Can the Social Progress Index be a tool for Capability Approach operationalization? [1]

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Abstract
Amartya Sen´s critique to welfarism amounted to the construction of a normative framework that defines human development as the evolution of human freedoms ('capabilities') to live a life worth living ('Capability Approach'). Nevertheless, attempts to measure such concepts in composite indices fall prey to criticism on overspecification and distortion of the informational basis, generating concerns on the extent to which Sen´s original defense of autonomy and human agency is *de facto* being translated into public policy. Social Progress Index (SPI) is a framework of multidimensional, non-monetary, outcome-based measures specifically designed to foster public debate towards the deployment of actionable tools that power social change. As Social Progress initiatives gain thrust worldwide, it is tempting to assess to what degree its empirical applications are tuned in Capability Approach main tenets and what are the main conceptual and empirical challenges to consider SPI as a tool for CA operationalization. Illustration and examples were drawn from Global SPI and subnational applications with primary and secondary data.

Keywords: Social Progress Index; Capability Approach; SPI Rio de Janeiro; SPI Carauari.

JEL Classification: I3, I31, O1.

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[1]Paper to be presented at the 2016 Human Development and Capability Association Conference at Hitotsubashi University in Tokyo, Japan.

[2] Msc. in Political Economy. Pontifical Catholic University of Sao Paulo (PUC-SP). Methodology used in this article to evaluate conditions for the operationalization of the Capability Approach was based on the author's Msc thesis. Mosaner (2016) identifies five major challenges to turn Capability Approach operational: (1) the choice of dimensions, indicators and relative weights, (2) the contrafactual nature of the problem of measuring individual liberties, or capabilities, (3) the question of individual or collective methodological focus, (4) access to data and (5) data aggregation in multiple dimensions.

> A social progress index, if one is to be found, will have to be based on judgments that we can defend - regarding what is important and what is trivial. It cannot but address the nature of human deprivation and predicament, and it must invoke some of the most deeply cherished values about enhancing the quality of human life.
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> **Amartya Sen.** Social Progress Index. A proposal. UNDP, 1992.

Introduction

Back in the early nineties, soon after the release of the first Human Development Report, Julio Boltvinik presented a proposal on a so-called 'Social Progress Index' in the context of UNDP Regional Project to Overcome Poverty in Latin America. His index was largely motivated by the aspiration to dethrone GDP growth as the 'sole objective of development.' Even though the only resemblance between Boltvinik index and the Social Progress Imperative´s SPI (the object of this study) is their name and the proposal for alternative measures of wellbeing, other than GDP[3], the author presents an interesting account of the underlying reasons for the predominance of *per capita* GDP in the economic welfare debate: (1) The theoretical scale of GDP is practical and the same as daily life (currency); (2) GDP is intuitive for policymakers, businessmen and common citizens, since their own situation is regarded as better off as the income is higher and (3) It´s a synthetic expression, decomposable in various dimensions. As a consequence, other alternative development indicators failed to replace GDP because: (1) They resort to 'artificial units' (index numbers) that don´t correspond to the units in real life; (2) The conceptual background is not always explicitly stated; (3) Not consistent with national accounts, they do not generate the same degree of 'consensus' and (4) Decomposition characteristics are not as extended as those of national accounts (Boltvinik, 1992:34).In the same direction, Amartya Sen defended that "even the fragmented information on the important functionings tells us more than the oddly precise picture of aggregated GNP" (Sen, 1987:46-7), strongly arguing for the adoption of result indicators: 'the standard of living is not a standard of opulence, even though it is inter alia influenced by opulence. It must be directly a matter of the life one leads rather than of the resources and means one has to lead a life.' (Sen, 1987:16).

The Social Progress Index (SPI), launched in 2013 by Washington non-profit Social Progress Imperative, provides answers for most of Boltvinik´s and Sen´s remarks. The Index proposes the use of social and environmental outcome indicators only, avoiding proxies for economic inputs, investments or process variables. SPI is decomposable by dimension and component in a scale ranging from 0 to 100 and its results are highly correlated to *per capita* GDP (PPP). Barely three years after the release of the Beta version in 2013, it is becoming a quite widespread tool for stakeholders in Latin America. SPI is built in a truly participative process, specifically designed to promote social change towards enhancing human life conditions, thus actionability is its very first priority.

The present article introduces the Social Progress Index to the debate of Capability Approach operationalization. It´s an exploratory article that presents SPI framework and features, intertwining empirical applications with a variety of issues and common challenges faced on attempts to turn Amartya Sen´s and Martha Nussbaum´s theoretical concepts

[3] Boltvinik´s index is not actually a multidimensional measure, instead, it proposes to amend some of GDP flaws by correcting it to account for 'adult equivalent needs,' relative working time (and amount of free time), and equity of distribution, but it is still a monetary measure of production output.

operational. Instead of providing in-depth analysis on particular issues, this articles provides an overview on topics such as the role of composite indicators for the Capability Approach, the choice of parameters, context adaptation, measuring outcomes, capabilities and achieved functionings, lists of human development, individual and collective capabilities, index comparability, weighting and aggregation procedures. The focus is to analyze whether Social Progress Index can help to turn CA tenets operational, promoting agency and freedom expansion. Illustrations were drawn from the building process of SPI Rio de Janeiro (intracity) and from the first SPI initiative built solely with primary data, in the riverine communities of Middle Juruá river, in the southwest of Amazon State, Brazil. Global Social Progress Index 2015, calculated from 133 countries, is also used for illustration and correlation analysis with the HDI, global MPI and GDP *per capita* (PPP).

The article is divided into the present introduction and four sections. First section introduces the Social Progress Index origins, framework, methodology and context adaptation using the case of SPI Rio de Janeiro. Second section explains the motivations of introducing SPI in the capabilities debate. Third section is the longest and sketches challenging points in order to consider SPI as a tool for CA operationalization including: (1) the measurement of outcome indicators and the measurement of achieved functionings and capabilities; (2) issues of overspecification and paternalism; (3) agency and public engagement in the case of SPI Carauari; (4) collective capabilities; (5) interrelations with human development lists and local specification of capabilities; (6) index comparability and robustness. Fourth section concludes pointing out to specific advantages and challenges for CA operationalization using the Social Progress framework.

1. The Social Progress Index: Origins, framework and methodology

1.1 Origins

Social Progress Index started to conform by the end of 2009 in the context of the World Economic Forum Global Agenda Council on Philanthropy and Social Investment (Porter, Stern and Artavia, 2013). Featuring leading social entrepreneurs drawn mostly from Schwab Foundation (a not-for-profit organization dedicated to sustainable social innovation) and also including academics, impact investors and foundations, the WEF Council mission is to support the widespread adoption and upscaling of social entrepreneurship and corporate social investment in order to address world´s social problems (WEF,2016).

By that time Matthew Bishop (from The Economist) was chairing the Council and an important insight emerged - as later quoted by Capetown University "Inside Out" magazine - "What if countries competed with each other to become the most socially innovative in the world ?". One of the key ideas that emerged by that early stage was that countries with the same level of *per capita* GDP may accomplish very different results regarding social indicators, such as the example of Costa Rica and South Africa, the former in the 12th position in the preliminary version of SPI with 50 countries, and the latter in the 39th position. (Joseph and Bonnici, 2013).

Accordingly to the Social Progress Index website, the Council then proposed the creation of a new index inspired by the Global Competitive Index (GCI) "to spur competition between nations to improve the environment for social innovation in the way the competitive index has done for enablers of economic growth" (SPI, 2016). Bishop´s vision was that some 'Social Competitive Index' was to be forged so that countries would compete with each other to be the most socially advanced, instead of competing in terms of production output. By 2011, Fundación Avina - one of the early supporters of the initiative - stated in their Annual Report that "The Social Progress Index (SPI) is an attempt

to meet the need for non-economic measures reflecting a broader understanding of human well-being, including indicators for health, security, education, environment and equal opportunity." (Avina, 2011:15). The idea that GDP was not properly measuring social welfare was present, while sticking to the social innovation adage: "The results will identify the areas where a country is lagging relative to similar countries, with the aim of encouraging dialogue on a country's priority areas for social innovation. Over time, it will show the impact of social policies and investments." (Avina, 2011:15).

Matthew Bishop and Prof. Michael Green (University of London) wrote the initial concept paper and Roberto Artavia at INCAE supervised the initial work by Shannon Music, who reviewed 'literally thousands of indicators' before the first meeting with Prof. Michael Porter was held in September 2011, when he proposed to remove all economic-related indicators from the index so that it could be used for comparisons between social outcomes and economic production level. Social outcomes ought to be gauged - instead of investments or inputs - in order to measure the direct results and 'work backwards' to check the reasons underneath countries' social achievements. Amy Wares (Research Director at SPI) and Roberto Artavia (Viva Foundation) worked on an initial, topic-based framework, using the factors missing from GDP, as stated in the Report on Sarkozy Commission, *Mismeasuring Our Lives* (Stiglitz, Sen and Fitoussi, 2009).The principles initially designed by Porter helped to guide the extensive research work on available indicators assembled by INCAE. Scott Stern, from MIT, developed the first notion that some components were 'more basic' than others, and that there could be reasonable grounds to have indicators split into different dimensions, originating the three-dimension and 12-component model. After another round of feedbacks, the rough idea was presented at the 2012 Skoll World Forum in two moments - a panel for general audience and a smaller meeting to facilitate discussion of leaders of all sectors that attended the Forum.[4]By late 2012 the initiative was incorporated under the name of "Social Progress Imperative" as a nonprofit based in Washington, DC. Among the sponsors were Fundación Avina, Deloitte and Skoll Foundation. Its mission is "to advance global human wellbeing, by combining national social performance and capacity indicators with solutions-oriented outreach to sector leaders, and grassroots champions, who together can effect large-scale change." (SPI, 2016). A 'beta version' of SPI global was released in April 2013 with data from 50 countries and after another round of feedback, the fist 'alpha' version was released in 2014, covering 132 countries in the world and seeding many subnational initiatives in Latin America through the development of local 'social progress' networks.

SPI methodology was used to draw the 2030 National Development Plan of Paraguay, helping to build a shared view of human development between government and civil society. In Brazil, the calculation of SPI for 772 municipalities in the Amazon area has led the governor of the state of Para to effectively use SPI scores to map urgent demands and effectively link the mandatory 5-year state development plan to top-priority cities in the region. That initiative also unfolded the first exercise using primary data in a participative process involving 50 communities living on the banks of Middle Juruá river, in the Brazilian section of the Amazon forest.

The Social Progress methodology also led to a collaborative process between universities, private sector and foundations in Colombia to launch a SPI score for the ten largest cities in the country, and the first intra-municipal index was calculated for Bogotá (2015) and Rio de Janeiro (2016) municipalities. Besides that, some other initiatives are emerging in other countries such as Peru, Argentina and Costa Rica. By February 2016, the Beta version of the European Union Regional Social Progress Index was released in

[4] I have to pay special thanks to Amy Wares, Research Director at the Social Progress Imperative, for sharing the backstage story on Social Progress Index origins. All omissions and mistakes are my own.

partnership with the European Commission, comprising 50 indicators covering 272 regions within 28 countries.(European Commission, 2016).

1.2 Framework

Social progress (or simply 'SPI') framework is constituted not only by the index calculation steps, but also - and most importantly - by a set of guiding principles on how social actors -individuals or institutions - can be engaged and what sort of informational requirements are needed to generate change.

The four key principles of SPI are: (1) To use exclusively social and environmental indicators, thus avoiding the heterogeneity problem of converting income into capabilities addressed by Sen. The problem of assuming that some inputs will yield certain results without a wider consideration of the joint combination of input elements is also a concern. Another important idea here is to segregate the measure from economic indicators in order to further observe the level of correlations between social development and GDP *per capita*. Pearson linear correlation between *per capita* GDP (PPP) and SPI Global 2015 scores was 0.78 and correlation between Administrative Regions scores and *per capita* income in SPI Rio 2016 was 0.89, even without any direct measure of income, wealth or employment-related data.That procedure allows for partial comparisons of groups of countries or regions with similar *per capita* income but with very different achievement matrices. The Administrative Region of Irajá, in Rio de Janeiro, ranked 6th in the component Access to Basic Education, 13rd in *per capita* income and 25th (out of 32 Administrative Units in Rio) in the component Foundations of Well-being, which comprises access to Basic Education. (Pulici, Moura and Mosaner, 2016); (2) To measure outcomes, not inputs; thus both avoiding the pitfalls of the different production functions used to forecast investment results in public policy, and focusing on the ultimate goals of human flourishing; (3) to keep an "holistic and relevant", universal approach that can be used for both rich and poor countries and – one of the most important claims – (4) To be an actionable tool for diverse development stakeholders (including civil society and non-profit organizations) to identify key priorities and track outcomes, "focusing on specific areas that can be implemented directly" (Porter, Stern and Green, 2015). SPI emerges as a toolkit to aid the 'development stakeholders' find a common coin to measure human development, or to use the jargon, measure social progress, understood as "the capacity of a society to meet the basic human needs of its citizens, establish the building blocks that allow citizens and communities to enhance and sustain the quality of their lives, and create the conditions for all individuals to reach their full potential." (Porter, Stern and Artavia, 2013).

SPI framework consists of 12 "components" arranged into three 'building blocks' (dimensions) of Basic Human Needs (BHN), Foundations of Well-being (FWB) and Opportunities (OPP). Each dimension and component is designed to answer a particular question: BHN attempts to answer if a country (or region) "provides for its people most essential needs", basically related to nutrition, medical care, housing and basic utility services and personal safety.

The second dimension, FWB aims to answer if 'the building blocks are in place for individuals enhance and sustain well-being', implying that if Basic Human Needs are minimally achieved, the next step is to 'enhance' human-well-being through basic education and access to information and communication, resorting to Health and Wellness and Ecosystem Sustainability components to account for the sustainability of the achieved well-being in the long run.

The Opportunities dimension is more focused on basic political and property rights, subjective and objective freedoms over life choices, such as freedom of movement, to decide on sexual life (and to avoid teenage pregnancy), tolerance towards minorities and

less privileged sectors of society (such as the cohort of young black male in SPI Rio, and the indigenous population in SPI Amazon). Data to account for these aspects of life are usually drawn from surveys where one can aspire to access subjective aspects of discrimination, tolerance and the freedom to live one´s life as one desires. SPI Rio relied only on administrative data to account for those aspects: not only was primary data collection far beyond the scope of the project, but also, it was to be avoided due to the high costs of implementation, since the index is to be updated frequently. Finally, the last component is Access to Higher Education, conceptually implying the intrinsic and instrumental value of higher education over life choice decisions, job opportunities and family wealth. The component empirically tracks differences on the rate of access to the universities across regions and social strata.

The division in blocks resembles Sen´s distinction between simple and complex functionings. Simple functions would cover 'being well-nourished', 'being decently clothed' and 'being properly sheltered' (Sen, 1985, 1992), whereas 'having self-respect' or 'participating in social life' would constitute complex functionings. I agree with Mehrotra (2008) that those groups of functionings are mutually interdependent and synergistically linked in real life, such as even literacy might be hard to achieve without taking part in community life and finding meaning in education. Those 'complex functionings' are usually measured in the Opportunities dimension, and index formulation accounts for dimensional decomposability. Therefore, partial analysis between basic and complex functionings is possible if there is available data.

SPI Global model is made of 52 indicators roughly distributed in equal number among the 12 components. Subnational initiatives must 'translate' the underlying concepts of global framework to the local level, applying SPI key principles of stakeholder active participation and 'actionability': the index must focus on situations and challenges it can help to change. In the case of Rio de Janeiro, 36 indicators came up in the final version, after an eight-month validation process involving municipality technicians, local universities and NGOs. **Figure 1** shows the three dimensions - Basic Human Needs, Foundations of Well-Being and Opportunities - and the twelve components that are common to all models.

Figure 1: The Social Progress Index framework.

Source: Porter, Stern and Green, 2015.

1.3 Context adaptation, prospective and evaluative analysis: The Case of SPI Rio de Janeiro (intracity)

Following Alkire's (2008) distinction, although SPI departs from a evaluative analysis, modeled essentially to compare different social levels of achievement within

different social realities and to assess changes within a society across time, its strong commitments with participation and collective deliberation may actually bring together some elements of prospective analysis, mainly due to the procedural requirements of selecting only actionable outcome indicators. At first sight, SPI appears to account primarily for a 'narrow' interpretation of the CA, since it aims to map the set of most valued functionings at each social reality, but the nature of its process brings the index much closer to the 'broad' interpretation of CA, in which stakeholders can actually build preliminary analysis on what the main issues are and how they can be properly measured to address change. Even if that sort of 'prospective' information is seldom embodied in the index informational set (scores and rankings) itis an inextricable part of the process as the Social Progress Initiatives connects actors with the clear goal of generating an actionable tool to drive social change in a geographic scale. The emphasis on building subnational indices is not only the informational output itself, that can be quite useful for public policy and private social investment, but it is also about 'closing the gap' between data producers and decision-makers, focusing on engaging the right partners for action with a sense of ownership, while tracking social advancements.[5] Certainly, as any other integrated, holistic well-being assessment framework, SPI can benefit from in-depth analysis of specific topics, as for instance, prospective assessments that map out the reason why some regions show higher violence levels, what its relations with life opportunities (such as work and education) are and the interconnections between its components. Nevertheless, those partial analyses can largely benefit from the original participative process that is an intrinsic part of SPI subnational initiatives, sharing resources and information in a collaborative manner. Sen (1992) argues that indices are important to the formulation of objectives and should not be seen as any sort of assessment indicating the means to achieve society goals. Prospective analysis would require 'careful causal analysis involving economic, social and political investigation' (Sen, 1992:27). In the case of Rio de Janeiro the initiative was carried out by a consortium of universities and research institutes, municipal and state government, private companies and non-profit organizations in order to better track the overall impact of social investments in the context of the Olympic Games, the 2017-2020 Rio strategic plan and "Visão +500," which is a long term projection for Rio de Janeiro in 2050. Using intracity publicly available administrative data with frequent updates was a key aspect of the project and 68% of the data can be updated at least every other year. The initiative was executed by Instituto Pereira Passos (IPP), an autarchy of Rio municipality responsible for producing strategic data on the city of Rio, heavily based on map production and intracity data production and consolidation. Departing from an extensive list of all the possible indicators that could comply with SPI requirements - regularly produced and available public data from reliable sources - for the selected unit of analysis (Rio´s Administrative Regions), the initiative scrutinized the long list of indicators for six months. After IPP technicians finalized the mapping of possible indicators, an initial proposal was presented to the City Information Council in September 2015. That Council is made up of specialists in key areas such as security, education, health, human rights and environmental sustainability coming from universities, city administration departments, community leaders and NGOs. After receiving feedback and possible alternative sources of information that could be further approximated to fit in the unit of analysis, IPP started a first round of individual consultation with public administration bodies, universities and NGOs and developed a new version on the index that was presented again to the City Information Council in October 2015. Still with missing indicators in key components of the Opportunities dimension, and large discussions on what would be the best available variables to translate such concepts into Rio´s complex social reality, a second round of

[5] I specially thank SPI methodologist Jaime Garcia for emphasizing that feature in his trainings and presentations.

consultations took place in November and December, when the grid was presented to Social Progress Brazil network of specialists in Sao Paulo. A half-day discussion meeting took place with over 40 institutions in January 2016 during the launch of SPI Rio Beta version. Among other gains, dozens of useful comments and criticism were properly registered, and that event yielded two new variables that were not yet available to the public.

A consolidation phase took place in the following months. From the rest of January to March, all the criticism and suggestions were carefully scrutinized by IPP technicians in close consultation with other bodies. Some indicators where recalculated and aggregation and robustness checks were carried out, while technical meetings with SPI technical experts in Washington, DC, took place in order to validate the application of the index methodology. The final version was approved and reports were written in April. A big launch event took place in May. Over 200 participants from city administration, NGOs, universities and other research bodies and interested parts joined the event. Among participating institutions in the whole process were Rio Como Vamos, ITDP (Institute for Transportation and Development Policy), Observatório de Favelas and Redes da Maré (representing favelas community associations), Unicef, UN Habitat, Federal University of Rio de Janeiro (UFRJ), UCAM (Candido Mendes University), FIOCRUZ (a leading Health research center in the country), IBGE (Brazil´s census bureau), IPEA (Brazil official institute of applied economic research) and over ten municipal and state-level bureaus - Health, Public Security, Education, Social Protection, Environment, Parks and Recreation, and Traffic Control among others. All these 'development stakeholders' took relevant, active part in the process of collectively building a tool to measure the city´s human development in the 12 components present in SPI structure. The evaluative analysis certainly benefited from the prospective analysis carried by those institutions and has the potential to stimulate further in-depth prospective analysis in selected areas.

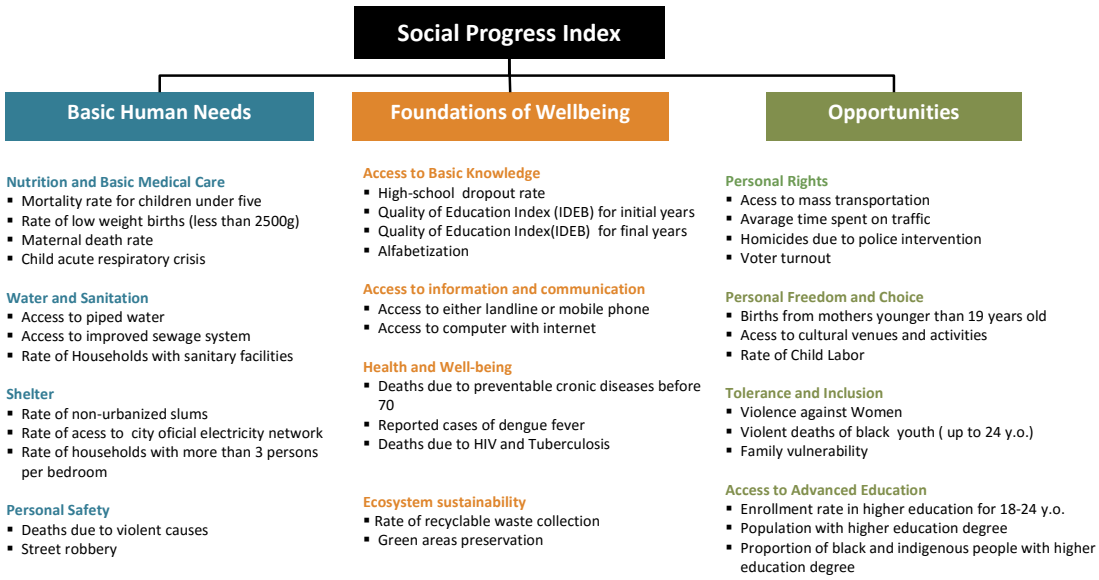
Some indicators were indeed very different from the global model, reflecting Rio´s specificities. One sad example is to appraise Homicides due to Police Intervention as a measure of basic civil rights infringement, once there is strong evidence that police kills black and poor people systematically[6]. After several rounds of consultation with experts, it was also decided that Street Robbery was a reliable indicator of the flows of perceived safety in the streets of Rio, even considering the issue of under notification. Gender equality in higher education was suppressed, since women already account for more than the proportional population (over 51%) in Rio´s higher education. **Figure 2** displays SPI Rio indicators.

1.4 Calculation

The process starts with fitting each one of the 12 components with most adequate variables. After public scrutiny on variable appropriateness for the local context, variables must be tested for aggregation, and the overall Cronbach´s Alpha should ideally be close to 0.7. Principal Component Analysis is used primarily to account for weighting, but it also helps with aggregation by identifying vectors with inverted signs or very low factorial loadings that must be excluded from the index.

Figure 2: Social Progress Index for Rio de Janeiro (Intracity).

[6] Extrajudicial executions at the hands of police officials are frequent in Brazil. The situation was denounced by Amnesty International 2015 report "You Killed My Son: Homicides by military police in the city of Rio de Janeiro". Accordingly to SPI Rio data, homicides due to police intervention numbered over 22 deaths per 100.000 inhabitants in some regions in 2015.



Source: Pulici, Moura and Mosaner, 2016.

After each variable is assigned a positive factorial loading, then the component score is calculated. Dimensional weights are calculated as the simple average of components score, and SPI scores are calculated as the simple average of dimension scores. The index can be calculated through the sequence of the following 8 steps.

1. Standardization: Subtracting the series average from each observation and dividing by its standard deviation, thus generating standardized z scores with zero average and standard deviation equal to one.

$$z_i = (v_i - V_\mu)/V_\sigma \qquad (1)$$

where z_i is a standardized observation of raw indicator value v_i, V_μ is the avarage and V_σ is the standard deviation of the raw series V, originating a vector Z (z-scores) of V´s standardized observations.

2. Check for Aggregation consistency: Component internal aggregation consistency is to be measured with Cronbach´s Alpha test, which computes the inter item correlations or covariances for all pairs of variables. Cronbach´s Alpha coefficient should ideally be 0.7 or higher. (Bland and Altman, 1997). (Stata: alpha).

3. Setting weights: A weight ω is to be calculated for each variable (vector Z_n) through the first factorial loadings of the unrotated factors yielded by principal component factor analysis (Stata: regress, pcf).

4. Checking PCF robustness: Principal Component Factor robustness must be tested. All vectors must present positive signs, point out to the same direction in the orthogonal plan and Kaiser-Meyer-Olkin (KMO) test must yield results above 0.5.(Manly,2004). (Stata: estat kmo).

5. Weight normalization: Each weight ω_n representing the respective factorial loading of variable n is normalized to the unit.

6. Calculating components score: The score of each observation i in each component is given by the multiplication of its z-score z_i by the normalized ω weights:

$$c = \sum \omega_i \, z_i \qquad (2)$$

7. Calculating dimensional scores: Scores of each one of the three dimensions - Basic Human Needs, Foundations of Well-Being, and Opportunities - is calculated by the simple average of its components:

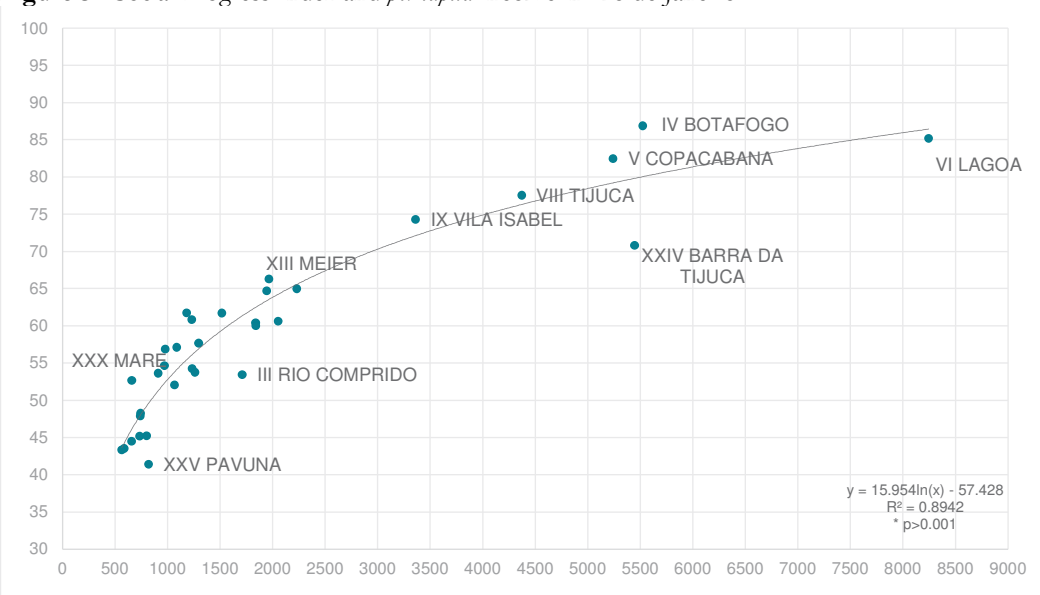
$$d = \frac{1}{n} \sum_{i=1}^{n} c \qquad (3)$$

8. Calculating index score: SPI score is calculated by simple average of dimensional scores:

$$IPS = \frac{1}{n} \sum_{i=1}^{n} d \qquad (4)$$

Those eight steps allow for the basic calculation of SPI Index. Some other products and partial analysis can be made. A typical analysis involves GDP *per capita* correlation analysis to account for *outliners* - regions that accomplished much better or much worst levels of 'social progress' when compared to their *per capita* income. **Figure 3** shows this analysis for Rio de Janeiro. In Rio´s case, the contrast is quite clear: Although Barra da Tijuca *per capita* income is slightly above Botafogo´s (R$ 5,446 against R$ 5,523), its SPI score is far worse - 67.60 against 85.41 in Botafogo. Concurrently, despite having very similar SPI scores, Vigário Geral (53.03) and Rio Comprido (53.52) have quite different *per capita* income levels - R$ 911 in Vigário Geral and R$ 1,710 in Rio Comprido. Breakdown in components and indicators provides explanations of such disparities.

Figure 3 - Social Progress Index and *per capita* income in Rio de Janeiro



Source: SPI Rio de Janeiro Executive Report, 2016.

Scorecards may prove helpful for this sort of analysis by comparing each region relative strengths and weakness within a group of similar *per capita* income level. In the case of Rio, scorecards where built by comparing each region with the group of seven regions featuring the closest *per capita* income. **Figure 4** shows a scorecard of Rio Comprido Administrative Region, proving more insights on the reasons why social progress in the

region falls behind the one in other regions with similar income levels. Colors are attributed according to the distance to the standard deviation from the group median values. Components and indicators printed in red color are below one half standard deviation from the group median, green colors means half standard deviation from the group median and yellow colors are indicators and components within - 0,5z and + 0,5z. In this case, we can easily notice that Rio Comprido´s region is falling behind other regions in most components of BHN and OPP dimensions, besides having some average indicators in basic medical care and sanitation. The region performs badly in access to tertiary education but its levels of selective trash collection, mobility and high-school dropout rates are above the group of comparison levels.

Figure 4 - Scorecard of Rio Comprido Administrative Region in Rio de Janeiro

Source: SPI Rio de Janeiro Executive Report, 2016.

2 Why does it makes sense to talk about SPI and the Capability Approach?

There are at least three reasons to justify this analysis. The first one is because Social Progress framework is a non-monetary, outcome based, multidimensional measure that requires participative deliberation and public discussion to be fully operational. The focus in outcomes and 'actionability' already provides good reasons for evaluating its possible connections with the Capability Approach. The second reason is the extent of its current use in public policy and the prospects for being increasingly used in the coming future: Structured under a hybrid alliance of private and public sector, the nonprofit Social Progress Imperative is succeeding in organizing resources towards the goal of advancing a viable alternative for GDP as the sole unit of measurement of human development, as the number and depth of applications are growing in Latin America, Europe and starting to spread to other regions.

The third reason is that, besides some direct references to Sen´s Capability Approach, further links between CA conceptual cornerstones and SPI framework are yet to be made. Social Progress Index 2013 Methodological Report states that "Our [SPI] model draws heavily on previous literature, notably the capability approach pioneered by Amartya Sen, which emphasizes the multidimensional nature of wellbeing and the importance of

freedom of choice." (Porter, Stern and Artavia, 2013:14). In the same document, there is a passage referring to the rise of HDI: "A quarter of a century ago, the Pakistani economist Mahbub ul Haq, influenced by Amartya Sen, led a pioneering effort to develop a more people-centered measure of wellbeing, the Human Development Index (HDI)" (Porter, Stern and Artavia,2013:17). And the last reference appears with mentions to the institutionalist work of Douglass North, amidst others: "Among many others, we draw on the seminal work of Amartya Sen focusing on the role of capabilities (Sen, 1985) and a range of more contemporary research emphasizing the role of institutions in shaping economic and social performance (North, 1990; Acemoglu and Robinson, 2012). (Porter, Stern and Artavia, 2013:43).

Clearly, having departed from Matthew Bishop's concern with stimulating countries competition for social innovation, it is more likely that the stronger link with Sen´s work refers to the 'move beyond GDP' argument. That can be further confirmed by the references and acknowledgements to the Commission on the Measurement of Economic Performance and Social Progress (CMEPSP). Created by French President Sarkozy in February 2008,CMEPSP clear motivation was to move beyond GDP as the sole indicator of human development: "[CMEPSP] aim has been to identify the limits of GDP as an indicator of economic performance and social progress, including the problems with its measurement; to consider what additional information might be required for the production of more relevant indicators of social progress; to assess the feasibility of alternative measurement tools, and to discuss how to present the statistical information in an appropriate way." (CMEPSP, 2009:7). The report, signed by Joseph Stiglitz, Amartya Sen and Jean-Paul Fitoussi, was published in 2009, the same year when those preliminary concerns with an index to make nations compete on social progress appeared in the Global Agenda Council on Philanthropy and Social Investment of the World Economic Forum. SPI 2015 Methodological Report acknowledges such a link: "Our work was influenced by the seminal contributions of Amartya Sen on social development, as well as by the recent call for action in the report *Mismeasuring Our Lives* by the Commission on the Measurement of Economic Performance and Social Progress." (Porter, Stern and Green, 2015:30). The general idea upheld in that report is that SPI "builds upon and synthesizes a large body of research emphasizing the importance of moving 'beyond GDP' being the first comprehensive framework for measuring social progress that is independent of GDP, and complementary to it" (2015:13). So the vision here is of complementarily rather than substitution of the GDP.

The aim of this paper is to bridge that gap between SPI framework and core Capability Approach topics that have not yet been properly treated in the literature, especially those topics concerning the most common deadlocks and necessary simplifications that arise in whatever attempt to turn the Capability Approach operational by using it in empirical measurement exercises, particularly in the construction of composite indicators. The underlying idea is to further extend the breadth and impact of SPI initiatives by critically assessing their implications on some key concepts emanating from the Capability Approach, promoting more interaction for analytic tools and implementation. Next section addresses the main challenges to consider SPI as a proper tool to turn Capability Approach operational.

3. Operationalization challenges

While trying to answer if a composite indicator can indeed capture the conceptualization of some particular approach and in fact, convert it into sound empirical

measures for further cardinalization[7], it is quite easy to fall into the temptation of logical formalism and verify if its main concepts are being noised from the outside world. Social Choice - a discipline that owns much of its development to Sen's critical analysis - seemed to be a reasonable path to answer the unyieldingly question of what are, who determines and, in short, where in the real world lays the informational constructs capable of uncovering the 'set of valuable beings and doings' that one has reason to value. If preferences could do the trick, then Social Choice would be of great help. But, unfortunately, no single composite index based on secondary data could ever claim to have successfully mapped out individual preferences and converted them into variables without arbitrariness. Even if there were a 'revealed preference' algorithm specifically designed for uncovering capabilities, there still remains the problem of aggregation, as extensively studied by Arrow (1951) and others. The impossibility of aggregating interpersonal preferences is far from being solved in the economic literature.

Following Sen´s Nobel lecture (1999b), the same way impossibility results on social welfare aggregation should invite engagement rather resignation, the impossibility to 'plug in' social welfare functions to derive aggregate measures of societal well-being should invite further criticism, in order to devise frameworks capable of establishing the minimum grounds for public debate that ultimately leads to human emancipation from poverty and inequality. Two paths are pointed out: focus on 'capabilities' as objective parameters for the assessment of well-being and relaxation on the social welfare strong demands of having final answers and complete preference orderings.(Sen, 1999b).The gigantic challenge of fighting social exclusion, growing inequality and injustice worldwide has to be seen in face of practical issues that can severely undermine any attempt of measuring well-being in a way that allows for action: limited datasets, budget constraints and the need to address critically systemic problems that ravage hundreds of million worldwide. Problems that are just too pressing to be evaluated accordingly, even with the less demanding axioms of Social Choice or any non-objective account of human reality.

In fact, the Capability Approach itself is constructed more on the premises of denial of subjective accounts of well-being, explicitly 'utility' and 'preferences', thus rejecting any appraisal of the social reality based in mental states, rather than creating any kind of logical formalism or any other set of procedures that could be followed in order to identify what is to be measured and how it should be assessed. A minimalist view of the Capability Approach as an 'objective theory of the good' (Arneson, 1999) would claim that it only says that the essence of human development lies in the expansion of life possibilities, the set of freedoms 'to be' and freedoms 'to have' that are indeed valuable to each and every human being; those 'valuable goods' being good 'for their own sake, quite independently of the individual's own attitudes toward them and opinions as to their worth.' (1999:43).

Human flourishment, reflecting the Aristotelic concept of *eudaimonia*, can be accounted for neither in merely rational and individualistic terms, nor in terms of hedonistic pleasure nor in simple axioms that aim to explain human behavior as containers of utilities that would escape from pain and strive for pleasured tastes at any cost. (Sen, 1989; 1992; 1999, *inter alia*). No wonder that, as noted by Qizilbash (2008:63), Sen seldom uses his own work on preferences in the development of the CA, being vulnerable to criticism whenever he attempts to do so.[8]

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[7] I am using the four-step scheme proposed by Flavio Comim (2001) for the operationalization of some theoretical approach that departs from the theoretical inclusion of concepts with possible empirical signification followed by measurement, application and quantification. (COMIM, 2001).

[8] Qizilbash (2008:63) points out to the fact that Sen could have used his work on 'meta-ranking' of preference rankings to account for morality and value (Sen, 1974) but he didn´t. Whenever criticized, Sen would argue based on the 'reach' of preference views and the distinction between preferences in the context of *value* and in the context of *advantage*.

If, for the time being, one has to abandon this Social Choice approach, it is still of some help to scrutinize Sen´s arguments in favor of the operationalization of the Capability Approach through composite indicators of 'well-being', as we may generically call them. Those 'well-being' indicators can interchangeably be called measures of 'social progress', 'deprivations' , 'poverty', 'quality of life' or simply 'multidimensional' indicators, referring basically to the same aspects that all these measures have in common, to wit: to try to capture social reality as perceived by its individual constituents and establish some kind of ranking in order to bring the intrinsic complexity of social reality into an acceptable level of distortion, which can be actually useful for public policy.

While mapping out the set of most valued capabilities (and even achieved functionings) throughout a vast population is already an immense challenge, the equation gets even more complex when the 'process aspect of freedom' (Sen, 1988, 1997) is demanded. It is not enough to ensure that common people have access to 'goods'[9] if they are not really included in the process that yielded such goods. As Sen departs from standard welfare economics, it gets clearer and clearer that people cannot be seen as mere depositaries of entitlements: being part of one's own history and genuine choice is of substantial value in the composition of valued lives. Autonomy is key to Sen: "it´s not adequate to be concerned only with whether she receives what she would choose if she had the opportunity to choose; it´s also important that she actually gets to choose herself". (Sen, 1997:753). Thus, another question to ask is to what extent the Social Progress Index framework can reflect autonomy on its differing applications.

The question of this article can actually be rephrased to answer these two main questions - whether SPI framework can capture capabilities - or achieved functionings - and whether it demands autonomy to choose what is valued in life. To use Sen´s terminology, to what extent can SPI capture both the opportunity and the process aspects of freedom ? In order to investigate these issues, this article contextualizes SPI framework in the debate of measuring achieved functionings or capabilities, openness in the selection of dimension and lists of human developments and agency. Empirical exercises such as the global SPI, SPI Rio and SPI Carauari illustrate the practical issues involved in primary and secondary data assessments.

3.1 What are we really measuring: outcomes, outputs, capabilities or achieved functionings ?

Social Progress Index uses only outcome indicators, but the concept of 'outcome' indicators may or may not be equivalent to the concept of 'capability to function' (Sen, 1992a). Differentiating outputs from outcomes does not automatically mean that the set of outcomes does refer to the ultimate human functionings that one has reason to value for themselves Many authors have critically appraised the practical constraints of capability measurement in the context of the Capability Approach (Brandolini and D'Alessio, 1998; Robeyns, 2000; Kuklys and Robeyns, 2005; Comim, 2008 and Lessmann, 2012). Once capabilities are defined in the realm of 'freedoms' or 'valued opportunities', mathematical translation can only be in terms of 'possibilities' or 'probabilities'. That definition is directly related to the aforementioned 'process aspect of freedom', since the Capability Approach is especially concerned with people´s autonomy to choose amidst a series of valuable functionings.

Sen deconstructs the social welfare by proposing the concept of 'capability to function' (Sen, 1980) and sets that the freedom to choose valued functionings of individual i (or its 'capabilities') can be defined as $Q_i(X_i)$, X_i being one's command over 'commodities'

[9] The term 'goods' is herein used in the extended sense to cover non-material goods and essential entitlements.

(or 'entitlements'), given one's personal features F_i, representing the set of 'utilization functions f_i, or, in other words, the conversion of sets of characteristics into functionings (Sen, 1987:7). It is not necessary to reproduce the full equation here to acknowledge the informational gaps: in the absence of direct information on individual personal features and choice, it is quite hard to derive information on capabilities, not to mention human arbitrariness and transfactuality issues.

Some authors worked on questionnaire designs to account for capabilities, such as Anand and Van Hees (2006), Alkire and Ibrahim (2007) and Anand, Santos and Smith (2009). If funds were available to draw samples from the heterogeneous regions all over the city of Rio de Janeiro, asking both subjective and objective questions on the current state of sanitation, such as inquiring whether local households have had any infant with diarrhea or dengue fever in the past weeks, or if they allow children to play near the house where lays open sewage stream or not, if they feel free to play in the stream or drink stream water or not, then one would have no hard time calling those *capability* indicators. Some other problems may arise, such as adapted preferences, but blending objective and subjective data provides better grounds for evaluation. The greatest operational problem in relying solely on survey data is the fund dependency and limited frequency of evaluation, which may jeopardize actionability. Further Social Progress Index applications with primary data can largely benefit from this 'CA' literature by assessing information on empowerment, self-realization, agency and expansion of individual freedom.

Other authors presented multivariate and econometric techniques to extract capabilities from observed functionings, such as latent variable models (Krishnakumar, 2007 and Anand, Krishnakumar and Tran, 2011) and Structural Equation Models (Krishnakumar and Ballon, 2008 and Krishnakumar and Juarez, 2014). SPI models built on primary and secondary data can both eventually benefit from this arsenal of novel techniques to uncover unobservable capabilities either to build the index or for further prospective analysis.

The discussion is particularly important for typical infrastructure indicators such as housing and sanitation: while it is quite safe to assume that most people in good state of mind would prefer having proper access to water and sewage system if they are given that choice and while appropriate housing and sewage system have instrumental value on achieving valuable functionings, such as 'being able to live free from diseases' and 'the ability not to be constantly ill', access to housing and a country's sewage system coverage rate are hardly measures of capabilities in the original sense proposed by Sen. Although such basic indicators are widespread in human development and well-being composite indicators, they are more related to infra-structure conditions, analogous to inputs into an social welfare function, than proper 'capabilities'. Yet, such indicators can be considered outcomes of public policy of outmost importance to people´s health and well-being. Measuring infra-structure over the years can be a very important actionable tool to press for change.

Qizilbash (2008:60) retrieves an important discussion on Sen's 'options application' and choice application (Sen, 1997a), in which Sen characterized the 'choice application' of the Capability Approach as looking to the range of vector of functioning that was actually chosen. The 'choice application' is a form of 'elementary evaluation' based on maximization exercise on incomplete ordering (picking the 'no worse than' option). That concept, yet under such criticism that we shall not explore in this article, may prove useful to justify the selection of infra-structure indicators. A distinction must be made in the case of most health indicators: Infant mortality, deaths due to non-communicable and to transmissible diseases, maternal mortality and low-weight births all express probability distributions of some capability 'infringement', such as 'living a lasting, good life, free of pain'. The notion of probability of not dying prematurely, for instance, is much easier to accommodate in the

Capability Approach than the mere coverage of bike lanes or green areas as a ratio of population in city neighborhoods. Even though sanitation and housing conditions are not exactly measures of capabilities, such type of infrastructure indicators has instrumental value for accessing various sets of capabilities, besides being good proxies for several deprivation domains where administrative data may not be available.

If a certain index is to measure the share of population from a given area with access to proper sanitation and after a few years the coverage rises, then it is safe to say that the population in question reached a desirable outcome that has instrumental value on the fulfillment of life's most basic needs, and that population moved towards enjoying a life worth living, but that can hardly be called a 'capability' indicator.[10]

Some variables in SPI Rio could not make it to the Beta version with the same level of scrutiny. The ratio of trees planted in public lanes was once proposed by IPP (Instituto Pereira Passos) technicians as a valid indicator for 'urban sustainability'. Despite the fact that the streets of Rio were not becoming more 'sustainable' due to more trees being planted, there is another conceptual issue that emerged many times in the validation process: being an input (or infra-structure indicator), the mere ratio of planted trees per Administrative Region cannot provide a direct link with the well-being, just because there is too much interference in the conversion of this input to be meaningful or even considered a priority in the city level. Obviously, in a city used to 40ºC temperature throughout most of the year, there is a great deal of thermal comfort in walking on a street covered with trees and on the shade. But is that really a priority for the vast majority of the population? And besides, should we add such a variable that would have roughly the same weight as child mortality or quality of education? That sort of question was solved in the City Information Council hosted by IPP, and the answer was no.

The conceptual issue of mixing input indicators was faced more than once in the development of SPI Rio. Without reliable data showing how many people and from what Administrative Region actually use urban equipment, such as green areas and bike lanes, those variables could not be incorporated in the model. Even as 'outputs' of public money, inserting those variables would presume the existence of a certain social welfare function that attempts to convert - implicitly or tacitly - units of infrastructure into some form of 'well-being'. In practicable terms, while there is no doubt that to measure and to monitor the evolution of green areas and bike lanes is beneficial for the city, heterogeneous conversion of capability into functions demands a much higher and sophisticated level of information on city infrastructure than what was available in real life, with administrative data.[11]

Following Pattanaik and Xu's (1990) 'principle of indifference between no-choice situation', if the measure of freedom could be simply identified by the number of possible options available in each alternative - irrespectively of how good or terrible they might be - we still could eventually attempt to use input indicators to measure personal freedom to use this equipment based on the most probable capabilities that could emerge. If 'indifference between no-choice situations' is not a concept we can easily accept, it would still be possible to evaluate the capability set by at least one most preferred capability that

[10] It is no wonder that authors such as Brandolini and D'Alessio (1998) and Kuklys and Robeyns (2005) suggest that very few studies have actually concentrated on measuring capabilities. Lessmann (2012) analyzes 58 studies that are considered within the Capability Approach, but in fact, only nine effectively focused their analysis on the capability space, while the others focused on achieved functionings.

[11] Another important discussion emerged out of the possibility to devise a bike lanes indicator: it is a paradigmatic indicator of cross-cutting issues, such as environment sustainability, considering the avoidance of greenhouse gases produced by those who choose to use bicycles for transportation, but it can also be considered as input for health, since increased use of bicycle for both leisure and commuting can reduce risk factors for chronicle non-communicable diseases. In real life, many sets of capabilities arouse out of city infrastructure.

would surpass all the other capabilities in an alternative set. But since preferences are volatile and subject to changes throughout time, if the menu changes, if one regrets one´s choices in the future, or if one has different preferences over preferences, or any other 'process significance' issue (Sen, 2002), it may prove more useful to return and further expand Sen´s principle of 'assertive incompleteness' (Sen, 1992a: 134; Sen, 2002: 182). Originally conceived for solving dominance over pair of alternatives in situation when simply adding more information will not solve the problem of finding the optimal choice, for the sake of pragmatism, the concept can just be extended to dominance over pairs of possible indicators, allowing for some kind of partial valuation that allows indicator A to be chosen simply because no 'best' alternative can be chosen, on the basis of the 'less worst' criteria. That should not be a constraint for public policy, simply because having more of each relevant capability is a clear improvement. The fuzziness here refers more to the choice and social justification of the selected functions and capabilities we decide to include in the model than properly to the issue of weighting and ranking incompleteness.[12]

On the other hand, some authors, such as Atkinson et al (2002), are much more pragmatic in proposing a looser, mid-point interpretation of 'outcomes'. In the context of building social indicators for the European Union, such authors state that a key principle is that indicators should focus on "identifying the essence of the problem and should have a clear and accepted normative interpretation" (2002:21). In Education, for instance, albeit measures of educational attainment are preferred to total spending - given its role in increasing the array of future life choices - availability of teachers may actually present relevant information on opportunities.

Achieved functionings contain - by definition - information on the greater set of capabilities from which the they were selected and thus, considering the information restrictions in real life assessments, could be used as a starting point, since agency cannot be captured by looking only at the selected functionings (Sen, 1992a:50). Even if we had trustworthy, frequent administrative data on water transmitted diseases, and could also account for all negative, contrafactual freedoms aspired by a population without proper access to sanitation, sewage coverage would still represent a good measure of the set of 'malfunctionings' originated from long-term exposition to open sewage.

There is a case for a simplification on Sen´s approach that can be explained with a few of his own arguments. First, even Sen (1992a) would agree that in some cases of chronicle or acute suffering - such as disaster-led deprivations and famines - it may be safe to assume that the linkage between the opportunity set and achieved functionings is quite straightforward. But do we need a severe famine or war to justify for 'chronicle or acute suffering'? Or the longstanding deprivations on basic health suffered by hundreds of millions across the globe would justify it?: "if a person dies prematurely or suffers from a painful and threatening disease, it would be, in most cases, legitimate to conclude that she did have a capability problem" (SEN, 1999: 131). It is defensible that most variables in SPI Rio contain information on sensitive subjects that cause lasting suffering and despair to hundreds of thousands in the city, and thus they would be considered 'capability problems' as well. The loop of 'corrosive disadvantages' (Wolff and De-Shallit, 2007) in Rio includes the absence of opportunities, very low access to higher education for the black and poor, combined with very high violence levels mixed with drug trafficking militias and a general sense of impotence. Homicide due to police intervention is grouped in the 'Opportunities'

[12] It seems that multidimensional composite indicators will always be at odds with Sen´s ideia of incompleteness (1992:48), since most (if not all) attempts to include complete ranking, attempting to order countries or regions accordingly to their achievements. The problem is that rankings are quite intuitive and easy to communicate to policymakers. In SPI, not only rankings but scorecards helps to focus on regional ranking differences to focus on successful cases of regions that excelled in social progress compared to their levels of GDP or *per capita* income.

dimension since it prevents people in favelas from going out at night for fear of being shot at by the police. To preclude somebody from leaving home, for instance, is not only a basic civil right violation but it can also impede that a chain of capabilities are achieved, including working during the day and studying at night. That is to say that, while building a composite index, it is important to pass on a clear and irredundant message signaling the priorities. The message has to be simple and direct in order to engage the development stakeholders, and thus to engage organizations, towards a shared view on human progress. To Sen, the role of composite indicator has to be seen: (1) as an exercise of emphasis that supplements a more comprehensive exploration; (2) as being based primarily on selection, supplemented by composition, and (3) as focusing on deprivations and shortfalls (...)(Sen,1992:25).

Deneulin (2002) argues that sometimes public policy goals should be based on functionings and not capabilities, such as living in a non-polluted environment is better than having the capability of living in a non-polluted environment, since pollution can be exported by changing the incentives to curb externalities from a region to another, or people can just drop their waste down in the river. In the real world, focusing on the human good may just be better than focusing on the freedom to realize that capability to achieve that human good.

This doesn´t necessarily mean that if we cannot or should not measure capabilities at all times, we are basically 'paying lip service' to the Capability Approach while actually resorting to nothing more than the Basic Needs approach.[13] Sen and Nussbaum´s demands for agency and political pluralism can accommodate the statement that capabilities are to be pursued whenever useful and available, but sometimes, in order to be of any real assistance to the expansion of life opportunities, achieved functioning are to be considered. Besides, it is still the beginning of a long journey and data on capabilities are on its initial stage, but as Sen points out, in the market of statistics, demand for data comes prior to the offer. Research must take into consideration in which domains of human life the measurement of achieved functionings can actually be more useful than measuring capabilities.

3.2 Individual and Collective capabilities[14]

Some authors criticize Sen for the excessive focus on individual achievements taken outs of the social context. Dean (2009) claims that the very concept of 'capability' shadows human interdependence. Deneulin (2008) claims that Sen´s methodological choice on the individual presents an unresolved tension between individuals and society as a whole, proposing the expansion of the concept of capability beyond the individual, attaching value to the role of communities in conquering and maintaining capabilities and to the role of collectivities in shaping individual values. Stewart (2005) defends that collectivities should play a larger role in public policy since group participation is not only a capability but also has significant influence in promoting capabilities.

Social Progress framework is more widely used in assessing the development of regions and cities than just individuals or households, being Carauari the first exercise in the community level. Collective capability is a hard concept to appraise in the global level. Global SPI presents ordinal scaled variables on political participation and freedom of association but it is not certain that they can reflect such intricate concerns as raised by Deneulin (2008) and Stewart (2005). In addition to the intrinsic difficulty to measure those wide-ranging concepts, there just is not much internationally compared data on that. Other

13 Discussion benefits from Comim, 2008.

14 This section summarizes the discussion presented in Mosaner (2016) p.113-119, when it comes to the role of collective capabilities for Capability Approach operationalization.

subnational initiatives relied on survey data that may face usual issues (such as adapted preferences). SPI Rio had to rely on administrative records on elections turnout.

The inclusion of political participation and freedom of speech and association domains is beneficial to the assessment of countries and regions, but 'collective capabilities' are a wider concept than 'political participation', it is more about proposing a collective view on 'human development' than actually finding the proper variables. It is also about the 'process aspect of freedom' itself; how much groups actually discuss important issues and organize for the formation of a collective voice. Primary data assessments have the advantage of cultural interpretation of norms and values, in addition to closeness to groups inside communities. SPI Carauari was built upon the strong collaboration of representatives from riverine communities and that was reflected in the local 'translation' of global SPI variables to emphasize locally valued functionings.

Sen liberalism preempts him from accepting the very concept of collective capabilities, placing it as a particular set of context-dependent individual capabilities with instrumental value only (Sen, 2002). Other authors point out to the possible negative impacts of choosing groups as the methodological focus of the analysis, as that can cloud potentially negative impacts such as coercion and inequalities within groups (Sen, 2009; Alkire, 2008). Solava Ibrahim (2013) defends that some conditions are required for including collective capabilities into the Capability Approach framework, such as free and voluntary participation, empowering and beneficial to both individual and the group. I believe Ibrahim´s concerns may serve as guiding principles also for the SPI framework, but the unit of analysis should be preferably the individual with some variables applying to the household. Another related subject is that, in order to better account for inequality in the distribution of achievements within units of analysis, SPI can largely benefit from adding inequality measures within groups, such as deprivation gaps, in primary and secondary data exercises. Multidimensional deprivation lines can be set for individual and group variables to better represent inequalities within regions and groups.

3.3 Capability and capabilities

In order to answer if a family of synthetic indicators - such as SPI framework - can operationalize the Capability Approach, it is necessary to consider that there are two main conflicting lines of arguments in the literature - in one side Sen - we shall call it "narrow view", which is strictly against any "canonical list" of capabilities and functionings, arguing that those should be the fruit of participative process (Sen, 1985, 1988, 1992, 1999, 2004, 2005). On the other, there is some understanding, owned in great part to Nussbaum´s Central Capabilities list, that in order to make Sen´s approach operational there is the need for some kind of commitment with substantive issues, and that comes as a need when we talk about building measurement tools. We will first analyze the possibility of filling the gaps left by Sen by using his own arguments and secondly, by allowing some commitment with substantive values, evaluate how SPI framework compares with the literature about lists of human dimensions.

3.3.1 SPI and the Capability Approach

The notion of 'basic capability equity' emerges from Sen´s criticism on the inadequacy of some utilitarian and Rawlsian concepts of equality to cogently account for the 'equality aspect of morality' (Sen, 1980: 220). While defending the newly coined term, Sen acknowledges that the indexing of capabilities bundles is a challenging issue, and that "any application of it must be rather culture-dependent, especially in weighting different

capabilities" (Sen, 1980: 219). In the following works (Sen, 1983, 1984, 1985), instead of systematically advancing towards either a process to uncover capabilities or any substantive commitment on what a list of basic capabilities would consist of, Sen uses the concept of 'capability to function' to show that commodity requirements may vary greatly to provide for the same level of well-being (or removing deprivations), thus building on the argument that human intrinsic heterogeneity accounts for great variations in the 'conversion of commodity-characteristics into personal achievements of functionings' (Sen, 1985:17). Later on, Sen resolutely refrains from selecting or indicating any particular evaluation process to select those capabilities that ' people have reason to value', arguing in favor of pluralism (Sen, 1988, 1999).

In *Capability and Well-being*, Sen claims that Nussbaum account (1988) of one list of functionings (with varying level of generality that does constitute the 'human good living ') is not strictly required for the Capability Approach and, even though not required, yet Nussbaum's view would not be inconsistent with it (Sen, 1993:46). Besides, while pointing out to the fact that lists of functionings and capabilities 'need not be based on a prior agreement', Sen acknowledges that 'A general acceptance of the intrinsic relevance and centrality of the various functionings and capabilities that make up our lives does have substantial **cutting power** (...)' (Sen, 1993:49).[Author emphasis].

More recently, Sen (2004 and 2005) stressed that his criticism on a 'cemented list of capabilities' is based on his demand that public reasoning and discussion are required to enable people to select the most relevant capabilities at each local context. Besides, as capability evaluations can serve multiple purposes and may evolve during time, it would be mistaken to draw a fixed list of basic capabilites. In his words: "My own reluctance to join the search for such a canonical list arises partly from my difficulty in seeing how the exact lists and weights would be chosen without appropriate specification of the context of their use (which could vary), but also from a disinclination to accept any substantive diminution of the domain of public reasoning." (Sen, 2005: 157).

Despite Sen´s postulations, Deneulin (2002) argues that policies implemented within the Capability Approach inextricably set *ex ante* choices on dimensions, regardless of people´s own choices and values, instead of actually leaving room for human beings to have an informed choice to seek their own conception of the good. She exemplifies it by expressing that most common 'human development' dimensions come with an intrinsic moral valuation, arguing that some individual choices are deemed more valued than others without actually asking people. Perfectionism, she continues, 'is a moral theory which regards certain activities, like knowledge, health or artistic creation as good, independent of any subjectivity' (2002:498). The idea of 'maximizing' human excellence towards intrinsically valued life forms would justify building and keeping social institutions that provide the best conditions for subjects to reach those life forms, but that establishment allows for state coercion in forcing individuals into that particular form of 'well-being', whether they pursue it or not. That perfectionist notion of the good may lead to paternalism, on which an individual´s autonomy to choose life choices is constrained for his own good.

As for Nussbaum's Capability Approach, Deneulin (2002) considers it more 'honest' than Sen´s, since her perfectionism is explicitly expressed in her Central Capabilities List. Nussbaum´s perfectionism would be compatible with liberalism (meaning respecting individuals' autonomy to pursue their own concept of good) inasmuch as public policy objective is "not to promote those 'perfections' of human life (functionings) but the opportunities to exercise those perfections" (2002:504), thus leaving the actual realization of those functionings up to people´s choice.

The whole question is relevant since Social Progress methodology presents *ex ante* definition on dimensions and components of well-being, leaving the indicators open to

adaptation in the local level.[15] The important questions here then is to ask if the methodology allows for public reasoning and debate in order to convert the most valued capabilities and functioning into proper indicators. I defend that, since Sen's main concern is with protecting a space of public reasoning and debate that can give rise to an adequate account of most valuable capabilities and functionings in the local context, the investigation should be based on the level of autonomy allowed within different SPI initiatives, so that no *a priori* commitment with substantive values can forcefully exclude important values from the list.

This analysis can be carried in two parts: In section 1.3 the case of context adaptation in Rio de Janeiro with secondary data was sketched; next section explores a SPI adaptation based on primary data exercise with 50 communities living on the banks of Juruá river in the Amazon forest. The second analysis - in section 3.3.3 - consists of comparing SPI components with the literature on human development lists in order to check for the level of coincidence and generality that would at least be compatible with Nussbaum´s approach.

3.3.2 Selecting indicators from bottom-up: the case of Carauari

The first exercise of building a Social Progress Index entirely with survey data was released in June 2015 in the State of Amazonas, Brazil, by a consortium formed by Natura, a world-class, Brazilian cosmetic company, Coca-Cola, the Public Affairs arm of Ipsos - a global market research firm and Social Progress Imperative. While Natura and Coca-Cola were both interested in studying the human impact of their sourcing activities in the region, Ipsos was responsible for adjusting the methodology to local reality, championing the craftsmanship of questionnaires and computing the results, and Social Progress Imperative provided technical supervision (Ipsos et al, 2015).

The whole process was carried in a participative manner with over 50 settlements based on the banks of the central section of Juruá river, in the municipality of Carauari in the state of Amazonas, Brazil. Natura and Coca-Cola's motivation was to generate shared valued to its suppliers - cooperatives of collectors of açai fruit (widely consumed in Brazil as a dessert) and andiroba and muru-muru seeds - raw materials for cosmetics. These companies have decided to invest in their relations with local collectors instead of purchasing raw materials from large plantations that would result in forest destruction. The idea behind it is to secure the supply chain while protecting the environment, since the collection of those native materials spread in Amazon forest actually avoids other kinds of destructive commercial exploitation.

Previous political culture embedded in the region was key to the success of the project. Souza (2013) researches the institutional background of the participative culture that emanated in the southwest region of the state of Amazonas through a historic and cultural review based on public documents, meeting notes, presence lists and structured interviews with representatives from management councils in five distinct Conservation Units. Brazil federal law 9.985 of year 2000 established the creation of deliberative councils for Conservation Units for the Sustainable use of land. Local management councils were formalized with the presence of government institution and civil society representatives with equal decision power (at least equal number of seats for government and civil society with equal voting power). According to Santos (2008), the joint participation of

[15] Global SPI, as any other country-level indicator such as the MPI and HDI that are devised to cover dozens of countries, naturally cannot envisage the same level of public participation expected in grassroots studies. Social Progress Index thus should be evaluated in its core methodology (expresses as the commonalities among different sub national studies) instead of this global grid.

government and civil society are the two pillars that support participative democracy in Conservative Units councils in the region.

In 2003, 161 local dwellers signed a petition asking for the creation of an extraction unit in the region in order to foster their economic activities. Vindication continued in at least eight local communities until the Uacari 'Sustainable Development Reserve' - a particular kind of conservation unit that allows for extraction of some raw materials and family agriculture - was finally founded in June 2005, but it was not until 2008 that the deliberative council was created. While the first and second composition of Uacari SDR deliberative council had 13 government seats and only 12 non-government seats, the situation radically changed in the third term, when there were 7 government seats and 14 representatives from civil society in the council, 6 of them from grassroots associations. Souza's study (2013) shows that other organizations such as ASPROC - the local rural production association - played important roles in the mobilization of local dwellers, and executed relevant projects in favor of strengthening ties in the local economy (such as cutting down on intermediary costs for locally consumption items). Structured interviews in this study showed that the deliberative council members high level of commitment in representing their local communities agenda was a distinguished feature of Uacari council, which also showed a closer level of interaction among council representatives than other Conservation Units councils in the region.

In 2010, the government of the State of Amazonas, following the national strategy of inclusive and sustainable rural development, launched the Middle Juruá river region Rural Sustainable Development Plan as a tool for local participative management. Middle Juruá region spreads over an area of more than 70 thousand km^2 in the southwest area of Amazon state, and comprises three municipalities: Carauari, Itamarati and Juruá. Representatives from the three municipalities met for four days in Carauari to validate public available administrative data that was previously gathered by an external consultant, to correct the data, discuss and plan local development actions organized in four axes - environment, culture and education, socio-economic and institutional development. In the final plenary meeting final suggestions were made by participants, and it was clear that the success of the development plan would ultimately depend on the organizational capacity and consolidation of the Middle Juruá territory (Souza, 2010).

A process of strengthening the ties among grassroots communities, companies with sourcing activities in the region, government and NGOs led to the creation of the Middle Juruá Region Territorial Development Forum by end of 2013 and the beginning of 2014, thus integrating the Uacari 'Sustainable Development Reserve' (SDR) and the Middle Juruá Extractivist Reserve (RESEX) agendas. The objective of the Forum is to 'integrate institutions that act in Middle Juruá region to promote social and economic development of riverine communities, generating value from biodiversity protection and strengthening region´s sustainable production chains'.

The Forum is mostly made up by civil society. The Municipality of Carauari, the Department of Climate Change and Conservation Units (DEMUC) of the State Environment Bureau and Instituto Chico Mendes (ICMbio) are the current government members. The other members are Natura, Coca-Cola and Açai Tupã (private companies), ASPROC (Carauari local production association), AMARU (Uacari SRD dwellers association), CODAEMJ (Middle Juruá Extractivist Cooperative), Middle Juruá Women Association, Lower Juruá ('Área de Baixo') Communities Association, CNS (National Council on extractivist populations), Fundação Amazônia Sustentável (pro-sustainability foundation) and OPAN ('Operação Amazônia Nativa' - pro-indigenous organization). [16]

16 I specially thank Ronaldo Freitas, from Natura, and Gilberto Olavo Costa de Oliveira, manager of Uacari SDR, for that information on the Forum mission and member institutions, since it is not available online and would be impossible to gather otherwise.

By mid-2014, the Forum realized there was a need for a tracking tool to prioritize projects and evaluate their impact over time and the Social Progress Index was thus chosen. The construction of the index helped in many ways: eliciting local population to reflect on their most valued functionings and pressing demands in the region, helping to officially publicize those demands to the government and stakeholders, generating visibility and public awareness to these demands, and tracking social impact investment. Materiality matrices - a technique commonly used for companies to support investment decisions in corporate social responsibility issues - were used to determine what social investments options could yield better results for the community.

The distances between settlements posed the greatest logistical difficulty while applying the questionnaires, since the region is only accessible by boat and many communities stand half a day trips far from each other. That explains why there were so little data about those families living in the region. The study allowed better visualization of riverine communities particular needs, which were quite different from those of the population living in urban centers of the nearby region.

A questionnaire was drawn with active participation of grassroots associations in the Forum with Ipsos facilitation. The translation of SPI questions into outcome-actionable demands was carried out in several steps, comprising focus groups and the selection of priorities among groups. That process of adaptation derived from an in-depth understanding of the local reality in terms of territorial diversity, language and cultural aspects common to the local population. After finally listing the valued dimensions that came up during the first phases of work, the team started to work on a consolidation of indicators, incorporating feedback and scrutiny of local grassroots leaders.

The design of a representative sample - with 95% confidence level - followed, randomly picking 331 households of the riverine settlements and an additional sample of 84 households to represent the urban area of Carauari municipality. Following SPI methodology, all variables were tested for adequacy, and aggregation robustness was tested with Cronbach´s Alpha test. Factorial Analysis was carried to check vector directions and determine weights based on factorial loading in each component, which was further verified with KMO test. Separate measures were calculated for riverine population and urban population, showing that the urban population was much better in some basic aspects, such as housing and sanitation. The riverine communities, for their part, were better off in personal safety and ecosystem sustainability. (Ipsos et al, 2015).

3.3.2.1 Project Outcomes

As a consequence of the whole process, many actions took place in the following couple of years. 'Sanear' project was deployed, helping to sort identified needs on the domain of access to water and to bathrooms at home. Hundreds of miles away from any city sewage system, the project focused on the collection, treatment and storage of rainfall water to supply households and on construction of bathrooms for these families, resulting in an increased level of access to piped water, as 90% of families enrolled in the project received new rainfall collection system, enhancing the capability "access to water", that would otherwise have to be collected from the rivers one mile away and not always clean. A technical learning center was set in Bauana community, having trained 40 people in the first year of operation on responsible collection of forest raw materials (2015). A school was set in Campina community for 80 children and teenagers. The local oil factory was upgraded and raised its production in 25%, thus increasing the revenue of the local production cooperative, and wooden pathways were built in order to help locals move the production to the boats.

So change indeed happened, but how to evaluate this change? Another round of the SPI survey is forecast to happen in Carauari by the end of 2016, two years after the first round, and the results will be tracked according to the locally selected variables based on the global framework. The translated variables for the Carauari context are available in the **Appendix**, but some comments follow.

After group meetings, the necessary adaptations took place: While some adaptations were more relevant to the method of measurement, (for instance, asking food consumption habits and frequency - vegetable, fruits and protein consumption - proved to be better for appraising undernutrition than, for instance, making body measurement for stunting, as in WHO specifications) most adaptations reflected the specific concerns of the local inhabitants. Child mortality was adapted to cover from zero to 3 years of age, and the quality of medical attention was assessed by using objective questions on the availability of a set of basic health services for the children and population in general. Component 'Health and Well-being' is more concerned with appraising the longevity component and capturing valued capabilities directly related to 'living a long life and free of unnecessary pain and suffering'. This component measures both objective and subjective aspects of well-being, evaluating risk factors to health (tabagism, alcoholism, physical exercises). The subjective questions accounted for the capability to feel proud of oneself and be an active member of the community, measured in a set of Rosemberg scales that where further aggregated into a single variable.

The Opportunity components measured aspects of life that hardly could be measured with administrative or census data. A mix of objective and subjective questions were used to depict the amount of political rights, including voting awareness and tracking of elected representatives, participation in local associations, freedom of choice - measured with objective and subjective questions – such as access to leisure and other group valued activities and the perception of freedom to make one´s own life choices. Tolerance to sex, gender and race differences and access to tertiary education were also assessed with questions adapted to local reality.

But what if other issues not present in SPI framework were precluded from being voiced out? How can we be sure that there were not important functionings left undiscussed simply because they were not in the model? The question was asked many times to community members but no other pressing demand appeared. It seems that even demands that were not in the original framework - there were no specific component for 'public transportation' in Global SPI, for instance-, were allocated in the closest possible components, as the way transportation in boats for riverine communities accounted for Opportunities component. The question is somehow related to local specification of universal value and holds certain similitude to Nussbaum's concept of general functionings, which can be embodied in diverse instantiations of universal values, depending on context particularity ('multiple realizability'). For instance, one has to evaluate the level of access to information and communications to apply SPI, but that can mean very different things in the local level - from quality and availability of mobile phone signal to freedom of the Press, depending on what is deemed more relevant. In the level of commodities, specified in the local level since it follows the specification of the most pressing needs for the local population, which can be quite different in contrasting regions. Once the tool is deployed and - hopefully - demands are being address throughout the years, local indicators may evolve into more demanding issues, such as the shift of access to services to the quality of the services provided.

The case of Carauari shows that *a priori* definition of some of the parameters (components) may be quite helpful in a/the deliberative process. I found it useful to quote Sen's defense (1992) that the 'systematic assessment of importance' is a key aspect while devising an index, and that indexes are more about evaluative tools for prioritizing

demands than actually excluding or hiding information. Of course, synthetic indicators reduce social reality by default, but since they are devised as useful tools to integrate measurement with evaluation and deliver social change, the simplification may come in handy. Sen states that different indicators don't need to be necessarily conflicting, and the very argument of 'decisional inescapability' also calls for some form of specification in order to make demands tangible, otherwise it is very likely that when the time comes, no commitments are made at all.

Two lessons are worth commenting: the first one is that flexibility in the choice of variables and the process of 'translating' SPI components into the local social reality is a key aspect for its success. The other interesting lesson which must be addressed in further works is the issue of asymmetry of power among large corporations, the government and ordinary people living in poor communities. The case of Carauari proved to be a typical case of 'win - win' scenario, because Coca-Cola and Nature could successfully find ways to secure their supply chains while enhancing some life aspects of local communities. Nevertheless, former political culture and civil engagement were key factors to success in and that is far from automatic and power asymmetry must be thoroughly addressed at all times.

Regarding Deneulin's criticism (2002) on Capability Approach paternalism, she actually acknowledges that since development policies evaluation depends on the evaluation of achieved functionings and not capabilities (because information on capabilities is not direct observable), it is very hard to respect the freedom of people to seize or not seize opportunities. If some family prefers not to go to school and instead educate children at home, it is very difficult to determine if the family cherishes home education for cultural reasons embedded in traditional values or just because they cannot reach the school because it takes half a day by boat to get to the closest classroom. Still, many people living in Carauari region complained about how hard it is to commute by boat and how schools were far away, and thus schooling projects were deployed. In Carauari the *ex ante* definition of dimensions and components did not prevent local people from selecting important functions, such access to technical training under Access to Higher Education, and to properly convert that into specific educational program focused on sustainable collection of forest fruits and seeds, a longstanding local demand. Thus, I must agree with Deneulin that the adoption of a perfectionist conception of the good is a condition for CA application and even if freedom is to be respected, some degree of paternalism is unavoidable. However, paternalism here must be seen not as a coercive force, but more as a 'non-indifference' principle to human beings suffering due to the lack of basic conditions to live a full life.

3.3.3 Lists of human development

Even though Rio de Janeiro and Carauari experiences showed that some level of parameter specification is justifiable for composite indices, providing cutting power to establish some kind of 'overlapping consensus' and highlighting pressing needs to government and stakeholders, an initial, preliminary comparison between Social Progress Index framework and the literature on lists of human development may prove useful to situate SPI amidst the Capability Approach operationalization attempts. Alkire's systematization (2002a) of 39 lists of human development from different disciplines was analyzed to subsidize this preliminary comparison, while reference to some of Nussbaum´s key arguments that some degree of substantive specification is needed to operationalize the Capability Approach proved useful to sustain that 'list', or 'capabilities approach'.

Sen (1993) objects to taking *a priori* substantive commitments on capabilities also due to his fear of over specification. The human nature is so plural and heterogeneous that it can hardly be forcefully inserted into a pre-set list of valuable doings and beings. Moreover, Sen argues that the 'deliberate incompleteness of the capability approach permits other routes to be taken which also have some plausibility' (Sen, 1993:47) but he does not specify the routes. Nussbaum (1998:176) defends that Sen needs to introduce 'an objective normative account of human functioning by describing a procedure of objective evaluation by which functionings can be assessed for their contribution to the good human life'. Nussbaum (2013) further presents many reasons to defend her list of Central Human Capabilities: it is unclear whether promoting 'freedom' in abstract terms is a coherent political project, since some freedoms limit others (2013:71); justice demands each society to figure out the preconditions of a 'life worthy of human dignity' (2013:73). Fundamental entitlements can be endorsed for political purposes only, 'not as a comprehensive guide to life' and different moral doctrines can be articulated in a 'thin' way that citizens reasonably hold (2013:90). Although it is a single list, 'it´s a very general one that can be further specified in many different ways' (2013:101); and, regarding implementation, a Central Capabilities list would 'remind policymakers that the goal is to present people with choices in the same areas the list identifies as central, rather than dragoon them into a specific mode of functioning' (Nussbaum, 2013:97). The idea of 'architectonic capabilities that both organize and suffuse all others, making their pursuit truly human' combines with Nussbaum´s notion of 'competing specifications of the same virtue' (Nussbaum, 2000a:35). It means that there is a need for further commitment in the substantive contents, but that can be done at such a general level that states can further specify to their proper, locally debated accounts of justice ('multiple realizability'). Another important remark is that Nussbaum actually endorses the proposed Central List as a legit tool to make comparisons across countries, 'asking how well they are doing relative to one another in promoting human quality of life' (Nussbaum, 2000a:35).

In spite of claiming that Nussbaum´s list represents 'the most well-developed active proposal of how the capability approach should be put into practice' (Alkire, 2002a:4), Alkire (2002a:37) criticizes Nussbaum´s approach for not giving a 'procedural account of how the process of local specification and cross-national comparison are to unfold over time'. How can the list be both deeply flexible and useful for cross-national comparisons? Alkire´s response is a thorough revision of lists of human development and participative methodologies trying to fill in Nussbaum´s blanks.

Searching for a methodology to account for capability change in microprojects, Alkire found it more useful to have a set of dimensions of human well-being that could usefully 'spark conversation' than having a 'fully normative account' of what those dimensions might be. The 'Basic Human Values' proposed by Grisez, Finnis and Boyle (1987) proved useful to organize those very basic reasons for action. Instead of naming basic needs or desired states of being, those 'Basic Human Values' are defined in a very broad way, such as 'Bodily life - health vigor and safety' , 'Self-integration' and 'Harmony with ultimate source of reality', which can be specified by asking the question 'why do I/others do what we do ?': the simplest reason to act that required no further reason. That approach is not tied to any moral or cultural account and its authors claim that the list contains all basic purposes of human action.

Whether or not that is true, many other authors attempted to further advance in specification without falling prey to over-specification and paternalism. Qizilbash's 'prudential values for development' (1996) are set to be a consensual, culturally non-relative account of human development, open to cultural specification. Max Neef (1993) sets a procedure for generating a classification of human needs, proposing that it must combine scope with specificity, reaching a limited number of needs, that it must be operational and

that the classification must be critical and propositional. Doyal and Gough´s depart from a list of 11 'intermediate needs' broadly defined as nutrition, work, health care, and basic education (among others) that would serve as the preconditions of well-being. Authors argue that specification would not call for local engagement in varying levels (being free from cholera, for example) since the list is not a normative account of human well-being but rather a list of preconditions. (Alkire, 2002).

The Social Progress Index takes a further step in specifying the dimensions, adding more normative content. **Table 1** draws possible interrelations within the guiding questions underlying SPI components and typical indicators used in each component with Nussbaum´s Central Capability List (2000) and with Grisez et al (1987) Basic Human Values. Reading the table from right to left allows us to see how the ultimate 'values' for action can be related to mildly specified 'capabilities' in Nussbaum´s list, and then further specified by the SPI indicators, but yet, open to scrutiny and public deliberation to the extension that the driving question in each component can be properly answered. For instance, 'healthily vigor' - a fundamental reason for action for Grisez et al (1987), established a direct dialogue with Nussbaum's capabilities of 'being adequately nourished' and 'not dying prematurely', which are related to SPI question "Do people have enough to eat and are they receiving basic medical care?" In order to be operational and actionable, typical indicators include Undernourishment, Depth of food deficit, Maternal mortality rate, Stillbirth rate and Child mortality rate.

Table 1: Relations with SPI component questions, Nussbaum´s Central Human Capabilities and Grisez et al Basic Human Values

SPI Components and underlying questions	Typical indicators	Nussbaum (2000) Central Human Capabilities	Grisez et al (1987) Basic Human Values
Nutrition and basic medical care: Do people have enough to eat and are they receiving basic medical care?	Undernourishment Depth of food deficit Maternal mortality rate Stillbirth rate Child mortality rate	1.Life :Not dying prematurely 2. Bodily Health: Be adequately nourished	Bodily Life – health vigour
Water and Sanitation: Can people drink water and keep themselves clean without getting sick?	Access to piped water Access to improved sanitation facilities	2. Bodily Health: Being able to have a good health	related to heatlh
Shelter: Do people have adequate housing with basic utilities?	Indoor air pollution attributable deaths Availability of affordable housing Access to electricity Rate of non-urbanized slums	2.Bodily Health: to have adequate shelter	related to health and safety
Personal Safety: Are people able to feel safe?	Homicide rate Level of violent crime Perceived criminality Street robbery	3. Bodily Integrity: Being able to move freely from place to place; to be securem against violent assault,including sexual assault and domestic violence. 5. Emotion (partially) : Not have one´s emotional development blighted by fear and anxiety	Bodily Life – safety
Access to Basic Knowledge : Do people have the educational foundations to improve their lives?	Adult literacy rate Children alphabetization level Quality of Education Enrollment rates	4. Senses, Imagination and Though: Being able to use the senses, to image, think and reason - and do to these things in "truly human" way, a way informed and cultivated by an adequate education, including, but by no means limited to, literacy and basic mathematical and scientific training.	Knowledge

Access to information and communication :Can people freely access ideas and nformation from anywhere in the world?	Internet users Press Freedom Index Mobile telephone subscriptions	It´s a transversal theme, linked to though development and capability to use technology to connect with family, friends, colleagues and to access information.*	Knowledge
Health and Well-being :Do people live long and healthy lives?	Non-communicable disease deaths between the ages of 30 and 70 Outdoor air pollution attributable deaths Suicide rate	1. Life: Being able to live to the end of a human life of normal length, not dying prematurely, or before one´s life is reduced as to be not worth living;	Bodily Life - health vigour
Ecosystem sustainability :Is the country using its resources so they will be available to future generations?	Greenhouse gas emissions Biodiversity and habitat Rate of recyclable waste collection	8. Other Species: Being able to live with concern for and in relation to animals, plants and the world of nature. This component is also associated with the rights of next generations on natural resources that is not part of the list. Nussbaum touches the subject in Frontiers or Justice (2009).**	Harmony with ultimate source of reality
Personal Rights***: Are people free of restrictions on their rights?	Political rights Freedom of speech Freedom of assembly/association Freedom of movement Private property rights Access to cultural venues and activities Rate of Child Labor	7. Affiliation (A) : [Being able to] engage in various forms of social interaction (...). Protecting institutions that constitute and nourish such forms of affiliation, and also protecting the freedom of assembly and political speech. 10A. Control over One´s Environment (A) - Political :Being able to participate effectively in political choices that govern one´s life, having the right of political participation, protection of free speech and association; 10B. Material: Being able to hold property (both land and movable goods) and having property rights on an equal basis with others; having the right to seek employment on an equal basis with others.	Skillful performance in work and play
Personal Freedom and Choice: Are people free of restrictions on personal decisions?	Freedom over life choices Freedom of religion Slavery, forced labor and human trafficking Satisfied demand for contraception Corruption	3. Bodily Integrity: Being able to move freely from place to place, having opportunity for sexual satisfaction and for choice in matters of reproduction. 4. Senses, Imagination and Though: Being able to use imagination and thought in connection with experiencing and producing works and event´s of one´s own choice, religious, literary, musical and so forth. 9. Play: Being able to play, to laugh, to enjoy recreational activities.	Skillful performance (play)
olerance and Inclusion :Is no one excluded from the opportunity to be a contributing member of society?	Women treated with respect Violence against woman Tolerance of immigrants Tolerance for homosexuals Discrimination and violence against minorities Religious tolerance Community safety net	7. Affiliation (A) : Being able to live and towards others, to recognize and show concern for other human beings, to engage in various forms of social interaction, to be able to image the situation of another. (B) Having the social base of respect and non-humiliation; being able to be treated as dignified being whose worth is equal to that of others. This entails provisions of nondiscrimination on the basis of race, sex, sexual orientation, ethnicity, caste, religion, national origin.	Self-integration
ccess to Advanced Education :Do people have the opportunity to achieve high levels of education?	Enrollment rate in higher education Population with higher education degree Women's mean years in school Value lost due to inequality in education	4. Senses, Imagination and Though: Being able to use the senses (...) ,cultivated by an adequate education, including, but by no means limited to, literacy and basic mathematical and scientific training. 10. Control over one´s environment (B) :having the right to seek employment on an equal basis with others.	Knowledge

ource: Elaborated by the author based on Porter, Stern and Green (2015) and Alkire (2002)

Hamel (2010) produced a in-depth paper covering the potentials of Information and Communication Technologies (ICTs) for human evelopment and capability approach. The author concludes that ICTs policies alone cannot improve peoples' lives as they need to be integra vith broader inclusion strategies to reap it´s potential benefits for human development

* Watene (2013) presents some important critics regarding the problem of future generations, since Nussbaum (2009) limits her analysis to ffirm the Rawls theory can be extended to provide answers to environmental issues concerning intergenerational justice, but the subject emains underspecied in the literature. For a more complete account of environmental sustainability within the Capability Approach see the ollection of articles The Capability Approach and Sustainability organized by Ostrud Lessman and Felix Rauschmayer (Routledge, 2013).

** The component is sometimes called "Political Rights"

Nevertheless, other data such as healthy habits and nutritional facts, e.g. frequency of eating fruits and protein, alcohol and tobacco consumption, were used in SPI Carauari, because those aspects were deemed a better way to measure nutritional in the local context. The specification level of SPI is not always that smooth, as many 'values' and 'capabilities' are transversal. For instance, 'Knowledge' cannot be translated straightforward into a single capability group and, in terms of public policy, can be directed into many fields of life, from basic education to access to culture and university production, but, in general, SPI components are strongly related to Nussbaum´s list in varying levels of generality. Another issue that arises is the comparability between differing capability specifications in different applications, and also how robustly SPI is related to choice of variables and parameters. These issues will be approached in the next section.

3.4 Comparability

The fact that a very basic set of functionings is still persistently relevant to the great majority of the world, and is thus featured in most human development measures, such as the topics covered in SPI Basic Human Needs dimension, may lead to the idea that competing specifications of same basic, 'Central Capabilities' are in fact comparable. Sen (1992) suggests that those different specifications need not to be competing, given that many variables offer complementary views of some basic social context as the correlations between malnutrition and stunting or low-weight births. There are in fact two questions on SPI comparability: how does it compare to other synthetic measures of poverty and well-being in the same geographical level, and how can different national and subnational exercises be compared. To answer the first question some measures of linear and rank correlation among SPI Global 2014, the Human Development Index and the Multidimensional Poverty Index are presented. To answer the second question some conceptual issues on levels of comparability are discussed based on the component scores obtained by Brazil in the Global SPI, the state of Amazon and the city of Carauari in SPI Amazon cities and those obtained in Rural and Urban Carauari based on primary data.

3.4.1 Comparability in the international level: SPI, HDI, MPI and *per capita* GDP

The Social Progress Index showed very strong linear correlations with all measures. The strongest linear correlations (Pearson) was found between SPI and the Human Development Index (HDI) (0.94) and the Inequality adjusted HDI (0.93), followed by the Multidimensional Poverty Index (MPI) (- 0.85)[17]. SPI also showed the second strongest correlation with *per capita* GDP among the analyzed measures (0.78), followed only by the Inequality-Adjusted HDI (0.83) for obvious reasons: both HDI and its inequality adjusted version feature *per capita* income as part of the index. Surprisingly, SPI correlation with *per capita* income was even higher than HDI correlation (0.73). MPI correlation was a bit lower, but still strong (- 0.70). All findings in this section are displayed in the **Statistical Annex**.

If we consider only the 94 countries with MPI scores we notice that the SPI correlation drops very little, keeping at 0.90 with the HDI, 0.85 for Inequality-adjusted HDI and MPI (- 0.85) and 0.72 for *per capita* GDP. For this group of countries, the "Opportunity" dimension on SPI has yielded the lowest correlations, but still positive and significant: 0.69 with the HDI, 0.57 with *per capita* income and 0.60 with the MPI.

Since most MPI indicators were grouped as "Basic Human Needs" in the Social Progress Index grid - such as nutrition, child mortality, sanitation, water, electricity and

[17] Negative correlation in the case of MPI, since SPI is standardized upwards and MPI moves downwards (for poverty, the lower the better).

housing - the higher correlation of this dimension and MPI was expected (0.94), followed by the second dimension of SPI that encompasses education (0.67) and Opportunities dimension (0.60).

Regarding rank correlation, Spearman's rho between SPI and HDI was the highest found (0.89), followed by Inequality Adjusted HDI and MPI (around 0.85) and *per capita* income (0.80). Kendall´s Tau B pairwise correlation was found higher between SPI and HDI (0.71), then 0.64 between SPI and MPI, and 0.60 between SPI and *per capita* income. It is possible to conclude that the "Opportunities" dimension of SPI accounts for a great part of the differences in scores and orderings between SPI and other measures: while 85% of the ranking order and 71% of pairwise rank correspondence are common to HDI and SPI, those values are much lower in the Opportunity component of SPI: 68% and 47%, respectively. In this way, it is important to investigate what information this dimension is adding to important agency topics such as political participation, woman empowerment and tolerance themes not yet covered by other synthetic indices worldwide. It´s important to note that Opportunity dimension also includes access to higher education.

The scatterplots comparing SPI and SPI Opportunities dimension with HDI and MPI, respectively, shows that there is no significant correlation between SPI Opportunities dimension and MPI.

But which countries are particularly affected by the differences of HDI, MPI and SPI? This analysis was carried in two steps, first by comparing the list of 133 countries with both HDI and SPI scores, and then comparing separately the rank differences between the standardized MPI scores and SPI equivalent scores for 75 countries with valid scores for both measures. 18 countries ranked 15 or more positions below the HDI, as compared to their SPI ranking in 2014. Iran ranked worst in the comparison - 41 positions below its HDI ranking, followed by Saudia Arabia (38 positions), Kazakstan (34), Sri Lanka (33), and Cuba and the Russian Federation (31). Other countries in the list are Iraq (24 positions down), China (21 positions down) and Pakistan and Venezuela (16 positions down). 20 other countries ranked 15 or more positions above the HDI. Jamaica (31 positions), Costa Rica (26 positions) and Colombia and Paraguay (26 positions) were in the top of that list. Other countries in the list were South Africa (25), Uruguay (20) and Brazil (17 positions). Further analysis can break down particular country strengths and weakness in the indicator level.

3.4.1.1 SPI and poverty

Social Progress Index correlation with the share of population living below the poverty line was between - 0.52 for the national poverty lines defined by each country (those poverty lines are based on population-weighted subgroup using data from national household surveys) and - 0.71 for the PPP (purchase power parity) international poverty line of USD 1.25 a day. Spearman rank correlation proved a little higher (- 0.56 for national poverty lines and - 0.77 for PPP poverty line) and Kendall´s Tau B proved much lower, but still with significant negative correlation to social progress: - 0.38 for national poverty lines and - 0.55 for PPP poverty line. Data is from UNDP 2015 Statistical Annex tables. National poverty lines were built with data from 2004 to 2014, and the PPP as $1.25 a day from 2002 to 2012. The revised methodology of MPI as per HDRO specifications was considered. MPI correlations were stronger for all cases: 0.60 with national poverty lines and 0.80 for the international poverty line.

Regarding standardized ranking for 75 countries with valid MPI and SPI scores, nine countries were 15 positions above in the MPI, when compared to the SPI, such as Yemen (26 positions), which scored 39.09 in SPI with a multidimensional poverty adjusted level of 20.04%, and ranked 70th in the SPI and 44th in the MPI. Other former Soviet

republics followed in the list of countries ranking better in MPI than in SPI: Kyrgyztan (25 positions), Kazakhstan (22 positions), Belarus and Uzbekistan (17). Eight countries ranked 15 or more positions better in SPI than in MPI. Colombia, with SPI score of 68.35 and a level of adjusted multidimensional poverty of 3.21%, stood 23 positions above in the SPI, followed by Peru (22), Argentina (20) and Namibia (20). Further research is needed to better understand the technical reasons behind different ranking orders and the level of significance.

3.5.2 Comparability within SPI measures

Many exercises on multidimensional indicators show that the requirements of comparability and usefulness, or 'actionability' may be competing. Focal variables with much sharper cuts can be used in micro projects and subnational applications to provide qualified data for local decision makers. With standard dimension and components specifications in the model, but flexibility to allow for local selection of variables, that seems to be an intrinsic trade-off to the methodology, though that is not necessarily true, as some variables seem to be persistently relevant in the great majority of the world as basic nutrition, infant mortality and basic education.

Considering that actionability is one of its major requirements, it is admissible that the decision on variables tends to be locally challenged by pressing demands, but still, if agency is respected and a true process of collective deliberation is made, then components and dimensional scores can at least be conceptually comparable as measures of how each society is evolving when compared to its selected priorities in each dimension. SPI Carauari, for instance, is not statistically comparable to SPI Amazon, since the very nature of data is different (primary data in the former and administrative data in the latter) and variables need not to be the same. Allowing for some flexibility and relaxing hard data comparisons constraints may prove useful to establish conceptual, non-cardinal, comparisons on how much each society evolved in terms of their own valued, incommensurable set of functionings. If the proposal is to have a glimpse of the current state of social progress and compare achievements in a mild way, inviting to investigate the reasons for the success of, let´s say, a sharp decrease in sanitation grades, than the issue of comparability may not be that challenging. Carauri residents' demand for higher education is rather focused on technical training for environmental and productivity challenges faced locally, as the project in Bauana community showed, while in the state government level, the most pressing needs are better converted in variables reflecting access to undergraduate courses and gender equality in higher education. In the global level, it actually made more sense to measure the number of globally ranked universities and the average years of study within a country. That is another reason why SPI score for Brazil is not strictly comparable to its subnational initiatives.

Table 2 shows how those different levels of achievements in selected components can be used in dashboard applications. The scores of the State of Amazonas were calculated as the average score of its municipalities, and thus are comparable to the score of Carauari city, showing that the city performs better in areas such as Shelter and Sanitation, but falls behind the State of Amazonas in Access to Information and Communication, and Personal Freedom and Tolerance. Similarly, results from the assessment of Carauari communities primary data show differences in urban and rural achievements, as in basic sanitation and shelter, which performed badly in the riverine (rural) communities.

The red numbers shows that some of the components, such as Access to Higher Education, regardless of the specification of variables, consistently display the worst results within each domain of analysis.

Table 2: Conceptual comparisons in subnational SPI applications.

Index	Global SPI	Amazon Cities		Carauari communities	
Unit of Analysis	Brazil	Amazonas	Carauari	Urban	Rural
Social Progress Index	70	57	55	62	53
Basic Human Needs	71	59	65	76	56
Foundations of Well-Being	76	65	59	57	49
Opportunities	63	48	72	54	53
Nutrition and Medical Care	92	72	74	65	60
Water and Sanitation	82	35	43	65	29
Shelter	73	72	85	92	41
Personal Safety	38	55	57	82	94
Basic Knowledge	95	61	57	66	52
Information and Communication	68	53	12	45	17
Health and Well-being	76	70	71	68	53
Ecosystem Sustainability	64	75	95	49	72
Personal Rights	75	45	39	71	64
Personal Freedom and Choice	77	64	48	82	86
Tolerance and Inclusion	62	64	64	56	58
Higher Education	38	19	17	7	5

Source: Ipsos et al, 2015.

Other components, such as Sanitation, are particularly useful to assess heterogeneity in the territory, because Brazil, in a worldwide comparison, has a relatively good score on sanitation. However, the North area of Brazil, where Amazon state is located, has the lowest levels of sanitation in the country. Although Personal Safety in Brazil is a major issue, the domain of public safety is not a pressing issue in Carauari city, and crime rate is not a particular concern of riverine communities in Carauari region. In **Table 2**, the limits of statistically valid comparisons are showed with the dotted lines in between the scores obtained by each initiative.

3.6 Weighting and Aggregation

Robustness in multidimensional indices can be tested by checking how partial and global rankings respond to changes in weighting and aggregation parameters. Decanq and Lugo (2010) developed a categorization of weighting procedures for multidimensional indexes. Following their categorization, SPI is computed by linear transformation of variables, calculating z-scores and normalizing the signals to positive outcomes. SPI weighting process within components is data-driven (statistical) and normative (equal) for composing dimensional and index scores. Elasticity of substitution of dimensions was not yet explored in SPI methodological reports, but it follows equal component and dimensional weights in the absence of a clear logic that better represents trading offs between dimensions. Another argument might be that dimensions are independent and non-hierarchical and thus no gain in one dimension can compensate for deprivation in the others. However, since equal dimensional weights mean that the intrinsic marginal rate of substitution is equal to one, SPI computation (exactly as the MPI, HDI and any other index that assumes equal weighting) allows for downgrade in one of the dimensions to be compensated by improvements in other dimensions. Ravallion (1997) points out that HDI implicitly established a very unequal monetary valuation of an extra year of life in poor and

rich countries. Focusing on outcome variables only, SPI does not include monetary indicators, thus not incurring directly in such monetary valuation problems. Nevertheless, the mathematical construction of the index brings in the implicit trade-offs between variables and dimensions. While measured in incommensurable, non-cardinal diverse units such as rate of degradation, level of perceived crime and malnutrition, those individual variables could not be compared and traded in, but transformations (standardization and normalization) make those comparisons mathematically valid in the context of index calculation. The problem arises because there is very little reasoning behind what set of functionings should have more or less value attached and how that evolves during time (Fleurbaey,2009). In fact, there are grounds to defend that the non-hierarchical, incommensurable value of capabilities (Alkire, 2002) should not be traded at all. Another possibility for further exploration comes from the idea that knowing the marginal rates of substitution between dimensions can also be thought of as the rate of return of public investments in each index dimension, e.g. finding out the different rates that each dollar invested in, let´s say, health and education, yields in terms of gaining index points. Still, these forms of valuation must be anchored in strong ethical grounds, for it would be easy for policymakers to focus on areas with higher rates of return, which is not usually where the most pressing demands are located (sanitation, for instance).[18]

The selection of indicators in SPI initiatives is more often based on expert and public deliberation than properly by principal component analysis or Cronbach´s Alpha test. Literally hundreds of social scientists were consulted by INCAE team back in 2012 prior to the release of the Beta version of the global index. Consultation for SPI RIO took 8 months to be completed. Principal Component Analysis is actually used only to weight data series already validated by public scrutiny, although it is also quite useful in discarding vectors moving in the opposite direction (inverted signs) in the same component, thus helping in the aggregation process and leading to better Cronbach´s Alpha results. The first factor loading is normalized to the unit and, ideally, weights should be close to equal. For the sake of robustness check, SPI RIO was recalculated assigning equal weights to variables inside the components, instead of PCA. Still, the number of variables per component ranged from two to five, thus components with less variables meant attaching more weight to each variable. An exercise was made keeping the same weight to all 36 variables, and rank correlation between the two measures was found to be quite high: Spearman of 0.998 and Kendall´s Tau B of 0.98. The highest score absolute difference was of 3.11 % down, but most score differences were kept lower than 1%, within an average of 0.31% and no region changed its rank order more than one position.

Further analysis could take into account the same variables with other aggregation functions, such as the dual cut-off method proposed by Alkire and Foster (2007, 2011a), or fuzzy sets to have a better understanding of how the information is transformed and what insights can be learned by applying different aggregation methods.

4. Concluding remarks

The present paper aimed to assess the framework proposed by the Social Progress Imperative as a tool to operationalize the Capability Approach. Most challenges and constrains derive from the intrinsic hardships in filling in the empty brackets in Sen´s conceptual framework and are commonly faced by other operationalization attempts.

Most empirical applications that aim to make CA operational present some degree of confusion of what is really being measured: capabilities, achieved functionings or

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18 I wish to thank the Professors of Centrum Universidade Católica de Perú who attended SPI workshop held in November, 2015, for bringing up this discussion on elasticity of substitution in public investment allocation with the use of composite index.

outcomes. Part of the confusion is conceptual, as the definition of outcome does not necessarily mean a final reason to act or the ultimate goals of human flourishing. Further specification on 'outcomes' would be needed to avoid this sort of pitfalls, or simply taking a mid-point stand on 'outcomes' and focusing on the 'essence of the problem' (Atkinson et al (2002). Another part of the confusion is due to the absence of better data, but most times both reasons apply, as in the examples drawn from SPI Rio. Nevertheless, simplicity and directness should prevail: 'systematic assessment of importance' and measurement integration with evaluation should be the key aspects for composite indicators (Sen, 1992). Still, capabilities should be pursued at all times and selected for measurement always when quality data is available, providing cutting power to subsidize decision-making processes. When that is not the case - e.g. Deneulin (2002) example of environment or Atkinson et al (2002) on education -, relying also in achieved functionings does not necessarily diminish the role of informed free-choice, or eliminate the value added by the Capability Approach.

Social Progress Index takes further substantive commitments when compared to the human development lists (Alkire, 2002), by specifying a global framework adjustable to local reality in the variable level. That degree of specification may help to amplify SPI operational efficiency by offering a common framework that facilitates dialogue with development stakeholders but, at same time, it also opens the framework to further criticism on its substantive contents, such as paternalism. That should be viewed as an intrinsic challenge in the operationalization of the CA and, as suggested by Deneulin (2002), even if some degree of perfectionism is required to apply Sen´s and Nussbaum´s approaches to public policy, it must be viewed as 'non-indifference' principle to human suffering rather than a coercion to live a life outside one´s own values and choices.

Motivation on Sen's persistent criticism of 'canonical lists' of human development is understood as a concern for over-specification, which precludes the 'process aspect of freedom', and his requirements that public reasoning and debate are indispensable for selecting the most important capabilities at each local context. SPI Rio de Janeiro and SPI Carauari illustrated such process of emphasis in pressing needs by public debate and local specification of variables.

The Comparison between Grisez, Finnis and Boyle (1987) 'Basic Human Values', Nussbaum´s 'Central Capabilities List' and SPI components showed that core values and capabilities can be decoded into differing levels of specification depending on social requirements and application but, in general, there is a reasonably high level of correspondence towards a core of essential human entitlements, ranging from the most abstract reasons to act in 'Basic Human Values' to pragmatic questions leading to indicators used in SPI diverse frameworks, Nussbaum´s list being an intermediate step.

Issues of comparability were analyzed, showing that SPI Global, despite a very different formulation, has a very high linear and rank correlation with the MPI, the HDI and GDP *per capita* worldwide. The Opportunity dimension of SPI showed the lowest linear and rank correlations, but still significant: 0.82 with the HDI and 0.62 with *per capita* income and a Spearman rank correlation of 0.59 with GDP *per capita* and 0.68 with the HDI, highlighting that most differences between SPI and other measures are found in the Opportunity dimension. Comparability within different SPI models were introduced, showing that even if no statistical comparison is allowed between different metrics (such as primary and secondary evaluations of the same territory), the framework allows for some conceptual comparisons between country-level and subnational SPI applications, which tend to converge in the acutest cases, e.g. the terrible level of access to higher education in Brazil, and may serve for contrasting development outcomes in different geographic cuts, as in the issue of public safety and sanitation.

The main argument in favor of SPI as a tool for Capability Approach operationalization is the premise of moving beyond GDP, for the problem of

heterogeneous conversion of 'resources' into capabilities and functions unfolds in Sen (1980, 1985a, 1999) and it is also clear (Sen, 1988, 1992, 1993) that *per capita* GDP is a weak and distorted measure of well-being. The process participation embodied in the methodology and in practical application, as illustrated in Rio de Janeiro and Carauari cases, and the arguments of usefulness, selection and priority of pressing issues (Sen, 1992) are also favorable points in the methodology. Compromise with substantive issues was not seen as a drawback for operationalization, quite on the contrary, because variables can be specified in the local level. However, issues of asymmetry in micro projects must always be addressed to avoid paternalism. Data comparability issues between subnational initiatives are to be the subject of further studies and analysis as new initiatives unfold. I encourage SPI enthusiasts to further exchange with the Capability Approach so that new applications can benefit from questionnaire and econometric techniques specifically developed to unfold capabilities, as well as novel techniques for inequality and poverty measurement originated within the framework.

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Statistical Software: Stata /SE 12.1 StataCorp

Appendix

Translating variables to local context: SPI with primary data in Carauari, Brazil

Basic Human Needs

Component	SPI Global	SPI Carauari
Nutrition and Basic Health	▪ Undernourishment ▪ Depth of food deficit ▪ Maternal mortality rate ▪ Child mortality rate ▪ Deaths from infectious diseases	Protein Consuption Consumption of fruits and vegetables Under 3 y.o. child mortality Quality of health servisse (time and perception)
Water and Sanitation	▪ Access to piped water ▪ Rural access to improved water source ▪ Access to improved sanitation facilities	Toilet inside the household Sewage (bathroom conditions + sewage treatment) Access to Water Network Water Availability (daily available or not)
Shelter	▪ Availability of affordable housing ▪ Access to electricity ▪ Quality of electricity supply ▪ Household air pollution attributable deaths	Access to electricity Frequency of acess to eletric energy Trash collection services Trash destination Public lighting around household
Personal Safety	▪ Homicide rate ▪ Level of violent crime ▪ Perceived criminality ▪ Political terror ▪ Traffic deaths	Safety perception in the household Victim of violent situation in lifetime and in the last 6 months ? Exposition to violence scenes in the neighboorhood

Foundations of Well-Being

Component	SPI Global	SPI Carauari
Access to Basic Knowledge	▪ Adult literacy rate ▪ Primary school enrollment ▪ Lower secondary school enrollment ▪ Upper secondary school enrollment ▪ Gender parity in secondary enrollment	School frequency Proportion of children in multi-seriated classrooms Illiteracy rate and proportion of population that never been to school % of household that completed the first grade
Access to Information and Communications	▪ Mobile telephone subscriptions ▪ Internet users ▪ Press Freedom Index	Access to ways of communication Internet use % people in the household that has a mobile phone Quality of mobile phone network in the place of living
Health and Wellness	▪ Life expectancy at 60 ▪ Premature deaths from non-communicable diseases ▪ Obesity rate ▪ Suicide rate	Risk factors to health: Smoking, drinking alcohol, physical exercises Subjective dimensions of well-being: lack of self-pride, self-perception of usefulness Basic safety conditions at work
Environmental Quality	▪ Outdoor air pollution attributable deaths ▪ Wastewater treatment ▪ Greenhouse gas emissions ▪ Biodiversity and habitat	Search for information on the environment Environment care

Opportunities

Component	SPI Global	SPI Carauari
Personal Rights	▪ Political rights ▪ Freedom of speech ▪ Freedom of assembly/association ▪ Freedom of movement ▪ Private property rights	People over 18 with all basic documents, such as national ID and birth register Search for information on basic rights Participation in associations (scaled) Access to transportation Land legal status (own, ceased or occupied)
Personal Freedom and Choice	▪ Freedom over life choices ▪ Freedom of religion ▪ Early marriage ▪ Satisfied demand for contraception ▪ Corruption	Perception of having or not necessary conditions to make one´s own choices Leisure infrastructure and practices Participation in traditional community activities Use of contraception methods
Tolerance and Inclusion	▪ Tolerance for immigrants ▪ Tolerance for homosexuals ▪ Discrimination and violence against minorities ▪ Religious tolerance ▪ Community safety net	Gender Inequality scale Race Inequality scale Sexual Intolerance scale Social Capital – solidariety and trust in the community
Access to Advanced Education	▪ Years of tertiary schooling ▪ Women's average years in school ▪ Inequality in the attainment of education ▪ Globally ranked universities ▪ Percentage of tertiary students enrolled in globally ranked universities	Access to higher education between men and women over 18 y.o. Access to technical training and extra-curricular courses

Statistical Annex

1. Pearson linear correlation among 160 countries with valid values for either 3 of the 4 measures: HDI and Inequality Adjusted HDI, MPI and SPI scores and *per capita* GDP.

	hdi	hdiineq	gdppc	mpi	spi	spibhn	spifwb
hdi	1.0000						
hdiineq	0.9792	1.0000					
gdppc	0.7373	0.8330	1.0000				
mpi	-0.9050	-0.8704	-0.7035	1.0000			
spi	0.9394	0.9302	0.7835	-0.8557	1.0000		
spibhn	0.9509	0.9459	0.7635	-0.8791	0.9376	1.0000	
spifwb	0.8609	0.8401	0.6207	-0.6726	0.9392	0.8306	1.0000
spiopp	0.8218	0.8317	0.6270	-0.6014	0.9376	0.7800	0.8676

2. Pearson linear correlation among 94 lower income countries with valid MPI scores

```
pwcorr hdi hdiineq gdppc mpi spi spibhn spifwb spiopp
```

	hdi	hdiineq	gdppc	mpi	spi	spibhn	spifwb
hdi	1.0000						
hdiineq	0.9677	1.0000					
gdppc	0.8149	0.7694	1.0000				
mpi	-0.9050	-0.8704	-0.7035	1.0000			
spi	0.9076	0.8590	0.7244	-0.8557	1.0000		
spibhn	0.9066	0.9049	0.6983	-0.8791	0.8988	1.0000	
spifwb	0.7457	0.6720	0.5497	-0.6726	0.8865	0.6819	1.0000
spiopp	0.6925	0.6219	0.5754	-0.6014	0.8542	0.5935	0.7653

3. Spearman rank correlation for HDI, MPI, SPI and its components

	hdi	hdiineq	gdppc	mpi	spi	spibhn	spifwb	spiopp
hdi	1.0000							
hdiineq	0.9744	1.0000						
gdppc	0.9138	0.8466	1.0000					
mpi	-0.9340	-0.9416	-0.8468	1.0000				
spi	0.8951	0.8569	0.8025	-0.8530	1.0000			
spibhn	0.8977	0.9003	0.8183	-0.9288	0.8821	1.0000		
spifwb	0.7439	0.6823	0.6662	-0.6612	0.8825	0.6634	1.0000	
spiopp	0.6871	0.6363	0.5920	-0.6213	0.8491	0.5960	0.7374	1.0000

4. Kendall Tau B pairwise rank correlation for HDI, MPI, SPI and its components

	hdi	hdiineq	gdppc	mpi	spi	spibhn	spifwb	spiopp
hdi	1.0000							
hdiineq	0.8721	0.9992						
gdppc	0.7336	0.6484	1.0000					
mpi	-0.7774	-0.7987	-0.6511	0.9996				
spi	0.7097	0.6533	0.6062	-0.6454	0.9996			
spibhn	0.7226	0.7340	0.6191	-0.7641	0.6975	0.9996		
spifwb	0.5430	0.4890	0.4806	-0.4650	0.7005	0.4684	0.9996	
spiopp	0.4718	0.4307	0.4033	-0.4098	0.6583	0.4018	0.5419	0.9992

5. Pearson linear correlation: people living in poverty (%) by PPP poverty line (USD 1.90) and National Poverty lines with MPI , SPI and its components scores;

	mpi	spi	povert~l	povert~p	spibhn	spifwb	spiopp
mpi	1.0000						
spi	-0.8557	1.0000					
povertynat~l	0.6033	-0.5629	1.0000				
povertyppp	0.8074	-0.7139	0.7406	1.0000			
spibhn	-0.8791	0.9376	-0.7140	-0.8363	1.0000		
spifwb	-0.6726	0.9392	-0.4485	-0.5596	0.8306	1.0000	
spiopp	-0.6014	0.9376	-0.3420	-0.3786	0.7800	0.8676	1.0000

6. Spearman rank correlation : people living in poverty (%) by PPP poverty line (USD 1.90) and National Poverty lines with MPI , SPI and its components scores;

	mpi	spi	povert~l	povert~p	spibhn	spifwb	spiopp
mpi	1.0000						
spi	-0.8566	1.0000					
povertynat~l	0.6658	-0.5684	1.0000				
povertyppp	0.8902	-0.7736	0.7334	1.0000			
spibhn	-0.9305	0.8888	-0.7020	-0.8986	1.0000		
spifwb	-0.6947	0.8914	-0.4134	-0.5851	0.6971	1.0000	
spiopp	-0.6262	0.8507	-0.2755	-0.4884	0.6034	0.7595	1.0000

7. Kendall Tau-B rank correlation: people living in poverty (%) by PPP poverty line (USD 1.90) and National Poverty lines with MPI , SPI and its components scores

	mpi	spi	povert~l	povert~p	spibhn	spifwb	spiopp
mpi	0.9996						
spi	-0.6532	0.9996					
povertynat~l	0.4816	-0.3850	0.9965				
povertyppp	0.7002	-0.5588	0.5426	0.9991			
spibhn	-0.7673	0.7072	-0.5000	-0.7195	0.9996		
spifwb	-0.4925	0.7142	-0.2788	-0.3780	0.4939	0.9996	
spiopp	-0.4201	0.6620	-0.1826	-0.3055	0.4083	0.5663	0.9991

8. Scatterplots

From left to right: SPI and MPI, and SPI and HDI, SPI Opportunities dimension and HDI and SPI Opportunities dimension and MPI.