, typically with a high technological composition and forming the basis of the competitiveness of most industrialised nations" (Huggins/Izushi 2008: 8). This is why the authors measure the knowledge-base as well as the size of knowledge-based industries.

Policy Advice

The authors do include some policy advice within the report, mainly in the executive summary and the conclusion. Besides the general advice to attract and maintain high-performing firms and to raise living standards, some concrete advice is also included. In the 2008 issue, the authors questioned the positive effects of migration from north to south as well as the public finance allocation system, based on the so called 'Barnett formula'. They recommend that funding should be provided based on the "needs required to improve their future competitiveness" (Huggins/Izushi 2008: 44). A more general advice is given with respect to rural economics. The authors call for more effort to explore how the competitiveness of rural regions can best be promoted. In past issues, the advice was even more generic, such as the one in 2006: "policy emphasis must be given to facilitating enterprise and business support that is attuned to regional and local environments" (Huggins/Day 2006: 57).

Conclusion on Theoretical Framework

The aim of the index as set out by the authors is "to assess the relative economic competitiveness of regions and localities in the UK by constructing a single index that reflects, as fully as possible, the measurable criteria constituting place competitiveness" (Huggins/Day 2006: 60). The choice of indicators reflects the definition of competitiveness as they focus on human capital, entrepreneurship and innovation. In addition, besides these input variables they also include performance indicators like exports, gross value added or productivity.[194] These output variables are taken into account as "[p]lace competitiveness cannot be measured by ranking any one variable in isolation, since it is the result of a complex interaction between input, output, and outcome factors" (Huggins/Izushi 2008: 8).

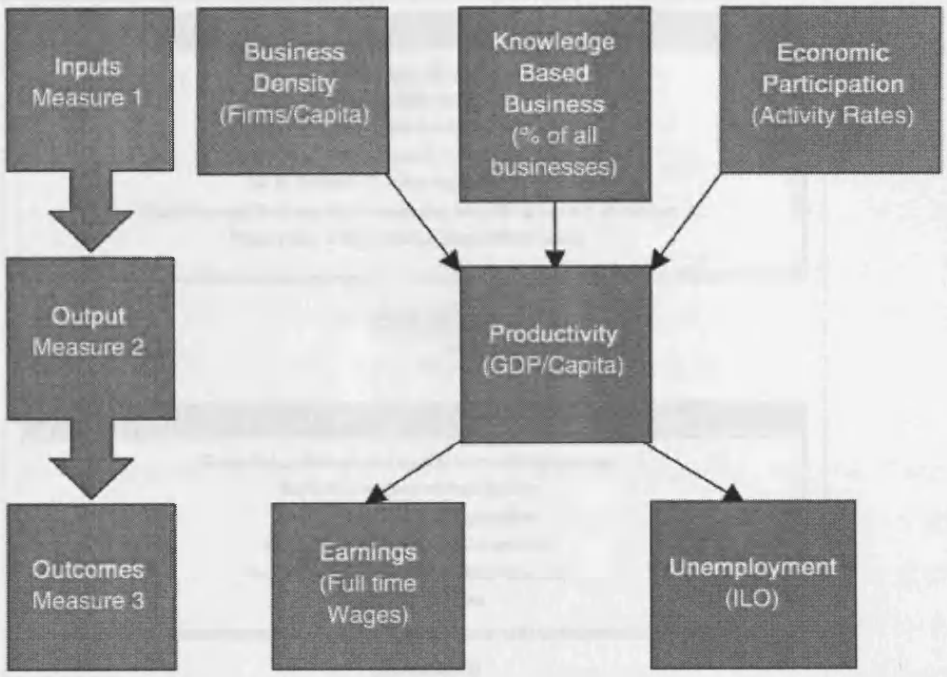
The overall concept is transferred into a three-factor model, deconstructed below.

11.3 Deconstruction

The definition of competitiveness as the ability to attract transfers into a three-factor model, based on Huggins (2003), and in its first version constitutes six variables, as shown below.

194 This clearly overlaps with the indicators included in the World Knowledge Competitiveness Index.

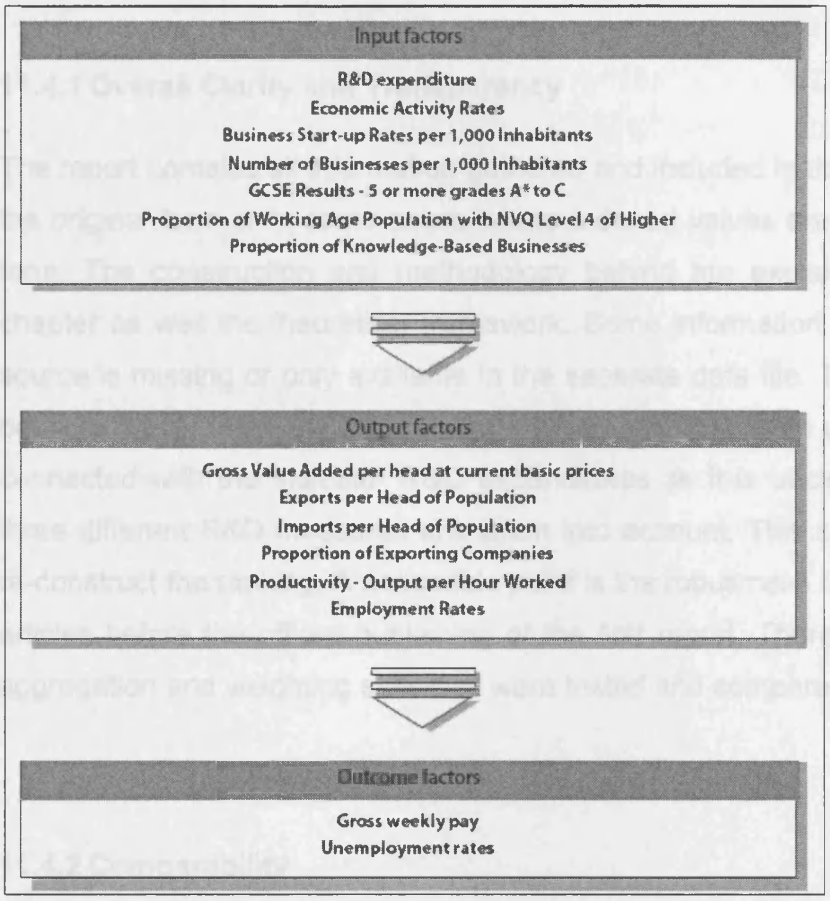
Figure 27: Original three factor model for the UKCI



Source: Taken from Huggins (2003: 91)

Since the 2005 report, the index incorporates 15 indicators. This is outlined in the following figure.

Figure 28: Three factor model and indicators of the UKCI



Source: Taken from Huggins/Day (2005: 2).

The design of the index also reflects a pragmatic view on measuring and benchmarking: "The key concern [...] is to develop a series of indices incorporating data that are available and comparable at the local and regional level, and that go some way towards reflecting the link between macro-economic performance and innovative business behaviour" (Huggins/Izushi 2008: 8). Again, this reflects the micro-economic view of competitiveness with a focus on innovation.

Besides the indicators constituting the UKCI, some additional indicators are included in the report as background information.

11.4 Evaluation

11.4.1 Overall Clarity and Transparency

The report contains all information gathered and included in the overall ranking in the original form or in some cases where indexed values are used, in the index form. The construction and methodology behind are explained in a separate chapter as well the theoretical framework. Some information like the exact data source is missing or only available in the separate data file. The sources should be included for every indicator so that readers can look them up. Another point is connected with the indicator R&D expenditures as it is unclear how and if the three different R&D measures are taken into account. This should allow one to re-construct the ranking. A noticeable point is the robustness testing in one of the articles before the official publishing of the first report. There, different kinds of aggregation and weighting schemes were tested and compared to each other.

11.4.2 Comparability

Comparability over Time

The methodology behind the index did not change since the first publication, but the number of indicators constituting the three sub-indices increased from six to 15 over the years. Since 2005 this remains stable and the index is computed back for 1997 based on the new number of indicators which makes it easy to compare results over time in general and run an analysis of predictive quality over a longer time-span.

The change in partners for issuing the reports remains an obvious point. While earlier issues were published by Robert Huggins Associates, the 2006 issue was published by the Work Foundation and Robert Huggins Associates together. The 2008 issue was then published by the Centre for International Competitiveness of the Cardiff Business School. These changes should not influence comparability.

Comparability of Data

As the report builds on national data, comparability should be high. Since the 2008 issues, data sources have been included in the accompanying spreadsheet file. All the wealth of data is from 2006 or 2006/07 (eight indicators) with the other indicators from 2005 or 2005/06. In all but one case, all numbers within the indicators refer to the same year.[195] This should ensure a high quality of the raw data and high comparability.

Comparison of Ranking Results

The results also did not vary a lot over time as can be seen in the table below, comparing the results for 2000 and 2002 based on six-indicators as well as 1997, 2005, 2006 and 2008 based on 15 indicators.

[195] In the case of the proportion of knowledge-based businesses, for Northern Ireland 2004 data was used.

Table 51: UK CI ranking results for 1997, 2005, 2006 and 2008

Region	Rank 2000	Rank 2002	Rank 1997	Rank 2005	Rank 2006	Rank 2008	Range
East Midlands	5	5	5	4	4	4	1
Eastern	4	3	3	3	3	3	1
London	1	1	1	1	1	1	-
North East	12	12	12	12	12	12	-
North West	8	8	8	7	8	6	2
Northern Ireland	9	11	10	10	10	10	2
Scotland	7	7	4	8	6	8	4
South East	2	2	2	2	2	2	-
South West	3	4	7	5	5	5	4
Wales	11	10	11	11	11	11	1
West Midlands	6	6	6	6	7	7	1
Yorkshire and The Humber	10	9	9	9	9	9	1

Sources: Author's own, with data from Cooke et al (2001), Huggins (2003), Huggins/Day (2005), Huggins/Day 2006, Huggins/Izushi (2008)

These results did not change much over time (average range 1.4), but the scores behind the ranking did change. The span between the highest and lowest scores for the 15-indicators ranking went down from 79.2 to 119.2 in 1997 (range of 40 scores) to 83.1 to 112.5 in 2008 (range of 29.4).

11.4.3 Indicator Choice

Relation to Theoretical Framework

In general, the index has an innovation bias towards certain dimensions as can be observed from the overall structure. The single indicators and how they relate to the index framework are outlined below.

Input factors measure competitiveness sustainability, incorporating the following indicators, mainly relating to human capital theory and the ability to adjust or innovate:

- **R&D expenditure (as % of GDP) business enterprise sector, R&D expenditure (as % of GDP) government sector and R&D expenditure (as % of GDP) higher education sector:** These indicators capture R&D expenditures for the three sectors funding R&D. There is no information if all three or just one is incorporated; it can only be speculated. Incorporating all three clearly would be meaningful as all three contribute to the knowledge base and technological innovation. However, the level is highly dependent on the level of development. But since only UK regions are benchmarked, this should not be too critical. Denominating expenditures by GDP helps take into account the level of development. The indicator clearly is in-line with the theoretical framework but readers would need more information.

- **Economic activity rate:** As outlined in the section on the WKCI, the main point here is hours worked. Besides this, it is one of the best indicators for economic participation as the numbers cannot be influenced as in the case of official unemployment rates. Of course it can be asked if economic activity really is a cause or an output variable.

- **Business start-up rate per 1,000 inhabitants:** Start-ups are a good indicator of economic dynamism. It is, therefore, meaningful to integrate such an indicator if one wants to measure such dynamism. To evaluate this indicator in full, one would need more information on the motivation for starting a business, meaning that more information on the source for the numbers of business start-ups is needed. Numbers could be based on official statistics such as the number of new VAT registrations or based on surveys. Denominating the numbers by the number of inhabitants is advantageous as absolute values would be misleading. Even though this is advantageous, one could think of disadvantages if a region is sparsely populated but many companies are registered in the region. In this case, the number would go up in relation to the number of inhabitants. In such

cases one would have to look at the reasons behind, e.g., tax deductions or subsidies. As the number of business start-ups is taken into account, one could also argue that this would mean that regions with a large number of small start-ups are better off than regions with a low number of large start-ups. This effect could also bias results. Diversity, i.e., high number of start-ups, here could be seen as advantageous as no one knows which of the start-ups will survive. From a worker's standpoint this could also mean a broader choice of potential employers.

- **Number of businesses per 1,000 inhabitants:** In this case, the same can be said as with business start-ups. Again, the absolute number of businesses is taken into account, not the size of the companies. This means that regions with a high number of small companies will receive higher ranks. This could be justified with the fact that this would mean a broader basis and could lead to a more diverse economic base, reducing business-cycle effects. To be able to evaluate such effects, one would certainly need more information on the kind of businesses. What one has to take into account are possible explanations why some regions may see higher numbers of businesses, such as tax reasons. Historical reasons may also play an important role, even though this would have nothing to do with sound policies today. This is especially the case if sunk-costs for businesses are high. Again, it must be questioned if this indicator really is a cause of future growth or simply reflects past growth.

- **GCSE results - 5 or more grades A* to C and proportion of working age population with NVQ level 4 or higher:** Whilst both indicators have different focus – pupils v workers – both measure a similar characteristic: education or human capital in general. The rationale behind is that "the future workforce will consist of those emerging from the education system" (Huggins/Izushi 2008: 33). In general, it could be true that better formal education will help foster knowledge, productivity and eventually economic growth. At the same time, it is not clear – after a certain threshold level is

achieved – if even higher numbers will be as advantageous. But still, this is a valid indicator for capturing human capital.[196]

- **Proportion of knowledge-based businesses:** Knowledge-based businesses are captured with the OECD definition.[197] This indicator is included as it "provides a crucial link between firm-based competitiveness, in terms of innovation, and aggregated geographic-based competitiveness" (Cooke et al 2001: 9). This is a typical sign for following the ability to adjust or the ability to innovate view. Denominated by the total number of businesses, it shows the distribution across the regions. Critical points are the classification and assumption that these businesses drive economic growth. It can be pointed to the earlier discussion on Thurow's (1992) approach.

Output factors measure the output of a region, reflecting past competitiveness, measured as GVA, exports or productivity. The main point of criticism in this index area may be that a ranking of growth potential should not mix input, output and outcome variables as the first can cause future growth while the last two are indicators of past growth or competitiveness.

- **Gross value added (GVA) per head at current basic prices:** GVA reflects historical competitiveness. It is also important as the higher the GVA, the higher the level of development will be. It can also be assumed that regions with higher GVA have more capital to invest and, therefore, can improve their economic situation more quickly than low GVA regions. Denominating GVA by per head is meaningful as this takes into account the attractiveness as a place for living.

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196 One would also have to look if GCSE standards are the same as in past years or if it is easier to pass the bar today.

197 This includes the following sectors: pharmaceuticals, office machinery and computers, aerospace, precision instruments, electrical/electronic engineering, telecommunications, financial intermediation-except insurance and pension funding, insurance and pension funding-except compulsory social security, activities auxiliary to financial intermediation, computer & related activities, R&D, other business activities, motion picture and video activities, and radio & television activities.

- **£ of imports per head of population:** This indicator is included "to gain a fuller picture of regional engagement in the international economy and its supply-chains" (Huggins/Day 2006: 29). Higher numbers would, therefore, indicate a higher level of engagement in world trade. While this may sound logic, from a regional perspective, not only imports from abroad but also imports from other regions should be taken into account. Imports from a regional perspective are all trade flows from outside the region, no matter where the region is situated. This should also be reflected. Difficulties can occur if a region ranks high in imports or exports but low in the other area. It is then difficult to asses if this region is integrated in world economy or not.

- **£ of exports per head of population:** Exports are the second indicator of trade competitiveness and integration in the international economy. As with imports, any kind of goods or services leaving a region can be viewed as export from the regional perspective. Export figures are often taken as indicators of the ability to sell and export base theory.

- **Proportion of exporting companies:** In general, the same points hold true as for the above indicator 'exports per head'. Another problem here could be the fact that this indicator catches the proportion of exporting companies, not the value and size of the trade activity of those companies. This may be desirable if one wants to take into account the 'size' of the base, i.e., if the exports are coming from just a few companies. As long as one doesn't know more about the exact definition of an exporting company and how many of the companies are exporting just a minimal share of their production, it is not possible to fully evaluate the indicator.

- **Employment rate:** The first and more general question would be to ask why economic activity rate is seen as an input, employment rate as an output and unemployment rate as an outcome. This is not explained

anywhere. Besides this, employment rates are better measures than unemployment rates, as they are hard to manipulate[198].

- **Productivity - output per hour worked (Index):** Productivity is seen as the most important variable to determine economic wealth. The authors state that "[t]his index largely mirrors regional GVA per capita" (Huggins/Izushi 2008: 21). This shows that productivity is one of the crucial characteristics to determine economic wealth. It is, therefore, an important variable for assessing a region's abilities. In Krugman's words, "for an economy with very little international trade, 'competitiveness' would turn out to be a funny way of saying 'productivity'" (Krugman 1994: 30).

Outcome factors measure past achievements. Just as in the case of output factors one may ask why a ranking of growth potential includes outcome factors.

- **Gross weekly pay:** Gross weekly pay is an outcome of economic activities and a high correlation with GVA can be assumed. The value added of this indicator then is not clear. Other points are missing, for instance, the information on if average or median values are taken into account or how the indicator relates to unemployment. How the numbers have been calculated would be interesting as 'outliers' can bias the whole distribution. Huggins (2003) defined the indicator as 'average earnings' and it could be concluded that this it is not the median. Despite these points, gross weekly pay is something people take into account when assessing their own quality of life as this is highly visible and changes are directly influencing people's perception of the economic situation. It is, therefore, meaningful.

- **Unemployment rate - working age:** Here, it can first be enquired why unemployment rate is grouped under outcome and employment under output while economic activity rate is seen as an input factor. This should be explained. The indicator itself is highly exposed to manipulation if the

198 Contrary to the assessment for the SCR, it here makes sense to include the employment rate as this is explicitly included as an outcome factor.

official figures are taken into account. Other sources like the International Labour Organisation (ILO), collecting data with surveys, may have other shortcomings. This shows the importance of disclosing full background information. The source for this indicator as indicated in the excel file is 'APS' which refers to the Annual Population Survey. Earlier, Huggins (2003) stated ILO, the International Labour Organisation as the source. As the index only includes UK regions, one should take it for granted that data is comparable.[199] From Cooke et al (2001) it can be concluded that the authors see this indicator also as a way of assessing the tightness of a labour market. This would mean that lower rates could also be seen as limiting future economic growth. But as the top ranked regions are those with the lowest unemployment rates, this seems not to be taken into account.

To summarise the discussion, there is the more general question why an index aiming at assessing place competitiveness combines input, output and outcome variables in the way it is done. Output and outcome variables cannot be sharply distinguished. At the same time these variables more reflect past competitiveness and past economic achievements, not abilities or potential.

Implicit Weighting

Although the authors claim not to apply any weighting for the final index, due to the different number of indicators under the three measures, outcome factors receive the highest weight as only two are used to derive the sub-ranking, compared to seven for the input factors and six for the output measures. There is no further explanation given for this weighting judgement. In earlier reports more weight was put on productivity, earnings and unemployment (Cooke et al 2001; Huggins 2003) as the number of indicators was lower. In the latter publication, other weighting schemes are also discussed to test robustness. It was concluded "that any of the proposed weighting scenarios would be a valid composite measure of competitiveness" (Huggins 2003: 94).

199 The APS data is seen as being more reliable and more accurate as it also takes into account residents on certain working age benefits in contrast to the Jobseekers allowance figures.

Whilst in all reports equal weights on the level of sub-categories are applied, the number of indicators changed from six to 15 before the 2005 report. This means the implicit weights changed drastically; in the case of productivity it went down from 33.3% to 6.6% (one fifth of a third).[200] This is a major change influencing comparability.

11.4.4 Index Construction

Rationale for Weights

All three pillars (inputs, outputs and outcomes) are weighted equally. This is done since it is hypothesised that "each will be interrelated and economically bound by the other" (Huggins 2008: 8). There appears to be no theoretical basis or justification for this judgement.

Index Aggregation

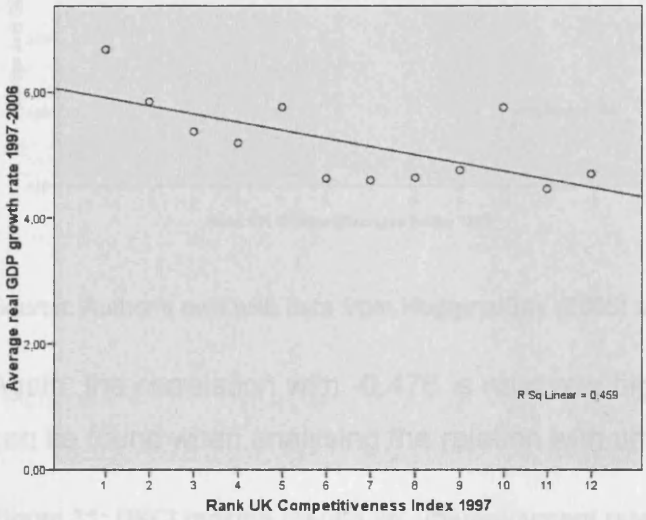
All data are first normalised via a logarithmic function on the single indicators level resulting in a distribution more closely to the Gaussian distribution. All the single indicators are then aggregated into one index for each of the three factors. All values are, therefore, ranked and expressed in relation to the UK average so that all the values can be compared, leading to numbers lower, equal or higher than 100. The normalised and anti-logged scores are then transformed again with an exponential cube transformation and the final number for the regional competitiveness is derived by averaging the scores for all three factors.

11.4.5 Predictive Quality

200 The authors seem to have anticipated this as in Cooke et al (2001: 9), they state that "the overall weightings given to each of the six indicators are as follows (within a total weighting ratio of 1.0): Business Density (0.111); Knowledge-based Business (0.111); Economic Participation (0.111); Productivity (0.333); Earnings (0.166); and Unemployment (0.166)."

As a first step the relation between the ranking results of 1997 and average regional real GDP growth from 1997 to 2006 was examined in detail.

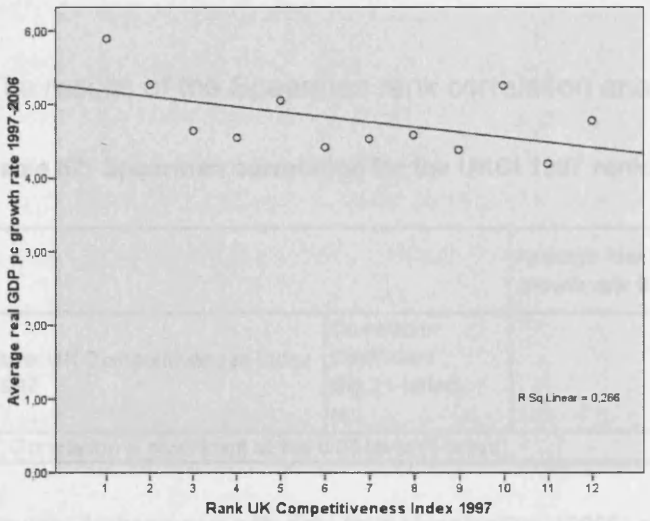
Figure 29: UKCI ranking results vs. average real GDP growth



Source: Author's own with data from Huggins/Day (2005) and the Office for National Statistics

As can be seen from the figure, there is a negative tendency. This means, the better the rank, the higher the average GDP growth rate for the period analysed. This correlation is relatively strong, with -0.643 and significant on the five per cent level. In addition, a test against GDP per capita growth over the same period was conducted.

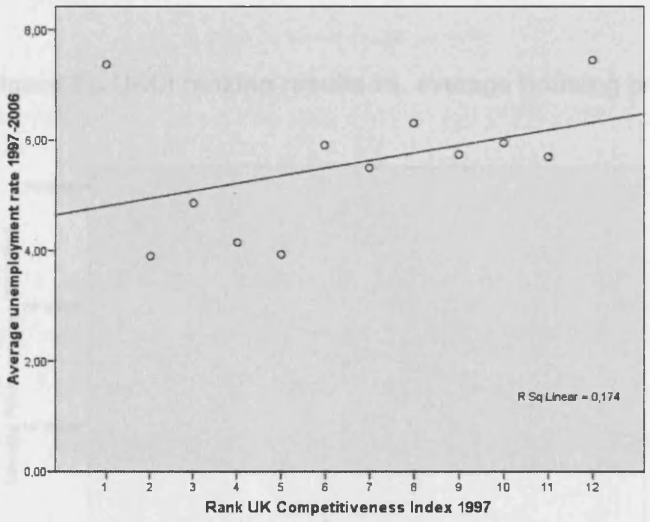
Figure 30: UKCI ranking results vs. average real GDP per capita growth



Source: Author's own with data from Huggins/Day (2005) and the Office for National Statistics

Again, the correlation with -0.476 is relatively high, but not significant. The same can be found when analysing the relation with unemployment rate.

Figure 31: UKCI ranking results vs. unemployment rate



Source: Author's own with data from Huggins/Day (2005) and the Office for National Statistics

The correlation coefficient is at 0.462, meaning that higher ranks are related with lower unemployment rates. As strong as this relation may seem, for an index incorporating unemployment rate and two other measures of employment, this correlation is not very high and in addition not significant.

The results of the Spearman rank correlation analysis are summarised below.

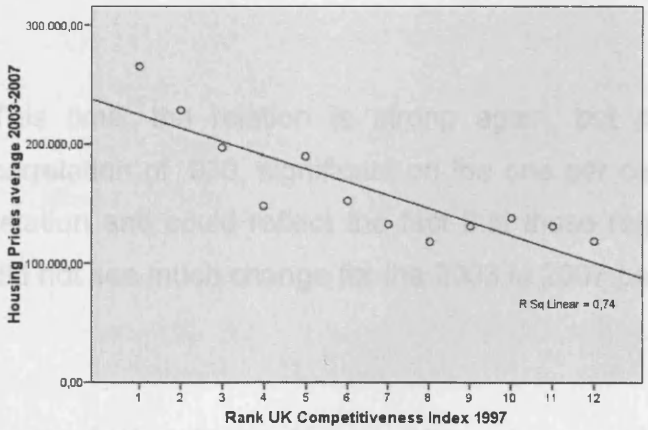
Table 52: Spearman correlation for the UKCI 1997 ranking

		Average real GDP growth rate 97-06	Average real GDP growth rate pc 97-06	Average unemployment rate 97-06
Rank UK Competitiveness Index 1997	Correlation Coefficient	-.643*	-.476	.462
	Sig. (1-tailed)	.012	.059	.065
	N	12	12	12
*. Correlation is significant at the 0.05 level (1-tailed).				

Source: Author's own with data from Huggins/Day (2005) and the Office for National Statistics

Besides the two variables unemployment and economic growth, a separate test was conducted looking at the relation of ranking results and housing prices to take into account another input variable.

Figure 32: UKCI ranking results vs. average housing prices

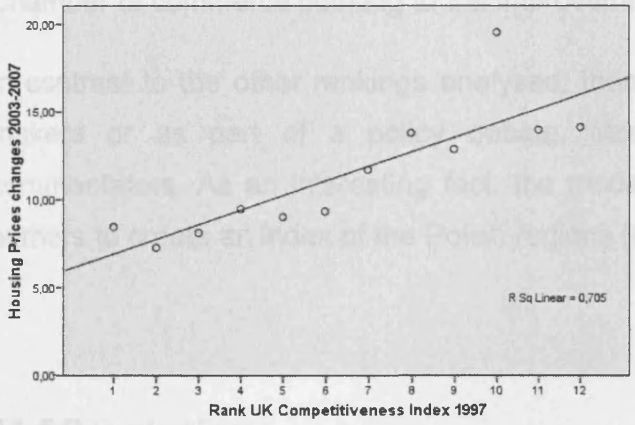


Source: Author's own with data from Huggins/Day (2005) and the Office for National Statistics

As can be seen, there is a strong correlation of ranking results and housing prices, indicating that there is a strong relation between the two variables. Spearman rank correlation is at -.881, significant on the one per cent level.

In addition, the same test was conducted looking at the relation between ranking results and housing price changes.

Figure 33: UKCI ranking results vs. average housing price changes



Source: Author's own with data from Huggins/Day (2005) and the Office for National Statistics

This time, the relation is strong again, but positive with a Spearman rank correlation of .930, significant on the one per cent level. This indicates a strong relation and could reflect the fact that those regions with higher housing prices did not see much change for the 2003 to 2007 period[201].

In conclusion, the ranking can be seen as an indicator of future growth with a relatively strong correlation for both, real GDP and real GDP per capita, although only significant on the five per cent level for real GDP data. This is also supported

201 Results did not change much when analysing the correlation of the 2001 ranking results and house prices. Spearman rank correlation was -.874, significant on the one per cent level for ranks and house prices and .888 for ranks and house price changes between 2003 and 2007.

by the fact that the correlation with unemployment rate is positive and relatively high, although not significant.

11.4.6 Policy Impact and Media Attention

The report receives a relatively high media attention with 59 citations from 2001 to 2007. The 2006 issue received the most attention especially in the North-East. It, for example, was cited several times by the chief executive of the North-East Chamber of commerce pointing to the improvements.

In contrast to the other rankings analysed, there were no citations from policy-makers or as part of a policy debate. Most of the citations were from commentators. As an interesting fact, the model was also taken over by other authors to create an index of the Polish regions (see Bronisz et al 2008).

11.5 Conclusion

It could be seen that the UK Competitiveness Index can function as a relatively accurate proxy for future economic performance, which may not be surprising as these variables – GDP, here: GVA and unemployment – form an important part of the index itself, with unemployment rate being one of the two indicators in the outcome measure having an overall weight of 1/6th.

The ranking lacks an explicit theoretical base and framework although the authors point to Storper's (1997) definition. The index is a compromise of what Huggins (2003) has seen as the two main concerns: data availability and explanatory indicators. The strong correlation between the single indicators and the overall results is stated as a proof for the "strong association with the composite index generated" (Huggins 2003: 94). But this mix of input and output indicators catches very different facets of a regional milieu. This does not provide causal explanations limiting its value especially for policy-makers. What would be needed more is a concise framework based on causal relations. Mixing input with

output variables leads to arbitrary rankings or simply works out past economic achievements.

Below are the results of the analysis in the form of a summary table:

Table 53: Summary evaluation table UKCI

Criteria	UKCI
Overall clarity and transparency: Information given on ...	
... original data	+
... transformed data	o
... theoretical framework	o
... competitiveness concept and underlying definitions	+
... sources for data	o
... exact indicator definition	o
... exact indicator units	+
... normalisation and transformation technique	+
... aggregation technique applied	+
... exact weights applied	o
Comparability	
Index construction does not change too often	+
Indicators do not change too often	o
Sources and partners do not change too often	?
Indicators are similarly defined, i.e. use the same sources	+
Data reflect different entity sizes	+
Data is not biased by inflationary effects	+
If applicable: Survey results are comparable, i.e. based on a sufficient number of respondents, take into account cultural biases, and the 'right' people are interviewed	
Indicator choice	
Indicators correspond to theoretical framework	+
No implicit weights applied	-
Index construction evaluation	
Rationale for weights disclosed	-
Meaningfull ranking orders (in general)	+
Standardisation and normalisation do not bias results	o
Aggregation does not bias results	+
Robustness tests conducted and included	+
Predictive quality evaluation	
with respect to higher GDP per capita growth rates	+
with respect to lower unemployment rates	+
if necessary: with respect to higher employment	+
Policy impact and media attention	
Citations in official political statements	low
Citations in LexisNexis data base	high

Evaluation is done without using fixed and pre-defined grades.
'+' stands for positive evaluation, 'o' for a neutral evaluation, '-' for a negative evaluation; Information in brackets indicate non-substantial findings, i.e. based on small sample size; ? indicates missing information

12 Conclusion and Further Research

This thesis aimed at evaluating indices of regional competitiveness and drawing conclusions with regard to their usefulness as policy and analytical assessment tools. This was done by giving an overview of existing indices and deriving common grounds on relevant indicators. Six indices were then taken and they were examined to see how the indices are grounded in theory and how methodologically robust theses indices are. This was finally done by looking at the predictive power for future economic success. The conclusions drawn from this analysis are summarised below, starting with the index analysis. Afterwards, the conclusions drawn from the literature review and the discussion on the validity of the concept of regional competitiveness are outlined. The last section highlights some suggestions for further research with respect to index construction and shows possible ways of dealing with the competitiveness hegemony.

12.1 Conclusion on Index Analysis

As has been shown in the thesis, the growth in number and range of regional indices over the last years is impressive. The search focusing only on major European languages found no less than 57 regional indices.

The overview of existing regional indices showed that mostly private organisations – for profit or non-profit ones – lead the field. Public organisations account for roughly 30% of the indices found. Looking at the scope of the indices, it was shown that only eight of the 57 indices found did benchmark regions from different countries, while all other were benchmarking regions from one country. The majority of indices – 40% – rank US states while seven are focusing on UK regions and six German regions. The number of entities covered in the reports analysed ranges from 12 to 1,100 with a mean of around 146 entities. To produce the final ranking, the indices on average apply around 35 indicators, ranging from 2 to 246 indicators.

When looking at the dimensions covered by the six indices analysed in detail, one could see that fifteen out of the 32 dimensions are covered by at least 50% of the indices. Of these, 'innovation capacity' and 'quality of labour force' are covered by all indices. This means that there is little consensus on which indicator dimensions to include in rankings of regional competitiveness. This is further confirmed by the fact that three of the six chosen indices cover less than 50 % of the dimensions analysed.[202] The fact that there is little consensus on which dimensions are crucial in order to capture regional competitiveness is not surprising as there is also no consensus on the theoretical basis of regional competitiveness. The fact that some indices cover much more dimensions than others is simply a result of the vast amount of indicators – up to 246 in the case of the World Competitiveness Yearbook – that are included in the index.

The *World Competitiveness Yearbook* was introduced in 1996 as a separate report, issued by the IMD, and compares 55 entities. The combination of quantitative and qualitative data is an outstanding characteristic, having some advantages such as information on certain characteristics not available from official sources. At the same time survey data may be misleading as the ranking of a country sometimes depends on the decisions of just a handful of managers, each with their own values and intentions. When looking at the indicators one has to ask why performance indicators such as GDP are often included and not separated from influencing factors such as taxes. This is a mix of outcome factors and input factors, limiting the usefulness the analysis. On the single indicator level, one could see that many indicators are not justified with respect to the theoretical framework and readers are not provided with information why certain indicators are included and on what grounds. The – more illustrative - analysis for the regional level shows a relatively strong correlation only for predicting future unemployment. But it must be said that findings for regions must be treated with care as only five regions were analysed. In general, the report is a wealth of source for business managers to evaluate different business sites, but not so much of help for policy-makers.

202 This could also be explained with the fact that some indices focus on certain aspects of an economy.

World Knowledge Competitiveness Index, introduced in 2002, aims at exploring the relative knowledge capacity and capability across the best performing 125 regions around the world to identify strengths and weaknesses. This is done by taking into account four different forms of capital: financial capital, physical capital, knowledge capital and human capital. The report stands out as one with an elaborate and uncommon index aggregation technique. It applies no fixed weights but its overall ranking is based on the outcomes of a Data Envelopment Analysis. This makes it less vulnerable to criticism in this area. For indicators, data sources are missing very often. In addition to this, in many cases national data or indirectly national data is applied instead of regional data. Looking at the predictive quality, one can see that the index performs poorly with respect to regional real GDP and regional GDP per capita. With relation to future unemployment, it can function as a proxy, although as a weak one.

The *BISW* report, benchmarking the 16 German states, consists of two indices, building on 50 indicators in total. The activity index measures what is actually done to sustain certain levels of economic success while the success index measures the level of current economic success. Neither of the indices applies a specific theoretical framework. When looking at the indicators, it can be seen that they often refer to the ability to attract or place attractiveness. Weights for influencing variables are derived with the help of an econometric analysis, while the weights for the sub-indices and indicators are taken from surveys and migration analyses. The predictive analysis reveals a mixed picture. Whilst both indices are a predictor of future employment changes and unemployment rates, there is a mixed picture for predicting future growth. Both indices cannot function as a proxy for future GDP per capita growth, although the success index has a high correlation with regional GDP growth, significant on the one per cent level. Interestingly, this is not the case for the activity index.

The *State New Economy Index*, with three reports from 1999, 2002 and 2007, has a specific focus on the New Economy and the economic transformation in the 50 US states. It, on the one side, wants to provide a snapshot of this transformation, but, on the other side, refers to state competitiveness. The indicators always centre on economic transformation and dynamism as well as knowledge creation and innovation. Even though the authors state that those

states coping best with economic transformation will see higher economic growth rate, there is a – weak – correlation of around -0.190 with respect to state GDP and state GDP per capita. This correlation is very weak as well as insignificant. With respect to unemployment, the same can be said, that the correlation coefficient is not only lower but next to zero (0.026) and still not significant. In general, the report with its 26 indicators presents a broad snapshot of the spread of New Economy phenomena. One of the other issues is that ranks cannot be compared over time as the construction of the ranking as well as indicators applied change very often. Therefore, policy-makers cannot take into account long-term tendencies for rank changes but must rely on the snapshots the indices provide.

The *State Competitiveness Report* introduced in 2001 consists of 43 indicators, benchmarking the 50 US states. It emphasises the view of state competitiveness as an aggregate of microeconomic firm performance limited by the business environment. They are also inspired by Porter's diamond and his framework developed for the Global Competitiveness Report. For measuring competitiveness, they come up with nine groups of indicators. The ranking itself cannot function as a proxy for future growth with correlation with GDP at 0.126 and with GDP per capita at -0.028. The correlation with future unemployment is significant, although not very strong (0.360). Besides this, the overall transparency is poor; no reasons are given why certain indicators are included and on what grounds different – implicit – weights have been assigned. Also striking is the mix of causal and outcome variables. Comparability over time is low as indicators changed sub-categories in earlier reports and there are only two issues – 2006 and 2007 – with no change of indicators. In general, it must be doubted whether the State Competitiveness Report can be used as a guide for public policy, as intended by the authors.

The *UK Competitiveness Index*, introduced in 2000 by Robert Huggins, ranks 12 UK regions according to their competitiveness. The ranking lacks an explicit theoretical base and framework although the authors point to Storper's (1997) definition. The index is a compromise of what Huggins (2003) has seen as the two main concerns: data availability and explanatory indicators. The strong correlation between the single indicators and the overall results is stated as a

proof for the "strong association with the composite index generated" (Huggins 2003: 94). But this mix of input and output indicators catches very different facets of a regional milieu. This does not provide causal explanations limiting its value especially for policy-makers. In contrast to the many other reports, it actually can function as a rough proxy for future economic performance, which may not be surprising as these variables – GDP, here, GVA and unemployment – form an important part of the index itself, with unemployment rate being one of the two indicators in the outcome measure having an overall weight of 1/6th. What would be needed more is a concise framework based on causal relations. Mixing input with output variables leads to arbitrary rankings or simply works out past economic achievements.

Looking at the correlation analysis results from a policy-maker's perspective, it must be concluded that none of the above indices can be seen as a valid basis for policy-decisions except – with some cautions – for the UK Competitiveness Index. While the UK Competitiveness Index may function as a rough proxy for future economic performance, all other indices perform poorly when it comes to predicting future economic performance.

The results of the index analysis are summarised in the table below:

Table 54: Summary evaluation table

Criteria	WCY	WKCI	BISW	SNEI	SCR	UKCI
Overall clarity and transparency: Information given on ...						
... original data	+	-	+	sources	-	+
... transformed data	-	+	+	o	-	o
... theoretical framework	+	+	(-)	o	-	o
... competitiveness concept and underlying definitions	+	+	(-)	-	o	+
... sources for data	+	o	+	+	-	o
... exact indicator definition	+	-	+	+	o	o
...exact indicator units	+	-	+	+	o	+
... normalisation and transformation technique	o	+	+	+	o	+
... aggregation technique applied	o	+	+	+	+	+
... exact weights applied	o	equal	+	+	+	o
Comparability						
Index construction does not change too often	o	o	+	-	o	+
Indicators do not change too often	o	o	o	-	-	o
Sources and partners do not change too often	o	?	+	o	?	?
Indicators are similarly defined, i.e. use the same sources	o	?	+	+	?	+
Data reflect different entity sizes	-	+	+	+	+	+
Data is not biased by inflationary effects	o	?	+	+	+	+
If applicable: Survey results are comparable, i.e. based on a sufficient number of respondents, take into account cultural biases, and the 'right' people are interviewed	-					
Indicator choice						
Indicators correspond to theoretical framework	o	+	N.a.	+	?	+
No implicit weights applied	-	N.a.	N.a.	o	o/-	-
Index construction evaluation						
Rationale for weights disclosed	+	N.a.	+	+	-	-
Meaningfull ranking orders (in general)	+	+	+	+	?	+
Standardisation and normalisation do not bias results	+	+	+	+	+	o
Aggregation does not bias results	+	?	+	+	+	+
Robustness tests conducted and included	-	-	-	-	-	+
Predictive quality evaluation						
with respect to higher GDP per capita growth rates	(o)	-	-	o/-	-	+
with respect to lower unemployment rates	(+)	o	+	-	o/+	+
if necessary: with respect to higher employment			+			+
Policy impact and media attention						
Citations in official political statements	high	low	high	low*	medium	low
Citations in LexisNexis data base	high	medium	medium	low*	medium	high

Evaluation is done without using fixed and pre-defined grades.
'+' stands for positive evaluation, 'o' for a neutral evaluation, '-' for a negative evaluation;
Information in brackets indicate non-substantial findings, i.e. based on small sample size; ? indicates missing information

* The official media coverage as monitored by the authors lists 49 references.

Source: Author's own based on the respective reports

The broader issues found have first to do with the construction of the indices. Theoretically, the whole construction is mostly not based on a sound theoretical basis but based on some experts' opinion. In some cases – like the Länder ranking of the Bertelsmann Foundation - authors even state that they applied pure statistics and did not base their index within a certain theoretical framework. But of course this is not true as even for the regression analysis they had to include some and exclude other indicators, which will always be based on specific grounds. This can be seen as less than half of the indices supply sufficient information on the theoretical framework. Even then, some indices are based on indicators not in-line with the overall concept behind the ranking.

From a more technical perspective – besides often ignoring differences between cardinal and ordinal numbers – it is interesting that there seems to be no consensus as to how to come up with the final number or how to weight accordingly. Indicators are then often weighted implicitly unequally, despite basing the index on a certain framework and assigning specific weights like in the case of the WCY.

Related with this, index construction changes a lot over time which makes it hard to compare results of some indices over time which leaves the impression of ad hoc empirics. Together with the fact that many indices do not include sufficient information on exact indicator definition or the sources for data so that original data can be looked-up, this adds up to the impression that they are benchmarking for benchmarking's sake and use the competitiveness debate to deliver their own agenda without creating transparency for their readers. The fact that robustness tests are only included in the UK Competitiveness Index fits into this non-transparency and can be seen as a sign of overconfidence of the authors.

In summary the study has shown that generally such simplistic overall rankings are neither very useful from an academic standpoint nor are they a valid basis for policy-decisions. The vast majority cannot function as proxies for future growth or future employment changes. This is also due to the methodological weaknesses.

While the main steps like normalisation of data, weighting indicators and aggregation techniques may be clear[203], the exact weights for single indicators are often chosen on an ad hoc basis and with limited underlying rationale. In theory, weights should relate to a certain theoretical framework and should be derived based on this framework. This can rarely be witnessed for existing indices as often, the theoretical framework is not clearly described. At the moment, many authors simply apply equal weights. Besides the fact that this indeed is some kind of weighting, this often comes with implicit weights and, therefore, must be viewed with much reservation. Aggregating indicators as the last step also is important as simply adding up the numbers builds on some implicit assumptions, for example, that there is as successful track all regions can follow. This goes back to the issue of applying the same weights for all regions despite the fact that regions are very different and may have different developmental goals in mind. It seems as if it is not so easy to carry over management-tools such as benchmarking from the business area and apply them in the context of regions.

This study therefore is important as we know now that such indices are imperfect and that stakeholders and policy-makers should not use them as guidelines for deriving regional policies or for monitoring regional performance without being cautionary. They may take a look at the original indicator values but even then should be very cautious as even on that level, indicators can be biased which was shown for the survey data of the WCY.

203 Of course neglecting the problems of summing-up ordinal and cardinal indicators the same way (Kladroba 2005a: 103).

12.2 Conclusion on the Theoretical Basis of Place Competitiveness

As was shown above, the theoretical base of national and regional competitiveness remains vague and much more work on theorisation is needed. This has to focus primarily on systematising the different approaches. On the national level, Trabold (1995) has offered a method of systematising the different concepts of national competitiveness with the help of four broader categories: ability to attract, ability to sell, ability to adjust and ability to earn. The same has been made on the regional level by Martin (2004) or lately by Bristow (2005a) but with much broader categories such as microeconomic productivity and macroeconomic performance. These two systematisations help grouping the existing approaches to work out commonalities and differences and, therefore, are important and necessary for a broader analysis of the soundness of these approaches.

On the national level, one strand of criticism is that "national economies do not go out of business such as uncompetitive firms" (Kitson et al 2004: 992). The question then is where the bottom line would be. When nations are treated like companies, one assumes that they compete with similar products in the same market. Within this context, authors often call for a strategic management on the national level, focusing, for example, on high-value added activities or exports. This insight is of limited help. The danger here is that such rhetoric is used to justify protectionism and trade wars in a mercantilist way, leading to wealth losses on all sides in the long run.

On the regional level, the fundamental issue is whether the regional scale is the right scale to address spatial competitiveness. The importance of regions stems from the hypothesised critical role they play in fostering innovation and knowledge creation.[204] The focus on regions has also derived from the observation so that although space should not matter any more in an era of globalisation, still there seems to be a tendency of firms to concentrate in certain areas ('glocalisation'), something which led Porter (1990) to develop his cluster approach. The precise role and significance of a region is not clear, as regions are stuck between the macro (national) level and the micro (firm) level (Budd/Hirmis 2004). Notions of the growing importance of

[204] See Bristow (2005a) for an overview on several studies evaluating the influence of regional-level determinants on innovation.

regional competitiveness may then be just political metaphors to please some political groups[205] and may help foster certain policies. Examples include Matthias Platzeck's inaugural speech in 2003 in which the head of government of the state of Brandenburg prepared his citizens for hard reforms by pointing to the low competitiveness of his state. Another example is provided by Jaques Delors who, in a EU Copenhagen meeting in June 1993, addressed the leaders of the European countries and stated that the "root cause of European unemployment was a lack of competitiveness" (Krugman 1994: 28) without ever explaining what he meant with competitiveness.

One general issue underlying both discussions on the national and regional level is the fact that there is also no concept for explaining competitiveness on the firm level. At the moment, the resource-based view competes with the market-based view; even though there are many commonalities between them and some even see a convergence of both views (Stahl 2005: 20). The question then is how authors want to evaluate the local framework for fostering firm competitiveness if there is nothing like a concept of firm competitiveness. This is especially the case for authors following the microeconomic view of regional competitiveness.

The notion of place competitiveness is also often connected with the measurement of spatial performance and a call for performance management on the regional and national scale with the help of development agencies. This view treats geographical spaces just like companies and neglects the differences between the two institutions. One, therefore, perhaps has to let go of the command and control approach and view regions and nations as what they are: complex systems of interacting elements with constant in- and outflows. This is especially true for regions as they are very open (Bristow 2005a).

Then, factors such as trust or culture and what people perceive have to be taken into account. This perception is exactly where regional competitiveness can come into play as national and regional competitiveness is much about the perception of the "otherness" (Bellini et al 2008) of a region. Such an otherness will always be relative to other regions, which, again, means that regional competitiveness is a relative

205 One may think of regions aiming at seeking their independence as a sovereign state.

concept. This does not answer the fundamental question if a region is manageable with the help of such comparisons.

It can, therefore, be argued that regional competitiveness could have a meaning for regional science if it is applied as a relative concept and in a benchmarking sense. This is because there is a need to benchmark[206] and learn from others as this might prove a good way of gaining some new insights for deriving policies. The basic problem still exists that stakeholders want to monitor progress and, therefore, have a thirst for indices as a performance management tool. In addition to this legitimate request of stakeholders, regional development organisations may also be pushing for such indices. Just as Lagendijk and Concord (2000) have discussed, there is some kind of competition for resources, for instance, for project funding. Consultancies can then position themselves with the help of such indices by gaining attention from the media.[207] The media itself is keen to publish such rankings as this pushes publicity and circulation (Malecki 2004: 1107).

This shows that however reasonable the application is, it would often be better placed in political science or marketing. In a reply to Krugman's (1994) critique on the notion of national competitiveness, Cohen (1994: 196) argues that such notions are simply "metaphors, [trying] to encapsulate complicated matters for purposes of political mobilization." This shows that the notion of competitiveness – be it on the national or regional level – is mostly just political rhetoric. For this purpose, regional competitiveness indices and rankings can also be of help for policy-makers in a different way: they can help mobilise resources for a certain political agenda by pointing to such ranking results.

Looking at this study and taking into account technical and theoretical issues, it must be concluded that most ranking results should be disregarded totally. Only on the level of single indicators could such indices prove helpful for benchmarking. More work is needed here, which leads to the last point, suggestions for further research.

206 This is not to argue for a society of control as Deleuze labelled it. It is simply a fact that at the moment initiatives for monitoring, reporting or benchmarking are en vogue. This may also have its downsides but that's the zeitgeist and not the focus of this work.

207 As shown above, 59 % of the indices found are issued by private for profit or non-profit companies.

12.3 Suggestions for Further Research

Index Construction

Further research in the field of index analysis should focus first on giving a more accurate and complete overview of existing indices in the world. Therefore, indices not issued in English, French or German also should be taken into account to come up with a clearer picture on the index industry. This should also involve contacting the authors to openly discuss their methodology and fully understand their theoretical framework as well as working on different aggregation techniques. Data envelopment analysis as applied by Huggins shows that alternatives are there. Applying simulation techniques such as the Monte-Carlos simulation may also prove helpful for ranking entities. Based on these findings, one could then conduct robustness tests to verify whether results remain stable and how different techniques influence ranking results.

More research is also needed with respect to the survey data. Here, researchers should focus on possible cultural biases as this could play an important role. People have some benchmarks in mind when they answer questions about place competitiveness. It is, therefore, important to get all background information on the people being asked, their educational and cultural background and possible motives for answering. In addition to these, it would prove helpful to go through the exact translation of questions asked and assess how respondents actually did understand the questions.

Future studies should also evaluate the predictive quality of competitiveness indices based on a broader data basis, with respect to different economic indicators and with larger time-spans. This may not be easily possible for regional indices at first sight, but could be first done for some European or American regions as data should be available for these regions, as could be shown with this thesis.

Further research should also address how policy-makers actually incorporate such rankings in their decisions. As could be seen, many indices are cited in parliaments or in official governmental statements. Austria even published advertisements

emphasising the highly motivated workers, cited from the WCY. These impacts on policies should be identified and highlighted to better understand the mechanisms behind. Therefore, more work is needed, especially in co-operation with political science.

Regional Competitiveness Hegemony

There was an interesting separation of studies that could be observed: while most of the research concentrates on the indicators and their meaning, another group of researchers merely look at the construction form a mathematical perspective. Further research should be inter-disciplinary, taking into account all different aspects of regional indices, especially the policy aspects.

At the moment there is a strong competitiveness hegemony that is not questioned the way it should be questioned. Even though some authors like Bristow and Wells (2005) do doubt this paradigm and provide possible alternatives, it is still widely applied uncritically. This may be due to the fact that economists do not pay attention to rankings or the notion of competitiveness. This is dangerous. First of all, leaving the field to the blind followers and mercantilists – as Krugman called them – will even lead to more 'undertheorised' indices and policy recommendations. Secondly, policy makers indeed take the findings as granted and respond to them, mainly because of the media attention they receive. Researchers, therefore, must also find a way to be heard in public – besides the fundamental work on the theoretical basis – to break the competitiveness hegemony and start a discourse on how to help regions based on policies that take into account regional characteristics and not apply catch-all approaches from best cases for all kind of regions.

The discussion should also be brought back to regional development and not focus on regional competitiveness alone as this is just one specific area of regional science, focusing on benchmarking. It is, for example, still not clear how to define well-being and measure it properly. As well-being is the central goal in life, this should be focused more. From a policy standpoint, this is problematic as there are no good measures of well-being besides some questionnaires from Happiness Economics. As evaluations are important nowadays, this could be a barrier. Here, more meaningful indicators are needed.

13 Appendix

13.1 Regional Development Theories and Linkages to Regional Competitiveness

The discussion showed that there is no theory of regional competitiveness. Rather than that the concept draws from many different regional development theories and incorporates a lot of single measures. The following table lists current regional development theories and shows linkages to the concept of regional competitiveness as well as typical indicators. It also summarises the basic policy recommendations and the implications for regional competitiveness. A summary with the main points of to all of the below stated regional development theories is included in the appendix.

Table 55: Regional development theories and linkages to regional competitiveness

Theory/ approach	Basic Proposition	Basic policy implication	Implications for competitiveness	Typical indicators
(Neo)classical economics	Markets are stable and perfect, mobility will ease regional disparities, convergence takes place	Markets must be open and without restrictions (free market hypothesis), minor interventions	Ricardian comparative advantage theory, all nations have comparative advantages Trade plays the most important role in the division of labour. The notion of competitiveness is not relevant in the long run as markets are perfect.	• Indicators which measure the degree of market liberalisation and governmental intervention • Indicators of input factors • Productivity • Tax burdens
Economic/export base theory	Outside demand drives economic development	Focus on exporting industries, minor interventions	External demand signals competitiveness, whether price or non-price based	• Indicators of exporting activities and exporting sectors
Product cycle theory	Innovations are crucial for development	Foster innovation policies	Price competitiveness for producers and non-price competitiveness for innovators (short run).	• Indicators of innovation activities • Home demand for advanced goods
Stages of growth theory	Regions/nations pass different stages when developing; technological progress as key driver	Foster technological progress and investments and "let capitalism work"	Competitiveness and the kind of competitiveness (price/non-price) depends on the stage of development	• Degree of industrialisation to assess the current stage of the economy, e.g. degree of innovational capacity • Indicators of the degree of market liberalisation
Long wave theory	Application of basic innovations drive economic development	Foster application of basic innovations	The ability to apply basic innovations determines competitiveness.	• Indicators of innovation activities (if it fits with current basic innovations), e.g. patents

Theory/ approach	Basic Proposition	Basic policy implication	Implications for competitiveness	Typical indicators
Theory of sectoral change	As regions/nations develop, focus shifts from primary over secondary to tertiary sector	Help "shifting" an economy to the tertiary sector	The area of competitiveness will shift from agrarian to industry and finally to the service sector.	• Share of tertiary sector
Growth pole theory	Growth processes lead to polarization; innovations drive these processes	Foster innovation (theory originally not spatially applied) and focus on infrastructure	(Theory originally not spatially applied)	• Indicators of innovation activities like patents or employee suggestions
Core-periphery approach (Friedman)	Growth processes cause uneven development processes; innovations drive these processes	Help peripheral regions to bridge the gap between the core and the periphery, focus on infrastructure	Central regions will have an initial advantage. Peripheral regions will stay uncompetitive if no interventions take place.	• Indicators for (income) imbalances of regions • Indicators of (possible) spread effects (e.g. political forces) • Indicators of regional innovation activities
Theory of unbalanced growth	Growth processes cause uneven development processes; innovations drive these processes	Foster trickle-down-effects, focus investment on a few key places/firms/ industries, invest in infrastructure	Some regions will be left behind and stay uncompetitive, dependent on the strength of trickle-down-effects.	• Indicators of imbalances of regions (distribution of income etc.) • Indicators for trickle-down-effects • Indicators of the focusing of investments • Indicators of innovation activities
New Trade Theory/New economic geography	Imperfect competition can cause polarization processes based on increasing returns and economies of scale.	Foster specialisation at the industry level, investments in human capital and technology are important as well as learning processes on the regional level.	Economies of scale and learning processes i.e. innovations are a crucial explanation for the competitiveness.	• Indicators of labour force education or innovations (e.g. patents) • Indicators that deal with the size of the home market

Theory/ approach	Basic Proposition	Basic policy implication	Implications for competitiveness	Typical indicators
Theory of cumulative causation	Growth processes cause uneven development processes; innovations drive these processes	"Manage" development to ease imbalances and invest in infrastructure	Convergence is slow if it ever takes place, i.e. catch-up is slow, so some regions/nations will stay richer than others in the long run.	• Indicators of imbalances of regions • Indicators of effectiveness of measures to ease imbalances • Indicators of innovation activities
Central place theory	Transportation costs limit the possible market of a good; these different markets form a hierarchical system of central places	No special recommendations; some implications for regional planning, but no concrete measures	Transportation costs determine the distribution of activities	• no. of activities with importance on the regional or interregional level, e.g. retailing attraction for non-locals
Endogenous growth theory	Endogenous factors drive economic development, especially innovations	Use the endogenous potential of a region, invest in human capital and R&D	Differences in human capital explain much of the different competitiveness.	• Indicators of internal input factors and potential for development (e.g. human capital)
Entrepreneurship	New ventures drive economic development	Utilize the potential of entrepreneurs, create an entrepreneurial environment to foster entrepreneurship and innovation	Those with an entrepreneurial culture and the will to build something new will be more competitive as new companies will foster (international) competition.	• Entrepreneurial activities, • Entrepreneurial culture
Cluster approach	Companies group because it is advantageous; innovations drive economic development	Creation of environments in which companies can gain competitive advantage	Competitiveness is driven by the microeconomic level, i.e. firms and is dependent on the shape of the local diamonds	• Indicators to assess the internal relations and strength of the diamond

Source: Author's own

13.2 Ranking of Medal List of the Olympic Games in Athens 2002

The following is an example on how weights and aggregation rules influence ranking results. The list is based on the final medal list of the Olympic Games in Athens 2002 final medal list.

The original ("final") ranking is derived by first ranking according to the number of gold medals, then by the number of silver medals and then by the number of bronze medals. This leads to the strange situation that e.g., for instance, Norway (17^{th} place) with six medals ranks higher than Bulgaria with 12 medals (33^{rd} place).

When ranking according to the total number of medals, that is applying equal weights, this changes drastically with Norway now on the 32^{nd} place and Bulgaria on the 19^{th}. When applying unequal weights by multiplying the number of gold medals with 3, silver medals with 2 and bronze medals with 1, both nations now come close with Norway on the 25^{th} and Bulgaria on the 23^{rd} rank.

This makes clear that the ranking depends on the emphasis put on gold medals. The first variant puts an 'absolute' weight on gold medals, meaning that one gold winner counts more than any number of silver or bronze medal winners. The second variant does not distinguish between the three medals and, therefore, sees no difference between the first three ranks, neglecting differences. The third variant puts a higher weight on gold and silver medals but does take into account the number of total medals awarded.

As data is not normalised, all three variants do not take into account information on distances between the three ranks. Even in this example, the norms and values behind the ranking rules influence the results and can be worked out.

Table 56: Example for weighting changes-Olympic medal list Athens 2004

Final rank	Nation	Gold medal	Silver medal	Bronze medals	Score total	Rank total	Diff.	Score weighted	Rank weighted	Diff.
1	United States (USA)	36	39	27	102	1	0	213	1	0
2	China (CHN)	32	17	14	63	3	-1	144	3	-1
3	Russia (RUS)	27	27	38	92	2	1	173	2	1
4	Australia (AUS)	17	16	16	49	4	0	99	4	0
5	Japan (JPN)	16	9	12	37	6	-1	78	6	-1
6	Germany (GER)	13	16	20	49	4	2	91	5	1
7	France (FRA)	11	9	13	33	7	0	64	7	0
8	Italy (ITA)	10	11	11	32	8	0	63	8	0
9	South Korea (KOR)	9	12	9	30	9	0	60	9	0
10	Great Britain (GBR)	9	9	12	30	9	1	57	10	0
11	Cuba (CUB)	9	7	11	27	11	0	52	11	0
12	Ukraine (UKR)	9	5	9	23	12	0	46	12	0
13	Hungary (HUN)	8	6	3	17	16	-3	39	14	-1
14	Romania (ROU)	8	5	6	19	14	0	40	13	1
15	Greece (GRE)	6	6	4	16	17	-2	34	17	-2
16	Brazil (BRA)	5	2	3	10	21	-5	22	20	-4
17	Norway (NOR)	5	0	1	6	32	-15	16	25	-8
18	Netherlands (NED)	4	9	9	22	13	5	39	14	4
19	Sweden (SWE)	4	2	1	7	28	-9	17	23	-4
20	Spain (ESP)	3	11	5	19	14	6	36	16	4
21	Canada (CAN)	3	6	3	12	19	2	24	19	2
22	Turkey (TUR)	3	3	4	10	21	1	19	21	1
23	Poland (POL)	3	2	5	10	21	2	18	22	1
24	New Zealand (NZL)	3	2	0	5	37	-13	13	30	-6
25	Thailand (THA)	3	1	4	8	24	1	15	26	-1
26	Belarus (BLR)	2	6	7	15	18	8	25	18	8
27	Austria (AUT)	2	4	1	7	28	-1	15	26	1
28	Ethiopia (ETH)	2	3	2	7	28	0	14	28	0
29	Iran (IRI); Slovakia (SVK)	2	2	2	6	32	-3	12	33	-4
31	Chinese Taipei (TPE)	2	2	1	5	37	-6	11	36	-5
32	Georgia (GEO)	2	2	0	4	46	-14	10	38	-6
33	Bulgaria (BUL)	2	1	9	12	19	14	17	23	10
34	Jamaica (JAM); Uzbekistan (UZB)	2	1	2	5	37	-3	10	38	-4
36	Morocco (MAR)	2	1	0	3	51	-15	8	44	-8
37	Denmark (DEN)	2	0	6	8	24	13	12	33	4
38	Argentina (ARG)	2	0	4	6	32	6	10	38	0
39	Chile (CHI)	2	0	1	3	51	-12	7	48	-9
40	Kazakhstan (KAZ)	1	4	3	8	24	16	14	28	12
41	Kenya (KEN)	1	4	2	7	28	13	13	30	11
42	Czech Republic (CZE)	1	3	4	8	24	18	13	30	12
43	South Africa (RSA)	1	3	2	6	32	11	11	36	7
44	Croatia (CRO)	1	2	2	5	37	7	9	42	2
45	Lithuania (LTU)	1	2	0	3	51	-6	7	48	-3
46	Egypt (EGY); Switzerland (SUI)	1	1	3	5	37	9	8	44	2
48	Indonesia (INA)	1	1	2	4	46	2	7	48	0
49	Zimbabwe (ZIM)	1	1	1	3	51	-2	6	53	-4
50	Azerbaijan (AZE)	1	0	4	5	37	13	7	48	2
51	Belgium (BEL)	1	0	2	3	51	0	5	54	-3
52	Bahamas (BAH); Israel (ISR)	1	0	1	2	58	-6	4	57	-5
54	Cameroon (CMR); Dominican Republic (DOM); United Arab Emirates (UAE)	1	0	0	1	65	-11	3	62	-8
57	North Korea (PRK)	0	4	1	5	37	20	9	42	15
58	Latvia (LAT)	0	4	0	4	46	12	8	44	14
59	Mexico (MEX)	0	3	1	4	46	13	7	48	11
60	Portugal (POR)	0	2	1	3	51	9	5	54	6
61	Finland (FIN); Serbia and Montenegro (SCG)	0	2	0	2	58	3	4	57	4
63	Slovenia (SLO)	0	1	3	4	46	17	5	54	9
64	Estonia (EST)	0	1	2	3	51	13	4	57	7
65	Hong Kong, China (HKG); India (IND); Paraguay (PAR)	0	1	0	1	65	0	2	65	0
68	Colombia (COL); Nigeria (NGR); Venezuela (VEN)	0	0	2	2	58	10	2	65	3
71	Eritrea (ERI), Mongolia (MGL); Syria (SYR); Trinidad and Tobago (TRI)	0	0	1	1	65	6	1	71	0

Score total: Σ all medals
Score weighted: Σ gold x 3, silver x 2, bronze x 1

Source for original data: Wikipedia

Average change	1.92	Average change	0.69
Greatest change	20	Greateds change	15
# unchanged	13	# unchanged	18
% changed	**82.4%**	% changed	**75.7%**

Source: Author's own based on data from Wikipedia

13.3 Proxy Indicators of the WCY 2006

Table 57: Proxy indicators as included in the WCY 2006

Economic Performance		Government Efficiency		Business Efficiency		Infrastructure	
1	1102	1	2201	1	3101	1	4110
1	1103	0	2203	1	3102	1	4118
1	1104	0	2204	1	3103	0	4119
0	1105	0	2205	0	3104	0	4120
0	1106	1	2408	0	3105	1	4121
0	1107	**2**	**5**	0	3106	1	4201
0	1108			0	3107	1	4211
0	1109			1	3208	1	4218
0	1110			1	3210	1	4301
1	1113			1	3211	1	4302
0	1114			1	3212	1	4303
0	1115			1	3214	1	4304
0	1116			1	3301	1	4305
0	1117			1	3303	1	4312
1	1120			0	3304	1	4317
0	1121			1	3311	1	4318
0	1122			1	3312	1	4320
0	1123			1	3313	1	4321
0	1124			1	3320	1	4412
0	1203			**14**	**19**	1	4501
0	1204					**18**	**20**
0	1205						
0	1206						
1	1207						
1	1208						
1	1209						
1	1210						
1	1211						
1	1212						
0	1214						
0	1215						
0	1216						
1	1218						
1	1220						
1	1301						
1	1302						
1	1303						
1	1304						
1	1305						
1	1306						
1	1307						
1	1308						
0	1309						
0	1310						
0	1311						
0	1312						
1	1316						
1	1317						
1	1401						
1	1402						
1	1403						
26	**51**						

Source: IMD (2006)

Note:
"0" indicates indicator not included in the overall ranking
"1" indicates indicator applied for the overall ranking
The numbers in the second column refer to the numbers in the report

Source: Author's own based on data from IMD (2006)

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