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INSTITUTIONAL SPHERE CONTRIBUTION  
TO HUMAN DEVELOPMENT:  
AN INSTITUTIONAL APPROACH

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and Houda Abdenneji

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# **INSTITUTIONAL SPHERE CONTRIBUTION TO HUMAN DEVELOPMENT: AN INSTITUTIONAL APPROACH**

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## Abstract

The main objective of this work is to emphasize the importance of integrating the institutional indicator component for evaluating human development. To this aim, we propose a human development composite index (HDCI), which oversteps the HDI published by the UNDP. Our HDCI takes into account the three economic, social and institutional spheres. We used as institutional indicators, those of Kaufmann, Kraay and Mastruzzi (KKZ) for a sample of 178 countries. We reclassified these countries in an increasing order of HDCI to estimate the differences compared to the HDI. We identified four groups of countries at different development levels (HDCI). We found, for every group, countries outgoing and countries entering from the initial HDI classification towards lower or superior levels of HDCI according to the importance of their institutional sphere. Finally, to provide a comprehensive analysis of interrelationships among the determinants Human Development, we make a sensitivity analysis using Borda rule, equal weight method and the principal components approach. We show that various measures of HDCI are highly sensitive to indicators that are considered in the construction, and how measurable indicators are aggregated and weighted to arrive at HDCI.

## ملخص

الهدف الرئيسي من هذه الورقة هو للتأكيد على أهمية إدماج العنصر المؤسسي لتقييم مؤشر التنمية البشرية. لتحقيق هذا الهدف، فإننا نقترح مؤشر التنمية البشرية المركب (HDCI)، والذي يتعدى دليل التنمية البشرية الصادر عن برنامج الأمم المتحدة الإنمائي. يأخذ مؤشر التنمية البشرية المركب بعين الاعتبار المجالات الثلاثة: الاقتصادية والاجتماعية والمؤسسية. كما استخدمنا المؤشرات المؤسسية، تلك التي لكوفمان، وكراي وماستروزي (KKZ) للحصول على عينة من 178 بلدا. ولقد صنفنا هذه البلدان حسب مؤشر التنمية البشرية المركب بشكل تصاعدي لتقدير الاختلافات بالمقارنة مع HDI. حددنا أربع مجموعات من البلدان ذات مستويات التنمية المختلفة (HDCI) وجدنا، انه لكل مجموعة بلدان هناك التي تدخل وتخرج من تصنيف مؤشر التنمية البشرية الأولى HDI نحو مستويات أدنى أو أعلى من HDCI وفقا لأهمية مجالها المؤسسي. وأخيرا، نقدم تحليل شامل لتنمية العلاقات المتبادلة بين العوامل البشرية، وإجراء تحليل الحساسية باستخدام قاعدة Borda، وطريقة الوزن المتعادل ونهج المكونات الرئيسية. ونظهر أن التدابير المختلفة HDCI تكون شديدة الحساسية للمؤشرات، وكيفية تجميع المؤشرات القابلة للقياس للتوصل الى HDCI.

## 1. Introduction

The debate on the factors explaining differences in growth between countries gave the institutions a major role. The institutions have been considered as a major determinant of development with the new institutional economics<sup>1</sup>. Following the theoretical corpus of the new institutional economics and new economic policy -positive economy- the report on development in the world for 2002 emphasizes the need to build institutions in developing countries given their importance in the functioning of markets and poverty reduction. Based on studies linking inequality to institutions, the Report on World Development, for 2006, shows that inequality adversely affects growth.

Although governance indicators are present in the official publications, they are considered individually and no composite index involving all three spheres -economic, social and institutional- is used to classify countries. World Bank classification is still dependent on the economic sphere (GDP per capita), alone which is not sufficient to reflect the level of development. The UNDP classification adds the social sphere (adult literacy rate, enrolment rates and life expectancy)<sup>2</sup> in addition to the economic sphere to calculate an indicator of human development, HDI.

The main objective of this work is to emphasize the importance of integrating the institutional indicator component for evaluating human development. The concept of institution is multidimensional and the definition and the measurement of the institutional variables are not so obvious.

Some works took only one component to measure governance. Barro (1996) introduced democracy. Clague et al. (1996) focused on respect for property. Scully (1988), Grier and Tullock (1989), Barro (1996), Helliwell (1994) and Isham et al. (1997), taking as indicator of governance, civil liberties, have found that this indicator may improve economic growth. Kormendi and Meguira (1985), Acemoglu et al. (2004) and Rodrik et al. (2002) took as proxy for governance, security of property rights, to show that this indicator can explain the growth differences between rich and poor countries. Kaufmann et al. (2004), taking the rules and laws, as an indicator, found that a proper application of rules and laws improves the level of income. Alesina and Perotti (1994, 1996), Barro (1991), Londregan and Poole (1992), and Svensson (1998) have highlighted that political instability and political violence undermine growth<sup>3</sup>.

Other studies used composite index of governance to explain the growth differences between countries. Dasgupta and Weale (1992) introduced indices of political rights and civil liberties. Knack and Keefer (1995), showed that the security of contracts and property rights improve growth. Mauro (1995) used three indices -the index of corruption, bureaucratic quality index and the index of political stability- to show that the correlation of these three indices with growth and investment is positive. By using the comprehensive index of governance,

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1 The seminal paper dates from 1937, that of Ronald Coase which introduced the concept of transaction costs.

2 The human development index (HDI) classifies countries into four groups: (i) countries with very high human development (HDI between 1 and 0, 9), (ii) countries with high human development (HDI between 0.89 and 0.8), (iii) countries with medium human development (HDI between 0.79 and 0.5) and (iv) countries with low human development (HDI between 0.49 and 0).

3 Considering the multidimensional nature of institutions, the empirical literature suggests causal relationships ranging from institutions to growth or from growth or living standards to institutions. Pritchett (1995) showed that institutions are not necessarily a factor of growth even if they are a very desirable. However, political stability seems to play an important role in growth. In fact, political conflicts and civil wars are considered by Przeworski (2000) as very devastating, and are a major cause of weak growth in poor countries.

Kaufmann et al. (2002) and Easterly and Levine (2002) showed that governance is an important determinant of growth<sup>4</sup>.

The objective of this research is twofold. First, we compute a composite indicator, the human development composite index, HDI. We used the principal component method on the three sphere indicators to measure the global development in the world. Second, we undertake a new classification based on a composite indicator, showing changes in rank from the UNDP classification. This work could serve to distinguish incoming countries from outgoing countries considering the HDI. The goal of ranking countries according to the principal component index is to separate or characterize different countries according to the chosen measure of the three spheres components. The composite index is defined as the linear combination of the constituent indexes with maximal variance. Maximizing the variance serves to 'spread-out' the resultant rankings, which in turn serves to maximize information content and therefore helps to categorize or rank countries as effectively as possible.

To meet these objectives, our paper is organized as follows: In the first section, we analyze the failure of habitual indicators to measure countries development. In the second section, we present our method of constructing the composite indicator of human development and we discuss our results on changes in rank compared to those of the HDI. In the third section, we analyze the contribution of the institutional area in countries development compared to economic and social sphere. We then address sensitivity analysis in section 4, we draw the results of the robustness assessment to the assumptions and methodological choices made for the construction of the index. The last section draws the conclusions.

## **2. The failure of development indicators**

### ***1.1. Economic sphere versus social sphere***

Comparing the classifications of the WB expressed by GDP per capita<sup>5</sup> and UNDP based on the human development index HDI<sup>6</sup> for 2007, some countries gain rank and progress from the group of countries with medium income as defined by the WB to the group with high level of development according to UNDP. While, certain countries like Saudi Arabia, Bahrain and Oman lose their rank in the group of countries with very high development level to a lower level of development. Table 1 illustrates a clear discrepancy in classification between the WB and the UNDP.

Other countries have, for most of them, a change in rank but not in classification. The classification of countries according to the only indicator of living standards used by the WB under-estimates the country, which has no significant resources, particularly energy and mineral resources. Besides, as shown in Figure 1, as the relationship between the classifications of the WB and the UNDP is not linear, the majority of countries changed in rank.

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4 Several authors who suggested causalities in several senses mentioned endogenous problems. The level of development of a country can affect the quality of its institutions. Thus, some countries can produce good institutions because they already have a high level of development; in this case the level of development affects the institutions. But some countries have become developed because they have built the right institutions. However, State institutions, which lack credibility and weakly consolidated, non-legitimate political regimes, social norms promoting discrimination and exclusion, are sources of poverty.

5 The World Bank (2009) classifies countries according to GDP per capita: (i) low-income countries: \$ 935 or less, (ii) middle-income countries: \$ 936 to \$ 3 705, (iii) country income above the average of \$ 3 705 to \$ 11 455 and (iv) high-income countries: more than \$ 11 456.

6 The human development index (HDI) classifies countries into four groups: (i) countries with very high human development (HDI between 1 and 0, 9), (ii) countries with high human development (HDI between 0.89 and 0.8), (iii) countries with medium human development (HDI between 0.79 and 0.5) and (iv) countries with low human development (HDI between 0.49 and 0).

Considering the social sphere in the development, some countries show very different levels of human development for close levels of per capita incomes. Countries, such as Japan, Bahrain, New Zealand, which have similar per capita incomes, exhibit very different levels of HDI. Bahrain has moved to a lower level of development as defined by UNDP while Japan and New Zealand remain at the same level of development. Saudi Arabia and Oman, which have close income per capita levels to those in Chile and Estonia, exhibit different levels of human development. While the former loses rank and switches to a lower level of human development, the second gains rank and moves into a higher level. This raises the question: which indicator(s) then will fit best to allow a good definition of the development? Should we consider the economic development using only the economic sphere or should we add the social sphere to speak of human development in the broadest sense of the term involving both the economic and social sphere?

However, the failure of economic reforms advocated by international institutions has also shown the limits of the definition of development based on both economic and social spheres. In fact, the HDI as an indicator<sup>7</sup> is the subject of three main criticisms (Noorbakhsh, 1998; Neumayer, 2001; Hicks 1997). The first relates to the insufficient number of variables considered and to the arbitrary selection and weighting of HDI component (Srinivasan, 1994; Kelly 1991). The second is the redundancy between the three variables (GDP per capita and adult literacy rate and life expectancy), plus a strong correlation between HDI and GDP, which can reduce the effect of a strong change in rows according to two indicators (McGillivray, 1991; McGillivray and White, 1993). The third concerns the adequacy of the definition in terms of the approach by the "capabilities" which is supposed to make it operational. Sen (1984) doesn't make any explicit list of "capabilities" to be taken into account in the development of indicators of well-being and opens the way for multiple proposals (Alkire, 2002; Gasper, 2002). Therefore, there is no reason, theoretically and empirically, for the three indicators selected for the construction of the HDI instead of other indicators such as respect for political rights and civil liberties.

## ***2.2 Institutional sphere versus economic and social spheres***

On the basis of criticism of the HDI, other factors must now be taken into account in the definition of development; these are indicators of governance. In recent years, there has been a surge of interest on governance and its effect on development through the proliferation of several indicators measuring subjective perceptions of various aspects of governance.

In this paper, we refer to the database used by the most economic literature that of Kaufmann, Kraay and Zoido-Lobaton (2008). KKZ constructed six aggregate indicators corresponding to six basic governance concepts, compiled from more than 300 governance measures.

The first two indicators measure the process, by which the authority is selected and replaced :

- "Voice and Accountability" which measure the extent to which citizens of a country are able to participate in the selection of their governments;
- "Political Stability and absence of Violence." Which measure perceptions of the likelihood that the current government will be destabilized or overthrown by unconstitutional means and /or violence.

The state's ability to formulate and implement sound policies is measured by two indicators:

- "Governmental Effectiveness" which relates to the elements necessary for the government to produce and implement good policies;
- "Regulatory Burden" includes measures of the impact of market policies.

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<sup>7</sup> HDI = (life expectancy index + education index + GDP Index) / 3

The two last indicators measure compliance by citizens and state institutions, which govern their interactions:

- "Rule of law" which measures the extent to which agents have confidence in the rules of society and agree to abide by them;
- "Control of corruption or Graff." measures perceptions of corruption<sup>8</sup>.

These authors, using this database, showed that there is a strong causal relationship between good governance and a higher level of development, characterized by higher per capita incomes, lower infant mortality and higher literacy (Kaufmann, Kraay and Zoido-Lobaton, 1999a).

The definition of governance used in this work is that used by these authors. Indeed, governance is defined as the traditions and institutions by which authority in a country is exercised. This includes the process by which governments are selected, monitored and replaced, the government's ability to effectively formulate and implement sound policies and compliance by citizens and the state of economic and social institutions that govern their interactions.

Using these indicators, we assess for each country of our sample, the level of its governance from the development of a synthetic indicator of governance. Moreover, considering countries with close HDI, differences are observed in the quality of their institutions. The deficit in terms of governance seems more pronounced than that of their social sphere. For instance, the United Arab Emirates, Kuwait and Qatar, are well ranked in terms of GDP per capita when compared to Iceland, Denmark and Finland, but lose in the HDI ranking, especially under the governance index, whereas ranking changes are contrary to those for Nordic countries. It is the importance of the institutional sphere in development of HDI, which makes countries like Lebanon, with its strong political instability and Libya with the lack of free media unable to be regarded as countries well ranked in the scale of development. While Chile, with its developed political system and the quality of its institutions, should be classified among the highly developed countries; although it is classified by UNDP in the group of countries with medium human development. Table 2 shows some examples of ranking according to governance index.

It follows that with close levels of HDI, countries with different institutional frameworks cannot be considered as countries with similar levels of development. Then we investigated an approach that considers, in addition to economic and social sphere, the institutional sphere. We drew a regression line on the resulting Figure and examined the position of groups of countries according to governance index over the line. As shown in Figure 2, we find significant differences between countries within each group.

Figure 2 shows a weak correlation between the two indices HDI and governance ( $r = 0.55$ ). The Figure has a large funnel-shaped bottom and narrows at the top showing a high correlation between the two indexes for those projected in a higher position (developed countries) and for those located down (the developing countries). This regression shows the difference in governance in many countries with similar levels of human development. Countries with good governance (Finland, Switzerland, Netherlands, etc.) and countries with bad governance (Italy, Israel, South Korea, etc.) are placed in the same group of countries with very high development HDI. Italy, South Korea, Greece and Israel exhibit lower levels of governance than they should do, given their level of development according to the HDI. This institutional gap is widening more and more if we compare the first group of countries

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<sup>8</sup> However, measures of corruption differ depending on the sources used, ranging from the frequency "of additional payments to get things done" to the effects of corruption on the business environment. (Kaufmann, Kraay and Zoido-Lobaton, 1999b).



with some Gulf countries, which have the same level of GDP per capita (Table 3). Thus, the countries of Gulf mark a significant delay in democracy and political freedom since, according to the WB's Governance Indicators; these countries are assigned a negative value with respect to the indicator "Voice and accountability"<sup>9</sup>. Regarding other indicators, the United Arab Emirates, Kuwait, Oman and Qatar are awarded by positive, but very low values, compared to developed countries. A low level of voice and accountability in addition to its almost absent democracy marks Bahrain. Similarly Saudi Arabia is characterized by a low level of rule of law, high levels of corruption and inefficiency public.

Hence, by only referring to economic and social spheres, it isn't sufficient enough to speak of development; the introduction of the institutional area is necessary. Thus, countries located near the correlation line are those which institutional sphere is consistent with the level of development so that countries above this line, due to a high quality of their institutions, deserve best ranking in the ladder of development. The countries located below the correlation line are characterized by an overestimation of the level of development due to poor quality of their institutional area; they should belong to lower levels of development if we simultaneously include economic, social and institutional spheres.

The construction of a representative indicator of these three spheres is needed to better assess the development in a country. Then, from the various regressions we have calculated, we propose to define a composite indicator of development.

### **3. Une analyse multidimensionnelle du développement / A multivariate analysis of development**

#### ***3.1 Construction of the Composite Index of Human Development: HDCI***

Human development is a multidimensional concept involving the three spheres-economic, social and institutional. The usefulness of the composite indicators is being increasingly recognized to analyze and to communicate complex and multidimensional issues, as it is the case of human development.

The construction of Composite Indexes involves stages: the selection of indicators, the treatment of missing values, the choice of aggregation model, the weights of the indicators, and so on. The choices of these parameters can be used to manipulate the results. It is, thus, important to use sensitivity analysis to study the robustness of our HDCI. We first evaluate the index as a weighted average of the basic indicators by considering principal components weights. Second, we use an alternative weighting methods: equal weights, and Borda Rule (that is, ranks based on the sum of individual factor ranks) and alternative aggregation methods.

The weighting of each sphere in the composite index of human development depends on the importance of each of them in the process of development. The aggregation method used in calculating the HDI adopted equal weighting for representing different aspects of the design (subjective method). In the literature, several methods are proposed for the calculation of composite indicators and almost all are based on multivariate statistical analysis (objective method). Sahn and Stifel (2001) proposed the use the technique of factor analysis to determine the weights of variables. In the same case, Filmer and Pritchett (1998) use a variant of factor analysis, which is the Principal Component Analysis (PCA) to determine the weights.

In our study, for the construction of the composite indicator of human development, we use the approach of Filmer and Pritchett (1998). In fact, this method is better suited to the nature

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<sup>9</sup> Saudi Arabia (-1,616), Kuwait (-0.516), Oman (-1.059), Qatar (-0.731), United Arab Emirates (-0.997) and Bahreïn (-0.840).

of our data, which include a set of quantitative variables. In addition, it removes as much as possible arbitrariness in calculating the Human Development Index of UNDP, while avoiding the redundancy between the selections of relevant dimensions of development. The use of multivariate statistical methods (extraction factor axes) may seem more appropriate scientifically and many critics of the HDI propose to replace it by the first axis of principal component analysis performed on the basic indicators (Lai, 2003).

To make a principal component analysis, we take GDP per capita variable as a component of living standards or economic sphere, education and health as components of the social sphere and the six institutional variables to represent the institutional sphere. The principal components analysis group together individual indicators, which are collinear to form a composite indicator, that captures as much as possible of the information common to individual indicators<sup>10</sup>. Principal components analysis allows: (i) to evaluate the similarities between countries -both countries have comparable levels of development if they have similar values for all nine variables- and (ii) to establish a balance of relationships between variables. This second aspect is particularly important. Indeed, it can provide factorial axes that are synthetic variables constituting the best "summaries" of initial variables. The "best" of these summaries, is the principal components, which will constitute our composite indicator of human development.

In present study, we consider that the coordinates of the countries on the F1 axis can be regarded as the values of the new composite index of human development that we can bring in the interval [0,1] (Combarous, 2003)<sup>11</sup>. In fact, Ambapours (2006) used the correspondence analysis (a variant of the technique of data analysis applicable on qualitative variables) to construct a composite indicator of multidimensional poverty in Congo. He took the values of axis F1 as the values of the new indicator. In the same analytical framework, Lawson Body and et al. (2006) have calculated a composite index measuring the state of poverty and inequality in Togo using the same method mentioned above. Berr and Combarous (2004) have calculated a numerical indicator for monitoring the Washington consensus to study the impact of the Washington consensus on developing countries. This multidimensional indicator is obtained by a principal component analysis of ten dimensions (F1 is the value of this indicator).

The first two axes concentrate 85.77% of the variance (see Appendix n°1). All the variables are located in the quadrants North-East and South-East, centred on the F1 axis. It represents a sort of "axis of human development at large sense," which opposes human development (North-East quadrant) to the quality of the institutional system (South-East quadrant). This axis explains 78% of all differences between countries. Thus, the first factorial plan is sufficient to provide a completely correct representation of data. The representation of countries on the first factorial plan illustrates this analysis (Figure 3).

By analyzing the position of the country (and variables) in each quadrant, we can sketch a typology of developing countries and particularly the relative influence of different variables on the formation of the first factorial plan. The study of tools aid to interpretation -as a representation quality (cosine square) and contributions to the axes inertia -shows that most countries are well represented on the factorial plan<sup>12</sup>. The principal component F1 describes

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10 A detailed description on constructing indices using Principal Component Analysis (PCA) can be found in Anderson (1958), Lindeman, Merenda et Gold (1980), StataCorp (1999), Hotelling (1933), Rahman et al. (2003), Ram (1982), Slotje (1991) and Nardo et al. (2005a, 2005b).

11 See Validation of composite indices of development in appendix n°2.

12 See Annex 1: "The quality of representation is an average of 0.570 and half the country has on the quality of representation than 0,700. The countries most badly represented on this map - Albania, Saudi Arabia, Bhutan, El Salvador, Jamaica, Argentina are all close to the inertia."

and classifies countries, from left to right, depending on the effectiveness of their system of governance, economically and socially. To the right of the F1 axis are projected countries characterized by a performance in all three spheres suggesting a close correlation between the level of HDI and institutional quality, as is the case of developed countries. However, we note the extreme diversity of governance systems and level of development in the developing countries dispersed on the two quadrants (North-West and South-West). These results are consistent with those found by Meisel and Ould Aoudia (2007).

First, on the South-East quadrant are projected the developed countries characterized by a high institutional quality compared to their relatively remarkable economic and social spheres. It is such quality of institutions which gives these countries a higher level of development compared to that given by UNDP through HDI indicator. While countries placed on the North-East quadrant are those, which position in development was the result of the good quality of the economic or at least the social sphere rather than institutional sphere. It is primarily most Gulf countries, characterized by poor quality of the institutional sphere.

Then, on the North-West quadrant are projected countries with medium level of human development and poor governance. These are particularly countries in Asia, Latin America and the MENA region. While in the North-East quadrant, which combines the high level of development with good governance, some countries as CEEC<sup>13</sup> are projected. This result is consistent with those found by Labaronne and Ben Abdelkader (2008) who have developed a comparative analysis to examine the deficit and explain the delay in human development and fundamental freedoms in MENA<sup>14</sup> relatively to CEEC.

Finally, at the South-West quadrant, there are countries characterized by poor governance and poor HDI. Countries emblematic in this quadrant are African countries of Sub-Sahara, in particular, Niger, Mali, Burkina Faso, Senegal, Mozambique, but also Sri Lanka, who are at the bottom of the Figure and less close to the horizontal axis. They are characterized by a high poverty rate and poor health and education systems, as well as political instability and a rise in corruption.

In sum, the calculation of the composite index of human development, involving the institutional sphere has repositioned countries in the hierarchy of development. Some countries have migrated from one development level to lower levels due to the ineffectiveness of their institutional spheres while others have improved their rank.

In the following paragraphs, we shall determine the impact of the introduction of governance variables on the change in ranking of countries according to the new HDCI and the migration of these countries from one group to another.

### ***3.2. Classification of countries according to the HDCI***

After calculating the composite index of human development, we proceeded to a classification according to this indicator (HDCI). Our results show that with the exception of a few countries (Bulgaria, Burundi, Central Africa, Dominican and Romania) which have kept the same rank following HDI and HDCI, almost all other countries moved from their initial rank (97.8%). Some countries have gained rank while others have lost rank.

A sphere of institutional quality and thus a significant governance index characterizes a country, which gains places by HDCI. This is the case of Finland, ranked first when considering the governance index. Other countries, including the Gulf countries but also some European countries like Italy have lost ground in the classification by the HDCI

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13 The countries of Central and Eastern Europe

14 The Middle East and North Africa

because of the mediocrity of their institutional sphere, expressed in terms of governance index.

The influence of the institutional sphere becomes more important when countries development changes to a lower or a higher one depending on the HDCI classification compared to that of HDI. Figure 4 shows these various developments.

The projection of the country on the factorial plan takes the form of "trumpet". The positions of the countries are scattered on the left and are heavily concentrated on the right side around axis1. Thus, the left part of the plan includes countries with common characteristics of poor public governance, but with wide disparities in human development and economic dynamism, such as Libya, Russia in the North-West quadrant, Mali and India in the South-West quadrant (Figure 4).

Countries, which have left their groups according to their HDI ranking for a lower level of development by HDCI, were grouped into three circles on the Figure. The three circles represent countries that are different from other countries in their start groups by institutional failures. The circle 1 brings together countries with a very high human development (Italy, Greece, Qatar, etc.) which discriminate sharply from more developed countries having a rather higher HDCI. Circle 2 gathers high human development countries, Russia, Peru, Lebanon ... they differ from their group with a HDCI rather medium given the quality of their public governance. Finally, circle 3 brings together countries with medium human development, Iran, Yemen, Laos, Syria, etc. which according to our rating have low HDCI given their poor public governance relatively to their group. The classification into four classes according to the HDCI can refine our analysis and demonstrates the relevance of our composite index, especially for countries that have changed their groups. Globally, the positions of the groups may eventually be identified along the vertical axis 1 (Figure 4).

*i. Countries with very high HDCI*

These are the countries that camped near axis 1, on its right side. They are mainly those located in the South-East quadrant. This first class includes countries with high human development (UNDP) minus those which have poor governance relative to the group (the right circle, Figure 4) plus those which left the group of countries with high level of development (UNDP): the Bahamas, Chile and Estonia given their good public governance (see Appendix). Countries considered with very high human development index are "liberal" countries". They are European countries (France, Norway, etc.), characterized by a "moderate liberalism" in which states are involved and not corrupt. These countries ensure the proper implementation of law and companies plan and invest in the future. They are open to the outside and fitted with quality public institutions. Unlike the former, they are effective but less protective (U.S., Chile). Finally, Hong Kong and Singapore belong to this group, characterized by a "financial liberalism". They are identified as a 'financial hub', thanks to the quality of their public institutions.

*ii. Countries with high HDCI*

These countries are scattered in the quadrants North-East and South-East around axis1. This second class consists of three sets of countries. First, countries with high human development according to the UNDP which is subtracted from those with good governance that have joined countries with very high HDCI and those with poor governance relatively to the group by joining, according to our indicator, the group of countries with medium HDCI (circles 2 of the Figure 4). Then in the second set of countries, there are those which left the group of countries with very high development according to the UNDP (circle 1 of the Figure 4), namely the UAE, Kuwait, Greece, Italy, Israel ... Finally, joins these two sets of countries those with medium human development by UNDP with good quality of public governance

(located in the South-East quadrant Surrounding axis 2), namely, Cyprus, South Africa, Namibia, Botswana ... (See Appendix n°3).

The right part of the plan brings together countries with similar institutional features but different socio-economic backgrounds. These are countries in rapid transition, Israel and European countries, which have converged after accession, the Czech Republic, Lithuania, and Poland. These are also clearly discriminated European countries, compared to other European countries; saw the ineffectiveness of their institutions: Italy, Greece. Finally, African countries in sub-Sahara also belong to this group given the quality of their institutions relatively to other African countries (See Appendix n°3).

### *iii. Countries with medium HDI*

These countries are concentrated around axis 2 and scattered mainly in the quadrant North-West and South-West. This third class includes three sets of countries. First, countries with medium human development (UNDP) from which we subtract those with good governance that joined countries having a high HDI and those with poor governance relative to the group and those which joined, according to our index, the group of countries with low HDI (the circle located at the west side of Figure 4). Then the second set of countries, those that left the group of countries with high development UNDP (2 circles of the countries located in the North-West of Figure 4) such that some countries in transition: Albania, Russia, etc. , many countries in Latin America: Cuba, Colombia, Peru, etc. and Arab countries: Libya, Saudi Arabia, Lebanon, etc. Finally, joins these two sets of countries Benin, regarded as low human development by UNDP with the public governance better than other countries at low HDI group (See Appendix n°3).

Indeed, this group includes, besides Russia, the countries most influenced by the Soviet footprint but characterized by a delay in their political, social and economic transition. It also called upon 'emerging' countries, which made a financial liberalization without going through public institutions that guarantee the necessary regulations. They include Latin American countries, Turkey and Philippines. These are also countries qualified as 'authoritarian-paternalistic' as their institutions combine the power of tradition and security for the inhabitants, with a public action with low efficiency (Bertheliet et al., 2003). For some of these countries the State derives its legitimacy from the redistribution of oil revenues namely Saudi Arabia, Vietnam, Egypt and China. Civil society has a very limited autonomy. Pluralism of information is one of the smallest. In this class, there are also countries where states are bit presents. The traditional solidarity is active, allowing the creation of security, which partly offsets the public failures. The political, economic and social aspects are not provided to citizens, but the most dynamic can benefit from opportunities and areas of freedom. This is particularly the case in Nigeria, Cameroon; ... However, these countries have economic and institutional quality better than some other African countries, ranked with medium HDI while UNDP consider them with low HDI. Countries such as Peru, Venezuela, Colombia, have left the group in high HDI because they know a situation of high social risk: traditional solidarity have been eroded while the institutional solidarity are very limited. They share, for the most part, this characteristic with Turkey, the Philippines, Mexico, and Argentina, and thereby confirm our classification.

### *iv. Countries with low HDI*

These countries are scattered around axis 1 and camped at the left end. The fourth class includes two sets of countries. We find in the first group the low human development countries from which we subtract Benin characterized by better governance relative to the group, which joined countries with medium HDI. Then in the second set of countries there are those which left the group of countries with medium development considering PNUED classification (as in the circle located at the west side of the Figure 4) such as Nepal,

Turkmenistan, Iran, Pakistan, in Asia, Senegal, Cameroon, in Africa and Arab countries: Syria Yemen. (See Appendix n°3).

Most countries in sub-Sahara sample belong to this group. These countries are experiencing delayed demographic transition and a low level of human development in its three components (education, health and income funds). Traditions hamper social mobility. Weak public administration, coupled with the absence of an institutional solidarity system and high share of the unofficial economy rank these countries into the category of type 'informal' countries. Finally, countries characterized by a single party appearing not only as a mere legacy of the past, but seem consistent with a specific institutional combination (Syria and Iran).

#### **4. Weight of the institutional area in the development**

The composite indexes are constructed traditionally in several stages, among which the choice of variables, the formation of scales, weights and the aggregation procedure, but the crucial problem is assigning appropriate weights to the indicators. The information can be aggregated into a single figure in two major ways. The first method is subjective and consists in highlighting the arbitrary and beliefs of the researcher and may mislead the public trial and expert. The most common method, as the HDI, gives equal weights to the attributes of the composite index on the assumption that they are of equal importance for the representation of different aspects of the concept.

The second method of aggregation based on objective weighting schemes and uses multivariate techniques to determine an assignment with much less arbitrary weights. The most common is the principal component analysis (Rahman et al., 2003 Ram, 1982; Slottje, 1991) in which the attributes are weighted according to variance of all original variables explained by first principal component. The principal component analysis gives the highest weighting to effectiveness government, the rule of law, regulatory quality, control corruption and the index of GDP per capita in the calculation of the ICDH (more than 63.7%). In Table 3, we show weighting of indicators.

Our results show that the weight of the institutional area is much higher (71.2%) compared to economic sphere (11.3%) and social sphere (17.6%). Moreover, we can announce that institutional quality plays a key role in explaining the level of development of countries, which agrees with results of several economists. Work on inequalities between nations show a variety of explanations for developmental delay experienced by the developing countries: the technological gap due to lack of physical capital, limited access to credit markets, low human capital (low education, brain storming, etc.), dependence of agricultural raw materials (Acemoglu et al., 2004). However, these conventional factors of growth do not fully explain the delay in growth. For North and Thomas (1976) the factors listed (innovation, education, and capital accumulation) are not the causes of economic growth, rather these represent the growth. The institutional and organizational forms contain formal and informal constraints that hamper the economic growth of sub-Saharan countries. Many studies, including that of Glaeser et al. (2004), show the influence of political institutions on economic growth.

Many economists believe that corruption is a major obstacle to development. Indeed, it is a cause of reduced income levels and plays a major role in increasing the rate of poverty (Blackburn et al., 2006, 2008). Indeed, the effect of corruption on growth depends on the quality of institutional policy of each country. For countries with good governance, the impact of corruption on growth is negative, but it is positive (or less negative) in countries with bad governance (Méndez and Sepúlveda, 2006; Aidt et al. 2008 Méon and Sekkat, 2005; Méon and Weill, 2008). Fisman and Svensson (2007), studying the economic situation in Uganda, showed that the increase of 1% of "bribery" is associated with a reduction of 3% in economic growth.

## **5. Robustness Analysis**

The robustness of the country rankings depends on a number of factors including: the amount of missing data, the choice of the imputation algorithm, the aggregation methods and the choice of weights, e.g. equal weights, or weights derived from principal component analysis, or based on expert opinion, etc. An extensive discussion on composite indicators can be found in a joint OECD/JRC handbook on constructing composite indicators (Nardo et al. (2005)). In the present study, we first consider two alternative weighting methods: equal weights, and principal components weights. Second, we use Borda Rule (that is, ranks based on the sum of individual factor ranks) as an alternative aggregation method.

Following, Dasgupta and Weale (1992) we use the Borda Rule to provide a rank-order score. To illustrate, we suppose a country has the ranks  $i$ ,  $j$ ,  $k$ ,  $l$ , and  $m$ , respectively, for the five criteria. Then its Borda score is  $i + j + k + l + m$ . We rank then countries on the basis of their aggregate scores. The Borda rule suffers from various limitations (Goodman and Markowitz (1952) and Fine and Fine (1974)). However, the Borda rule is simple, and its strengths and weaknesses are transparent, which provides a good justification for using it (Dasgupta and Weale 1992). Moreover, it provides a very simple tool to analyse the sensitivity of HDCI rankings across countries.

### **5.1 Results and discussion**

We consider 178 countries from around the world for which comparable data on eight domains of QOL and corresponding indicators were available in the year 2007. Our set of countries includes both developed and developing economies. In total we make use of 9 indicators.

The rankings (see Table in Appendix 5) for HDCI provide a relative gauge of development in 178 countries. Table in Appendix 5 presents a comparison of HDCI ranks based on both the Borda rule and principal components approach, and the HDI ranks. The HDI rank is the rankings of countries provided by Human Development Report 2009. These rankings in Table in Appendix 5 tell us that country rankings are highly sensitive to the index used. Thus, rankings in Table in Appendix 5 suggest that not only the measures of development are sensitive to its components or inputs, but also how these different inputs are aggregated to arrive at a composite indicator.

The Nordic countries, Sweden, Denmark and Finland steadily occupy the top ranks. These countries are highly developed in the economic social and institutional spheres. On the other hand, at the bottom of the rankings there are Zaire, Chad and Afghanistan. These countries suffer from low developed economic and social spheres and from bad quality of their institutions. The relative positions of the middle-ranked countries are affected by the weighting scheme employed in the study. Small oscillations of the index scores may result in larger changes in rankings compared to countries at the top and bottom positions.

Now let us look at the rankings based on the HDCI (equal weight), HDCI (Borda rule) and HDCI (principal components approach). We can clearly note from Table 4 that these three methods do not produce quite similar rankings.

From Table 4, we observe that the correlation coefficient between HDI and ICDH (Borda) is 0.574, between HDI and ICDH (PCA) is 0.873, and between HDI and ICDH (Eq\_W) is 0.771, we observe also that the correlation coefficient between and between ICDH (PCA) and ICDH (Eq\_W) is 0.983.

Thus we can say that the HDCI based on the principal component approach follows more closely the HDI and HDCI based on equal weight than HDCI based on the Borda rule. Since these three indexes are based on all indicators of human development, we conclude that there is sufficient evidence that the HDCI levels are sensitive to aggregation rules.

Table 5 presents rank correlation matrix of indicators of HDCI, the HDI, and HDCIs themselves. First, let us look at the correlation coefficients between ICDH (Borda) and its nine inputs. We notice that ICDH (Borda) rank has statistically significant correlation with all indicators rank. HDCI (Borda) has the highest correlation (0.954) with the government effectiveness indicator rank, which is the most correlated indicator. That is government effectiveness is the closest to our measure of the Human development. HDCI (Borda) rank has the second highest correlation with the Rule of Law rank, which is the most correlated indicator to government effectiveness. In fact, if government is able to formulate and to implement adequate policies, which means high level of "Governmental Effectiveness" indicator, then citizens and state institutions, which govern their interactions, comply with these policies and don't need to use graft to realise their objectives. This supports our postulation that institutional sphere quality is very important for human development. The result is the same with rank correlation coefficients between HDCI (ACP), HDCI (Eq\_W) and the nine indicators.

Now let us look at correlation coefficients between HDCIs and the nine indicators (Table 6). The contrary to HDI, HDCI has the lowest correlation coefficient with social sphere indicators and particularly with Education of the (0.745 for HDCI (ACP), 0.639 for HDCI (Eq\_W) and 0.142 HDCI (Borda)) and inversely for the institutional indicators. In fact, HDCI (ACP, Eq\_W and Borda,) have the highest correlation (0.929, 0.948 and 0.842 respectively) with control of corruption. This is expected because HDI does not include any measure of institutional quality. Thus, if we had to choose a single input of human development, the control of corruption would seem to be the best. In addition, we emphasize that as correlation coefficient between HDI and control of corruption (and globally with institutional indicator) is low, it also means that they are two distinct dimensions of human development and inclusion of institutional sphere indicators in the measurement of HDCI will give additional statistical information. Thus, institutional indicators are not statistically, redundant for the measurement of human development.

## **Conclusion**

Our analysis provides another look at the human development indicators. Issues in human development are multi-dimensional. Our study adds some new approaches to these important aspects of human development. To measure the multi-dimensional progress of human development we require delicate and thorough understanding of the indicators in various aspects. The measurements of the human development by the UNDP have inspired many researchers for proposing better and more effective index.

In this study, we try to emphasize the importance of integrating the institutional indicator for evaluating human development. The World Bank (WB) measures countries development using GDP per capita. The Human Development Index (HDI) was proposed by the UNDP for measuring human development. The HDI includes both economic and social indexes. The analysis in this paper shows that neither GDP per capita nor HDI provide a significantly better indicator of country development. An alternative measure of development must incorporate a more factors than GDP per capita or HDI indicators. Hence, we calculated a composite indicator for measuring human development (HDCI), which includes all three "Institutional, Economic and Social" components. These three spheres are then inter-linked.

For synthesizing the multi-dimensional measurement of the human development index into a single indicator, we used a multivariate technique called principal component analysis, which combines various measures of human development in an optimal fashion to create a development index. The principal component analysis represents an objective method of combining component indexes in a fashion that maximizes the information content of the



resultant index. Applying the principal component analysis to the indicators composing the economic, social and institutional spheres yields a new index whose rankings are different from the original HDI.

In fact, using as institutional indicators those of Kaufmann, Kraay and Mastruzzi (KKZ) (2008) to represent the institutional sphere and calculating, for each country, the HDCI, we reclassified countries into four groups with different development levels (HDCI). Our results showed that with the exception of a few countries (Bulgaria, Burundi, Africa Centre, Dominica and Romania) which have kept the same rank following the two indicators HDI and HDCI, almost all countries in our sample changed rank (97.8%). Some countries have gained rank while others have lost rank. This rank change depends on the importance of their institutional sphere.

We measured the contribution of the institutional sphere in development. Our results show that the weight of the institutional area is much higher (71.2%) compared to the economic sphere (11.3%) and the social sphere (17.6%). Moreover, we can announce that institutional quality plays a key role in explaining the level of development of countries, which agrees with results of several economists.

In addition, we have tested the robustness and sensitivity of our Composite Indicator. Our results suggest that the HDCI rankings are not robust to the various aggregation and weighting methods. We found that control of corruption (an indicator of institutional sphere quality) was closest to the measure of the HDCIs. This indicator is highly correlated to "Governmental Effectiveness" and Rule of Law. This means that if corruption is controlled this implies that citizens and state institutions which govern their interactions comply with policies because they are efficient. Thus, if we had to choose a single indicator, the most appropriate choice would be the control of corruption. We will complement our analysis with the uncertainty analysis of our results and we will investigate our HDCI sensitivity with the sensitivity measures of first order and total effect for the composite indicators scores (Sobol', 1967)

Through this study, we identified a need for more studies on countries differences in development and improved efforts to share these findings with global indicator programs. Hopefully this study has made a step towards identifying this need.

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Figure 1: Regression HDI rank and GDP per capita rank

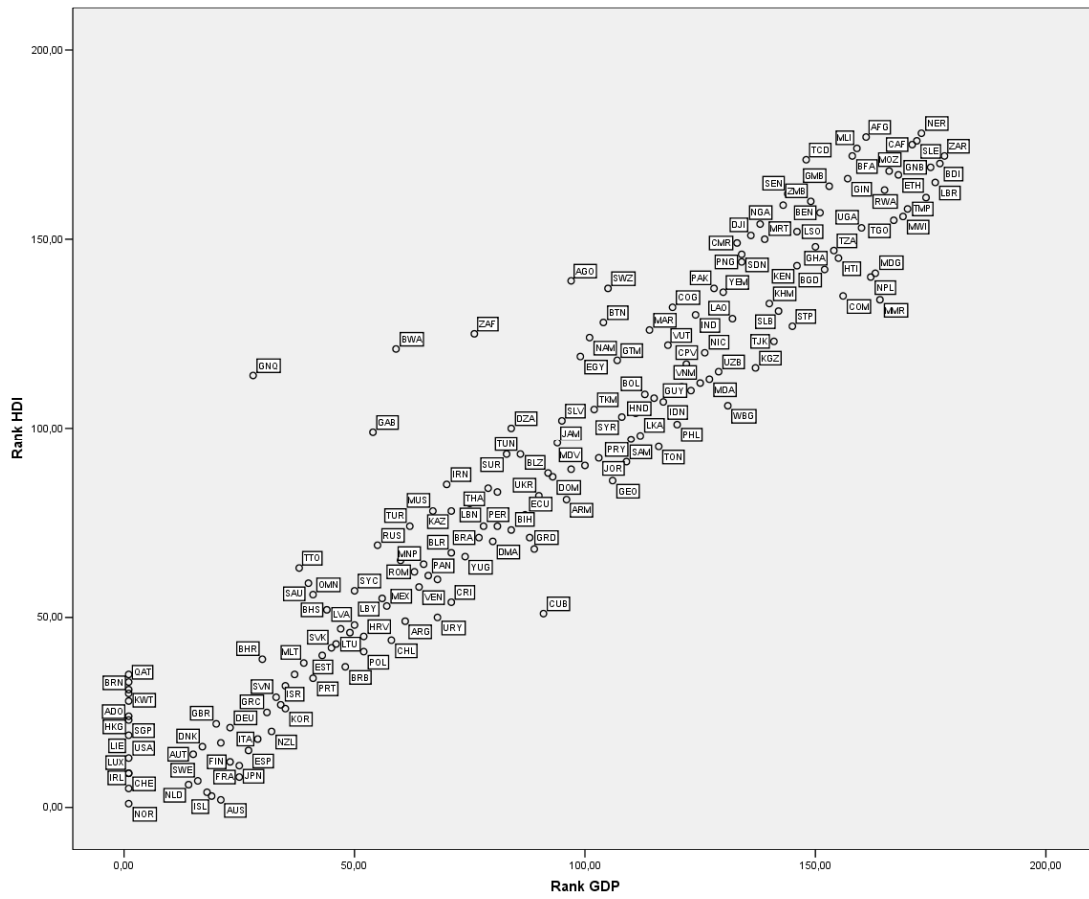
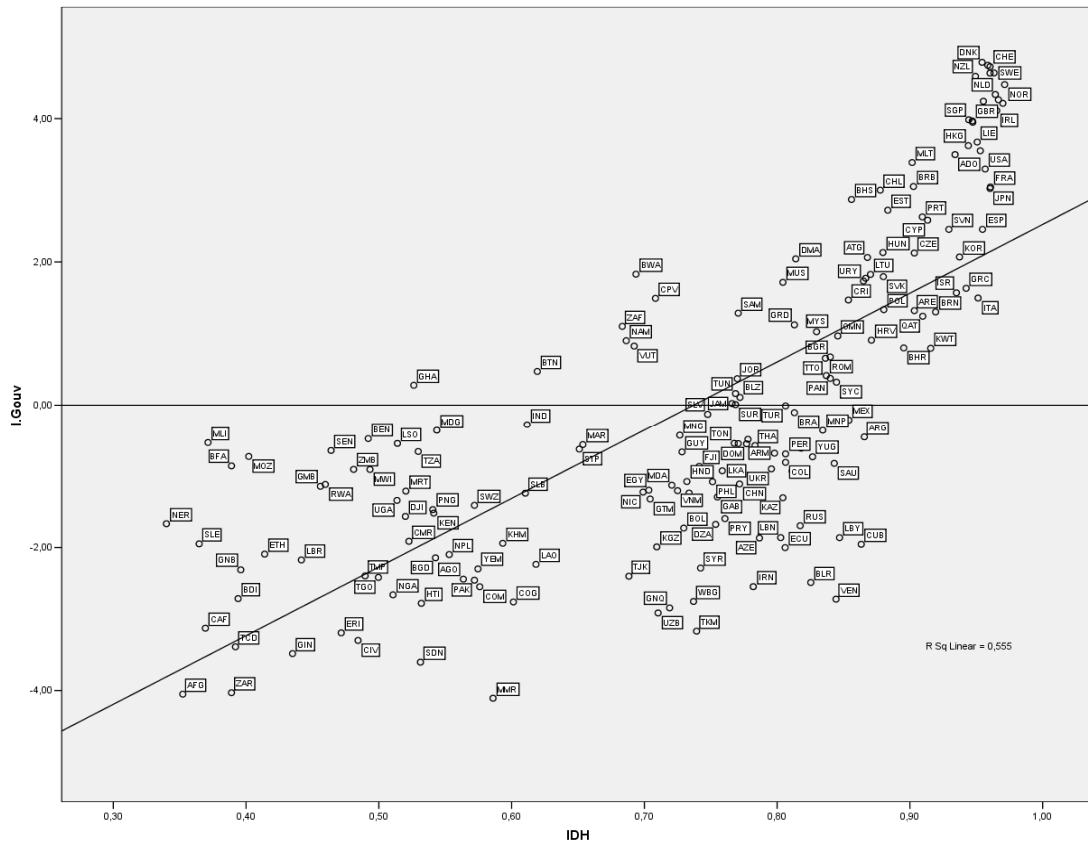
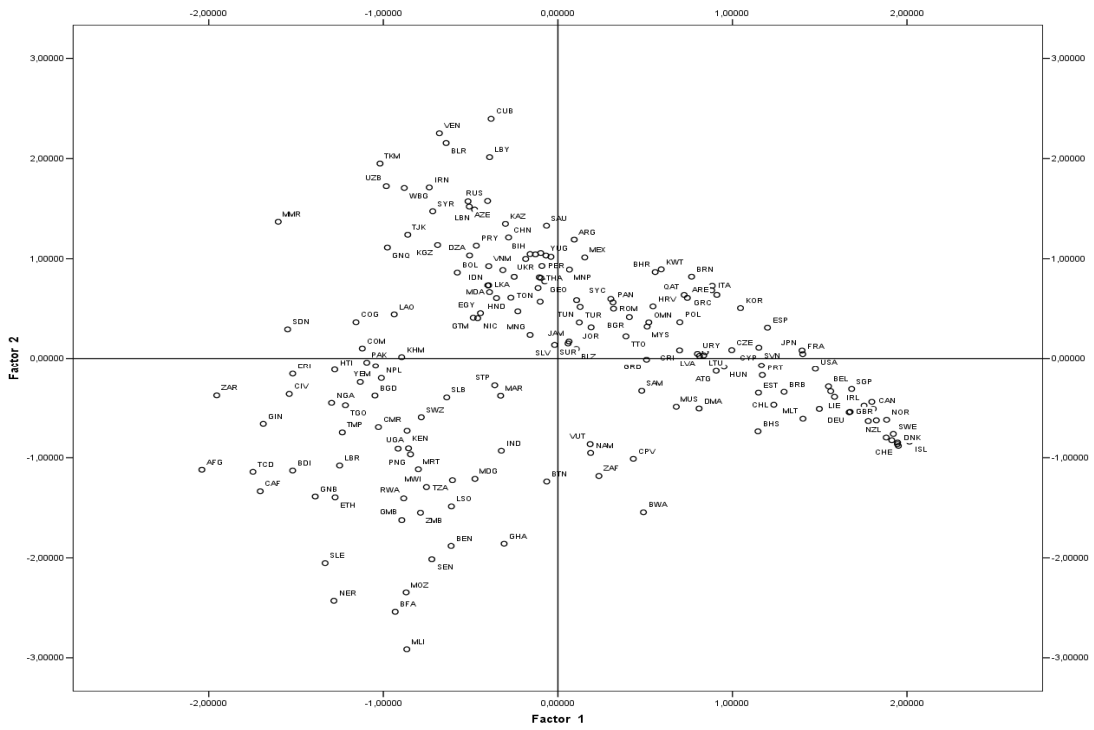


Figure 2: Regression of governance index and the countries HDI



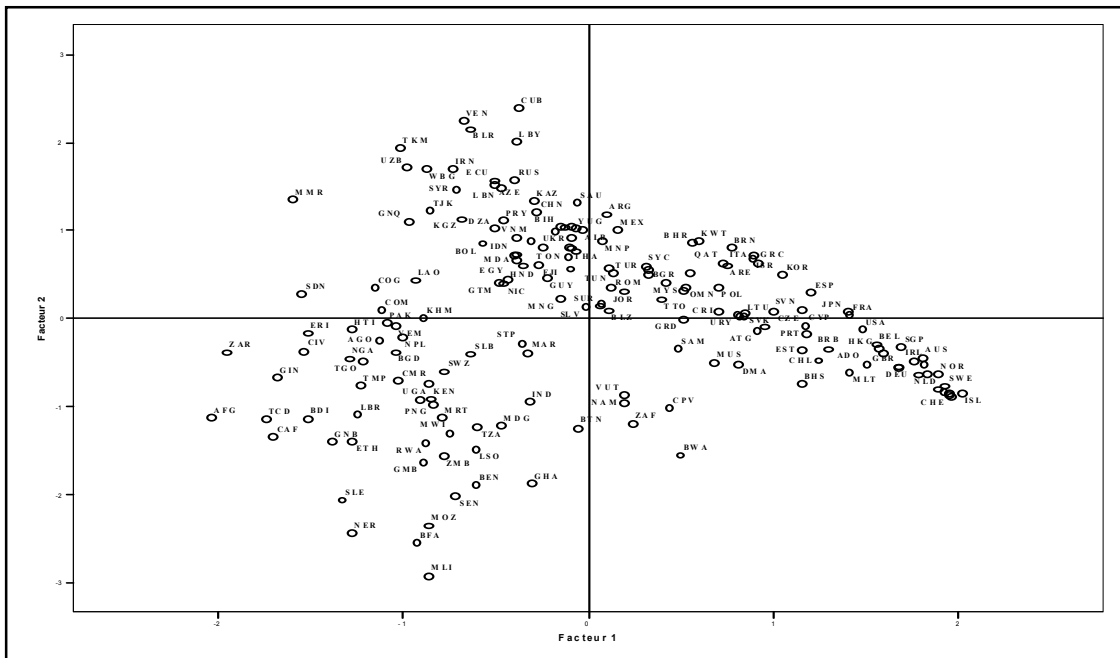
Source: authors' calculations from the database of the UNDP (2009) and World Bank (Governance Matters 2009)

**Figure 3: Projected Country on 1st factorial plan**



Source: authors' calculations from the database of the UNDP (2009) and World Bank (Governance Matters 2009)(Governance Matters 2008), Software SPSS 14.

**Figure 4: The countries that have left their groups for a group of lower level**



Source: authors' calculations from the database of the UNDP (2009) and World Bank (Governance Matters 2009)(Governance Matters 2008), Software SPSS 14.



**Table 1: Comparison of ranking of World Bank and of UNDP in 2007**

Country	Classification		Level Development	
	WB	UNDP	WB	UNDP
Albania	89	68	Medium	High
Bosnia Herzegovina	84	73	Medium	High
Serbia	74	66	Medium	High
Cuba	91	51	Medium	High
Uruguay	68	50	Medium	High
Costa Rica	71	54	Medium	High
Saudi Arabia	40	59	High	High
Oman	41	56	High	High
Bahrain	30	39	High	High
Equatorial Guinea	28	114	High	Medium
Gabon	54	99	High	Medium

**Table 2: Comparison of World Bank rank, UNDP rank and Governance Index rank (2007)**

Country	Classification		
	WB	UNDP	Governance Index
Saudi Arabia	40	59	103
Bahrain	30	39	61
United Arab Emirates	1	35	50
Kuwait	1	31	62
Oman	41	56	57
Qatar	1	33	53
Iceland	19	3	1
Denmark	17	16	2
Finland	22	12	3

**Table 3: Weighting of indicators**

	Voice and account ability	Political stability and absence of violence	Governance and effectiveness	Regulatory quality	Rule of law	Control of corruption	Life Expectancy Index	Education Index	GDP Index	Total
Weight of variables	0,094	0,094	0,135	0,128	0,134	0,127	0,094	0,082	0,113	1
Weight spheres			0,712				0,176		0,113	1

Source: authors' calculations from the database of the UNDP (2009) and World Bank (Governance Matters 2008)

**Table 4: correlation matrix of Human development indices**

**Correlations**

		GDP_In	HDI	HDCI_PCA	HDCI_Eq_W	HDCI_Borda
GDP_In	Pearson Correlation	1	,940**	,875**	,794**	,602**
	Sig. (2-tailed)		,000	,000	,000	,000
	N	178	178	178	178	178
HDI	Pearson Correlation	,940**	1	,873**	,771**	,574**
	Sig. (2-tailed)	,000		,000	,000	,000
	N	178	178	178	178	178
HDCI_PCA	Pearson Correlation	,875**	,873**	1	,983**	,770**
	Sig. (2-tailed)	,000	,000		,000	,000
	N	178	178	178	178	178
HDCI_Eq_W	Pearson Correlation	,794**	,771**	,983**	1	,789**
	Sig. (2-tailed)	,000	,000	,000		,000
	N	178	178	178	178	178
HDCI_Borda	Pearson Correlation	,602**	,574**	,770**	,789**	1
	Sig. (2-tailed)	,000	,000	,000	,000	
	N	178	178	178	178	178

\*\* . Correlation is significant at the 0.01 level (2-tailed).

**Table 5: Correlation matrix of ICDH indicators rankings**

Correlations

			R_Voice_Ac	R_Polit_Stab	R_Gov_Effic	R_Qual_Reg	R_Rule_Law	R_C_Corrupt	R_Exp_In	R_Edu_In	R_GDP_In	R_HDI	R_HDCI_PCA	R_HDCI_Borda	R_HDCI_eq_w	
Spearman's rho	R_Voice_Ac	Correlation Coefficient	1,000	,673**	,755**	,774**	,745**	,746**	,595**	,582**	,559**	,622**	,791**	,803**	,858**	
		Sig. (2-tailed)	.	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000
		N	178	178	178	178	178	178	178	178	178	178	178	178	178	178
	R_Polit_Stab	Correlation Coefficient	,673**	1,000	,752**	,699**	,813**	,775**	,592**	,578**	,672**	,662**	,815**	,818**	,853**	
		Sig. (2-tailed)	,000	.	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	
		N	178	178	178	178	178	178	178	178	178	178	178	178	178	
	R_Gov_Effic	Correlation Coefficient	,755**	,752**	1,000	,936**	,939**	,915**	,768**	,674**	,804**	,813**	,950**	,954**	,952**	
		Sig. (2-tailed)	,000	,000	.	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	
		N	178	178	178	178	178	178	178	178	178	178	178	178	178	
	R_Qual_Reg	Correlation Coefficient	,774**	,699**	,936**	1,000	,890**	,862**	,746**	,643**	,777**	,787**	,920**	,923**	,932**	
		Sig. (2-tailed)	,000	,000	,000	.	,000	,000	,000	,000	,000	,000	,000	,000	,000	
		N	178	178	178	178	178	178	178	178	178	178	178	178	178	
	R_Rule_Law	Correlation Coefficient	,745**	,813**	,939**	,890**	1,000	,933**	,739**	,616**	,752**	,763**	,928**	,935**	,951**	
		Sig. (2-tailed)	,000	,000	,000	,000	.	,000	,000	,000	,000	,000	,000	,000	,000	
		N	178	178	178	178	178	178	178	178	178	178	178	178	178	
	R_C_Corrupt	Correlation Coefficient	,746**	,775**	,915**	,862**	,933**	1,000	,731**	,599**	,746**	,756**	,910**	,920**	,931**	
		Sig. (2-tailed)	,000	,000	,000	,000	,000	.	,000	,000	,000	,000	,000	,000	,000	
		N	178	178	178	178	178	178	178	178	178	178	178	178	178	
	R_Exp_In	Correlation Coefficient	,595**	,592**	,768**	,746**	,739**	,731**	1,000	,779**	,838**	,935**	,859**	,854**	,763**	
		Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	.	,000	,000	,000	,000	,000	,000	
		N	178	178	178	178	178	178	178	178	178	178	178	178	178	
	R_Edu_In	Correlation Coefficient	,582**	,578**	,674**	,643**	,616**	,599**	,779**	1,000	,790**	,892**	,791**	,787**	,689**	
		Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	.	,000	,000	,000	,000	,000	
		N	178	178	178	178	178	178	178	178	178	178	178	178	178	
	R_GDP_In	Correlation Coefficient	,559**	,672**	,804**	,777**	,752**	,746**	,838**	,790**	1,000	,951**	,883**	,874**	,788**	
		Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	.	,000	,000	,000	,000	
		N	178	178	178	178	178	178	178	178	178	178	178	178	178	
	R_HDI	Correlation Coefficient	,622**	,662**	,813**	,787**	,763**	,756**	,935**	,892**	,951**	1,000	,910**	,903**	,809**	
		Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000	.	,000	,000	,000	
		N	178	178	178	178	178	178	178	178	178	178	178	178	178	
	R_HDCI_PCA	Correlation Coefficient	,791**	,815**	,950**	,920**	,928**	,910**	,859**	,791**	,883**	,910**	1,000	,997**	,973**	
		Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	.	,000	,000	
		N	178	178	178	178	178	178	178	178	178	178	178	178	178	
	R_HDCI_Borda	Correlation Coefficient	,803**	,818**	,954**	,923**	,935**	,920**	,854**	,787**	,874**	,903**	,997**	1,000	,977**	
		Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	.	,000	
		N	178	178	178	178	178	178	178	178	178	178	178	178	178	
	R_HDCI_eq_w	Correlation Coefficient	,858**	,853**	,952**	,932**	,951**	,931**	,763**	,689**	,788**	,809**	,973**	,977**	1,000	
		Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	.	
		N	178	178	178	178	178	178	178	178	178	178	178	178	178	

\*\* Correlation is significant at the 0.01 level (2-tailed).

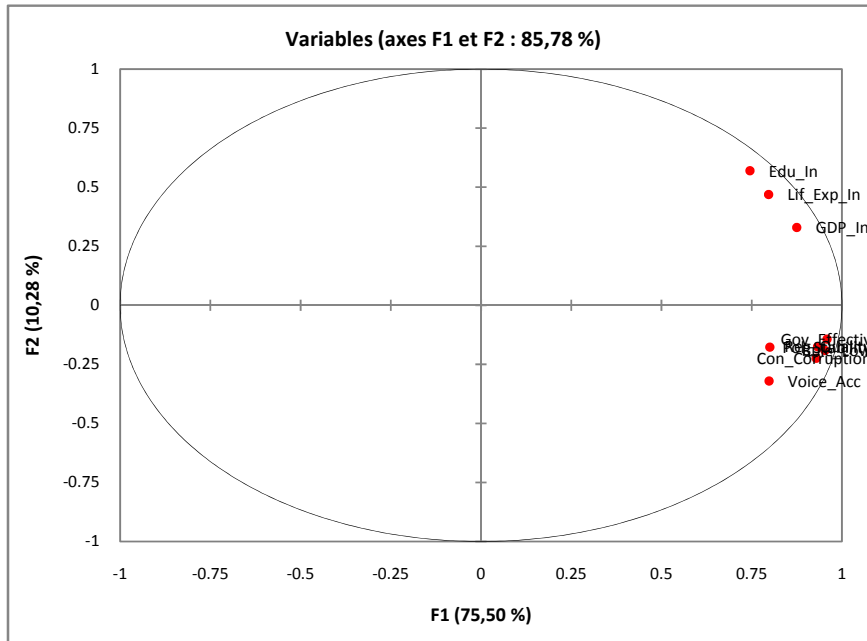
**Table 6: Correlation matrix of ICDH indicators**

**Correlations**

		Voice_Ac	Polit_Stab	Gov_Effic	Qual_Reg	Rule_Law	C_Corrupt	Esp_In	Edu_In	GDP_In	HDI	HDCI_PCA	HDCI_Eq_W	HDCI_Borda
Voice_Ac	Pearson Correlation	1												
	Sig. (2-tailed)													
	N	178	178	178	178	178	178	178	178	178	178	178	178	178
Polit_Stab	Pearson Correlation	,632**	1											
	Sig. (2-tailed)	,000												
	N	178	178	178	178	178	178	178	178	178	178	178	178	178
Gov_Effic	Pearson Correlation	,761**	,725**	1										
	Sig. (2-tailed)	,000	,000											
	N	178	178	178	178	178	178	178	178	178	178	178	178	178
Qual_Reg	Pearson Correlation	,794**	,691**	,940**	1									
	Sig. (2-tailed)	,000	,000	,000										
	N	178	178	178	178	178	178	178	178	178	178	178	178	178
Rule_Law	Pearson Correlation	,752**	,783**	,953**	,907**	1								
	Sig. (2-tailed)	,000	,000	,000	,000									
	N	178	178	178	178	178	178	178	178	178	178	178	178	178
C_Corrupt	Pearson Correlation	,743**	,736**	,940**	,880**	,957**	1							
	Sig. (2-tailed)	,000	,000	,000	,000	,000								
	N	178	178	178	178	178	178	178	178	178	178	178	178	178
Esp_In	Pearson Correlation	,513**	,507**	,693**	,661**	,682**	,643**	1						
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000							
	N	178	178	178	178	178	178	178	178	178	178	178	178	178
Edu_In	Pearson Correlation	,479**	,537**	,616**	,579**	,580**	,545**	,782**	1					
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000						
	N	178	178	178	178	178	178	178	178	178	178	178	178	178
GDP_In	Pearson Correlation	,545**	,639**	,799**	,772**	,766**	,739**	,793**	,792**	1				
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000					
	N	178	178	178	178	178	178	178	178	178	178	178	178	178
HDI	Pearson Correlation	,553**	,611**	,763**	,729**	,734**	,699**	,919**	,921**	,940**	1			
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000				
	N	178	178	178	178	178	178	178	178	178	178	178	178	178
HDCI_PCA	Pearson Correlation	,798**	,801**	,959**	,933**	,953**	,929**	,797**	,745**	,875**	,873**	1		
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000			
	N	178	178	178	178	178	178	178	178	178	178	178	178	178
HDCI_Eq_W	Pearson Correlation	,855**	,827**	,963**	,946**	,966**	,948**	,698**	,639**	,794**	,771**	,983**	1	
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000		
	N	178	178	178	178	178	178	178	178	178	178	178	178	178
HDCI_Borda	Pearson Correlation	,639**	,581**	,799**	,723**	,788**	,842**	,522**	,460**	,602**	,574**	,770**	,789**	1
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	
	N	178	178	178	178	178	178	178	178	178	178	178	178	178

\*\* . Correlation is significant at the 0.01 level (2-tailed).

## Appendix 1



Source: authors' calculations from the database of the UNDP (2009) and World Bank (Governance Matters 2009), Logiciel SPSS 14.

## Appendix 2

### Validation of composite indices of development

As explained by Sharpe (1999) and Land (2000), several factors must be taken into account in developing a composite index. Selection criteria for evaluating indicators aim to allow international comparisons on a global scale (in space and time) and provide a better evaluation of universal development. In this paper, we focus on four conceptual issues related to composite indices, namely the main dimensions of well-being included in these indices, the availability of data for a significant number of countries, the accessibility and comparability of data over time, the method of construction of indices as well as the weights for the components in the index calculation (Gadrey and Jany-Catrice, 2003; Booyesen, 2002).

We attempt to present in the following Table the positions of different indicators vis-à-vis the benchmarks in order to evaluate our new composite index of development (HDCI) compared with that adopted by the UNDP (HDI) and World Bank (GDP/C).

### Application of evaluation criteria for indicators: HDCI, HDI, GDP/Cap.

	Criterion 1: presence of the dimensions of development	Criterion 2: comparability in space	Criterion 3: comparability over time	Criterion 4: Features / construction method
HDCI	Composite Indicator -Size-economic, social and institutional	178 countries covered (wide coverage), but problems with reliability of some data - Ability to disaggregate to study each component.	Yes	- Weighting objective of the three-dimensional (ACP) - Unified Measure index between 0 (the worst-off countries) and a (better-off countries).
HDI	Composite indicator -only social and economic dimensions - Political and governance dimensions unposted	- 182 countries covered (wide coverage), but problems with reliability of some data - Ability to disaggregate to study each component	Yes	- Weighting subjective, arbitrary and equivalent to each of the two dimensions - Unified Measure index between 0 (the worst-off countries) and a (better-off countries).
GDP/Cap	Single-Indicator -Economic dimensions only	-193 countries covered (wide coverage), but problems with reliability of some data	Yes	

Notes: The new composite index of human development is similar to other development indicators adopted (HDI and GDP / H). However, it compares favorably for: - The number of components (economic, social and institutional); - The construction and weighting method (objective).

### Appendix 3

Very high ICDH	Very high HDI
ADO	ADO
AUS	ARE
AUT	AUS
BEL	AUT
BHS	BEL
BRB	BHR
CAN	BRB
CHE	BRN
CHL	CAN
CYP	CHE
DEU	CYP
DNK	CZE
ESP	DEU
EST	DNK
FIN	ESP
FRA	FIN
GBR	FRA
HKG	GBR
IRL	GRC
ISL	HKG
JPN	IRL
LIE	ISL
LUX	ISR
MLT	ITA
NLD	JPN
NOR	KOR
NZL	KWT
PRT	LIE
SGP	LUX
SVN	MLT
SWE	NLD
USA	NOR
	NZL
	PRT
	QAT
	SGP
	SVN
	SWE
	USA

	Countries with very high HDI who migrated to the group of counties with high ICDH
	Countries with high HDI who migrated to the group of counties with very high ICDH

High ICDH	High HDI
ARE	ALB
ATG	ARG
BGR	ARM
BHR	ATG
BRN	BGR
BWA	BHS
CPV	BIH
CRI	BLR
CZE	BRA
DMA	CHL
GRC	COL
GRD	CRI
HRV	CUB
HUN	DMA
ISR	ECU
ITA	EST
JOR	GRD
KOR	HRV
KWT	HUN
LTU	KAZ
LVA	LBN
MUS	LBY
MYS	LTU
NAM	LVA
OMN	MEX
PAN	MNP
POL	MUS
QAT	MYS
ROM	OMN
SAM	PAN
SVK	PER
SYC	POL
TTO	ROM
URY	RUS
VUT	SAU
ZAF	SVK
	SYC
	TTO
	TUR
	UKR
	URY
	VEN
	YUG

	Countries with very high HDI who migrated to the group of counties with high ICDH
	Countries with medium HDI who migrated to the group of counties with high ICDH
	Countries with high HDI who migrated to the group of counties with medium ICDH
	Countries with high HDI who migrated to the group of counties with very high ICDH



## Appendix 4: List of Countries

Country	Code	Country	Code	Country	Code	Country	Code
ANDORRA	ADO	ECUADOR	ECU	LUXEMBOURG	LUX	SWEDEN	SWE
AFGHANISTAN	AFG	EGYPT	EGY	LATVIA	LVA	SWAZILAND	SWZ
ANGOLA	AGO	ERITREA	ERI	MOROCCO	MAR	SEYCHELLES	SYC
ALBANIA	ALB	SPAIN	ESP	MOLDOVA	MDA	SYRIA	SYR
UNITED ARAB EMIRATES	ARE	ESTONIA	EST	MADAGASCAR	MDG	CHAD	TCO
ARGENTINA	ARG	ETHIOPIA	ETH	MALDIVES	MDV	TOGO	TGO
ARMENIA	ARM	FINLAND	FIN	MEXICO	MEX	THAILAND	THA
ANTIGUA AND BARBUDA	ATG	FIJI	FJI	MALI	MLI	TAJIKISTAN	TJK
AUSTRALIA	AUS	FRANCE	FRA	MALTA	MLT	TURKMENISTAN	TKM
AUSTRIA	AUT	GABON	GAB	MYANMAR	MMR	TIMOR-LESTE	TMP
AZERBAIJAN	AZE	UNITED KINGDOM	GBR	MONGOLIA	MNG	TONGA	TON
BURUNDI	BDI	GEORGIA	GEO	MONTENEGRO	MNP	TRINIDAD AND TOBAGO	TTO
BELGIUM	BEL	GHANA	GHA	MOZAMBIQUE	MOZ	TUNISIA	TUN
BENIN	BEN	GUINEA	GIN	MAURITANIA	MRT	TURKEY	TUR
BURKINA FASO	BFA	GAMBIA	GMB	MAURITIUS	MUS	TANZANIA	TZA
BANGLADESH	BGD	GUINEA-BISSAU	GNB	MALAWI	MWI	UGANDA	UGA
BULGARIA	BGR	EQUATORIAL GUINEA	GNQ	MALAYSIA	MYS	UKRAINE	UKR
BAHRAIN	BHR	GREECE	GRC	NAMIBIA	NAM	URUGUAY	URY
BAHAMAS	BHS	GRENADA	GRD	NIGER	NER	UNITED STATES	USA
BOSNIA-HERZEGOVINA	BIH	GUATEMALA	GTM	NIGERIA	NGA	UZBEKISTAN	UZB
BELARUS	BLR	GUYANA	GUY	NICARAGUA	NIC	VENEZUELA	VEN
BELIZE	BLZ	HONG KONG	HKG	NETHERLANDS	NLD	VIETNAM	VNM
BOLIVIA	BOL	HONDURAS	HND	NORWAY	NOR	VANUATU	VUT
BRAZIL	BRA	CROATIA	HRV	NEPAL	NPL	WEST BANK GAZA	WBG
BARBADOS	BRB	HAITI	HTI	NEW ZEALAND	NZL	YEMEN	YEM
BRUNEI	BRN	HUNGARY	HUN	OMAN	OMN	SERBIA	YUG
BHUTAN	BTN	INDONESIA	IDN	PAKISTAN	PAK	SOUTH AFRICA	ZAF
BOTSWANA	BWA	INDIA	IND	PANAMA	PAN	Congo, Dem. Rep.	ZAR
CENTRAL AFRICAN REPUBLIC	CAF	IRELAND	IRL	PERU	PER	ZAMBIA	ZMB
CANADA	CAN	IRAN	IRN	PHILIPPINES	PHL		
SWITZERLAND	CHE	ICELAND	ISL	PAPUA NEW GUINEA	PNG		
CHILE	CHL	ISRAEL	ISR	POLAND	POL		
CHINA	CHN	ITALY	ITA	PORTUGAL	PRT		
COTE D'IVOIRE	CIV	JAMAICA	JAM	PARAGUAY	PRY		
CAMEROON	CMR	JORDAN	JOR	QATAR	QAT		
CONGO	COG	JAPAN	JPN	ROMANIA	ROM		
COLOMBIA	COL	KAZAKHSTAN	KAZ	RUSSIA	RUS		
COMOROS	COM	KENYA	KEN	RWANDA	RWA		
CAPE VERDE	CPV	KYRGYZSTAN	KGZ	SAMOA	SAM		
COSTA RICA	CRI	CAMBODIA	KHM	SAUDI ARABIA	SAU		
CUBA	CUB	KOREA, SOUTH	KOR	SUDAN	SDN		
CYPRUS	CYP	KUWAIT	KWT	SENEGAL	SEN		
CZECH REPUBLIC	CZE	LAOS	LAO	SINGAPORE	SGP		
GERMANY	DEU	LEBANON	LBN	SOLOMON ISLANDS	SLB		
DJIBOUTI	DJI	LIBERIA	LBR	SIERRA LEONE	SLE		
DOMINICA	DMA	LIBYA	LYB	EL SALVADOR	SLV		
DENMARK	DNK	LIECHTENSTEIN	LIE	SAO TOME AND PRINCE	STP		
DOMINICAN REPUBLIC	DOM	SRI LANKA	LKA	SURINAME	SUR		
ALGERIA	DZA	LESOTHO	LSO	SLOVAKIA	SVK		
ECUADOR	ECU	LITHUANIA	LTU	SLOVENIA	SVN		

## Appendix 5: A Comparison of quality of life indices





Code	R_HDI	R_GDP	R_HDCI_PCA	R_HDCI_Eq.W	R_HDCI_Borda
ADO	28	1	20	19	19
AFG	177	161	178	178	178
AGO	139	97	158	157	161
ALB	68	89	79	84	79
ARE	35	1	46	53	49
ARG	49	61	74	80	68
ARM	81	96	86	94	84
ATG	47	47	37	36	39
AUS	2	21	11	12	10
AUT	14	15	12	11	13
AZE	83	81	119	138	127
BDI	170	177	170	167	170
BEL	17	21	19	18	16
BEN	157	151	124	91	116
BFA	172	158	147	114	133
BGD	142	152	155	145	157
BGR	60	68	60	60	55
BHR	39	30	52	64	54
BHS	52	44	32	27	37
BIH	73	84	91	99	90
BLR	67	71	126	148	126
BLZ	88	92	73	68	70
BOL	109	113	121	130	124
BRA	71	77	72	74	69
BRB	37	48	25	23	24
BRN	30	1	45	51	44
BTN	128	104	80	70	88
BWA	121	59	57	45	58
CAF	175	171	175	170	174
CAN	4	18	10	10	11
CHE	9	1	4	4	3
CHL	44	58	26	26	29
CHN	89	97	97	120	98
CIV	159	143	171	171	171
CMR	149	133	153	143	155
COG	132	119	159	163	163
COL	74	78	90	100	85
COM	135	156	157	158	158
CPV	117	122	59	49	62
CRI	54	71	49	46	48
CUB	51	91	105	139	95
CYP	32	35	29	30	30
CZE	35	37	34	34	33
DEU	21	23	16	14	15
DJI	151	136	146	134	145
DMA	70	80	43	37	46
DNK	16	17	2	3	7
DOM	87	93	87	82	88
DZA	100	84	118	133	119

ECU	77	87	120	135	123
EGY	119	99	112	122	113
ERI	161	174	169	172	169
ESP	15	27	27	32	26
EST	40	43	31	28	32
ETH	167	168	163	156	156
FIN	12	23	3	2	3
FJI	104	111	96	102	103
FRA	8	25	23	24	18
GAB	99	54	109	118	114
GBR	22	20	15	15	17
GEO	86	106	83	85	80
GHA	148	150	99	72	94
GIN	166	157	174	174	175
GMB	164	153	144	125	140
GNB	169	175	168	155	168
GNQ	114	28	149	164	149
GRC	25	31	36	42	33
GRD	71	88	56	54	53
GTM	118	107	117	119	121
GUY	110	123	94	92	96
HKG	24	1	18	20	21
HND	108	115	103	107	108
HRV	45	52	53	55	50
HTI	145	155	164	166	167
HUN	43	46	35	33	36
IDN	107	117	110	116	112
IND	130	124	101	83	99
IRL	5	1	13	13	9
IRN	85	70	131	159	139
ISL	3	19	1	1	1
ISR	27	34	39	47	41
ITA	18	29	38	44	35
JAM	96	94	76	71	78
JOR	92	103	66	69	73
JPN	11	25	24	25	22
KAZ	78	71	98	117	102
KEN	143	146	139	132	143
KGZ	116	137	128	140	134
KHM	133	140	145	142	151
KOR	26	35	33	35	31
KWT	31	1	51	62	51
LAO	129	132	148	149	153
LBN	80	75	116	137	111
LBR	165	176	162	147	160
LBY	55	56	106	136	105
LIE	19	1	17	17	14
LKA	98	112	95	108	92
LSO	152	146	123	96	115
LTU	46	49	41	39	43

LUX	9	1	6	5	5
LVA	48	50	42	41	41
MAR	126	114	102	98	100
MDA	113	127	107	109	109
MDG	141	163	115	86	106
MDV	90	100	88	93	91
MEX	53	57	69	78	67
MLI	174	159	140	101	122
MLT	38	39	22	21	25
MMR	134	164	173	176	173
MNG	111	121	92	81	87
MNP	64	65	75	79	71
MOZ	168	166	141	106	131
MRT	150	139	135	123	135
MUS	78	67	50	43	52
MWI	156	169	132	112	130
MYS	65	60	55	58	58
NAM	124	101	67	57	66
NER	178	173	165	141	159
NGA	154	138	166	165	164
NIC	120	126	113	113	118
NLD	6	14	9	9	12
NOR	1	1	7	8	2
NPL	140	162	151	146	147
NZL	20	32	8	7	8
OMN	56	41	54	59	57
PAK	137	128	156	161	152
PAN	61	66	63	66	60
PER	74	81	84	89	83
PHL	101	120	100	111	101
PNG	144	134	136	127	144
POL	41	52	48	48	45
PRT	34	41	28	29	28
PRY	97	110	114	126	125
QAT	33	1	47	52	47
ROM	62	63	62	65	61
RUS	69	55	111	131	110
RWA	163	165	143	124	138
SAM	91	109	58	50	56
SAU	59	40	81	105	82
SDN	146	134	172	175	172
SEN	162	144	130	104	120
SGP	23	1	14	16	23
SLB	131	142	125	115	128
SLE	176	172	167	144	166
SLV	102	95	78	77	81
STP	127	145	104	88	107
SUR	93	83	77	73	76
SVK	42	45	40	38	38
SVN	29	33	30	31	27

SWE	7	16	5	6	6
SWZ	137	105	133	129	136
SYC	57	50	64	67	64
SYR	103	108	129	150	137
TCD	171	148	176	173	176
TGO	155	167	160	160	165
THA	84	79	85	95	85
TJK	123	141	138	151	146
TKM	105	102	152	169	148
TMP	158	170	161	152	162
TON	95	116	89	87	93
TTO	63	38	61	63	63
TUN	93	86	71	75	74
TUR	74	62	70	76	75
TZA	147	154	122	103	117
UGA	153	160	137	128	141
UKR	82	90	93	97	97
URY	50	68	44	40	40
USA	13	1	21	22	20
UZB	115	129	150	168	149
VEN	58	64	127	154	129
VNM	112	125	108	121	104
VUT	122	118	68	61	72
WBG	106	131	142	162	142
YEM	136	130	154	153	154
YUG	66	74	82	90	77
ZAF	125	76	65	56	65
ZAR	172	178	177	177	177
ZMB	160	149	134	110	132

Meduim ICDH	Meduim HDI
ALB	AGO
ARG	AZE
ARM	BGD
AZE	BLZ
BEN	BOL
BIH	BTN
BLR	BWA
BLZ	CHN
BOL	CMR
BRA	COG
BTN	COM
CHN	CPV
COL	DJI
CUB	DOM
DOM	DZA
DZA	EGY
ECU	FJI
EGY	GAB
FJI	GEO
GAB	GHA
GEO	GNQ
GHA	GTM
GTM	GUY
GUY	HND
HND	HTI
IDN	IDN
IND	IND
JAM	IRN
KAZ	JAM
KGZ	JOR
LBN	KEN
LBY	KGZ
LKA	KHM
LSO	LAO
MAR	LKA
MDA	LSO
MDG	MAR
MDV	MDA
MEX	MDG
MNG	MDV
MNP	MMR
NIC	MNG
PER	MRT
PHL	NAM
PRY	NGA
RUS	NIC
SAU	NPL
SLB	PAK
SLV	PHL
STP	PNG
SUR	PRY
THA	SAM
TON	SDN
TUN	SLB
TUR	SLV
TZA	STP
UKR	SUR
VEN	SWZ
VNM	SYR
YUG	TGO
	THA
	TJK
	TKM
	TON
	TUN
	TZA
	UGA
	UZB
	VNM
	VUT
	WBG
	YEM
	ZAF

	Countries with high HDI who migrated to the group of counties with meduim ICDH
	Countries with low HDI who migrated to the group of counties with meduim ICDH
	Countries with meduim HDI who migrated to the group of counties with high ICDH
	Countries with meduim HDI who migrated to the group of counties with high ICDH

