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An empirical reflection on '*Smart Social Justice*', its measurement and possible drivers and bottlenecks

Abstract

In this research, we present a first empirical reflection on 'smart social justice', its measurement and possible 'drivers' and 'bottlenecks'. The very idea of 'smart development' was first proposed by Meadows[1] and has not been really followed up to now in social science ever since. We first provide data on how much ecological footprint is used in the nations of the world system to 'deliver' a given amount of democracy, economic growth, gender equality, human development, research and development, and social cohesion. To this end, we first developed UNDP-type performance indicators from current standard international comparative, cross-national social science data on these six main dimensions of development and on the combined performance on the six dimensions ('human development index plus'). We then show the non-linear standard OLS regression trade-offs between ecological footprints per capita and their square on these six components of development and the overall super-UNDP development performance index, derived from them. The residuals from these regressions are our new measures of smart development: a country experiences smart development, if it achieves a maximum of development with a minimum of ecological footprint. We then look at the cross-national drivers and bottlenecks of this smart social justice and development, using standard cross-sectional data, which operationalize standard economic, sociological and political science knowledge in international development accounting. Finally, we take up income inequality which has been very prominent in recent global public health debate due to its very detrimental effect on life quality.

JEL Classification Codes: C43; F22; F24; Q56

Keywords: index numbers, environment, development, international, migration, smart, social justice

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Introduction

In this research, we present a first empirical reflection on *'smart social justice',* and its measurement and its possible 'drivers' and 'bottlenecks'. The very idea of *'smart development'* was first proposed by Meadows[1] and has not been really followed up to now in social science ever since. In the face of the huge usage of this term in the international media, such a statement is perhaps surprising, but our verdict corresponds to the clear bibliographical evidence on the base of such indices as *'ISI Web of Knowledge'* or *'Cambridge Scientific Abstracts' (nowadays taken over by PROQUEST)*.The basic idea, proposed by Meadows two decades ago in his single pioneering article on the issue was that we should relate our whole concept of development, and not just economic growth, to the natural resources needed to sustain it. In a similar vein, the Happy Planet Organization presented the so-called 'Happy Planet Index' (HPI), which is, as it is perhaps known to the readership of this publication, an index of measuring the trade-off between ecological footprint data and life quality (Happy Life Years, HLYE). Arguably, ecological footprint today is the best single international yardstick for environmental destruction in a nation.[2]

Economic theory, for sure, is conscious about the non-linearity of the trade-off between income and happiness, with rising income levels not necessarily increasing the happiness of all. This phenomenon has become widely known in the economic research literature as the *'Easterlin paradoxon'*.[3–6] But here, we provide the first cross-national data, how much ecological footprint is used in the nations of the world system to 'deliver' a given amount of democracy, economic growth, gender equality, human development, research and development, and social cohesion. To this end, we first developed UNDP-type performance indicators from current standard international comparative, cross-national social science data on the six main dimensions of development (democracy, economic growth, gender equality, human development, research and development, and social cohesion) and on the combined performance on these six dimensions (a kind of super-UNDP *'human development index').* We then show the non-linear standard OLS regression trade-offs between ecological footprints per capita and their square on these six components of development and the overall super-UNDP development performance index, derived from them. The residuals from these regressions are our new measures of smart development: a country experiences smart development, if it achieves a maximum of democracy, economic growth, gender equality, human development, research and development, and social cohesion, and the combination of them with a minimum of ecological footprint.

We then look at the cross-national drivers and bottlenecks of this 'smart development', using standard comparative cross-national data, which operationalize standard economic, sociological and political

science knowledge in international development accounting. We compare the predictive power of these standard predictors, using standard OLS stepwise regression procedures, based on IBM SPSS XXIV. Apart from important variables and indicators, derived from sociological dependency and world systems theories, we also test the predictive power of other predictors as well, ranging from geography and achieved development levels to the clash of civilization models, feminist theories, migration theories, and the *'small is beautiful paradigm'* in the tradition of Schumacher. In Section 2 we sketch a possible theoretical background. Section 3 will introduce the measurement concepts and the methodology of this essay. Section 4 will be dedicated to the presentation of the results on the drivers and bottlenecks of *'smart social justice',* while Section 5 looks into the trade-off between inequality and smart development. Section 6 presents our preliminary conclusions.

Theoretical background and earlier studies

To present a theory or competing theories of 'smart development' is virtually impossible, because there has been no measurement, let alone accounting of its cross-national successes and failures in the literature up to now. We are really had to start research into this issue from 'scratch'. Among the prominent views on the issues involved, our readers should be reminded that these questions play an important role in the works of the economists Ernst Friedrich 'Fritz' Schumacher[7–9] and Leopold Kohr.[10–13] Their work is often being referred to today as 'Buddhist economics'. We already drew our reader's attention to the fact that on an international level, the Happy Planet Organization indicators[1]–Ecological Footprint, Happy Life Years, and the derived measure Happy Planet Index (HPI), which measures the ecological efficiency with which human well-being is delivered around the world, increasingly gained in importance. At first sight, the measure is of a compelling simplicity, capturing at the same time the growing global ecological concerns about the validity of our lifestyle, needing more and more energy to produce a stagnant or even shrinking rate of human happiness. Accordingly, the basic logic of the Happy Planet Index must be traced back especially to Schumacher's writings.[2] Schumacher's *'Buddhist economics'* are based on an envisaged minimum material consumption in relation to life quality. Internationally, we observe a growing framework of what is being increasingly referred-to as *'the environmental efficiency of well-being'*.[14–16] Schumacher's critique of Western economies and his proposals for human-scale, decentralized and appropriate technologies led him to call for 'Intermediate Size' and 'Intermediate Technology'.[3] Schumacher, in many ways, must be considered as one of the founders of contemporary thinking about *'sustainable development'*. Central for Schumacher's concerns is the idea that in rich countries these developments can be partly compensated, as far as incomes are concerned, by an enormous and never-ending expansion of welfare payments; in poor countries it produces 'dual societies'-great masses of destitute people on the one side-many of them without work and living in slums-and a small, rich elite on the other, who often 'earn' in an hour more than most of their compatriots earn in a month. A genuine middle class to connect the extremes does not exist; it has disappeared together with the 'disappearing middle' of technology. The loss of social structure is paralleled by the loss of a coherent structure as far as human settlements are concerned: hence the appearance of vast congestion in a few places and a vast (relative) emptiness in all other places.[7,9] Schumacher's alternative strategy is based on the factors of smallness, simplicity, capital-cheapness and non-violence. Schumacher was also among the first to highlight the enormous dependence of modern, industrialized agriculture on fossil fuels. Harvested crops capture solar energy and store it as food or some other useful product. Yet the energy captured is small compared to the energy we burn to capture it. Agriculture, as a result, has become a major consumer of our stores of energy, using more petroleum than any other single industry. If the world is facing a future with rising energy prices, the highly mechanized technology currently used in modern, industrialized agriculture may be inappropriate.[7] In Schumacher,[7] it is already being argued that government effort must be concentrated on sustainable development, because relatively minor improvements, for example, technology transfer to Third World countries, will not solve the underlying problem of an unsustainable economy. Schumacher[7] indeed was one of the first economists to question the appropriateness of gross national product as a measure for human well-being, emphasizing that 'the aim ought to be to obtain the maximum amount of well-being with the minimum amount of consumption'.[7] For Kohr's approach, the consequences are even more radical:[4] there seems only one cause behind all forms of social misery: bigness. Whenever something is wrong, something is too big. Social problems have the tendency to grow at a geometric ratio with the growth of the organism of which they are part, while the ability of man to cope with them, if it can be extended at all, it grows only at an arithmetic ratio. For Kohr it is clear that if a society grows beyond its optimum size, its problems must eventually outrun the growth of those human faculties which are necessary for dealing with them. A small-state world would not only solve the problems of social brutality and war; it would solve the problems of oppression and tyranny. It would solve all problems arising from power.[10] What determines *"smartness"?* At a time of a profound global economic crisis, which began in 2008, it might be permitted to look therefore at some of the more radical paradigms, challenging the wisdom of neo-liberal mainstream economic theory. Acemoglu, in his 2009 paper reflecting the lessons of the 2008 crisis, and certainly himself being a leading 'mainstream' and not a 'radical' and 'globalization critical' economist, went on the record of admitting that: *'There is another sense in which the myth of the end of the business cycle is at odds with fundamental properties of the capitalist system. As Schumpeter argued long ago, the workings of the market system and the innovation dynamics that constitute its essence involve a heavy dose of creative destruction, where existing … firms, procedures and products are replaced by new ones'*.[17]

For the interested readers, Box 1 summarizes this 'dependency theory'/'world systems theory' 'empirical logic':

[1]http://www.happyplanetindex.org/

[2]see http://www.resurgence.org/education/schumacher-circle.html#ne

[3]For an overview of Schumacherian economics, see also http://www.resurgence.org/education/schumacher-circle.html#ne

[4]Kohr, 1958, 1960, 1977, 1992. 10–13

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Box 1: The logic of dependency and the capitalist world system, challenging neo-liberal orthodoxies

MNC penetration (MNC PEN) measures the different degrees of weight that foreign capital investments have in the host countries, i.e. the UNCTAD percentages of the stocks of multinational corporation investments per total host country GDP. This research tradition has been especially developed, as mentioned earlier, by the Swiss sociologist Volker Bornschier and his school. Bornschier18–22 and Bornschier et al.23 predicted a strong negative determination of development by a high MNC penetration, due to the negative consequences that monopolies have on the long-term development trajectory of countries.

- We also ascertain the growth of MNC penetration over time (DYN MNC PEN), from 1995 to 2005. The Bornschier School expected short-term dynamic effects from such MNC penetration increases.
- Equally, Bornschier and his school already developed a high theoretical and empirical awareness about the long-term consequences of the presence or absence of 'MNC headquarter status' (MNC HEADQU), measured in our analysis by the indicator MNC outward investments (stock) per GDP. Bornschier and his school expected that a high headquarter status mitigates against the long--term negative effects of MNC penetration.
- FPZ (free production zones) employment as a per cent of total population is the indicator best suited to measure the so-called 'NIDL' (new international division of labour) school. Early on, Froebel, Heinrichs and Kreye (1980) already predicted the unfettered rise of the model of 'export processing zones', especially in China and Southeast Asia. This first major international study by Froebel/Heinrichs/Kreye, was followed, among others, by Ross; and Singa-Boyenge. Export Processing Zones (EPZ)–or 'Free Production Zones' today already account for some 80 per cent of the merchandise exports of countries like China, Kenya, the Philippines, Malaysia, Mauritius, Mexico, Senegal, Tunisia, and Vietnam. The 3500 EPZs in 130 countries of the world now employ 66 million people, among these 40 million employees in China. The tendency, correctly foreseen by Froebel/Heinrichs/Kreye, towards this total global re-location of world industries continues unabated. In the present Chapter, we try to determine the quantitative weights, which free production zones have in the determination of development performance (per cent of the population working in export processing zones versus MNC penetration versus the other dependency/globalization indicators).
- 'Low comparative price levels' (for an exhaustive debate on the underlying issues from a dependency theory/world systems perspective, see Kohler/Tausch, furthermore Samuelson, from a more conventional economic theory framework) is operationalized here simply by ERD or ERDI, the exchange rate deviation index, which is calculated by the ratio between GDP at purchasing power parities, divided by GDP at current exchange rates. Dependency theories and world systems theories assume that low comparative price levels are an indicator of 'unequal exchange' between the countries of the center and the periphery.[5]
- For dependency authors, foreign savings show the weight that foreign savings, mostly from the centres and richer semi-peripheries, have in the accumulation process of the host countries in the periphery and semi-periphery. It is calculated by the difference between the share of investments per GDP and the share of savings per GDP.

Our main independent variable is presented in Table 1. Their theoretical linkages or earlier empirical studies connected with these variables are not included here due to limited journal spaces. These can be obtained from the authors upon request.

Methods and measurement

To gain a real empirical knowledge under scrutiny here, we first developed UNDP-type indicators from current standard international comparative, cross-national social science data on these six dimensions of development and on the combined performance on the six dimensions.[6] We then show the non-linear standard OLS regression trade-off between ecological footprint per capita and its square and these six dimensions of development (and the overall development performance indices). The residuals from these regressions are our new measure of smart development: with a minimum of ecological footprint one has to achieve a maximum of democracy, or economic growth, or gender equality, or human development, or research and development, or social cohesion (and the combination of all of them). We then look in a very preliminary way at the drivers and bottlenecks of smart development. Can the accumulated knowledge of cross-national development research be applied to this new question writing? We use standard comparative cross-national 'development accounting' data, which operationalize standard econometric drivers of economic growth, and compare their weight in explaining 'smart development' with the results for the clash of civilization models, political integration theories, feminist theories, migration theories, and peace research approaches to global development. We also analyze the possible explanatory weight of sociological dependency and world systems theories and later globalization critical research, and also do not overlook in our choice of independent variables with a possible effect on the dependent variables–smart development-the *'small is beautiful paradigm'* in the tradition of Schumacher. Appendix Table 1 provides a complete list of dependent and independent variables.

Since our Chapter does not feature primarily on ecological footprint, but on a variety of measures of 'smart development', which are mathematically derived from the logic of the Happy Planet Index,[24,25] it suffices to say here that ecological footprint (g ha /cap)[7], as it is universally well-known by now, is indeed a one-catch all-indicator of ecological strain, caused by human activity. Ecological footprint and its measurement cannot be further debated in the

[5]For an easily survey of the available and often very complicated literature as well as the empirics of 'unequal exchange', see Kohler/Tausch, 2003 and http://wsarch.ucr.edu/archive/papers/kohlertoc.htm

[6]The data for our calculations is collected from 72 different sources. It combines the most up-to-date data on the social, economic, political, and environmental effects of globalization. The dataset in EXCEL format and codebook in PDF format are available from the authors upon request, so that the global research community can have access to the original data and the opportunity to conduct new research. A brief description of the smart development data, calculated from that data source, is also contained in the Appendix Table 1 of this work.

[7]http://www.footprintnetwork.org/en/index.php/GFN/

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framework of our Chapter and at this stage must be regarded as a 'given' (for studies about the logic and determinants of footprint per capita see also Dietz et al.[14,15] It should be enough to state here that it is measure of the amount of land required to provide for all their resource requirements plus the amount of vegetated land required to sequester (absorb) all their CO_2 emissions and the CO_2 emissions embodied in the products individuals consume. This figure is expressed in units of 'global hectares'. In 2005, the per capita footprint for the rich OECD nations was 6.0 global hectares.[8] The other variables are then compared to the footprint, which was used by a society to achieve a given standard of democracy, economic growth, gender equality, human development, research and development, and social cohesion. We should also remind our readers here of the fact that the Happy Planet Index Organization measures the Happy Planet Index on the basis of the global life satisfaction (Happy Life Years), which have to be maximized in relationship to the 'ecological price' of happiness, ecological footprint. It is then of course very tempting to calculate–in a Schumacherian tradition–the 'environmental price' of different development processes, like democracy, economic growth, gender equality, human development, research and development, and social cohesion. The Happy Planet Organisation calculates the HPI in the following way:

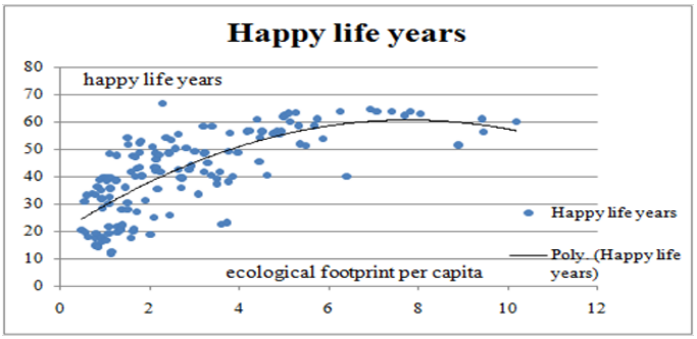
$$HPI_i = \left((HLYE_i) / (EFPC_i + \alpha)\right) \times \beta \qquad (1)$$

where Happy Life Years (HLYE) is obtained as the product of life expectancy (LE) and average life satisfaction (LS) index. In its currently used formula, the Happy Planet Organization adds a constant (α) to ecological footprint. The result of the division: [Happy Life Years divided by Ecological Footprint plus the constant (α)] is then multiplied by another, equally arbitrarily chosen constant (β) to normalize the efficiency index. In the Happy Planet Organization formula, the constants have the following numerical values: (α)=3.35 and (β)=6.42.

The highest global HPI score is that of Costa Rica (76.1 out of 100.0). Of the 10 best performing countries of the world, nine are in Latin America.[9] But unfortunately, the Happy Planet Organization's straightforward and simple methodology overlooks advances in the social sciences, which long ago already developed appropriate methodologies to relate life quality variables–like life expectancy–to GDP per capita or energy consumption levels in empirical, and non-linear mathematical formulations, which capture much better than the above simple equation the underlying non-linear tradeoffs between *'energy consumption and/or environmental strain'* and *'life quality'*.[26] Goldstein's empirically developed idea that basic human needs indicators–like life expectancy–are a non-linear function of development levels has been so widely received in the social science literature that is has become a real international standard nowadays.[27–39] The neglect of such a basic non-linear function (whatever its concrete mathematical formulation)[10] is a major shortcoming of the currently used Happy Planet Index calculation. The global public health research tradition, too, produced massive evidence on the cross-national determinants of life expectancy and other life quality variables.[40–42] This growing methodological convergence of the social sciences, geography and earth sciences, and public health research on predictors of life quality at different stages of development should be taken into account in this Chapter.[43–47] Graph 1 depicts the trade-off between ecological footprint and happy life years; the (standardized) residuals in our graph are a reformulated Happy Planet Index:

Variable	Coefficient
Std error	
Ecological Footprint per capita	10.541***
1.313	
Ecological Footprint per capita^2	−0.677***
0.147	
Constant	19.631***
2.246	
N =	140
Adj. R^2 =	54.1%
F-test =	
83.081	
p-value =	0.000

Significance level: *p <0.05, **p <0.01, ***p <0.001



Graph 1 The non-linear relationship between Happy Life Years (HLYE, vertical Y) and ecological footprint (horizontal X), n=140 countries in 2005.

In a similar vein, we investigated the non-linear trade-offs between ecological footprint and the combined UNDP type indices for six dimensions of development, derived from freely available current cross-national, comparative data. The lists of components and their indicators is provided in Table 2.

As we already explained, the hitherto existing calculations of the HPI,[11] provided by the Happy Planet Organization, are merely based on simple arithmetical principles. Following Heintz[48] we propose as an alternative method a residual method, and calculate our smart development indicators as the standardized residuals from Graph 2. The standardized residual values are computed as observed minus predicted development outcomes divided by the square root of the residual mean square (Appendix Table 2):

[8]http://www.happyplanetindex.org/
[9]http://www.happyplanetindex.org/
[10]The most often encountered formulation in the literature is a double logarithmic expression, based on the natural logarithm of development level/energy consumption and its square.

[11]Although we presume the main contemporary global environment indicators to be known, we refer our readers especially to the very comprehensive Yale/Columbia environmental data series, available at http://sedac.ciesin.columbia.edu/es/esi/ and http://epi.yale.edu/Home. The important new 'grammar' of the global footprint discourse can be found at http://www.footprintnetwork.org/en/index.php/GFN/page/glossary/ .

$$SDP_i = (HLYE_i - \hat{HLYE}_i) / \hat{\sigma} \quad (2)$$

Table 1 The independent variables of our model and theories or earlier empirical studies, connected with these variables

Independent variables, determinants of smart development
% women in government, all levels
% world population
2000 Economic Freedom Score
Absolute latitude
Annual population growth rate, 1975-2005 (%)
Comparative price levels (US=1.00)
Foreign savings rate
FPZ (free production zones) employment as % of total population
Immigration - Share of population 2005 (%)
ln GDP per capita
ln GDP per capita ^2
Membership in the Organization of Islamic Cooperation (OIC)
Military expenditures per GDP
Military personnel rate ln (MPR+1)
MNC outward investments (stock) per GDP
MNC PEN - stock of Inward FDI per GDP
MNC PEN: DYN MNC PEN 1995-2005
Muslim population share per total population
Net international migration rate, 2005-2010
Openness-Index, 1990 (export-share per GDP + import-share per GDP)
Population density
Public education expenditure per GNP
UNDP education index
Worker remittance inflows as % of GDP
Years of membership in EMU, 2010
Years of membership in the EU, 2010

Table 2 The combined six components, measuring development, and the overall indicators, combining 26 variables

Components	Indicators
democracy	Combined Failed States Index
democracy	Civil and Political Liberties violations
democracy	Corruption avoidance measure
democracy	Democracy measure
democracy	Global tolerance index
democracy	Rule of law
economic growth	Crisis Performance Factor
economic growth	economic growth IMF prediction growth rate in 2009
economic growth	economic growth IMF prediction growth rate in 2010
economic growth	economic growth in real terms pc. per annum, 1990-2005
Gender equality	closing economic gender gap
Gender equality	closing educational gender gap
Gender equality	closing health and survival gender gap
Gender equality	closing of global gender gap overall score 2009
Gender equality	closing political gender gap
Gender equality	gender empowerment index value
human development	Infant mortality 2005
human development	female survival probability of surviving to age 65 female
human development	Human development index (HDI) value 2004
human development	Life Expectancy (years)
human development	Life Satisfaction (0-10)
R&D	Country share in top world 500 Universities
R&D	per capita world class universities
R&D	tertiary enrollment
social cohesion	quintile share income difference between richest and poorest 20%
social cohesion	unemployment rate
nonparametric_26 equal weights	overall 26 development index
nonparametric, weighting each dimension equally	overall 26 development index, based on six dimensions

High positive outlayers imply a very high smart development performance, while countries below the trend line are the countries with a low smart development performance. Having established a residual-based smart Development Indicator family, we now can look more realistically at the cross-national determinants of smart development performance. Our investigation duly acknowledges many of the key determinants of economic performance, mentioned in the economic literature, like current shares of the country's inhabitants in total world population, calculated from UNDP data; the famous Heritage Foundation 2000 Economic Freedom Score; absolute geographical latitude, adapted from Easterly's growth theory; the UNDP figures for long-term annual population growth rate, 1975-2005 (per cent); the trade-off between development level and development performance, otherwise also known in economics as 'conditional convergence' (ln GDP per capita; ln GDP per capita^2); the simple Huntingtonian fact of whether a country is a Muslim country, to be measured by the Organization of Islamic Conference (OIC) Membership or by Muslim population share (Nationmaster); UNDP data on the simple geographical fact of population density (based on the CIA's World Factbook); UNDP data on public education expenditure per GDP; and the UNDP education index, combining the enrolment rates at the primary, secondary and tertiary education levels. We also take into account UNDP figures on military expenditures per GDP and the openly available CIA data on military personnel rate, which are key variables of contemporary political science international relations theory and peace research. In our analysis, we also show the theoretical and practical (political) potential of the following

two drivers of development, which are somewhat a 'terra incognita Australis' in the hitherto existing macro-sociological debate, like migration and European (Monetary) Union membership.

Instead of concentrating on the ever more complex modelling of the effects of *'foreign capital dependence',* the economics profession, by contrast, developed its mathematical models of 'development accounting' side by side with an ever-growing amount of many different variables, which featured as *'control variables'* in the literature. An attempt, like the one by Sala-i-Martin,[49] to filter out the most robust predictors of economic growth by applying Bayesian techniques and combining dozens of predictor variables in all mathematically possible different combinations is a very legitimate one from the viewpoint of the advancement of social science and statistical methodology. By contrast, sociologists used to the published articles in journals like the *'American Sociological Review'* most probably would be shocked by Sala-i-Martin's[49] successful attempt to run two million regressions (in a scientific paper version of his 1997 essay, he even speaks about four million regressions). Availability of computer power, common databases and search engines with same on-line journal service may finally bring the three disciplines of sociology, politics and economics closer. The choice of a country to be included in the final analysis (175 countries) was missing values' routine (i.e. only entering countries with complete data into the statistical analysis). The statistical design of our study is thus based on the usual, SPSS XVIII ordinary least square standard regression analysis of the 'kitchen sink type' (Durlauf *et al.*[50] Hertz et al.[51] determined by the availability of a fairly good data series for these independent variables (if not mentioned otherwise, UNDP data for the middle of the first decade of the new millennium).

In the final regressions, we applied the 'list wise deletion of Hertz et al.[51] of economic growth and economic, social and political performance in the research tradition of Barro.[52,12] Surveying the vast econometric literature on the subject of the possible drivers and bottlenecks of the EU-2020 process and overall development performance of a given country, one indeed finds support for the inclusion of geographic and demographic variables in the comparative analysis of development success or failure. Our list is thus corresponding to international research standard praxis in the discipline of general 'development accounting'.[30,36,39,46,47,50,52,53,54] Compared to a recent approach on the subject,[16] we do include globalization-oriented variables as well, and not just levels of GDP, winters, social trust, democracy, inequality, and Latin America, former USSR, Africa, and Asia as 'dummy variables'.[16] There is a wide and well-established research tradition in international comparative sociology to include globalization-related drivers of environmental decay.[55,56] To exclude such variables and to introduce instead four geographically determined dummy variables (Latin America, former USSR, Africa, and Asia, as was done by Knight and Rosa) does not necessarily increase the theoretical and predictive power of analysis. The statistical design of our study is based on the usual, SPSS XXIV[13] ordinary least square standard regression of the 'kitchen sink type' Durlauf et al.[50] Hertz et al.[51] of economic growth and economic, social and political performance in the research tradition of Barro.[57] To our knowledge, the term *'kitchen sink regression',* commonly used in econometrics of economic growth, was re-introduced in more recent standard social science journal vocabulary in Laver and Shepsle. Prior stepwise regression procedures selected the significant among the total list of 26 available predictors. Among the many international studies, applying such a research design, we find.[51] This study analysed the effects of independent variables including dietary factors, medical resource availability, gross national product (GNP/capita), literacy rates, growth in the labour force, and provision of sanitation facilities and safe water on infant and maternal mortality rates and life expectancy at birth. The study fitted a series of general linear models for each of the three dependent variables.[14]

Results on the drivers and bottlenecks of 'smart social justice'

The image of social realities suggested upon a very first inspection of smart development performance values around the globe would suggest a Friedrich August Hayek vision[58,59] of markets, inequality and a free society interacting with one another. There should be no blocks against inequalities in the name of whatever 'social justice', explaining then the phenomenal success of the unequal Latin American societies on the parameters of smart development (see especially, the global rankings of smart development in the Appendix Table 3). A the same time, the high-equality performers in global society (quintile share of less than 5.0) with a relatively high per-capita income are at the same time bad performers on the new smart development scales. Notably enough, several of these countries are members of the European Union and traditional developed western welfare states. This very first glance at the data would suggest a complete turn-around from the 'European social model'[60] in favour of a high-inequality, open to globalization 'Latin American model' or Philippine model as the best way to achieve a good 'smart development' performance. However, such a first glance completely overlooks the massive available evidence about world economic openness and the failure of 'smart development'. In the following, we will present, equation by equation, the results of our research. Table 3 shows the significant drivers and bottlenecks of Happy Planet performance, i.e. happy life years in relationship to the ecological footprint of a society used. The z-standardized residuals from Graph 2 are well-explained; our equation is based on 103 countries with complete data. Our equation explains 29% of total variance, the F-value for the entire equation is 9.339, and the error probability is 0.000. The constant is-124.628 and is significant. There is a clear 'Kuznets' curve at work. But the shape of the curve contradicts much of the earlier debate on the subject: with rising per capita incomes, problem solving capacities first increase and then decrease. The larger states in the world system, having a larger share of global population, are much better able to achieve a good happy life years performance at relatively low ecological costs, measured in ecological footprints than smaller nations. This clearly contradicts the 'small is beautiful' philosophy in the tradition of Kohr and Schumacher. Military expenditures are a clear additional burden on an ecologically viable happy planet performance, while societies, depending on worker remittances, clearly manage to perform better on this scale than other societies around the globe.

Graphs 2A–2G show the trade-off between ecological footprint and 'smart development', measured for the various dimensions (democracy, economic growth, gender equality, human development,

[12]To our knowledge, the term 'kitchen sink regression', commonly used in econometrics of economic growth, was re-introduced in more recent standard social science journal vocabulary in Laver and Shepsle.

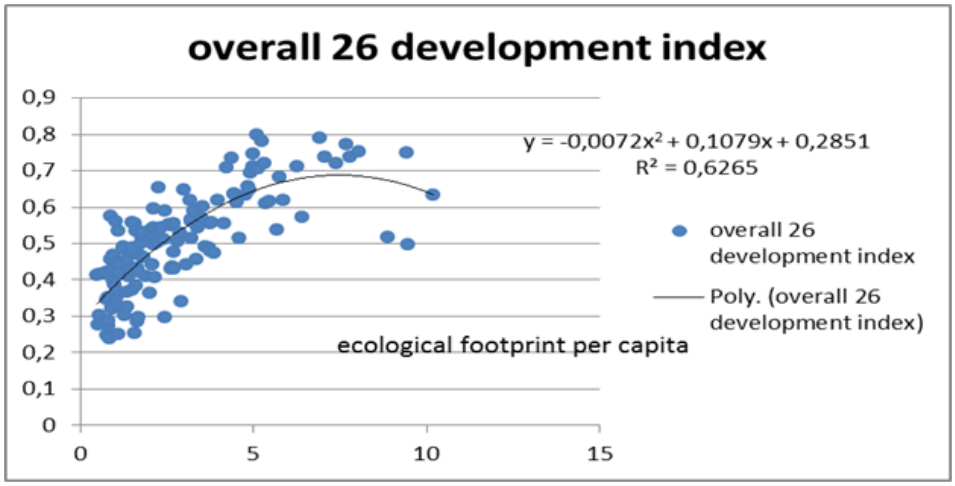
[13]http://www-01.ibm.com/software/analytics/spss/products/statistics/

[14]It emerged that the percent of households without sanitation facilities showed the strongest association with all three dependent variables: life expectancy at birth, infant mortality rate, and maternal mortality rate

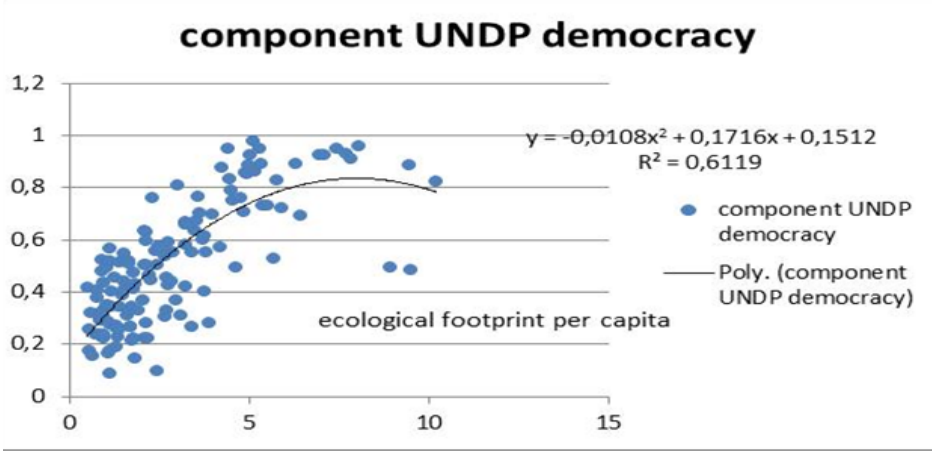
research and development, social cohesion, and the two differently combined overall measurement scales).Only the scatterplot for ecological footprint and 'social cohesion' suggests a weaker relationship, all the other relationships are considerable. The overall development performance, democracy, gender equality, human development, research and development are a clear non-linear, inverted U-shaped function of ecological footprint per capita, while economic growth and also social cohesion first decrease and then increase with rising levels of ecological footprint per capita.

Table 3 The drivers and bottlenecks of happy planet performance

Independent variable	B	Std error	Beta	t-value	Error prob.
Constant	-124.628	42.647		-2.922	0.004
% world population	0.596	0.313	0.161	1.904	0.06
ln GDP per capita	26.062	10.069	3.136	2.588	0.011
ln GDP per capita ^2	-1.309	0.584	-2.731	-2.241	0.027
military expenditures per GDP	-1.098	0.376	-0.245	-2.922	0.004
worker remittance inflows as % of GDP	0.42	0.133	0.288	3.153	0.002
memorandum item: statistical properties of the equation	adj R^2	df	F	error prob. of the entire equation	
	29	102	9.339	0	



Graph 2A Ecological footprint and the general development performance index, based on an equal weighting of its 26 components.



Graph 2B Ecological footprint and democratic performance (6 components combined).

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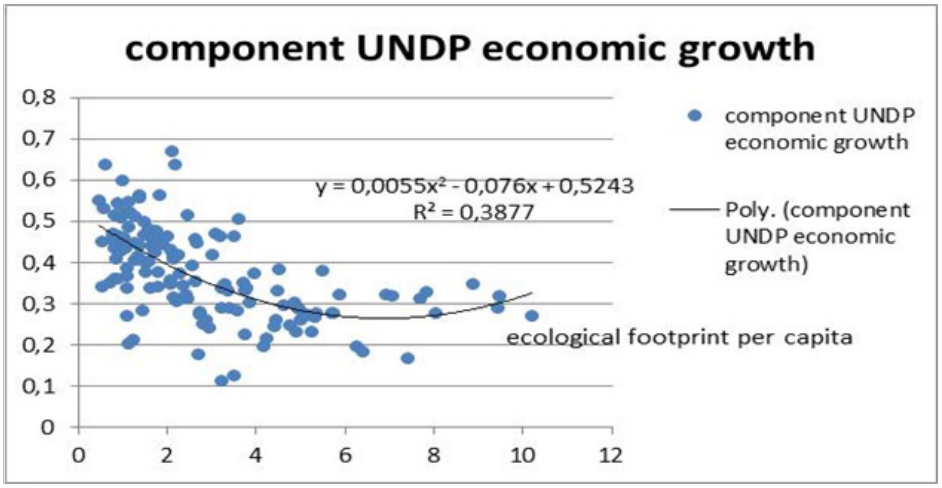
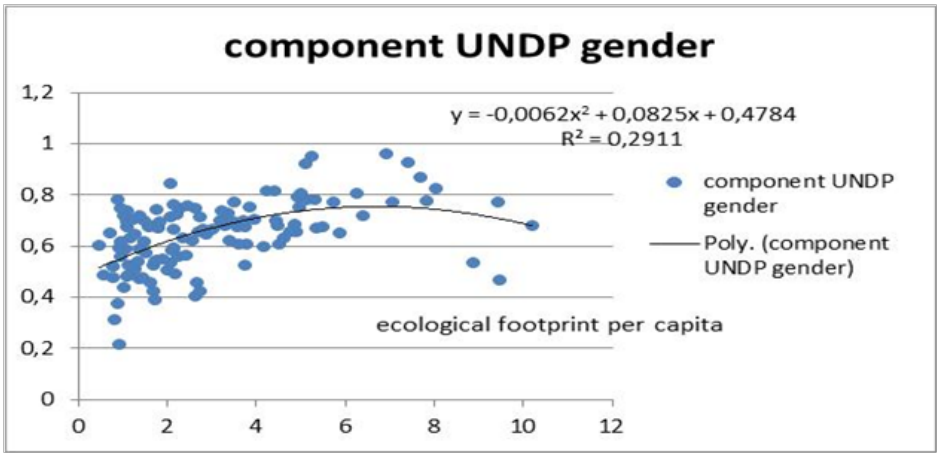
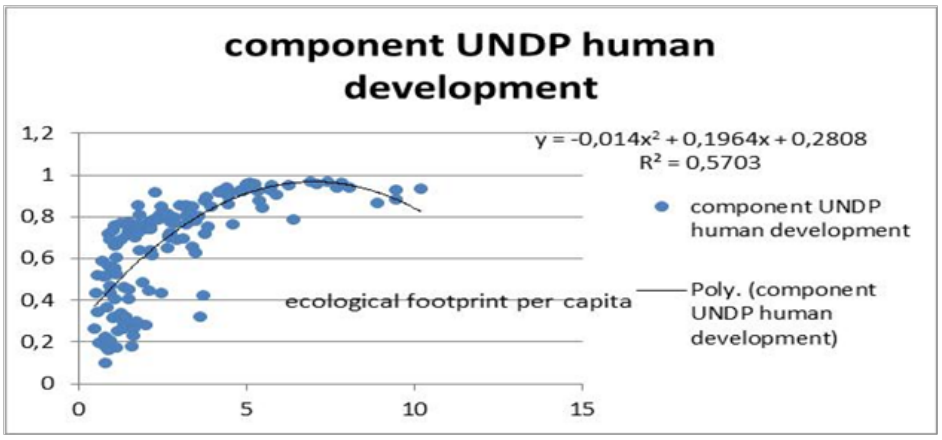


Graph 2C Ecological footprint and economic growth performance (4 components combined).

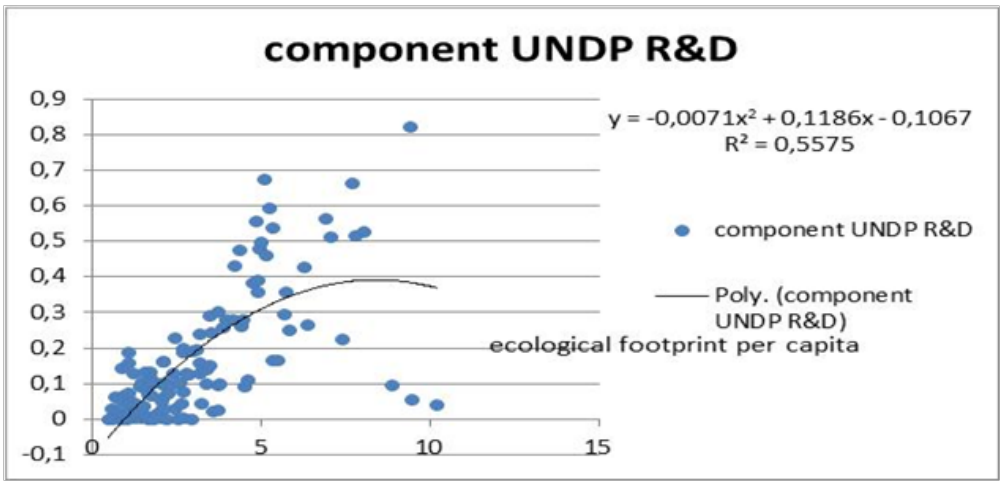


Graph 2D Ecological footprint and gender equality performance (6 components combined).

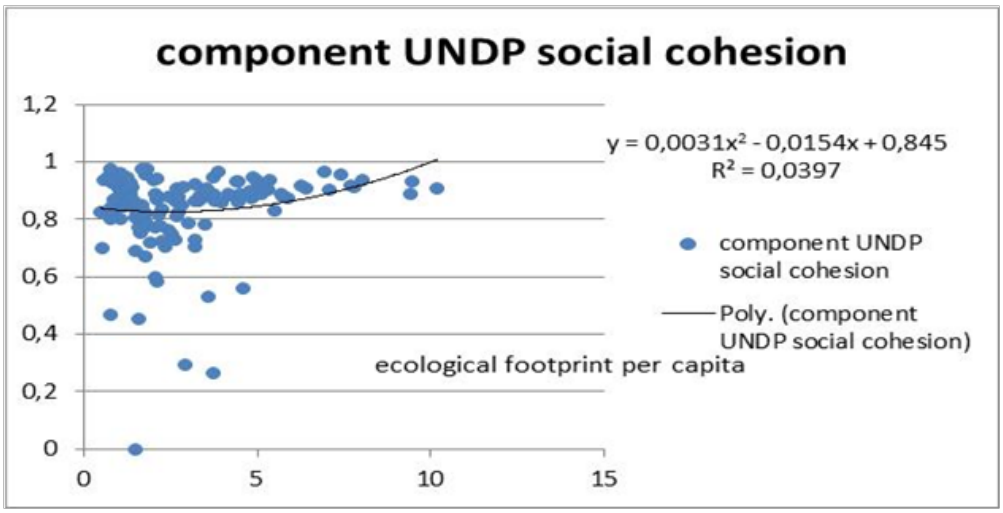


Graph 2E Ecological footprint and human development performance (5 components combined).

Citation: Heshmati A, Tausch A. An empirical reflection on *'Smart Social Justice'*, its measurement and possible drivers and bottlenecks. *Sociol Int J.* 2018;2(3):142–158. DOI: 10.15406/sij.2018.02.00042



Graph 2F Ecological footprint and research and development performance (3 components combined).



Graph 2G Ecological footprint and social cohesion performance (2 components combined).

In a similar fashion, we can establish in Table 4 that in the 101 countries with complete data, smart overall development, is explained to 37% by our model. The F-test for the entire equation is 9.392, the error probability is 0.000. The constant is -2.486 and is significant. The ten countries of the world system, best combining the performance on our 26 development indicators and avoiding ecological footprint at the same time are the Philippines; Sri Lanka; Costa Rica; Sweden; Jamaica; Dominican Republic; Finland; Peru; Netherlands; and Trinidad and Tobago. The ten worst performers on this scale are Sudan; Bosnia and Herzegovina; Central African Republic; United Arab Emirates; Niger; Kuwait; Chad; Zimbabwe; Burundi; and Hong Kong, China (SAR). Feminism in power, economic freedom, population density, the UNDP education index as well as the receipt of worker remittances all significantly contribute towards a smart overall development, while high military expenditures and a high world economic openness are a bottleneck for 'smart overall development'.

Table 5 of our study analyses the drivers and bottlenecks of smart gender justice. We are comparing the given amount of gender equality in a society with the amount of resources (ecological footprint), needed to sustain it. The global best performers on this equation, how to achieve a maximum of gender justice with a minimum of ecological footprint, are the Philippines; South Africa; Finland; Norway; Mozambique; Sweden; Iceland; Kyrgyzstan; Sri Lanka; and Uganda. The worst balance sheet on this item of combing 'lilac' gender policies and 'green' issues (minimizing ecological footprint per capita) are Yemen; Saudi Arabia; United Arab Emirates; Turkey; Pakistan; Chad; Iran; Kuwait; Korea (Republic); and Egypt. Our equation, based on the 93 countries with complete data, explains 39% of total variance, achieves an F-value of 15.712 and an error probability of the entire equation of .000. The insignificant constant has the value of -0.034. Women in government and worker remittances per GDP are the significant drivers of smart gender justice, while high military expenditures and the Muslim population share per total population are the major variables, to be interpreted as 'bottlenecks' of smart gender justice.

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Table 4 Drivers and bottlenecks of smart overall development

Independent Variable	B	Std error	Beta	t-value	Error prob.
Constant	-2.486	0.533		-4.666	0
% women in government. all levels	0.025	0.012	0.185	2.027	0.045
2000 Economic Freedom Score	0.031	0.01	0.336	3.239	0.002
military expenditures per GDP	-0.076	0.032	-0.191	-2.345	0.021
Openness-Index. 1990 (export-share per GDP + import-share per GDP)	-0.004	0.002	-0.17	-2.007	0.048
population density	0.002	0.001	0.214	2.612	0.01
UNDP education index	0.945	0.445	0.198	2.123	0.036
worker remittance inflows as % of GDP	0.027	0.011	0.208	2.459	0.016
memorandum item: statistical properties of the equation	adj R^2	df	F	error prob. of the entire equation	
	37	100	9.392	0	

Table 5 Drivers and bottlenecks of smart gender justice

Independent Variable	B	Std error	Beta	t-value	Error prob.
Constant	-0.034	0.213		-0.161	0.873
% women in government. all levels	0.044	0.013	0.3	3.364	0.001
military expenditures per GDP	-0.087	0.036	-0.204	-2.403	0.018
worker remittance inflows as % of GDP	0.035	0.013	0.241	2.764	0.007
Muslim population share per total population	-0.01	0.003	-0.396	-4.153	0
memorandum item: statistical properties of the equation	adj R^2	df	F	error prob. of the entire equation	
	39	92	15.712	0	

Table 6 looks at the drivers and bottlenecks of 'smart human development'. Which are the countries best combining the task of a maximum of 'human development' with a minimum of ecological footprint per capita? The ten best practice countries on this scale are Jamaica; Philippines; Cuba; Sri Lanka; Costa Rica; Vietnam; Dominican Republic; Indonesia; Colombia; and Moldova; while all the worst performers are located in the African continent, comprising the following countries: Botswana; Namibia; Central African Republic, Burkina Faso; Niger; Sierra Leone; Zimbabwe; Mali; Angola; and Chad. Our equation explains 29.9% of the total variance of 'smart development' and is based on the analysis of the 115 countries with complete data; the F-value is 13.183 and the error p of the entire equation is 0.000. The constant, which is significant, has a value of -1.657. The drivers of 'smart human development' are the share of a country's population in world population, indicating the relative size of a nation, the UNDP education index, measuring the levels of education in a given country, and worker remittance inflows as % of GDP. The bottleneck of 'smart human development' is constituted by the crowding-out effect of public education expenditures on human development. Our last result is presented in Table 7.

It features on the preconditions of 'smart social cohesion', combining a relatively high social cohesion with a relatively low ecological footprint. Our equation is based on an analysis of 120 countries with complete data, the adjusted R^2 is just 8.7%, and the F-value is 6.771; and the error probability of the entire equation is 0.002. The constant is 0.824 and is significant. There are two significant bottlenecks and no positive drivers of smart social cohesion –annual population growth (population pressure) and the crowding-out effects of public education expenditures per GDP. The best results on our indicator are achieved by several less developed and or (former) communist or left wing regime countries as well as nations with a known record of relatively egalitarian development policies (South Korea), with the entire group comprising: Chad; Uzbekistan; Rwanda; Belarus; Laos; Cuba; Benin; Tajikistan; Korea (Republic of); and Thailand. The worst record of combing social cohesion with low ecological footprints was found in Djibouti; Namibia; Bosnia and Herzegovina; Central African Republic; Sierra Leone; Botswana; Macedonia; Bolivia; South Africa; and Colombia.

Inequality and smart public health development

In the following, we take up a very hotly debated issue, which has been very prominent in recent global public health debate. Following the path-breaking articles by,[40,41] income inequality has a very detrimental effect on life quality. But life quality also depends in a non-linear fashion from environmental data. Already in Graph 2 above we portrayed this trade-off, stating that the non-linear tradeoffs between *'energy consumption and/or environmental strain'* and *'life quality'* were first portrayed in Goldstein.[26] We already hinted at the fact that

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social science literature widely uses non-linear functions to depict the trade-off.[27–39,53,61,62] Following the public health debate contribution in Tausch[42] and the social scientific approaches in Fain et al.[43–47] we now portray in Graph 3A–3C the trade-off between ecological footprint and life quality. Life quality is measured as life expectancy, female survival rate and infant mortality rates. The relationship is non-linear and positive in the first two case but non-linear and negative in the last. Table 8 portrays the mathematical properties of this trade-off between ecological footprint and its square and the three life quality indicators. Our calculations show that inequality, as correctly predicted by Wilkinson and his school of public health research, has a detrimental effect on life expectancy[65] (smart life expectancy) and on female survival (smart female survival), but that the effect on smart infant mortality reduction does not materialize, once we properly control for the other intervening variables. Let us look first at the statistical results of our research (Tables 9-11).

Table 6 Drivers and bottlenecks of smart human development

Independent Variable	B	Std error	Beta	t-value	Error prob.
Constant	-1.657	0.348		-4.76	0
% world population	0.055	0.029	0.152	1.894	0.061
public education expenditure per GNP	-0.097	0.042	-0.196	-2.283	0.024
UNDP education index	2.437	0.43	0.478	5.666	0
worker remittance inflows as % of GDP	0.044	0.01	0.352	4.461	0
memorandum item: statistical properties of the equation	adj R^2	df	F	error prob. of the entire equation	
	29.9	114	13.183	0	

Table 7 Drivers and bottlenecks of smart social cohesion

Independent Variable	B	Std error	Beta	t-value	Error prob.
Constant	0.824	0.206		4.009	0
Annual pop growth rate. 1975-2005 (%)	-0.152	0.055	-0.248	-2.775	0.006
public education expenditure per GNP	-0.102	0.034	-0.27	-3.013	0.003
memorandum item: statistical properties of the equation	adj R^2	df	F	error prob. of the entire equation	
	8.7	119	6.771	0.002	

Table 8 The trade-off between ecological footprint and life quality

life quality indicator (dep. var)	Independent variables	Regression coefficient B	Std error	Beta	T	Error prob.
life expectancy	Constant	51.057	1.802		28.33	0
	footprint per capita	8.493	1.054	1.623	8.061	0
	footprint per capita^2	-0.609	0.118	-1.041	-5.173	0
	statistical parameters of the equation	adj R^2	0.488			
		n=	140			
		F=	67.222			
		error p=	0			
female survival	Constant	45.541	3.091		14.735	0
	footprint per capita	14.346	1.81	1.643	7.926	0
	footprint per capita^2	-1.065	0.202	-1.091	-5.263	0
	statistical parameters of the equation	adj R^2	0.463			

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Table Continued

life quality indicator (dep. var)	Independent variables	Regression coefficient B	Std error	Beta	T	Error prob.
		n=	139			
		F=	60.508			
		error p=	0			
infant mortality	Constant	100.458	6.395		15.709	0
	footprint per capita	-31.745	3.752	-1.721	-8.461	0
	footprint per capita^2	2.401	0.418	1.167	5.74	0
	statistical parameters of the equation	adj R^2	0.485			
		n=	138			
		F=	65.634			
		error p=	0			

Table 9 Explaining the z-standardized residuals from ecological footprint and life expectancy (ecologically efficient life expectancy; smart life expectancy)

	Regression coefficient B	Standard error	Beta	T	Error probability
Constant	-1.305	0.521		-2.503	0.014
Membership in the Islamic Conference	-1.606	0.598	-0.735	-2.686	0.009
military expenditures per GDP	-0.084	0.039	-0.194	-2.125	0.037
public education expenditure per GNP	-0.124	0.049	-0.244	-2.554	0.013
UNDP education index	2.529	0.568	0.483	4.45	0
worker remittance inflows as % of GDP	0.039	0.014	0.263	2.811	0.006
Muslim population share per total pop.	0.025	0.007	0.96	3.367	0.001
quintile share income difference between richest and poorest 20%	-0.018	0.01	-0.156	-1.71	0.091
Adj. R2=0.364; n=88; F=8.108; error p= 0.000.					

Table 10 Explaining the z-standardized residuals from ecological footprint and female survival rate (ecologically efficient female survival rate, smart female survival)

	Regression coefficient B	Standard error	Beta	T	Error probability
Constant	-1.289	0.512		-2.519	0.014
Membership in the Islamic Conference	-1.573	0.587	-0.714	-2.679	0.009
military expenditures per GDP	-0.075	0.039	-0.174	-1.953	0.054
public education expenditure per GNP	-0.141	0.048	-0.276	-2.96	0.004
UNDP education index	2.582	0.558	0.49	4.627	0
worker remittance inflows as % of GDP	0.036	0.014	0.237	2.599	0.011
Muslim population share per total population	0.026	0.007	0.999	3.596	0.001
quintile share income difference between richest and poorest 20%	-0.022	0.01	-0.187	-2.114	0.038
Adj. R2=0.396; n=88; F=9.157; error p=0.000					

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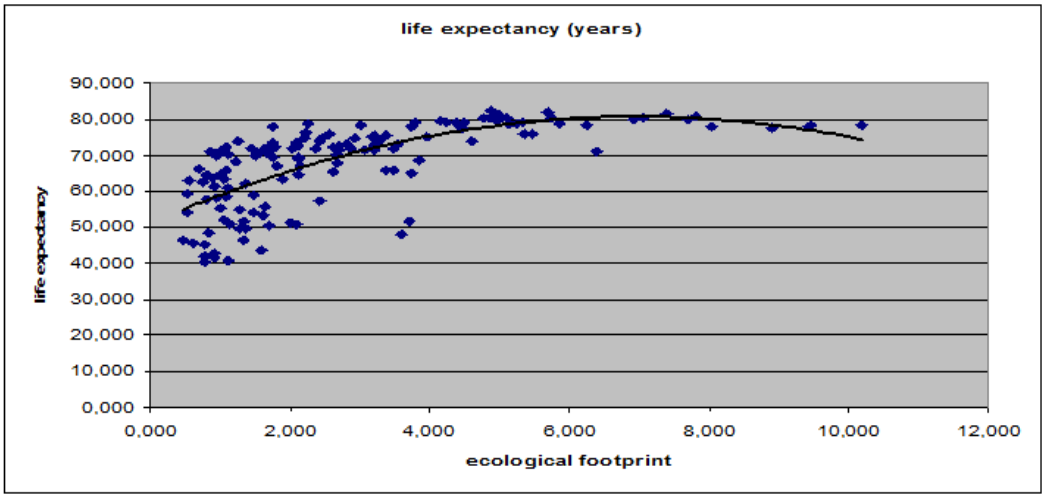
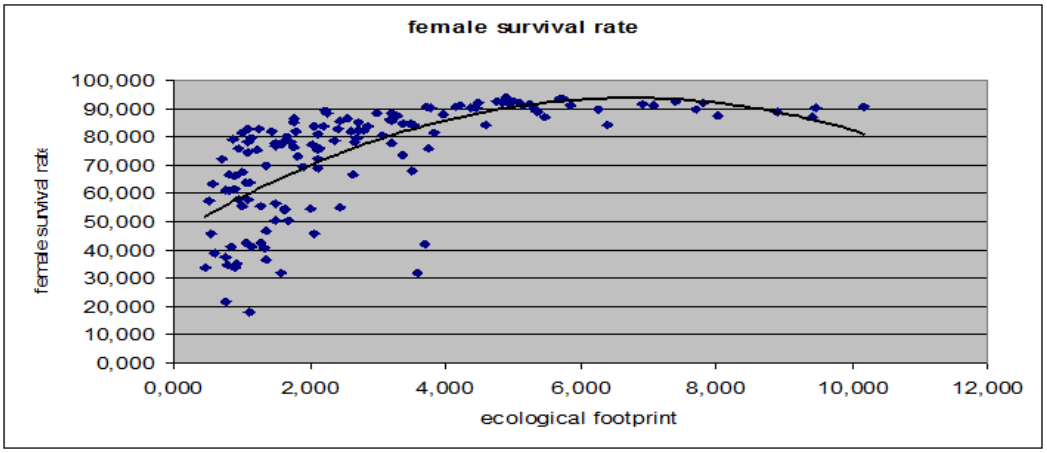
Table 11 Explaining the z-standardized residuals from ecological footprint and smart infant mortality

	Regression coefficient B	Standard error	Beta	T	Error probability
Constant	1.42	0.498		2.851	0.006
Membership in the Islamic Conference	0.863	0.571	0.444	1.511	0.135
military expenditures per GDP	0.044	0.038	0.116	1.18	0.241
public education expenditure per GNP	0.08	0.046	0.177	1.724	0.089
UNDP education index	-2.266	0.543	-0.487	-4.175	0
worker remittance inflows as % of GDP	-0.043	0.013	-0.327	-3.255	0.002
Muslim population share per total population	-0.012	0.007	-0.506	-1.653	0.102
quintile share income difference between richest and poorest 20%	0.004	0.01	0.036	0.369	0.713
Adj. R2=0.267; n=88; F=5.522; error p=0.000					



Graph 3A Life expectancy and ecological footprint.



Graph 3B Female survival rate and ecological footprint.

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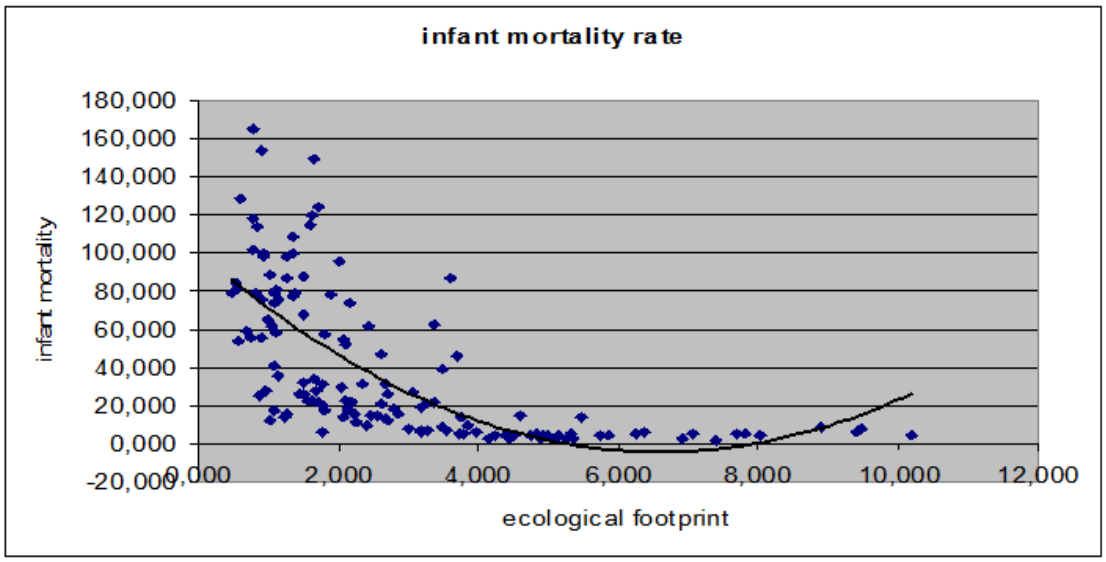

Graph 3C Infant mortality rate and ecological footprint.

The significant negative results of inequality on the female survival rate (ecologically efficient female survival rate, smart female survival, beta weight -0.187) and on life expectancy (ecologically efficient life expectancy; smart life expectancy, beta weight -0.156) have to be re-iterated. However, we must also observe that Membership in the Organization of Islamic Cooperation has a significant negative effect on life expectancy (ecologically efficient life expectancy; smart life expectancy) and on the female survival rate (ecologically efficient female survival rate, smart female survival). This results reflects the existing deficiencies of 'real existing' Muslim countries in the world today, while Muslim societies as such (share of Muslim population per total population) have a significant and positive effect on life expectancy (ecologically efficient life expectancy; smart life expectancy) and on the female survival rate (ecologically efficient female survival rate, smart female survival).

The effects of public education expenditure rates again confirm their crowding-out effects on life quality, already described in this work (beta weights):

female survival rate (ecologically efficient female survival rate, smart female survival)	-0.276
life expectancy (ecologically efficient life expectancy; smart life expectancy)	-0.244
infant mortality considering ecological footprint	0.177

Similar crowding-out effects are to be observed for military expenditures per GDP:

life expectancy (ecologically efficient life expectancy; smart life expectancy)	-0.194
female survival rate (ecologically efficient female survival rate, smart female survival)	-0.174

The UNDP education index, as to be expected from the other results of this work, has the following very beneficial significant beta-weights on our smart development indicators:

life expectancy (ecologically efficient life expectancy; smart life expectancy)	0,483
female survival rate (ecologically efficient female survival rate, smart female survival)	0.490
infant mortality considering ecological footprint	-0.487

Last, but not least, the effects of worker remittances per GDP are the following:

infant mortality considering ecological footprint	-0.327
life expectancy (ecologically efficient life expectancy; smart life expectancy)	0.263
female survival rate (ecologically efficient female survival rate, smart female survival)	0.237

Thus, the Wilkinson research agenda finds its proper place also in debates about 'smart development', but certainly, the weight of other variables, such as: membership in the Islamic Conference, military expenditures per GDP, Muslim population share per total population, public education expenditure per GNP, UNDP education index, and worker remittance inflows as % of GDP also has to be properly taken into account.

Conclusion

Since all existing major comparative empirical studies on drivers and bottlenecks of environmental quality only touched upon different dependent variables, and not the smart development, this our first international comparative study seems to suggest cautiously that future research efforts in comparative environmental science would

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be well advised to take the major predictor variables of the present study as well as the environmental plateau curve into account.[63–66] It emerges that the absence of 'rent seeking', economic freedom and a free price mechanism, and worker remittances are the most important drivers of 'smart development'. Most of the 'small is beautiful' assumptions of Schumacherian economics by contrast do not stand the test of cross-national development accounting and are squarely contradicted by our empirical results; with population density and population size always being among the drivers, and not the bottlenecks of 'smart development'.[67,68] As correctly predicted by Samir Amin, the big countries with huge population resources today are favoured in their smart economic growth, their Happy Life Years, and their smart human development. As correctly expected by Amin, peripheral rent seeking is a burden and its absence, measured by economic freedom, is an asset among the forces, shaping international development today, especially for smart democracy, and the overall smart development index (both formulations, used in this essay). In addition, Amin correctly stressed the necessity for European integration–and the positive effects of years of EU membership on smart democracy confirm is Euro-optimism. He correctly analysed the enormous transfer of resources from the centre to the periphery, brought about by migration, with the huge statistical observed effects of received worker remittances on smart human development, Happy Life Years, smart gender justice, smart R&D, and both formulations of the smart development index justifying his assumption. Amin's dependency theory correctly predicted the very negative effects of world economic openness on smart development. The huge statistical negative and very uniform effects, to be observed, cannot be simply easily rejected out of hand: smart R&D, and overall smart development (both formulations) are affected negatively by world economic openness. Among the major four founding figures of the 'world systems[69] he is the only one to have come up, in addition, with a consistent and far-reaching critique of Islamism, confirmed by the very negative trade-off between Muslim population share and smart gender empowerment.[70,71]

We could also show in this Chapter the importance of Feminism, the Kalecki/Steindl paradigm, the multinational corporation headquarter status, population density, population dynamics, Muslim population share per total population, absolute latitude, and migration on 'smart development'. We also investigated the negative effects of public education expenditures on public education expenditures per GDP on smart development.[72] We are aware that our answers, raised to the questions in this Chapter, are incomplete. But we hope to have provided at least some preliminary guiding posts for further research on this important subject.[73]

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None.

Conflict of interest

The author declares there is no conflict of interest.

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