Is Foreign Direct Investment (FDI) Caring for Sustainability?

A look of FDI inflows in African sub-Saharan countries and its impact on sustainability as well of the relation between the TBL pillars and population growth

Master degree in International Business Management

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Thesis submitted as requirement for the conferral of Master's Degree in International Management under the supervision of Professor Teresa Cristina Pereira Eugénio, Professor at the Escola Superior de Tecnologia e Gestão in Instituto Politécnico de Leiria and Professor Eulália Santos, Professor at the Escola Superior de Educação e Ciências Sociais at the Instituto Politécnico de Leiria

Originality and Copyright

Dedication

To all my family. Specially to my wife, Rita, who built with love the base ground for this achievement.

To Rafaela, my beautiful, lovely daughter, born during my academical journey.

A man can achieve whatever he feels like if he has the right motivation…and I have it double!!

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I have started my academical journey on a very trembling, shy way with Professor Eulália, and finish it with her.

Simply perfect!

Abstract

Business, politics, social and economic policies on the last decades brought us to inevitability of change. Foreign Direct Investment (FDI) plays a key role on this change as it is a tool for International Business Management on a global world. The relation between FDI and sustainability on the Sub-Saharan countries with lower income has not yet been sufficiently studied so our proposal is to bring a few more conclusions to the overall discussion as we intend to understand if FDI effectively affects the so-called *Triple Bottom Line* (TBL) pillars of sustainability. Also, we intend to analyse the relation between these pillars themselves as well with another variable, *Population Growth.* With data obtained from the World Bank (WB), regarding 20 countries, gathered between 2010 to 2018, we analysed 34 indicators composing 11 of the United Nations Sustainable Development Goals (SDG´s). After, we group them by the TBL pillars and evaluate the influence of FDI inflows on their scores using panel data models. Also, the influence between the pillars themselves and variable *Population Growth* was studied. Our results show a strong, positive correlation between the TBL pillars. FDI has no significant influence on the TBL pillars, and population growth positively affects the *Social* pillar, affecting negatively the *Environmental* pillar.

Keywords: FDI, Sub-Saharan Countries, Sustainable Development Goals

‘‘The greatest threat to our planet is the belief that someone else will save it.”

Robert Swan

“We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect.”

Aldo Leopold

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List of Abbreviations and Acronyms

CSR - Corporate Social Responsibility

ESCAP – Economic and Social Commission for Asia and the Pacific

FDI – Foreign Direct Investment

IMF – International Monetary Found

KPI - Key Performance Indicator

OECD - Organization for Economic Co-operation and Development

OLS – Ordinary Least Squares

OXFAM - Oxford Committee for Famine Relief

RAG - Red, Amber, Green (a Key Performance Indicator)

SD – Sustainable Development

SDG´s – Sustainable Development Goals

SER – Social and Environmental Reporting

SNA - System of National Accounts

SWI - Sustainable Wellbeing Index

TBL – Triple Bottom Line

UN – United Nations

UNECA – United Nations Economic Commission for Africa

WB – World Bank

Country Codes

BDI - Burundi

BFA – Burkina Fasso

TCD - Chad

CAF – Central African Republic

COD – Congo, Democratic Republic

ETH - Ethiopia

GIN – Guinea

GNB – Guinea Bissau

GMB - Gambia

LBR - Liberia

MDG - Madagascar

MWI - Malawi

MLI - Mali

MOZ - Mozambique

NER - Niger

RWA - Rwanda

SLE – Sierra Leone

SDN - Sudan

TGO - Togo

UGA – Uganda

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1. Introduction

Sustainability is an inevitability on today´s reality in international business management and being global is also being aware of the need to be sustainable. The days of going abroad to simply explore the richness of a country are gone as environmental, social, and economical consequences of these measures occur to host countries and affect regional and global population. Increasing migration flows from Africa to Europe might be an example of how important it is to stablish good practices of sustainability on this continent and worldwide.

FDI is a tool for internationalization of Multinational Companies (MNC´s) so it plays a vital role not only on investor´s lives but, most importantly, on the host country population as changes on industry, commerce or other economic activity will expectably have impact on the local lives.

The overall study of the impact of FDI in sustainability on host countries has not enough discussion and specifically on sub-Saharan countries with lower income. It is not clear that sustainability concerns and scores have increased with the entry of foreign investment. History has shown us that foreign companies and foreign nations intervention on these countries has not always acted on the pursuit of local collective welfare and environmental concerns, so it is important to ask ourselves if on these actual days and trough the scope of FDI and sustainability scores, things are changing.

The impact of Foreign Direct Investment (FDI) in sustainability on sub-Saharan countries excluding high income, is the subject for this work as we will try to understand if there is a direct, positive relation between FDI and the three pillars of sustainability which are commonly referred as TBL (Triple Bottom Line) and they are the Economic, Social and Environmental, grouped by the theoretical framework of Costanza et al. (2016).

Is FDI caring for sustainability on sub-Saharan countries? That is our general question that we will try to answer on this quantitative, longitudinal study with data on a panel, trough the available analysis of data regarding FDI inflows on African sub-Saharan Countries excepting high income and sustainability data obtained through the World Bank, since the year 2010 to 2018. Other studies such as the one from Aust, Morais and Pinto (2020), have also analyzed similar subject, but with a distinct procedure, sample and variables.

Are the three main dimensions of sustainability increasing with FDI? One by one, we will try to understand the eventual existence of a correlation between FDI and *Social, Economic,* and *Environmental* policies so the specific questions will be answered.

Are each one of the TBL dimensions influenced by the others or is influenced by population growth? Having the data available, we also extend our study on the analysis of the hypothetical influence between the TBL as also with population growth, in order to have more results and have a better understanding of the dynamics of these variables on these countries.

For this work, we will analyse the status of the discussion concerning the relation with FDI and sustainability trough a literature review, and later we will obtain existent secondary data concerning FDI, Sustainability and Population Growth. Using variated software such as Microsoft Excel, IBM SPSS Statistics 28 software and G*retl* (GNU Regression, Economic and Times-series Library) software version 2021b, we will apply a multivariate analysis, linear regressions and tests, and later analyse the results obtained.

This dissertation is organized as follows: after this introduction, we review the relevant literature; third, we introduce the research design and hypothesis; after, we present the empirical results of the descriptive statistics and multivariate analysis and formulate the

implications for future research. Finally, we discuss the results and in the last section, we present our conclusions, limitations, and policy recommendations.

2. Literature Review

To understand the status of the overall discussion, we need to look at the extant concepts of the variables we are going to work with, namely Foreign Direct Investment (FDI) and sustainability as also the studies that previously have approached this relation as well the status of the overall discussion.

2.1. Sustainability and Sustainable Development

The World Commission on Environment and Development on the Brundtland Report (WCED, 1987) defined Sustainable Development as "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*".

Sala, Farioli and Zamagni (2013) refer that SD is a complex concept that includes subjective, normative, inter and intra-generation aspects that cannot be neither defined with precision nor simply applied. A vision of the socio-economic system includes the global biophysical system and that is considered the ecological interpretation. The thermodynamic vision refers to an ecological sustainability on the economic-environmental relation and its entropic nature. Meanwhile, the planning and the public interpretation of this relations, tries to reach to a balance in all of these factors. Knowledge areas diverge and are overlooked as each one of these interpretations has a specific and different scientific domain (Sala et al., 2013).

The National Research Council (1999), emphasizes that world population will grow to 10 or 11 billion by the end of this century and that most of this population growth will occur in a more concentrated way on Latin America, Asia and African developing countries. The effort to reduce poverty without harming environment will be particularly difficult on those countries. This Council also highlights that the stresses between human development and

environment will be more sever over the next two generations and a serious progress and effort must take place during that period. A transition toward sustainability must occur in order not to damage this interaction and in final instance, damaging both:

> To meet the most basic needs and to stabilize this population will implies higher consumption and productions of goods and services, as well an increase demand for energy, materials, and land. This will have therefore, the need of a change on many industrialized nations, regarding their resource-intensive, consumptive lifestyles currently enjoyed. So, this report brings us the following question to the overall discussion "Can the transition to a stabilizing human population also be a transition to sustainability, in which the people living on earth over the next half-century meet their needs while nurturing and restoring the planet's life support systems? (National Research Council, 1999, p. 15).

As an answer, the National Research Council refer that due to the reality over the last half century regarding environment, it is believed that it will be more likely negative. However, they also refer that there is reason for optimism as population as started to secure more goods and services coming from several sector such as industry and agriculture, where less environmental damage is observed and respected.

This report also refers the *distance* between the political change occurred on the last decade about sustainability and particularly environment as it is understood that the political field is more advanced than the scientific and technological base to do this necessary change. Also, it is referred the difficulties on answering to the hopes of people around the world has they assimilated the idea of the need for sustainable development, which is growing wide as in increasingly clear. These difficulties are partially due to financial issues, equity and competition on the agenda of rulers and they are the reality of the existence of different points of

view about what is supposed to be developed, sustained, and for how long (National Research Council, 1999).

In addition, the idea of sustainable development has developed faster on the political side than on a scientific and technological field, and the consequence is that, when it is necessary to act in accordance, knowhow and knowledge are not on the same pace (National Research Council, 1999).

In conclusion, although the fact of this document has 20 years, it is still very actual as science is still struggling to fulfill the political and overall population demands, about sustainability solutions.

The United Nations Agenda for Sustainable Development Goals (SDG´s), has stablished 17 Sustainable Development Goals (See Appendix I), 232 indicators, and 169 targets as a reference and an objective to be achieved worldwide on 2030 (United Nations Assembly, 2015). The aim is to ensure inclusive, just, and peaceful societies, ending poverty and protecting the natural environment, by forging partnerships with the planet and its habitants through the public and private sector interventions.

Having keywords as the *five P´s* such as *People, Planet, Prosperity, Peace* and *Partnership,* this document objectively aims to reach the year 2030 ending poverty and hunger in all of their forms, protecting the planet from degradation, ensuring that all human beings will enjoy prosperous and fulfilling lives on a peaceful and inclusive society, all of this mobilizing all the necessary means to a strengthened global solidarity, including through sustainable consumption and production, taking urgent action on climate change (United Nations Assembly, 2015).

Figure 1. United Nations Sustainable Development Goals.

Note: From Department of Economic and Social Affairs, United Nations (https://sdgs.un.org/goals, accessed May 2021)

Together with FDI and *Population Growth*, the United Nations SDG´s and their indicators are the core of our study as we are going to group them by the TBL pillars.

2.2. The Triple Bottom Line concept

The Triple Bottom Line (TBL) concept has surged on the early 90's with Elkington (1994) with the objective to bring a new conceptualization and language sustainability in business. Since then, TBL has been used as a tool to assess sustainability policies and reporting under the scope of environmental quality, social justice, and economic prosperity by

several organizations. The main reason is that TBL concept makes it easier to assess the effects of business activities in society (McCartney & Rouse, 2004).

To celebrate the anniversary of the creation of TBL (Elkington, 2018), has reanalyzed its own creation by stating that if a car fails, then manufactures bring it back to solve the problems, as well of the reasoning he had when creating the TBL because this author understands that this concept must be reanalyzed, after 25 years. Having in mind the fact that poor management structures may lead to jeopardize lives everywhere and place at risk an all industry or sector (Elkington, 2018), *volunteers* to give the TBL concept a fine tuning, recalling it. And its conclusions are that, despite the fact that TBL concept has generated immense profit, and having the SDG´s forecast by UN by 2030 of over $12 trillion a year, the success of sustainability cannot be measured only on the scope of profit, standing that it must be also measured regarding the health of the planet as well as the wellbeing of billions of people, also concluding that some goals were clearly emphasized, compared with others and "while there have been successes, our climate, water resources, oceans, forests, soils, and biodiversity are all increasingly threatened. It is time to either step up — or to get out of the way." (Elkington, 2018, p 2-3).

This final statement said by a creator of one of the most important concepts of sustainability is a *wakeup call* to mankind and reinforces the urgency on making sustainability the *core* of all of our action, either as citizens, or as entrepreneurs, scientists, or politicians.

Regarding this concept and the amount of research using it such as Costanza et al. (2016), we may conclude that it is an actual concept and – therefore - it will be always present in this study. Grouping the SDG´s on the TBL is – therefore – supported by literature and it will be part of the procedure in this study.

2.3. How Sustainability has been reported

Reporting sustainability has been a long, tough journey due to the antagonization of ideas, ideals, and interests. In this sense Gray and Milne (2002), presented a vision about the actual discussion that shows the fact of sustainability reporting is actually being mostly a volunteer act from companies - referring to GRI reporting – and stressing the fact of the existence of conflict between the companies financial interests *versus* the sustainable development issue (Gray & Milne, 2002). This authors also states that business and accounting communities' efforts in the area have been puzzling and even considering the good intentions lying behind, the danger of doing more harm than good is a possibility. Also, efforts made so far by industry are not enough as any substantive moves toward sustainability already made collide with the growth seeking - regarding environmental measures - as also the reduction of disparities between poor and wealthy, collides with a successful capitalist organization. The inevitable question arises on everybody's minds regarding this subject and Gray and Milne (2002), formulates it on a clear manner; "*Is the future safe in the hands of business*?". If so, then society has the right to see "…*a) very widespread adoption of environmental, social and sustainability reporting by all major companies; and (b) such reporting to be of the highest standards",* and that is not the case in none of these situations.

Environmental and economic violations are widespread around the globe and well known from public, and the BP oil spillage accident on the Caribbean Sea, the ENRON scandal, deforestation in Brazil for intensive agriculture and deforestation in Indonesia for palm oil extraction purposes, the EXXON Valdez oil spillage on Alaska back on the late 80´s, and many other violations on environment, economic and social matters are the factual proof

about what these authors refer to. Some of these accidents were researched by different authors (see for example Cho, 2009 and Blanc et al. 2019).

Also, the very well-known discrepancy on wealth is an actual reality. Poverty is spreading wide, even in working people, on several developed continents. Many actual reports such as the OXFAM (2021) regarding poverty, are stressing the fact that Covid19 has increased this gap. So, sustainability was never so urgent as in today´s reality.

On the accounting reporting of sustainability point of view, Gray and Milne (2002), realized that the approach of the TBL analysis is not the best way to act as the financial performance will always prevail comparing with the environmental factor. So, it cannot be considered a reporting of TBL, but a *financial bottom-line* report. In this sense, is possible to understand sustainability as a:

Broader ecosystem-based approaches that require an understanding of cumulative environmental change, and most likely, new, and alternative decision-making arrangements and institutions. To give effect to sustainability, calls have come for cumulative effects assessments of economic activity, for ecological footprint analyses, for precautionary decision-making principles, and for more just, democratic, and participatory decision forums. All of these approaches represent profound challenges to existing capitalist systems, business behavior, and accounting and reporting (Gray & Milne, 2002, p.3).

The GRI reporting[1] is referred by Gray and Milne (2002) as *"yet to fully embrace",* considering the fact that guidelines are still failing addressing sustainability on a direct manner and predicting that it will be unlikely to ever be a sustainability report, concluding that:

[1] GRI is a multi-party initiative with organizations like NGO´s and large companies. Its goal is to derive, spread and encourage the use of voluntary guidelines on sustainability reporting. (See www.globalreporting.org, accessed in October, 2021)

> The real danger we face is that there is lot of talk about something which nobody is doing, can do or wants to do sustainability reporting. This term, though, is used interchangeably with something which everybody could do -triple bottom line reporting- but virtually nobody is doing! And what are organizations doing? Well, most of them are doing nothing at all and free riding on the backs of the few leading reporters who have yet to even reach the foothills of real triple bottom line reporting (Gray & Milne, 2002, p. 6).

Regarding *social and environmental reporting* (SER) and giving an update of the actual discussion, Mata, Fialho and Eugénio (2018), have analyzed the 20 leading accounting journals recognized as leading research editors on social and environmental accounting (SEA), between 2006 and 2015. Excluding papers that did not have as keywords *Environmental Disclosure* (ED)' and *Environmental Reporting* (ER), 342 papers were identified. However, only the ones with those keywords as objectives of the study were finally select (161 papers).

The findings were that most of the disclosed environmental reporting is voluntarily given by corporations, either on the form of reports or other means of communication, prevailing the legitimacy and stakeholder theories as perspectives on the analyzed studies, for the practices of SER. As research method on these studies, the analysis of sustainability reports, press releases, website, and CEO declarations were the most common tool used. Considering this, the content analysis is the most common method used on this field of study and Mata et al. (2018) propose that it would be right to combine this method with other methodologies to approach the subject, such as interviews.

In the same direction it is reported the existence of a wide range of tools to assess pollution, resource use and sustainability in several different areas such as industrial production, green consumerism to areas such as nature conservation, biodiversity and ecosystem services (M. Patterson, McDonald, & Hardy, 2017).

Despite the existence of these tools, accounting frameworks and models, sustainability assessment is not an easy task, and the reason is the different ways sustainability can be interpreted as it can have ecological, economical, thermodynamic, and ecological-economic and public policy interpretations. However, independently of the way of how interpreting sustainability, underlies the need for quantitative indicators that will make us understand the *wide effects* of an action and not only the *on-site*, immediate, environmental impact. To understand this need for quantitative indicators, an example is given by (M. Patterson et al., 2017) and it is the consequence of the introduction of a pesticide on a specific place. If it has none or residual influence on this site of application, the true is that, entering the food chain, it can indirectly reach to consequences more profound, durable, and critical than the direct, immediate, impact on the field previously used.

At this point, we came to a crossroad either because sustainable reporting is a mainly volunteer act from organizations, with selected information disclosed from themselves, or the fact of this reporting issue and discussion being far from ending, due to complete antagonized positions, even on the way how to approach the subject.

Concluding, GRI reporting, being predominantly a volunteer act, is not objective as this study intends to be since data inserted is given by the companies themselves. Also, information given trough GRI on African sub-Saharan countries is residual, compared with other latitudes.

In this sense, it is necessary to have objective, indisputable and factual data regarding sustainability. This kind of data is not given by companies, but from organizations such as the UN and the World Bank and it will be – therefore – the data we will use on this study.

2.4. How Sustainability has been assessed

Regarding the sustainability assessment, by the end of the last century it was already understood the need of using various tools such as regional information systems, scenarios, and integrated assessment tools under varied assumptions for human development and environment. In this sense, the National Research Council (NRC) stated the following:

> The purpose of these tools is not to predict the future, but rather to structure and discipline thinking about future possibilities in the light of present knowledge and intentions. They can be used to explore what contingencies society may face, assess how well society is prepared to deal with those contingencies, and identify indicators for which society should be watchful (National Research Council, 1999, p.5).

In this sense, it is proposed by this Council the use of four approaches; I – National capital accounts – in order to assess the national resources (Natural, human and produced capital) ; II – policy assessments – through data gathering, lessons could be learned and deviations on policies implemented could be corrected; III – Monitorization of trends and transitions – the progress that has been made analysis through the study of demographics, consumption patterns, and energy-intensity and pollution; IV – surprise diagnosis - the search for and evaluation of an unanticipated indicator (e.g., the stratospheric ozone hole), are crucial on the pinpointing of mistakes and omissions of analysis. Underlying, this definition already includes ecological, economic, and social criteria challenges (National Research Council, 1999, p.5).

2.5. How sustainability has been studied

As well as Corporate Social Responsibility (CSR)[2], sustainability as not yet been systematically addressed by the major publications specialized on International Business Management and in mainstream management journals. According to Kolk and van Tulder (2010), more than 97% of the published articles on main management journals on the last two decades, do not refer to CSR and sustainability at all. These authors also refer that MNE´s are on the front line to address sustainability issues while running overseas, due to the increase of global problems such as climate change, poverty, and human rights violations. These enterprises have a global influence due to their activities that will force them to approach stakeholders and institutional issues, either at home, or in in the host country. The increase of interest about the sustainability factor is due to the campaigns of non-governmental organizations (NGO´s), pointing the negative implications of globalization in general. Kolk and van Tulder (2010) also refer, on an International Business point of view:

For MNEs, the 'modern era of globalization' thus entails a balancing act between the components that are part of their 'regular' internationalization strategies and broader corporate social responsibility (CSR) considerations. As a result, for example, entry strategies, subsidiary relationships, and the choice of country, product, and market portfolios, both upstream and downstream, involve complex decision-making processes in which a variety of trade-offs come to the fore simultaneously: economic, legal, ethical, environmental, and social. In that sense, the landscape of IB has changed, and CSR is something to be taken into

[2] The first definition of CSR was given by Howard R. Bowen, (1953), who stated that CSR is the *''obligations of businessmen to pursue those policies, to make those decisions, or to follow those lines of action which are desirable in terms of the objectives and values of our society.''*

account explicitly on the study of MNE´s, as part of the challenges to globalization or the quality of global capitalism and its institutions (Kolk & van Tulder, 2010, p. 2).

It is reasonable to conclude that the discussion about CSR and sustainability is on the agenda of International Business Management as it is a strong influence on all the management fields, and it cannot simply be disregarded.

On a study including a survey on 284 researchers on sustainability participating in the international research platform *Future Earth: Research for Global Sustainability,* as well on a literature review made, van der Hel (2018) concluded that it is necessary to have a more explicit engagement on a political and normative dimensions of sustainability research as four groups of respondents on the survey were identified and classified with completely different narratives to justify their work: the *transformative research* as telling the truth to decision makers, the *transformative research* as being itself a political act, the *responsibility for rigorous science*, and *humility on solutions potential.* Apart from this apparent non consensus about the meaning and the goals of their work, most of these respondents agree and/or strongly agree that scientists should actively seek solutions for sustainability challenges through their research, as well that it is their responsibility as researchers, to give their contribution to changes in society towards sustainability.

This study brings us to the overall discussion about sustainability and the political side as the answers to the survey were more diverse regarding the normative and political dimensions of sustainability research (van der Hel, 2018). The findings were:

While most respondents in this cluster agree that researchers in sustainability need to be transparent about their personal values and interests, they also find it important to seek an impartial position. Respondents appear to make a distinction between the way normative aspects affect the research process. While respondents recognize the value-laden decisions

that shape research agendas, the research process–in the view of respondents–should be free from normative aspects to the greatest extent possible (van der Hel, 2018, p. 252).

Regarding this point, the discussion is ongoing for the last 30 years and is equally far from ending as there are many understandings of how to assess this subject, including authors proposing *Sustainability Science* as an emerging discipline aiming to study the social, economic, and environmental pillars on the light of cultural, historic, and institutional perspectives. Also, the main challenges of this discipline should be the adoption of a more participative approach from different disciplines, on an integrated, comprehensive environment, as well as on better identifying problems affecting sustainability, on the reality of the actual transition (Sala et al., 2013). Citing the National Research Council (1999), these authors refer that, despite the fact of existing different definitions and interpretations of Sustainable Development (SD), there are factors commonly accepted such as "I – *What is to be sustained*? II – *What is to be developed*? III - *What is the relation between what is to be sustained and what is to be developed*? 4. *Over what scales in space and time are those relationships meant to hold*?" (Sala et al., 2013, p. 1658).

Regions and countries are not the same all over the world and some regions such as the Sub-Sahara faces high level of poverty, hunger, health risks, gender inequalities, and illiteracy. In this direction, researchers have found the need for adequacy on the use of SDG indicators for each specific area or country. Diaz-Sarachaga, Jato-Espino and Castro-Fresno (2018) have highlighted the need to analyze SDGs through the geographical scope, to better recognize and understand the achievement of goals with a lower performance. And this analysis goes also using several extant Indices such as The Human Development Indices (HDI), the Gender Development Index (GDI), the Gender Inequality Index (GII), the Living Planet Index (LPI), the Environmental Sustainability Index (ESI), Human Wellbeing Index (HWI) and Index of Sustainable Economic Welfare (ISEW). These indicators, among related ones

– combined – divide the SDGs on the three main pillars of sustainability, creating an integrated framework that connects and correlates the social, environmental, and economic factors. These authors consider that data used on countries provides a unidimensional value that aggregates these three dimensions, and they are essential to make performance comparisons among countries in the long term (Diaz-Sarachaga et al., 2018). However, it is considered that these metrics are not appropriate to understand the multi-country interactions on each nation.

In this study, we are going to understand the impact of FDI on Sustainability so there is no potential hazard of incurring in wrong assessments in this field as we are not going to analyze multi-country interactions.

The clustering of the 17 SDGs has become The *Overarching Goal*, according to Costanza et al. (2016), as they consider that SDGs cannot be achievable without a sustainable wellbeing at a global dimension and for that, they propose a hybrid wellbeing indicator, composed by *the* three pillars, and create an aggregate Sustainable Wellbeing Index (SWI). The creation of SWI and the linkage of the SDGs with it is the author´s proposal, to a dynamics model that allow us to track and control flows and stocks of capital (either natural, social, human, or built), as well as make predictions in different realities. So, a disruptive, dynamic and integrated system model to include SDG´s and wellbeing indicators is needed (Costanza et al. 2016).

In this sense, the report from the ESCAP UN organization (United Nations, 2015 - p.23) is clear regarding the need to integrate the three dimension of Sustainability on the discussion when it refers:

> Integration of the three dimensions of sustainable development is not merely an aspiration, it is vital for the survival of societies, ecosystems, and economies. In

> addition to the tools and concepts discussed in this publication, there will need to be shifts in attitudes, behaviors, and knowledge competencies. Attitudinal shifts are a result of profound alterations in thinking and perspectives. The first attitudinal shift necessary to achieve sustainable development is recognition of the need to move from a short-term view to a long-term view of the economy, society and environment (United Nations, 2015, p. 23).

In other direction (Lafortune, Fuller, Moreno, Schmidt-Traub, & Kroll, 2018) on the 2018 SDG index consider that the 17 SDGs are the final overarching framework and, therefore, there is no need to re-clustering and also refer the fact that the SDG Index and Dashboards uses the 17 SDG´s as the final overarching conceptual framework itself. The report does not re- organize goals into sub-categories such as the 5Ps (People, Planet, Prosperity, Peace and Partnership) or between economic, social, environmental and governance related goals. So, it is a reality that there are no agreements on the re-clustering of these goals.

Despite that, it is our understanding that for this specific study and measurements of hypothetical changes, correlations and influences, it is advisable to use de clustering of the SDG´s as per Costanza et al. (2016).

Many studies have approached the discussion in different ways and procedures, but all have shown the same concern in understanding the dynamics of the relation between FDI and several variables concerning poverty, economy, industry, transfer of knowledge, environment, and others. So, it is undisputable that this discussion is important and it's on the scope of many investigations. Table 1 show us some studies that allow us to understand the status of the overall discussion.

Table 1

Literature Review

Author/year	Sample	Aims/Purpose	Results/Conclusions
Campos and Kinoshita (2002)	25 Central and Eastern European and former Soviet Union transition countries	FDI impact on economic growth and technology transfer	FDI has a positive and significant impact on economic growth and technology transfer
Abdouli and Hammami (2017)	17 MENA countries (Middle East and North African Countries)	The impact of FDI and environmental quality on economic growth	FDI inflows and capital stock boosts the economic growth process in most of these countries,
Gohou and Soumaré (2012)	African Continent	The relationship between FDI inflows and poverty reduction	Positive causal relationship between FDI and welfare.
Iamsiraroj and Ulubasoglu (2015)	108 published studies with worldwide data (140 countries)	Effects of FDI on economic growth	FDI positively affects economic growth.
Mazenda (2014)	South Africa	The effect of FDI on South Africa economic growth	FDI, REXCH and DEBT have a negative impact on growth. On other hand, Domestic Investment (INVE) has a positive impact on growth.
Ahmad et al. (2019)	Association of Southeast Asian Nations (ASEAN) and the South Asian Association for Regional Cooperation (SAARC) economies	The impact of FDI on welfare and poverty reduction	Positive, strong, and significant relationship between variables but significant differences between the ASEAN and SAARC countries
Noorbakhsh, Paloni and Youssef (2001)	36 developing countries from Africa, Asia, and Latin America	FDI and human capital on developing countries	FDI inflows is statistically affected and determined by human capital. Countries that only rely on natural resources and low cost/low skilled workforce to attract FDI, will face difficulties to insert that investment into a chain of high value-added as also are exposed suffer a slower economic growth.
Jun, Zakaria, Shahzad and Mahmood (2018)	China	Effect of FDI on pollution	FDI increases domestic production which – consequently – increase fossil burning. On a short and on a long term, FDI positively affects the emission of these gases, in particular CO2
Singhania and Saini (2021)	21 developed and developing countries with high CO2 emissions	The pollution halo or pollution haven hypothesis	Existence of a significant positive impact of FDI on environmental degradation

2.6. What is FDI

According to Patterson et al. (2004) at the International Monetary Fund (IMF), FDI has the following definition:

> A category of international investment that reflects the objective of a resident in one economy (the direct investor) obtaining a lasting interest in an enterprise resident in another economy (the direct investment enterprise). The lasting interest implies the existence of a long-term relationship between the direct investor and the direct investment enterprise and a significant degree of influence by the investor on the management of the enterprise (Patterson et al., 2004, p.19).

It is emphasized the fact that statistics that measure the operations of the foreign affiliates of multinational enterprises - such as sales, employment, and assets do not form part of the traditional balance of payments and international investment position statistics, which capture only the net investment of the direct investor in foreign affiliates. Patterson et al. (2004), also emphasize that Direct Investment (DI) is not only the initial transaction that establishes the FDI relationship through the direct investor and the direct investment enterprise. It is also the existence of all the following capital transactions between these, and the enterprises stablished in different economies.

> Direct investments may take the form of greenfield investment, where the investor starts a new venture in a foreign country by constructing new operational facilities; joint venture, where the investor enters into a partnership agreement with a company abroad to establish a new enterprise; or merger and acquisition, where the investor acquires an existing enterprise abroad. The IMF suggests that investments should account for at least 10 percent of voting stock to be counted as FDI. In practice many

countries set a higher threshold. Many countries fail to report reinvested earnings, and the definition of long-term loans differs among countries (Patterson et al., 2004, p.19).

2.7. FDI and its Impact on Environment, SDG´s, Human Capital, Technology Transfer and Economic Growth

There has been a strong discussion for the last decades about the impact of FDI inflows in host countries, with different findings, sometimes with antagonistic directions. Regarding its impact on sustainability, we will analyze some studies that have related FDI with some features connected with sustainability such as the SDG´s, welfare, technology transfer, environment, human capital, and economic growth.

2.7.1. FDI and the SDG´s

Concerning the effects of FDI on SDG´s (Aust et al., 2020) have studied 44 African countries over the period 2014 to 2017 and retrieving FDI time series from United Nations Conference on Trade and Development (UNCTAD) as well as SDG scores from the Africa SDG Dashboard Index 2018. By applying a multivariate analysis and order *probit* model, the results were that, on a general way, FDI leads do better achievements on the SDG scores, although the results were different in North Africa and lower East Africa, with better scores on the first area. Other findings on this study were that FDI increases the chance of better values in SDG´s 1, 7, 9, 14 and 16. Poverty reduction, increase of people with clean and affordable energy, better industry, innovation, and infrastructures as well as better scores on live bellow water and peace, justice and stronger institutions are the positively influenced SDG´s. On a different direction, findings as shown a negative relation between FDI and SDG

13 (Climate action). FDI plays an important role on the achievement of the SDG´s in this region, particularly on North Africa, where the results were more robust. Results were even stronger in countries with a political and civil rights stability (Aust et al., 2020).

2.7.2. FDI and economic growth

On an empirical study assessing the impact of FDI on economic growth in the 25 Central and Eastern European and former Soviet Union transition countries during the 1990-1998 period, Campos and Kinoshita (2002), concluded as main finding the direct positive relation between both variables, which meant that FDI has a positive and significant impact on economic growth as theory predicts. However, another finding on this study was the pure technology transfer that has occurred, with benefit to the host countries.

Concluding, FDI is a crucial variable in all the equation to explain growth in transition economies, although it is not considered or even ignored by the empirical literature. A suggestion out of this study is a better measurement for different geographical distances, as also the consideration of natural resources abundance to better measure the effects of FDI.

Regarding African countries, Gohou and Soumaré (2012), have analyzed the relationship between FDI inflows and poverty reduction on this continent. Using variables such as GDP *per capita* and welfare dimensions based on the HDI (Human Development Index) from UNDP (United Nations Development Program) composite that measures three basic aspects of human development such as *health, knowledge,* and *standard of living* and by using the Granger Causality Wald test, they have found a positive causal relationship between FDI and welfare. However, this positive relation was not equal to all countries as in more developed ones such as in Northern and Southern Africa, where the effect was not so observable, compared with Central and Eastern African Countries.

On a literature review analyzing 108 published studies with worldwide data (140 countries), the effects of FDI on economic growth, and on a spanned period between 1970 to 2009, Iamsiraroj and Ulubaşoğlu (2015), concluded that FDI positively affects economic growth. However, a mixed distribution on the results concerning the relation *FDI/economic growth* was 43% positive and statistically significant and 26% was positive but statistically insignificant as also 17% were negative and statistically significant, and 14% was negative and statistically insignificant, shows that the theoretical predictions on this relation are far from having effective support from data. So, these authors refer that the issues related with this relation "such as spillovers, technology diffusion, labor training and skill acquisition, might be merely "wishful" thinking, rather than pointing towards the "real" effects of FDI on growth" (Iamsiraroj & Ulubaşoğlu, 2015, p. 200).

Other studies have concluded on the opposite direction, considering that FDI has no impact on economic growth or that it has no effect at all on this variable. In this sense, Mazenda (2014), studying the effect of FDI on South Africa economic growth for the period of 1980 to 2010, using variables such as *real gross domestic product* (RGDP), *foreign direct investment* (FDI), *domestic investment* (INVE), *real exchange rate* (REXCH) and *foreign marketable debt* (DEBT), has concluded that on the long run results showed that FDI, REXCH and DEBT have a negative impact on growth. On other hand, this author found that Domestic Investment (INVE) has a positive impact on growth.

On the Asian continent, a similar study was conducted by panel and pool model specifications (Ahmad et al., 2019) where the impact of FDI net inflows was analyzed with welfare and poverty reduction in the Association of Southeast Asian Nations (ASEAN) and the South Asian Association for Regional Cooperation (SAARC) economies. Analyzing extant data from 1990 to 2014, using FDI net inflows *per capita* and the United Nations Development Program´s (UNDP) Human Development Index (HDI) as main variables, the findings

were the existence of a positive, strong and significant relationship between these variables but – at the same time – significant differences between the above relationship and the ASEAN and SAARC, where the impact of FDI was significantly observed on this last one so the mentioned impact is more significant in the less developed and poor countries of Asia.

2.7.3. FDI and technology transfer

Campos and Kinoshita (2002), also refer to a common discrepancy between the economic theory and the effective econometric evidence as they concluded that empirical literature has not succeeded in stablishing "a significant positive impact of FDI on the rates of economic growth of host countries*"* Campos and Kinoshita (2002). Regarding this subject and referring to the Central and Eastern European and former Soviet Union transition countries, the authors have provided a possible reason for that, and it is the fact that FDI is equated to Technology Transferred:

> FDI encompasses an array of arrangements that goes well beyond pure technology transfer. The transition economies may be the right context in this case. At the onset of the transition (from centrally planned to market economy), these economies were far away from the international technological frontier. Yet, differently from many developing countries, they started out with a complete industrial structure and a relatively educated work force. Other advantages of these economies are the proximity to richer European markets and that most embarked on comprehensive privatization processes at the time when FDI was starting to peak on a world-wide scale. Hence transition economies have the "enabling environment" that lacks in many developing countries but share their long distance away from the world technological frontier. It is this combination of potential gains and favorable conditions to realize these gains that, we

argue, makes the transition experience an excellent testing ground for the impacts of FDI on growth."(Campos & Kinoshita, 2002, p. 2-3).

In conclusion, the impact on the technology transfer due to FDI inflows was registered on these countries, but the specificity of the political and social reality brings us to the question if it is possible to generalize this positive impact. These countries had an industrial structure and a valuable human capital due to their education. Also, the proximity to European countries contributed to this effective technology transfer. So, although this technology transfer due to FDI was successful, these unique conditions cannot be simply transferred to other geographical, political, social, and economic realities.

Benefits of FDI on enterprises have been widely studied, specifically regarding the subject of innovation towards sustainability. In this sense, Melane-Lavado, Álvarez-Herranz and González-González (2018) have conducted a study on 4667 Spanish SMEs, on the period between 2004 and 2013, and using a binary logit model, which makes the comparison of SMEs with FDI and equivalent SMEs without FDI, over time and – consequently - exposed to changes on economy. Findings were that technological supply combined with the fact of being medium size companies, located on a medium-high technology sector, are predictor of positive spillovers. Nevertheless, there is a stronger factor over the above-mentioned ones, and it is the intervention of public funding trough effective system of protection on recession periods, which makes them more attractive to FDI and creating conditions for companies to likely give a better focus on the innovative process on sustainability.

2.7.4. FDI and environment

On an empirical study regarding 17 MENA countries (Middle East and North African Countries), Abdouli and Hammami (2017) analyzed the impact of FDI Inflows and

environmental quality on economic growth on the period 1990-2012. Using several statistic methods, the findings were that FDI inflows and capital stock boosts the economic growth process in most of these countries, created new jobs and increased technology transfer. However, the findings made by these authors also shows that economic growth is negatively affected by environmental degradation in 10 of these countries, referring that pollution may be responsible for directly decreasing productivity due to health problems in manmade capital and labor, provoked by polluted air or water deterioration.

On a study applying the wavelet tool and on the period between 1982 to 2016, Jun, Zakaria, Shahzadm and Mahmood (2018), have studied the effect of FDI on pollution in China, specifically on carbon dioxide and sulfur dioxide emissions. The findings were that on a short and on a long term, FDI positively affects the emission of these gases, in particular CO2, after a robustness analysis using a spectral causality test. These authors also refer that FDI increases domestic production which – consequently – increase fossil burning in domestic industries.

Also regarding Environment Jun et al. (2018) refer to two different hypothesis concerning FDI effect on the host countries.

1 - The *pollution haven hypothesis* - To attract FDI, local authorities create a pollution heaven by lowering their environmental standards and regulation

2 – The *pollution hallo hypothesis – FDI* through technology transfer and dissemination of best management practices on the host countries, creates pollution halos to reduce pollution by influencing positive externalities, which means that environment gains with this economic activity.

Another effect that might occur with FDI is the *income effect,* where populations with increased income due to FDI inflows, demand for more higher standards of living and therefore, for higher environmental standards and stronger regulations (Jun et al., 2018).

Regarding the *pollution halo* or *pollution haven* hypothesis Singhania and Saini (2021), have concluded for the existence of a significant positive impact of FDI on environmental degradation, after studying 21 developed and developing countries with high CO2 emissions, on the period between 1990-2016. Using dynamic panel data estimations, applying a system generalized method of moments on these countries, these authors found evidence of the existence of *pollution haven* hypothesis, on the developing countries analyzed. The final recommendation on this study stresses the fact that policymakers must aim on helping friendly environment technology transfer, to reduce their level of emissions on the host countries, since FDI inflows improve economic performance.

In fact, literature and findings are not unanimous regarding the effect of FDI in pollution in host countries as some studies show that it increases pollution and others have concluded by the opposite direction.

2.7.5. FDI and human capital

On the relation between the FDI inflows and human capital on developing countries, the discussion is also far from ending. Nevertheless, an empirical study by Noorbakhsh, Paloni, and Youssef (2001), concluded that FDI inflows is statistically affected and determined by human capital, considering human capital as one of the most important factor when deciding where to go abroad. Also, this importance has been increasing trough time. The results were also in line with other studies regarding the importance of other factors to attract FDI such as the efforts made by host countries to stablish a stable macroeconomic

environment, liberalization policies, availability of energy, growth of domestic markets, an overall supportive business environment and the last but not the least, the availability and cost of labor. So, in conclusion, among several factor that influence the decision of investing abroad, one of the most important is *human capital* since countries with an improved local skill and with policies to increase the human resources capabilities, are more attractive to FDI inflows. In other hand, countries that only rely on natural resources and low cost/low skilled workforce to attract FDI, will face difficulties to insert that investment into a chain of high value-added as also are exposed suffer a slower economic growth (Noorbakhsh et al., 2001).

2.7.6. FDI and the sustainable development goals (SDG´s)

The right FDI to achieve the SDG´s is also the object of a study conducted by Sauvant and Mann (2020) as these authors consider that there is a more appropriate FDI to do so and they call it *sustainable FDI.* To understand this concept, 150 instruments such as treaties, standards and codes prepared by key stakeholder were analyzed, aiming the relationships between FDI and the host countries. Four dimensions of sustainability were used; *Economic, Social, Environmental* and *Governance*. The analyzed instruments show the expectancies host countries have on FDI as well of what MNE´s, through their investment on these countries, expect to achieve there. The conclusions are for the existence of common FDI sustainability characteristics and emerging ones that can provide crucial information to various stakeholder's groups to achieve those SDG´s. So this *check list* of sustainable FDI reported by Sauvant and Mann (2020) is obtained by a broad consensus among all of the actors on the international business field and could provide them guidelines for a sustainable reality as identifying these factors might be an important contribution to the overall discussion of

international investment, inserting desirable FDI on the discussion as a "more generally, a broadly accepted indicative list of FDI sustainability characteristics, constructed around the common and emerging common FDI sustainability characteristics, gives direction to policy and legal development regarding the relationship between host countries and international investors" (Sauvant & Mann 2020, p. 951).

2.8. Population and the TBL

Population growth is a constant in most of the African countries and specifically on the Sub-Saharan ones. As per the World Bank (2021), population on the countries under analysis on our study has reached 1.3 billion people. The understanding of the impact of this factor on the TBL pillars is of the most importance as land, water, energy, and many other resources are scarce and their inexistence may bring populations to hunger, social convulsions and might be as well, the reason for the massive migration to developed countries that we are all facing and watching, daily.

On a study made in Rwanda - one of the countries of the population on the present study – by using a Multi-Scale Integrated Analysis of Societal and Ecosystem Metabolism (MuSIASEM) method (Imasiku & Ntagwirumugara, 2020), have analysed the constant population growth and density as well as environmental issues on a transition to a sustainable economy. The demand for food is increasing and food production faces the need of water for crops. Rivers are scarce in this country and dams for power plants control the levels of water.

While land remains equal, food, water and energy grow with population in a proportional way. Land is – therefore – the most critical resource and the other referred dimensions can be perfected to preserve it and it is on this sense that an ecologically sustainable development

approach should be the goal of attainment by all in Rwanda (Imasiku & Ntagwirumugara, 2020).

So, the energy–water–food–land *nexus* is related with population growth and is a case study for many years to come. In conclusion, it reasonable to state that population growth has its impact on ladn and food needs, food production, water resources and energy as well as in economy and society. Not only in Rwanda, but also in a general way, we can extend the same assumption.

2.9. Why Sub-Saharan Countries Except High Income?

African countries have specific SDG indicators as economic and demographic data are collected from censuses and surveys, with the help of international organizations, according to Aust et al. (2020) citing the SDG center for Africa and SDSN (2018). SDG´s indicators in Africa are scarce as only 37.8% are obtained through the official channels such as the above mentioned one and the United Nations Economic Commission for Africa, UNECA. However, a different approach on the extant data from the World Bank, which aggregates information coming from several quadrants and agencies, might bring to the discussion a more rich, observable data about the SDG´s in this specific part of the planet.

The choice of countries excluding high income concern to the fact that it is our understanding that hypothetical changes on the variables will be more easily observable during the period on analysis as these countries have a fragile social and economic structure as well of political, economic, and financial ones.

On a study in Sub-Saharan Africa (Amadu et al., 2021) concluded that the percentages of children stunting, wasted, and underweighted in the 31 countries in sub-Saharan Africa were 31%, 8% and 17%, respectively. These numbers are impacted by social and economic

issues such as the marital status of the mothers and the type of fuel that is used on the household to cook the meals for the enfants. For an individual living on the so-called *civilized/developed world,* these facts are almost on the edge of incredibility, but they are a reality that occurs and affects millions of people on these countries on a daily basis. All these factors (stunting, underweight, wasting, use of clean fuels and precocious marriage) are some of the indicators that compose the SDG´s – core of our study.

A regular, constant population growth is observed in these countries as on the time lapse under study the variation is very low (*Max* = 2.8%, Mi*n* = 2.7%) and these values might contribute to the robustness of the sample.

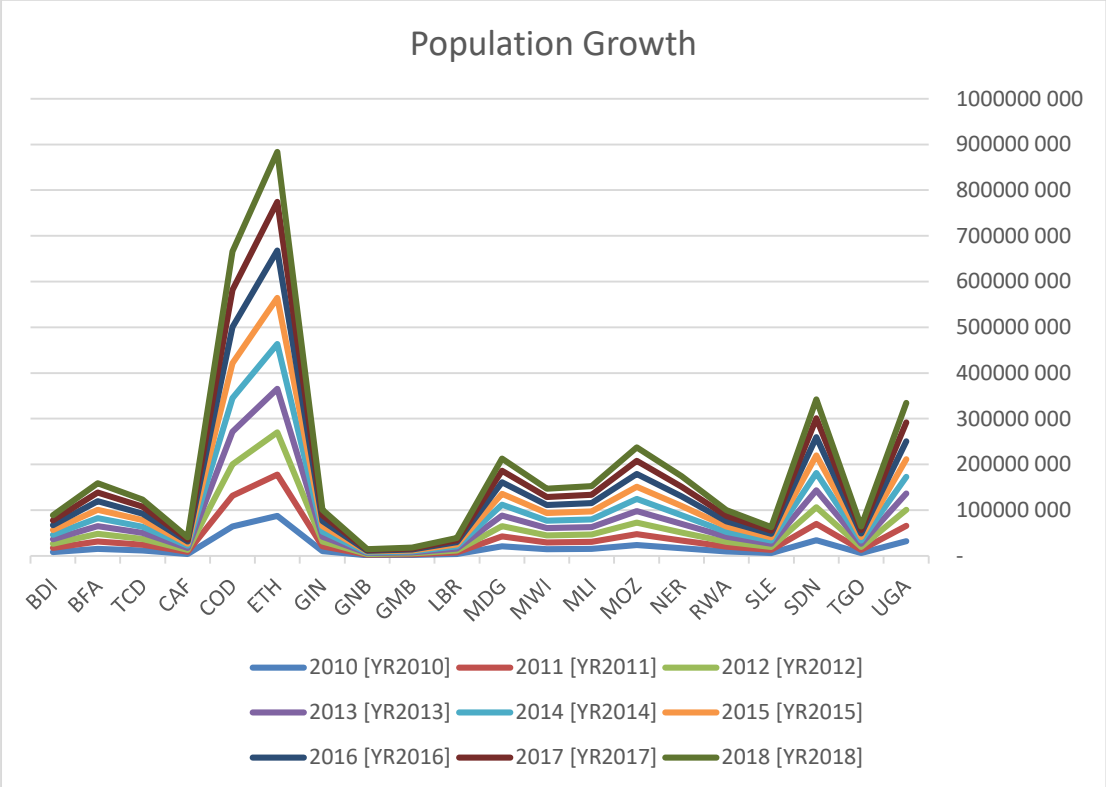

Figure 2. Population Growth.

Source: Population estimates and projections (https://databank.worldbank.org/source/population-estimates-and-projections# accessed in 05/10/2021)

As per figure 2, Ethiopia and democratic Republic of Congo are the countries with the highest population growth, on an average of 3 million people/year. Another noticeable fact is that all our sample are countries with constant growing population a trend that goes against *the flow* on most of the developed/developing countries, where this variable has been decreasing for thew last decades.

We can conclude that Sub-Saharan Africa is a *case study* comparing with other latitudes and regarding the conditions of live as they are much more difficult, where even the basic is always missing. Also, it is well known the nonexistence of competent governments on this region, with most of them being failed states, with no efficacy and therefore, with no social and economic structures or very weak ones.

3. Research Design and hypothesis

3.1. Objectives of the study

Sustainability is the word for the upcoming years and decades and not being aware of this problematic on a decision-making point of view is disregarding all the scientific evidence of global warming and the increase of social disappointment and poverty increase through all the planet. Both situations could bring us, as global society, to an endless road if we don´t act according to sustainable management and adopting sustainability policies, starting on the business/management sector, and going country and global wide. Alarming voices are coming from many social and scientific sectors as also from United Nations, through the constant speeches of awareness and need to change from its Secretary General.

In this sense, sustainability and business must walk *hand in hand* and every result or conclusion that might be brought to the overall discussion, could help us to go through the needed changes.

This is the overall objective for this study as we intend to use as independent variable one of the most important tools of international management (FDI) and try to understand its influence on the three pillars of Sustainability also known as the Triple Bottom Line (TBL), and they are the *Social, Environment* and *Economic* pillars, used as dependent variables. In order to have a higher amount of data, we also added *population growth* to the overall equation, trying to understand its impact on the relation between all the variables.

3.2. The Investigation Problem

Our investigation problem is to answer to the general question:

Is FDI caring for sustainability on sub-Saharan countries?

And the specific questions we have formulated based on that:

1 - Are the three dimensions of sustainability (TBL) increasing with FDI?

2 - Are each one of the dimensions influenced by the others or is influenced by population growth and FDI?

We intend to study the hypothetical influence of FDI on the three pillars of sustainability as well of the influence each other's and - on that phase of the study – adding the independent variable *Population Growth* as it might bring a richer set of results for the overall discussion.

3.3. Theoretical Frameworks

To achieve our objectives, we are going to use the Sala et al. (2013) conceptual Framework for SDG assessment.

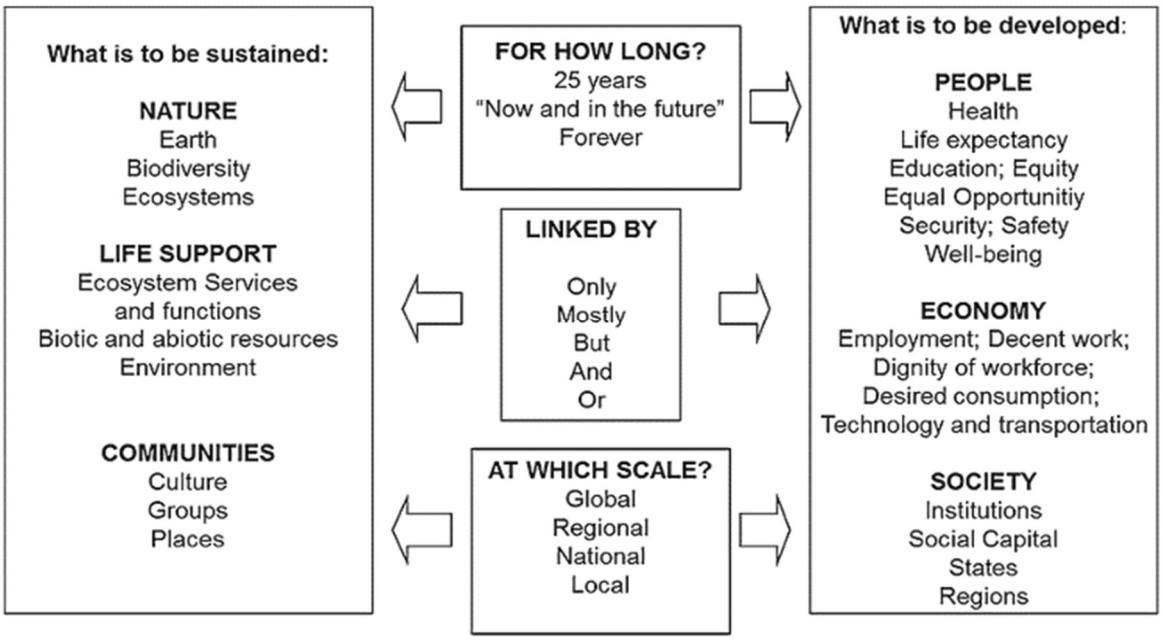

Figure 3. Framework for SD assessment

Source: From Sala et al. (2013), based on the NCR report (1999)

This framework integrates several factors such as *time period*, *objectives to achieve*, links between objectives and what is to be sustained, as well of the existence of an intervention scale as per Figure 3 indicates. So, this framework embraces all our procedures and inspires our own framework.

Regarding the grouping sustainability into TBL dimensions and its relation between their indicators, we will use the following framework from Figure 4. In this figure, it is observable the relation between several indicators with more than one pillar, as well as the pillars themselves, not with the same name as on TBL, but clearly representing the S*ocial, Economic,* and *Environmental* pillars.

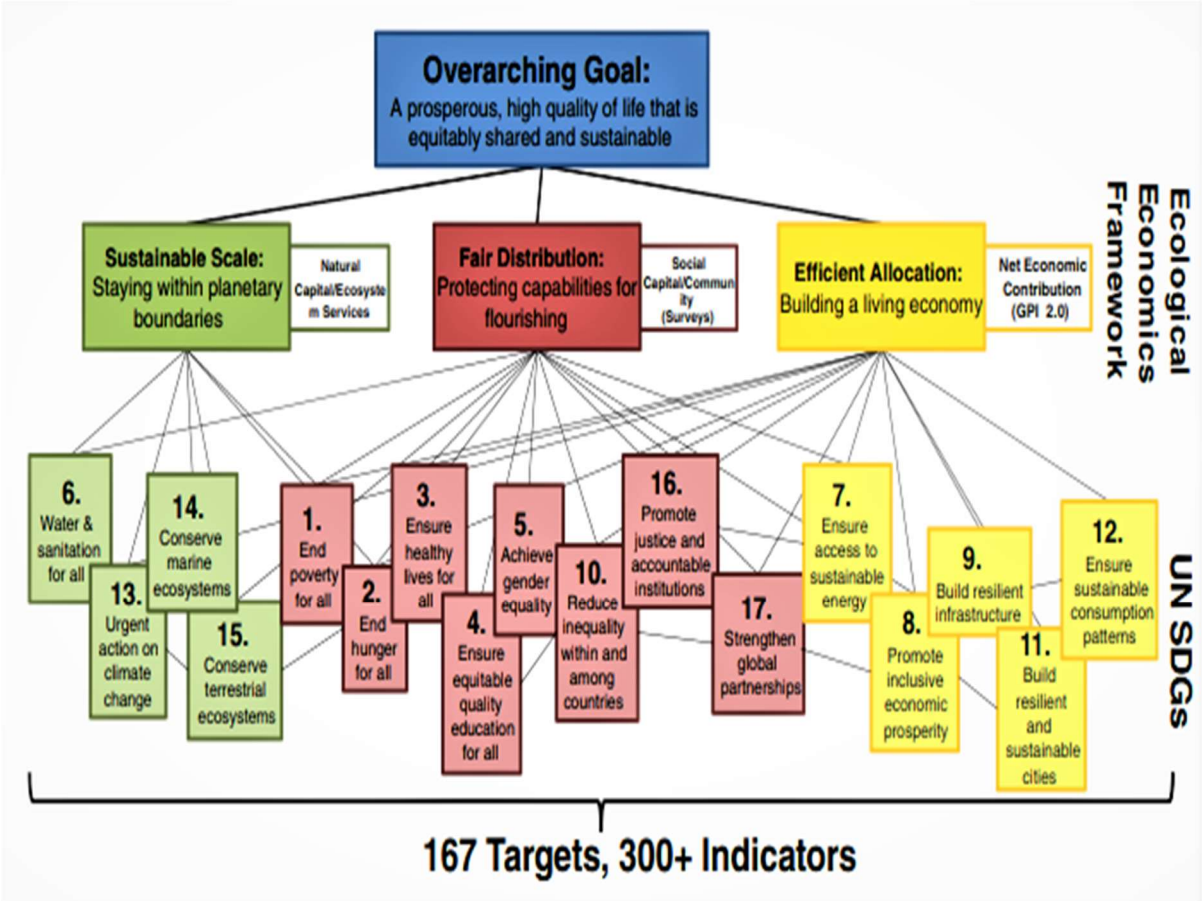

Figure 4. The overall framework for SDG grouping.

Source: From Costanza et al. (2015)

3.4. General Theoretical Framework and Hypothesis

According to the revised literature, we argue that FDI has a direct influence on the TBL pillars as well as we also argue that the TBL pillars influence each other and are influenced by the *population growth* variable. In this sense, the general theoretical framework is conceived as follows:

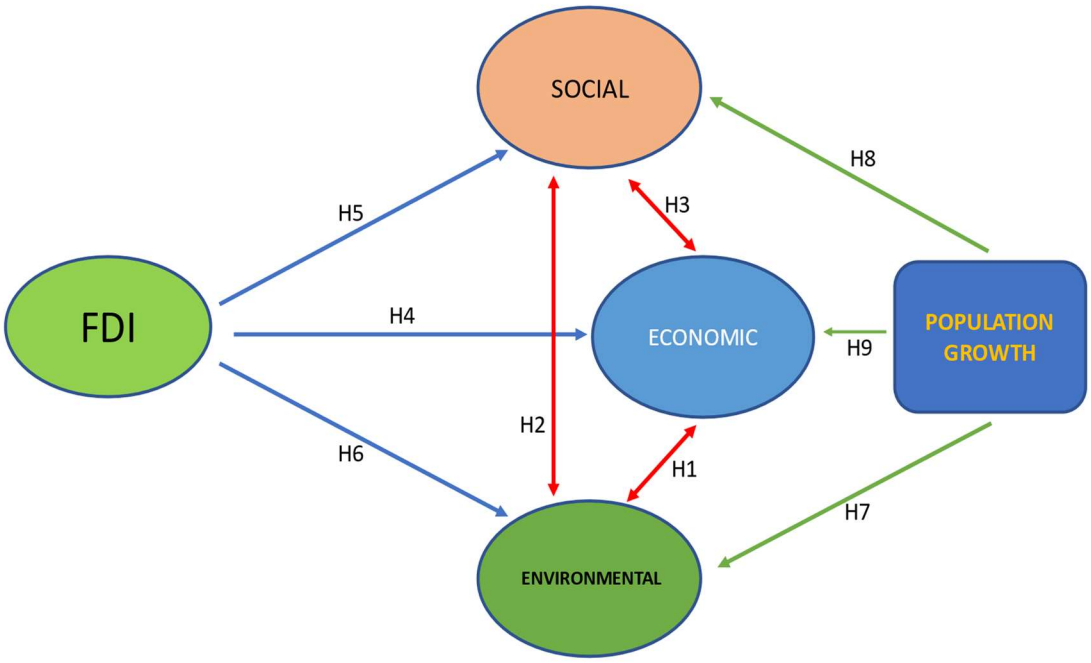

Figure 5. General theoretical framework

According to the revised literature and the designed theoretical framework, the hypothesis formulated are as per figure 5 and as follows:

H1: There is a positive relationship between the *environmental* pillar and the *economic* pillar on Sub-Saharan countries.

H2: There is a positive relationship between the *environmental* pillar and the *social* pillar on Sub-Saharan countries.

H3: There is a positive relationship between the *social* pillar and economic pillar on Sub-Saharan countries.

H4: There is an influence of FDI on the *Economic* pillar on Sub-Saharan countries.

H5: There is an influence of FDI on the *Social* pillar on Sub-Saharan countries.

H6: There is an influence of FDI on the *Environmental* pillar on Sub-Saharan countries.

H7: *Population Growth* positively influence the *Environmental* pillar.

H8: *Population Growth* positively influence the *Social* pillar.

H9: *Population Growth* positively influence the *Economic* pillar.

4. Methodology

In this section, it will be defined, analyzed, and described, the population, the sample, the measurement instruments and the performed procedures utilized during the investigation.

4.1. Population and Sample

Population is a group of elements with at least one common characteristic (Marconi & Lakatos, 2017). In the present study, the target population is composed of the Sub-Saharan countries, excluding high income. According to the country and area classification of the World Bank site (World Bank, 2021), this countries are Burundi (BDI), Burkina Faso (BFA), Central African Republic (CAF), Tchad (TCD), Democratic Republic of Congo (COD) Eritrea (ERI), Guinea (GIN), Gambia (GMB), Guinea-Bissau (GNB), Liberia (LBR), Madagascar (MDG), Ethiopia (ETH), Mali (MLI), Mozambique (MOZ), Malawi (MWI), Niger (NER), Rwanda (RWA), Sudan (SDN), South Sudan (SSD), Sierra Leone (SLE), Somalia (SOM), Togo (TGO) and Uganda (UGA).

However, due to the lack of data regarding several years in a considerable amount of the chosen indicators of sustainability, the sample is composed of 20 countries after eliminating Eritrea, Somalia, and South Sudan. The main concern to this action was to have a more robust, consistent data. This lack of data regarding Sub-Saharan countries is transversal to several studies such as the one from Aust et al. (2020), where the authors faced similar difficulties to have indicators with regular, annual data on this region.

4.2. Measurement Instruments

All data in this study came from the World Bank (2021). By that, we are saying that not only FDI, but all the indicators and *population growth* used on this study, were retrieved from this source which gathers information from several official UN institutions such as AIEA, UNICEF, IMF, UNCTAD, UNDP and others. The data bank available comprises several sets of indicators such as World Development Indicators, External Debt and Financial Flows, Statistical Capacity Indicators, Education Statistics, Gender Statistics, Health Nutrition and Population Statistics, as well as the SDG´s (see Appendix I) and their 404 indicators, where the ones we are using are included.

All the variables will be analyzed on this study only from years 2010 to 2018. Initially we intended to have a period of 10 years, but the overall missed information from the year 2019 concerning most of the indicators lead us to exclude this year. For the same reason, we have realized that earlier data than 2010 was also missing from many countries of the sample. The occurrence of a major, worldwide economic, and financial crisis back in 2008, might also have altered the regular flow of FDI, so the understanding that values *post* crisis will be more regular/accurate, is well founded. As we are analyzing some data previous to the SDG implementation, this source matches the purpose of the study so the selection of data will be precise for each one of the countries on our sample.

4.2.1. FDI assessment

Data on equity flows are based on balance of payments data reported by the International Monetary Fund (IMF). Foreign direct investment (FDI) data are supplemented by the World Bank staff estimates using data from the UNCTAD and official national sources. The internationally accepted definition of FDI (IFM, 2009), includes the following components:

equity investment, including investment associated with equity that gives rise to control or influence; investment in indirectly influenced or controlled enterprises; investment in fellow enterprises; debt (except selected debt); and reverse investment.

The IMF suggests that investments should account for at least 10 percent of voting stock to be counted as FDI. In practice many countries set a higher threshold. Many countries fail to report reinvested earnings, and the definition of long-term loans differs among countries. BoP refers to Balance of Payments. Sum is the used Aggregation Method, and the Periodicity is Annual (World Bank, 2021).

4.2.2. Assessing Population Growth

Population Growth data was also obtained by the WB (2021). The statistical *criteria* used by this organization was as follows:

Total population is based on the *de facto* definition of population, which counts all residents regardless of legal status or citizenship. The values shown are midyear estimates. Data was obtained by; (1) United Nations Population Division. World Population Prospects: 2019 Revision, (2) Census reports and other statistical publications from national statistical offices, (3) Eurostat: Demographic Statistics, (4) United Nations Statistical Division. Population and Vital Statistics Report (various years), (5) U.S. Census Bureau: International Database, and (6) Secretariat of the Pacific Community: Statistics and Demography Program (World Bank, 2021).

4.2.3. The grouping of the SDGs in social, economic and environmental pillars

This factor has been under discussion for a while and in this sense Costanza et al. (2016), have investigated different methods on relating SDGs to measures of sustainable

wellbeing that might be the trigger for a global societal change. Pointing the correct direction is so important as following the SDGs and respective indicators so Costanza et al. (2016) emphasize the importance of creating aggregated indicators on the overall process (Table 2).

Table 2

The 17 SDGs Clustered Under the Three Elements of Sustainable Wellbeing

Efficient allocation: building a living economy
Goal 7. Ensure access to affordable, reliable, sustainable, and modern energy for all
Goal 8. Promote sustained, inclusive, and sustainable economic growth, full and productive employment and decent work for all
Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
Goal 11. Make cities and human settlements inclusive, safe, resilient, and sustainable
Goal 12. Ensure sustainable consumption and production patterns
Fair distribution: protecting capabilities for flourishing
Goal 1. End poverty in all its forms everywhere
Goal 2. End hunger, achieve food security and improved nutrition, and promote sustainable agriculture
Goal 3. Ensure healthy lives and promote well-being for all at all ages
Goal 4. Ensure inclusive and equitable quality education and promote life-long learning opportunities for all
Goal 5. Achieve gender equality and empower all women and girls
Goal 10. Reduce inequality within and among countries
Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
Goal 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development
Sustainable scale: staying within planetary boundaries
Goal 6. Ensure availability and sustainable management of water and sanitation for all
Goal 13. Take urgent action to combat climate change and its impacts
Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development
Goal 15. Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Source: According to Costanza et al. (2016)

4.3. Procedure

At this point, we are now going to understand the *criteria* utilized for the selection of the SDG´s, the procedures to homogenise values on the indicators, on the SDG´s and as well on FDI, the TBL pillars and Population Growth. The statistical description and methodology used to obtain the variables is also in this section

4.3.1. The SDG indicators and the selection criteria

For the TBL, we have initially intended to use all the World Bank SDG indicators and they were 404 (World Bank, 2021). After an initial analysis of this indicators, we verified a considerable amount of omitted values, with countries with almost nonexistent data regarding some of the excluded indicators, yearly basis.

In this sense, and similar to the study of Aust et al. (2020), we have excluded a considerable amount of indicators. As result, we ended up with 34 indicators that will be composing only eleven SDG´s, instead of the original 17 and the reason is the above referred exclusion of indicators, due to nonexistent data (see Table 3).

As per Table 4, some indicators show the specific reality of the countries on the sample as they have values that are worrisome for the standard values on developed or developing ones. Starting with *Adolescent fertility rate* (I4) which has a mean value of 119.11 (*SD* = 39.65) when, for example, in the EU it was 8.739 in 2019, according to the World Bank (2021). *Incidence of tuberculosis* (I6), is, once more, a reality on these countries (*n* = 180, *M* = 206.66, *SD* = 127.76). However, the standard deviation is remarkably high, which means that there are some countries with control of this disease policies and others with lack of it.

Table 3

Distribution of Indicators by SDG

Goal	Indicator Description
SDG2 - Zero Hunger	I1. Cereal yield (kg per hectare)
	I2. Prevalence of stunting, height for age (% of children under 5) *
	I3. Prevalence of undernourishment (% of population) *
SDG3 - Good health and well being	I4. Adolescent fertility rate (births per 1.000 women ages 15-19) *
	I5. Immunization, measles (% of children ages 12-23 months)
	I6. Incidence of tuberculosis (per 100.000 people) *
	I7. Maternal mortality ratio (modelled estimate, per 100.000 live births) *
	I8. Mortality from CVD, cancer, diabetes or CRD between exact ages 30 and 70 (%)*
	I9. Mortality caused by road traffic injury (per 100.000 people) *
	I10. Mortality rate, under-5 (per 1.000 live births) *
	I11. Mortality rate, neonatal (per 1.000 live births) *
	I12. Prevalence of HIV. total (% of population ages 15-49) *
SDG4 - Quality Education	I13. School enrolment, primary and secondary (gross). gender parity index (GPI)
SDG5 - Gender Equality	I14. Proportion of seats held by women in national parliaments (%)
SDG6 - Clean water and Sanitation	I15. People practicing open defecation (% of population) *
	I16. People using at least basic drinking water services (% of population)
	I17. People using at least basic sanitation services (% of population)
SDG7 - Affordable and Clean Energy	I18. Access to clean fuels and technologies for cooking (% of population)
	I19. Access to electricity (% of population)
	I20. Renewable energy consumption (% of total final energy consumption)
	I21. Renewable electricity output (% of total electricity output)
SDG8- Decent and Economic Growth	I22. Exports of goods and services (% of GDP)
	I23. GDP growth (annual %)
	I24. GDP per capita growth (annual %)
	I25. GNI per capita growth (annual %)
	I26. Individuals using the Internet (% of population)
	I27. Unemployment, total (% of total labor force) (modeled ILO estimate) *
	I28. Wage and salaried workers, total (% of total employment) (modeled ILO estimate)
	I29. Total natural resources rents (% of GDP)
SDG11 - Sustainable Cities and Communities	I30. PM2.5 air pollution, mean annual exposure (micrograms per cubic meter) *
SDG13 - Climate Action	I31. CO2 emissions (metric tons per capita) *
SDG14 - Life Bellow Water	I32. Capture fisheries production (metric tons)
	I33. Total fisheries production (metric tons)
SDG15 - Life on Land	I34. Forest area (% of land area)

Note. Each SDG with * are categorized with values on the opposite side of the remaining ones which means that as much higher the value, more negative the impact will be.

Same happens with *Maternal mortality ratio* (I7) as it shows exceedingly high mean, combined with a very high standard deviation (n = 160, M = 590.99, SD = 260.64). In this indicator, we have only 160 answers which means that countries have missed this information for some years, and it shows the reality we have faced on finding constant, robust data.

Regarding *Mortality rate under -5* (I10) and compared with a developing country such as Portugal (3.7 in 2019), the sample shows values 24 times higher (n = 180, M = 89.19, SD = 28.00). The indicator *People practicing open defecation* (I15) we have values showing behaviours in opposite directions (n = 159, M = 27.46, SD = 21.17, Min = 1.08, Max = 74.3*)* revealing a discrepancy between the sample countries due to the high value of standard deviation and the difference between minimum and maximum of the results, showing us countries with very low values and others revealing almost ¾ of the population practicing open defecation.

Regarding nutrition, we have values showing us that there is still a long way to walk until *Prevalence of stunting, height for age* (I2: n = 81, M = 35.52, SD = 8.60), reach near the values of most countries in the world. A relatively low standard deviation also shows that is it a problem regionwide. And the same happens with *Prevalence of undernourishment* (I3), with almost 1/4 of the population of this region being affected (n = 117, M = 24.21, SD = 10.04), with a highest value obtained in one of the countries of the sample reaching near a half of the population (Max = 41.70).

Access to clean fuels and technologies for cooking (I18) is also an indicator that shows the specific reality of this African region, where we have less than 5% of the population using facilities (n = 140, M = 3.89, SD = 7.42) and even on the country with the highest value, it doesn´t reach to a half of the population (Max = 41.29). *Access to electricity* (I19) is also one of the indicators showing us the reality of having only 1/4 of the population using

this item (n = 180, M = 24.10, SD = 13.89), and even on the country with the highest value on this indicator, more than 1/3 of the population, does not have access to it (Max = 60.30).

Table 4

Statistical Description of the indicators

Indicator	n Valid	Missing	M	SD	Min.	Max.
I4	180	0	119.11	39.65	38.85	204.29
I1	178	2	1375.40	713.52	362.80	4302.10
I5	180	0	75.22	15.84	25.00	99.00
I6	180	0	206.66	127.76	38.00	540.00
I7	160	20	590.99	260.24	248.00	1360.00
I8	180	0	24.79	4.40	17.10	39.40
I9	180	0	29.69	3.44	21.10	37.90
I10	180	0	89.19	28.00	35.90	160.50
I11	180	0	30.33	6.28	16.30	46.80
I15	159	21	27.46	21.17	1.08	74.43
I16	159	21	55.30	11.41	33.05	78.26
I17	159	21	23.46	13.70	5.71	66.57
I12	180	0	2.85	3.16	0.10	12.50
I2	81	99	35.52	8.60	13.60	57.60
I3	117	63	24.21	10.04	5.10	41.70
I14	168	12	21.07	13.55	5.16	63.75
I13	107	73	0.90	0.10	0.66	1.04
I18	140	40	3.89	7.42	0.47	41.29
I19	180	0	24.10	13.89	4.10	60.30
I22	179	1	22.82	9.62	5.73	46.48
I23	180	0	4.62	5.01	-36.39	20.72
I24	180	0	1.92	4.89	-36.56	18.05
I25	175	5	1.78	5.19	-36.33	18.01
I26	161	19	7.81	6.85	0.58	33.00
I30	160	20	37.48	15.13	14.94	94.05
I20	120	60	80.55	11.40	51.51	96.83
I21	120	60	55.36	38.41	0	99.97
I27	180	0	4.27	3.63	0.32	17.47
I28	180	0	17.82	10.05	4.90	45.73
I32	180	0	106013.22	111513.05	6549.00	461711.00
I31	140	40	0.16	0.11	0.03	0.51
I34	179	1	27.91	21.62	0.87	82.23
I33	180	0	113185.83	127545.79	6549.00	572734.00
I29	180	0	12.82	6.13	2.55	29.50

The use of internet (I26: *n* = 161, *M* = 7.81, *SD* = 6.85) is another indicator showing us the specificity of the sample countries as values are very low, comparing with an EU country reality. The country with the highest value is still 2/3 away to reach the totality of internet users (*Max* = 33.00).

On the *GDP growth* (I23: *n* = 180, *M* = 4.62, *SD* = 5.01) we find strong variations on the results, having countries with 20.72% growth on a year and others with a negative value of -36.39%, which show us a very heterogeneous sample on this indicator. Same happened with the indicator *GDP per capita growth* (I24: *n* = 180, *M* = 1.92, *SD* = 4.89, Mi*n* = -36.56, *Max* = 18.05). *GNI per capita growth* (I25) is an indicator with similar values as the earlier one, with very discrepant values (*n* = 175, *M* = 1.78, *SD* = 5.19, Mi*n* = -36.33, *Max* = 18.01).

On the Environmental side, *PM2.5 air pollution mean annual exposure* (I30) is far high than European Union countries (around 14), when sample shows some countries with 94.5 as maximum and minimum values never less than 14.94, (*n* = 160, *M* = 37.48, *SD* = 15.13, Mi*n* = 14.94, *Max* = 94.05). Regarding *CO2 emissions* (I31), the countries on our sample show very low values (*n* = 140, *M* = 0.16, *SD* = 0.11). Comparing once again with EU countries (6.424 in the year 2018), we can conclude that each habitant on these countries is responsible for a very low rate of CO2 emissions and that might bring us to the discussion of a low income and – therefore – low capacity of consumption, no ownership of an internal combustion vehicle and other similar facts that characterize the sample and makes it so *sui generis.*

As observable at Table 4, values from several indicators are presented in different scales. Considering the 2018 SDG index for Africa and the work of Aust et al. (2020), we have also initially tried to score the referred indicators and characterize them with a color, as per the RAG KPI system. However, by using RAG system, we have realized that we have

indicators without variability on their scores. The aim of this study is to analyze the variability of indicators and SDG´s in a period and not if the SDG´s are near of far from being achieved.

Also, indicators scores are not all categorized in the same sense (ones are negative, and others, positive), as the mentioned with * on Table 3. In addition, we also realized that measurement units on the scores were different because we had values in percentage, per million, per thousands, per ton, per age group, etcetera. To group indicators by SDG as per Table 3, it is mandatory to have one and only measurement unit.

Thus, to create a common measurement unit per indicator, and to be statistically processed, first we had to transform all to have values on the interval [-1,1], by using the following procedure.

$$NI_k^{it} = 2 \times \frac{I_k^{it} - \min\,(I_k^{it})}{\max(I_k^{it}) - \min\,(I_k^{it})} - 1$$

where k is the indicator number (k = 1, …, 34), i represent the country (i = 1, …, 20) and t represent the year (t = 2010, …, 2018). Thus, NI_k^{it} is the new score value of the indicator I_k for the country i in the year t, and I_k^{it} is the original value of the indicator I_k for the country i in the year t.

After this procedure, we inverted the values with* on Table 4 and the intention is to have all indicators categorized in the same sense. At this point, all the indicators oscillate between -1 and 1.

To transform x values in the interval [-1, 1] to y values in the interval [0, 1] we consider the points (x_0, y_0) = (-1, 0) and (x_1, y_1) = (1, 1). By using linear interpolation, we obtain the value of y using the following simplified formula:

$$y = \frac{x + 1}{2} \quad (1)$$

where *y* belongs to the interval [0, 1] and *x* belongs to interval [-1, 1]. Note that transformation (1) was used to convert the values of the old indicators (in the range [-1, 1]) to the new indicators in the range [0, 1].

Having now all the indicators with the same scale of measurement and to obtain each one of the 11 SDG´s, we have performed an arithmetical average of the indicators that compose each one of the SDG´s.

4.3.2. The Sustainability pillars

We will cluster the remaining 11 SDGs on its three pillars: *Economic, Social* and *Environmental*, following Table 3 and Figure 4 and according to Constanza et al. (2016). To obtain every pillar value, we have performed an arithmetical average of the SDG's that compose each one of the respective pillars (Table 5 shows the distribution of SDGs across the three pillars). The value of each pillar is also in the range [0, 1], after the respective procedure.

Table 5

Distribution of the SDG´s by the TBL

Sustainability pillars	Sustainability Development Goals
Environmental	SDG2, SDG6, SDG13, SDG14 and SDG15
Social	SDG2, SDG3, SDG4, SDG5, SDG6, SDG7, SDG8 and SDG15
Economic	SDG3, SDG7, SDG8, SDG11 and SDG14

Source: Based on Constanza et al. (2016)

4.3.3. The FDI measurement

Retrieved from the World Bank (2021), FDI on the Sub-Saharan countries except high income as the results presented in Table 6 on the period under analysis.

Table 6

FDI Net Inflows on Sub-Sahara Excluding High-Income Countries from 2010 to 2018 (in millions Usd)

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018
BFA	38.87	143.85	329.28	490.40	357.30	231.90	390.62	2.57	268.41
BDI	0.78	3.35	0.60	116.73	81.75	49.62	0.06	0.32	0.98
TCD	313.00	281.90	579.79	520.20	-675.55	559.64	244.68	363.38	460.89
COD	2,742.30	1,596.02	2,891.61	1,697.59	1,499.57	1,165.72	932.37	1,047.98	1,407.56
ETH	288.27	628.62	278.56	1,343.88	1,855.05	2,626.52	4,142.94	4,017.16	3,360.42
GMB	37.14	36.08	41.18	68.34	23.01	-1.69	-1.13	5.45	32.96
NER	796.64	1,067.19	841.23	719.34	822.97	529.48	301.33	338.71	466.04
MOZ	1,258.45	3,663.94	5,635.09	6,697.42	4,998.80	3,868.35	3,128.15	2,319.07	2,678.19
MLI	371.57	556.15	397.87	307.85	144.02	275.41	356.23	559.36	467.07
MWI	97.01	812.75	-8.89	451.36	598.09	287.75	115.70	90.20	101.46
RWA	216.19	112.13	269.62	233.76	314.00	162.08	279.75	274.03	366.19
SLE	238.40	950.48	722.45	429.66	375.09	252.44	138.51	413.72	250.45
TGO	125.06	728.71	121.51	183.60	54.02	257.86	-46.31	88.56	-180.97
UGA	543.87	894.29	1,205.39	1,096.00	1,058.56	737.65	625.70	802.70	1,055.35
SDN	2,063.73	1,734.38	2,311.46	1,687.88	1,251.28	1,728.37	1,063.77	1,065.30	1,135.79
GIN	101.35	956.06	605.56	0.19	-73.76	53.27	1,618.45	577.59	352.76
GNB	26.24	25.02	6.62	19.64	28.85	18.58	14.22	15.69	20.56
MDG	912.29	815.53	814.79	565.85	372.87	328.06	540.84	464.86	612.04
CAF	61.52	36.91	70.04	1.85	3.48	3.00	7.26	6.89	18.00
LBR	2,064.68	2,086.01	2,309.98	1,998.68	501.87	232.68	311.70	247.84	129.13

It is possible to conclude that FDI was stronger in countries such as Mozambique for the last 9 years but having a sharp line of decreasing since 2014, exception made in 2018, where a slight increase was felt. Liberia and Democratic republic of Congo also had a strong FDI during these years. With a low FDI, we find Guinea Bissau, Central African Republic and Burundi, as well as Gambia and Burkina Fasso (Table 6).

Note that transformation (1) was also used to convert the values of FDI (in the range [-1, 1]) to the new indicators in the range [0, 1].

4.3.4. The *Population Growth* measurement

As per Table 7 and Figure 2 it is observable the existence of a constant population growth in all the countries of the sample, contrary to many of the developing and developed countries in the globe (World Bank, 2021). So, it is understandable to rename this variable as *Population Growth,* as we are doing in this study.

As well as FDI and the SDG indicators, we have performed the same transformation on the values obtained on this variable, which means that values are now on the interval [0, 1].

Table 7

Population (in millions)

Country Code	Year								
	2010	2011	2012	2013	2014	2015	2016	2017	2018
BDI	8. 675	8 958	9 245	9 540	9 844	10 160	10 487	10 827	11 175
BFA	15 605	16 081	16 571	17 072	17 586	18 110	18 646	19 193	19 751
TCD	11 952	12 360	12 784	13 220	13 663	14 110	14 561	15 016	15 477
CAF	4 386	4 418	4 436	4 447	4 464	4 493	4 537	4 596	4 666
COD	64 563	66 755	69 020	71 358	73 767	76 244	78 789	81 398	84 068
ETH	87 639	90 139	92 726	95 385	98 094	100 835	103 603	106 400	109 224
GIN	10 192	10 420	10 652	10 892	11 150	11 432	11 738	12 067	12 414
GNB	1 522	1 562	1 604	1 648	1 692	1 737	1 782	1 828	1 874
GMB	1 793	1 848	1 905	1 963	2 024	2 085	2 149	2 213	2 280
LBR	3 891	4 017	4 135	4 248	4 359	4 472	4 586	4 702	4 818
MDG	21 151	21 743	22 346	22 961	23 589	24 234	24 894	25 570	26 262
MWI	14 539	14 962	15 396	15 839	16 289	16 745	17 205	17 670	18 143
MLI	15 049	15 514	15 979	16 449	16 934	17 438	17 965	18 512	19 077
MOZ	23 531	24 187	24 862	25 560	26 286	27 042	27 829	28 649	29 495
NER	16 464	17 114	17 795	18 504	19 240	20 001	20 788	21 602	22 442
RWA	10 039	10 293	10 549	10 811	11 083	11 369	11 668	11 980	12 301
SLE	6 415	6 563	6 712	6 863	7 017	7 171	7 328	7 488	7 650
SDN	34 545	35 349	36 193	37 072	37 977	38 902	39 847	40 813	41 801
TGO	6 421	6 595	6 773	6 954	7 137	7 323	7 509	7 698	7 889
UGA	32 428	33 476	34 559	35 695	36 912	38 225	39 647	41 162	42 723

4.4. Data Analysis Procedure

We started to compile data from the World Bank (2021) and database for the study was compiled with the help of Microsoft Excel software. This database had initially 404 indicators (see Appendix I), as well as FDI and Population. After a preliminary analysis, we have

excluded 3 countries from the initial number of 23. The same happened to several indicators, only being still 34.

Second phase – with the use of IBM SPSS Statistics 28 software - was the analysis of the 34 indicators regarding omitted values and valid answers, as well as the Mean, Standard Deviation, and Minimum and Maximum values. Also, all the variables' scores were transformed to have one only measurement scale and criteria. To perform the descriptive analysis of the three pillars and FDI by country and per year, the graphic (radar and line chart) was used. The mean and standard deviation were also calculated.

To verify the sensitivity of the variables, the asymmetry (Sk) and flattening (Ku) coefficients were used, with $|Sk| \leq 3$ and $|Ku| \leq 10$, otherwise they show severe violation of the normality assumption (Kline, 2016). After, to test the correlation between the different pillar of TBL and FDI, we have performed a Pearson´s correlation. As per Marôco (2018), on the human and social sciences, we consider the thresholds of the correlations by the following criteria: weak, when $|r| < 0.25$, moderate, when $0.25 \leq |r| < 0.5$, strong, when $0.5 \leq |r| < 0.75$ and very strong, when $|r| \geq 0.75$.

Referring to Baltagi´s work (2006), Gujarati and Porter (2011) concluded that panel data analysis has the potential to offer a more informative data, less collinearity among variables as well as more liberty and efficiency on the analysis, specifically on the dynamics of the occurred changes. Also, panel data analysis allows us to perform a better detection and measurement of causality between variables, in a more efficient way than on a transversal cut or a pure time series, giving us ways to study more complicated behavioral models. These authors also refer that by analyzing at the same time a huge amount of data, panel data analysis might reduce/minimize bias that could occur if we were studying only an aggregate of the all sample.

Panel data in this specific study allows us to simultaneously analyze the oscillation of the variables during a certain period as well as in different countries. Therefore, data panel has a spatial and temporal dimension (Baltagi, 2005). One of the advantages of using panel data model is the fact that heterogeneity of data is considered while in *time series* and in *cross section analysis*, there is no control of this factor, which might lead us to biased data.

In conclusion, having such a large amount of data as we have on this study with the analysis of 20 countries, 34 indicators and 9 years, the use of panel data was the most appropriate choice. Panel data analysis was performed running the G*retl* (GNU Regression, Economic and Times-series Library) software version 2021b.

To assess the influence of FDI on the TBL, we used the following three general models for panel data:

$$SOC_{it} = \beta_{1it} + \beta_{2it} \times FDI_{it} + \beta_{3i} \times ECO_{it} + \beta_{4i} \times ENV_{it} + \beta_{5it} \times Pop_{it} + e_{it}$$

$$ECO_{it} = \beta_{1it} + \beta_{2it} \times FDI_{it} + \beta_{3it} \times SOC_{it} + \beta_{4it} \times ENV_{it} + \beta_{5it} \times Pop_{it} + e_{it}$$

$$ENV_{it} = \beta_{1it} + \beta_{2it} \times FDI_{it} + \beta_{3it} \times ECO_{it} + \beta_{4it} \times SOC_{it} + \beta_{5it} \times Pop_{it} + e_{it}$$

where *i* represent the country (*i* =1, …, 20) and *it* represent the time index (*it* = 1, …, 9), β_1 is the intercept and β_k (k = 2, 3, 4, 5) are the unknown parameters to be estimated corresponding to the k-th explanatory variable of the model, FDI is foreign direct investment, SOC is the *Social* pillar, ECO is the *Economic* pillar, ENV is the *Environmental* pillar, Pop is *Population* and e_{it} is the errors.

To assess collinearity, VIF (Variance Inflation Factor) values are calculated. These values must be close to 3 or less (Hair et al., 2019).

In this study, to test some of the formulated hypothesis, we apply data panel analysis: *pooled* OLS (Ordinary Least Squares), *fixed effect* and *random effect models,* selecting the most fitted model according to F (Fischer), the Breusch-Pagan end the Hausman tests. In

more detail, the F (Fischer) test lets us choose between the *pooled model* and the *fixed effects model*. The test presents in its null hypothesis, the existence of a single intercept for all countries, so the non-rejection of this hypothesis leads to consider the pooled model to the detriment of the fixed effects model. The Breusch-Pagan test allows us to choose between the *pooled model* and the *random effects model*. The null hypothesis of this test assumes that the errors are normally distributed, which means that the variance of the error specific to each unit is zero. The non-rejection of this hypothesis leads to considering the pooled model to the detriment of the random effects model. The Hausman test allows us to ascertain whether there is a correlation between the unobservable heterogeneity and the respective explanatory variables, based on the comparison of the coefficients obtained by the model of fixed effects and random effects. Thus, the Hausman test allows choosing between the model of *fixed effects*, or the model of *random effects*, which is the most proper for the research study.

5. Results

5.1. Statistical Description of the TBL

Table 8 shows that on the *Environment* variable, Uganda ($M = 0.54$, $SD = 0.03$) shows the highest score whit a low standard deviation, which reveals environmental concerns, actions, and policies, compared with countries like Niger ($M = 0.21$, $SD = 0.08$) or Tchad ($M = 0.25$, $SD = 0.05$), where this variable is far from the expected values for the 2030 goals.

On the *Social* variable, Gambia has the highest score value ($M = 0.60$, $SD = 0.04$), followed by Malawi ($M = 0.59$, $SD = 0.02$). Tchad has the lowest score value ($M = 0.31$, $SD = 0.02$) followed by Niger ($M = 0.34$, $SD = 0.04$) and both countries far from the overall average, about this variable. These scores values are an indicator of lower or nonexistent social protection programs and/or policies.

The *Economic* variable shows Uganda (M = 0.64, SD = 0.04) and Mozambique (M = 0.61, SD = 0.03) with the highest scores values. Once again, Niger (M = 0.31, SD = 0.03) and Tchad (M = 0.31, SD = 0.04) are the countries with the lowest scores values. However, they are not the countries with the lowest FDI during the years under analysis. Foreign Direct Investment was stronger in Mozambique, but with an abnormally high standard deviation, compared with the remaining countries (M = 0.61, SD = 0.23) and this considerable variation might relate to security and political instability occurred in some years and regions in this country, which might have *scared* investor as they prefer stability and safety on their investments.

In the opposite direction for this variable FDI, we see Sudan with the lowest score (M = 0.09, SD = 0.04), followed by three countries with the same scores values and they are Central African Republic, Gambia, and Guinea Bissau (M = 0.11, SD = 0.00). All these countries are facing either strong political instability and/or economic, climate, and security problems as well as others in this region, where some have inclusively a UN military intervention, like CAF.

Table 8 show us the lower values obtained overall, with the pillar E*nvironment,* comparing with the other pillars. Exceptions are seen in Uganda, where *Environment* (0.54) surpassed the *social* pillar (0.47) and in Guinea-Bissau and Tchad, where the *environment* pillar (0.48 and 0.38, respectively) surpassed the *economic* pillar (0.41 and 0.32, respectively). However, *environment* never had the highest score value in none of the countries. Higher overall scores values are seen on the E*conomic* pillar as in Uganda (0.64), Mozambique (0.61). The *Social* pillar has its higher score value in Gambia (0.60), and it is observed has the pillar with higher scores values on eleven countries, comparing with the extant pillars. Congo Democratic Republic unites two variables on the same score value (0.52) and a lower

one, ENV (*M* = 0.51, *SD* = 0.05). In conclusion, the social concerns are general among these countries, where environmental ones are being disregarded, we may conclude.

Table 8

The TBL and FDI scores by country

Country	ENV		SOC		ECO		FDI	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
1- BFA	0.34	0.03	0.51	0.03	0.41	0.03	0.14	0.02
2- BDI	0.35	0.11	0.48	0.03	0.43	0.05	0.11	0.01
3- CAF	0.38	0.08	0.41	0.05	0.32	0.02	0.11	0.00
4- TCD	0.25	0.05	0.31	0.02	0.36	0.04	0.15	0.05
5- COD	0.51	0.05	0.52	0.03	0.52	0.04	0.33	0.09
6- ETH	0.33	0.03	0.47	0.02	0.51	0.02	0.38	0.21
7- GMB	0.45	0.04	0.60	0.04	0.48	0.06	0.11	0.00
8- GIN	0.41	0.03	0.45	0.05	0.55	0.04	0.17	0.07
9- GNB	0.48	0.05	0.56	0.01	0.41	0.02	0.11	0.00
10- LBR	0.44	0.03	0.56	0.01	0.45	0.03	0.25	0.13
11- MWI	0.50	0.04	0.59	0.02	0.54	0.02	0.19	0.03
12- MLI	0.46	0.05	0.54	0.05	0.47	0.04	0.14	0.04
13- MDG	0.39	0.04	0.49	0.03	0.50	0.03	0.16	0.02
14- MOZ	0.48	0.03	0.49	0.02	0.61	0.03	0.61	0.23
15- NER	0.21	0.08	0.34	0.04	0.31	0.03	0.19	0.03
16- RWA	0.40	0.10	0.50	0.02	0.48	0.03	0.14	0.01
17- SLE	0.46	0.03	0.51	0.03	0.51	0.04	0.16	0.03
18- SDN	0.26	0.03	0.55	0.03	0.51	0.03	0.09	0.04
19- TGO	0.27	0.02	0.53	0.03	0.52	0.03	0.13	0.03
20- UGA	0.54	0.03	0.47	0.02	0.64	0.04	0.22	0.03
Total	0.40	0.11	0.49	0.08	0.48	0.09	0.20	0.14

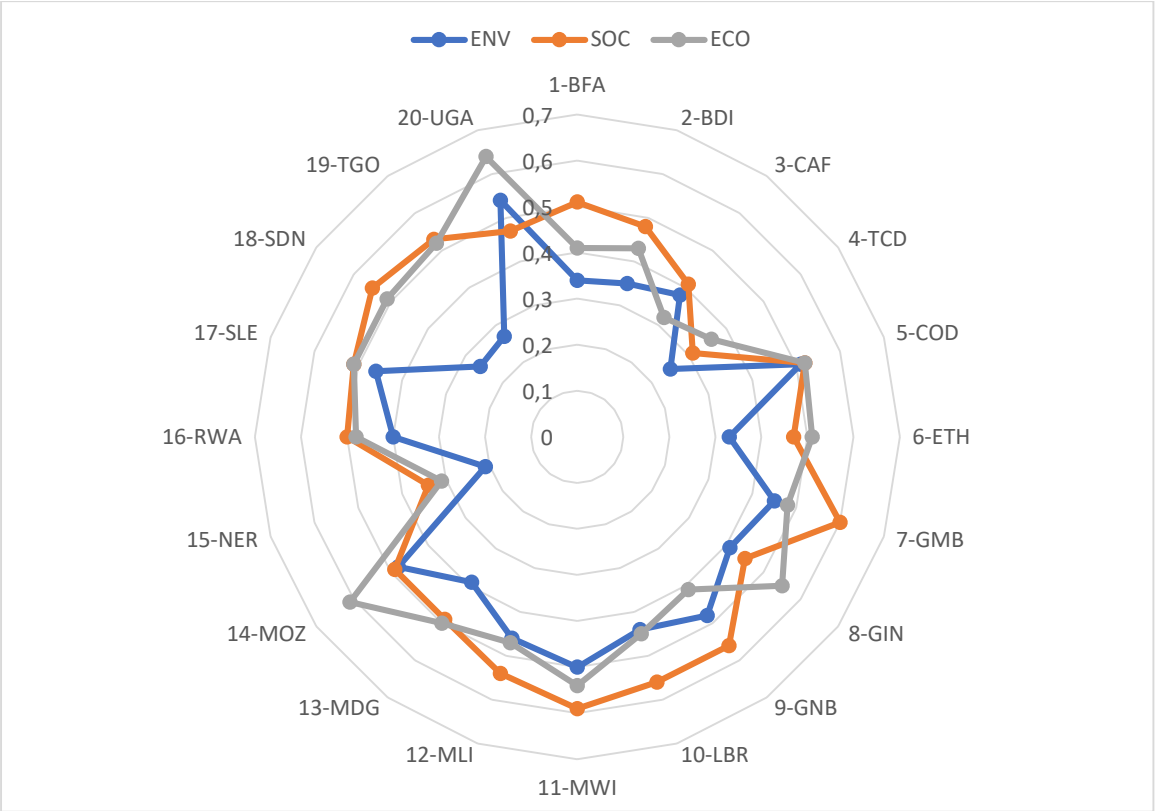

Figure 6. Heterogeneity between countries on the TBL

Following table 8, its graphical representation of figure 6 clearly show us the prevalence of low scores on the Environmental pillar in our sample, comparing with the other pillars as well as the overall prevalence of higher values in most of the countries of the *Social* pillar.

Table 9 and Figure 7 show us the lowest scores obtained by the *Environmental* pillar as well as its faster decrease since year 2016 and overall decrease since 2010, which is a sign that environmental concerns is not on the *agenda* of policy makers on these countries, in an overall conclusion. The S*ocial* pillar scores are the highest ones and have a general mild increase since year 2010. Apart from sharps variation between years 2016 and 2018, the Economic pillar has regular scores, during the observed period. In conclusion, the

Environmental pillar has never reached closer to the other two pillars, always showing the lowest scores.

Table 9

Scores of the TBL Pillars and FDI by Year

	ENV		SOC		ECO		FDI	
Year	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
2010	0.42	0.10	0.48	0.08	0.47	0.07	0.18	0.10
2011	0.41	0.10	0.48	0.08	0.47	0.08	0.21	0.12
2012	0.42	0.10	0.49	0.07	0.48	0.08	0.22	0.18
2013	0.42	0.10	0.48	0.08	0.48	0.09	0.21	0.20
2014	0.42	0.09	0.49	0.07	0.49	0.08	0.19	0.16
2015	0.41	0.09	0.50	0.08	0.47	0.09	0.18	0.13
2016	0.41	0.09	0.48	0.08	0.45	0.09	0.19	0.15
2017	0.35	0.12	0.52	0.08	0.50	0.11	0.18	0.13
2018	0.30	0.12	0.52	0.08	0.47	0.11	0.19	0.12

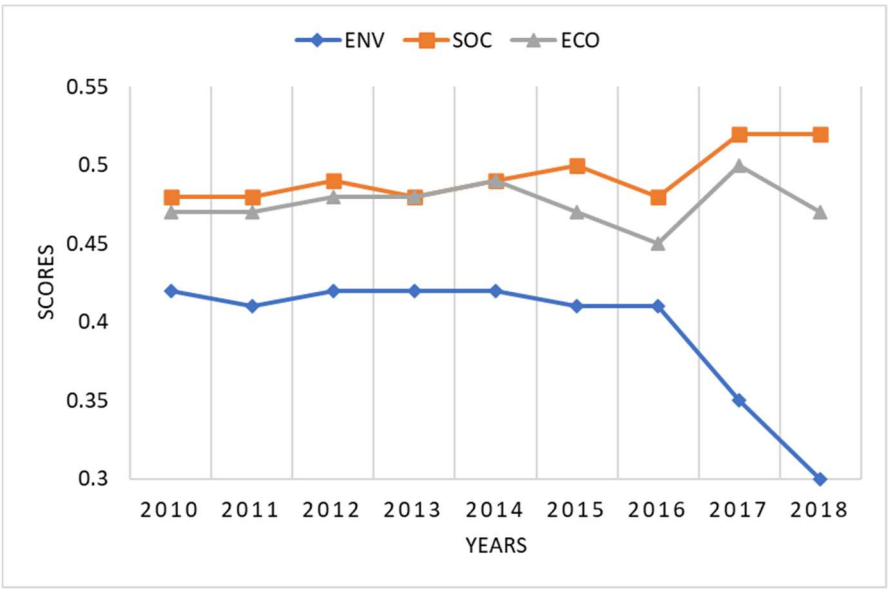

Figure 7. Variation of the 3 pillars by year.

Figure 8 shows the variation of FDI on our sample by year. In red color, the trend line obtained through these nine years, where we can conclude that foreign direct investment on these countries is decreasing on a regular, constant way.

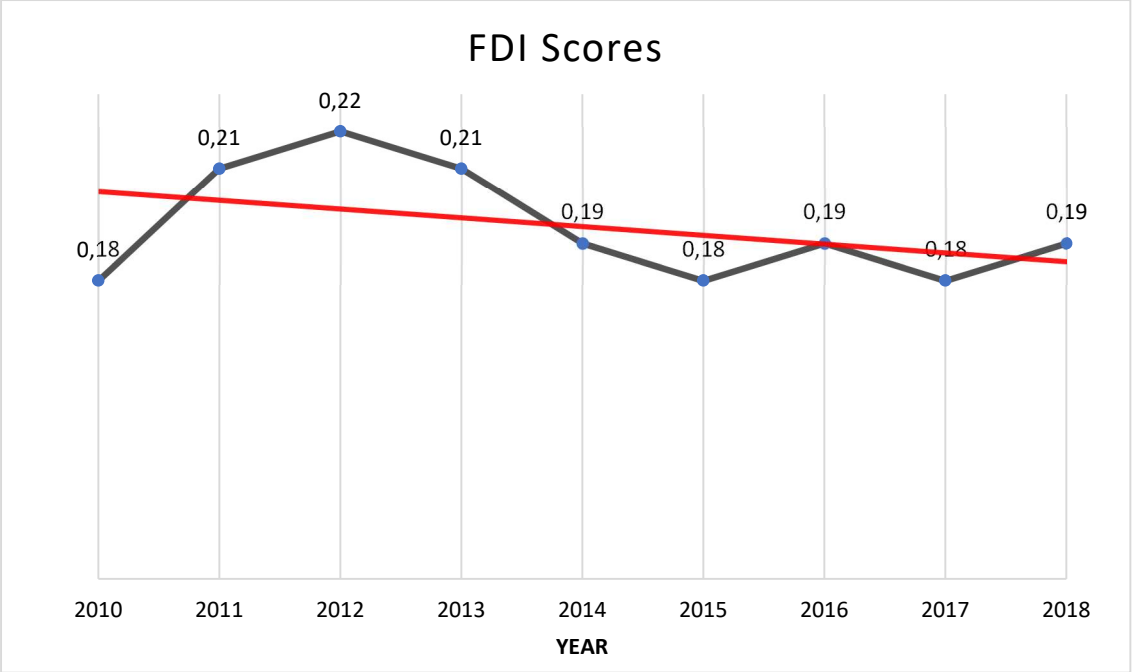

Figure 8. FDI scores per year as per WB

5.2. Testing the Hypotheses

To answer the research questions, it is necessary to test the formulated hypotheses, so in this sense, we will perform a series of tests.

As we know that the pillars are constituted by the different SDGs, we analyzed the correlations between the SDGs and the FDI. In table 10, we observe a weak and significant negative correlation between *SDG5 - Gender Equality* and *FDI* ($r = -0.248$, $p = 0.001 < 0.01$) and *SDG6 - Clean water and Sanitation* and *FDI* ($r = -0.218$, $p = 0.003$) so it is possible to conclude that as higher values of FDI are, the lower are the results on *Clean Water and Sanitation* as well as *Gender Equality*. In other hand, SDG 8 - *Decent and Economic Growth*

(r = 0.285, p = 0.000) as well as *SDG14 - Life Bellow Water* (r = 0.359, p = 0.000) show a moderate and significant positive correlation with the variable FDI. A weak correlation with FDI is verified with *SDG7 - Affordable and Clean Energy* (r = 0.147, p = 0.025); SDG11- *Sustainable Cities and Communities* (r = 0.185, p = 0.010) and *SDG15 - Life on Land* (r = 0.248, p = 0.000).

Table 10

Correlations Between FDI and the SDG´s

SDG´s	FDI	
	r	***p***
SDG2 - Zero Hunger	-0.076	0.156
SDG3 - Good health and well being	0.033	0.330
SDG4 - Quality Education	-0.094	0.169
SDG5 - Gender Equality	-0.248**	0.001
SDG6 - Clean Water and Sanitation	-0.218**	0.003
SDG7 - Affordable and Clean Energy	0.147*	0.025
SDG8 - Decent and Economic Growth	0.285***	0.000
SDG11- Sustainable Cities and Communities	0.185**	0.010
SDG13- Climate Action	0.038	0.327
SDG14 - Life Bellow Water	0.359***	0.000
SDG15 - Life on Land	0.248***	0.000

Note. ***$p < 0.001$, **$p < 0.01$; *$p < 0.05$.

The asymmetry and kurtosis coefficients of the variables under study present absolute values lower than 3 and 10, respectively, thus being within the parameters defined by Kline (2016), so the assumption of normality of the variables is assumed. Thus, Pearson's correlation was applied to test hypotheses H1, H2 and H3.

Table 11 shows a moderate, positive and significant correlation between the pillar *Social* and *Environmental* ($r = 0.419$, $p < 0.01$), *Economic* and *Environmental* ($r = 0.492$, $p < 0.01$) and *Economic* and *Social* ($r = 0.470$, $p < 0.01$). According to these results, it is reasonable to conclude that H1, H2 and H3 are empirically supported and there is, effectively, a positive relationship between the TBL pillars.

Regarding FDI, we see a weak, positive and significant correlation with the *Environmental* pillar ($r = 0.230$, $p < 0.01$) and a moderate, positive and significant correlation with the *Economic* pillar ($r = 0.348$, $p < 0.01$). *Population growth* also shows significant correlations with the ECO pillar ($r = 0.275$, $p < 0.010$) and FDI ($r = 0.490$, $p < 0.010$).

Table 11

Pearson's Correlations Between The Three Pillars, FDI and Population Growth

	ENV	SOC	ECO	FDI
SOC	0.419**			
ECO	0.492**	0.470**		
FDI	0.230**	-0.014	0.384**	
Population	0.085	-0.081	0.275**	0.490**

Note. $^{**}p < 0.01$.

This correlation between the three pillars follows the results of Costanza et al. (2016) as well of their understanding on the existence of indicators correlating with other indicators from different pillars and – therefore – correlation between pillars.

Given that the correlation coefficients, in general, are not significantly high, we may conclude that there are no multilinearity problems between the variables to be used in the estimation of the models. However, the VIF values varied between 1.257 and 1.647, showing that there are no collinearity problems (Hair et al., 2019).

Table 12 stands for the three models: *pooled* OLS, *fixed effects* and *random effects*. Results show that FDI variable only has significant influence on the TBL when using the Pooled OLS model as pillars *Environment* ($\beta = 0.097$, $p < 0.1$) and *Economic* ($\beta = 0.154$, $p < 0.01$) show. *Social* pillar is negatively influenced by FDI ($\beta = -0.098$, $p < 0.05$). At this point, we need to stress the fact that, when applying *random* and *fixed effects* models, H4, H5 and H6 are not empirically supported.

Table 12

Results of pooled OLS, fixed effects, and random effects of models

Dependent variable		Pooled OLS	Fixed effects	*Random effects*
ENV	Constant	0.011 (0.046)	0.493 (0.075)	0.328*** (0.069)
	FDI	0.097* (0.054)	0.072 (0.050)	0.062 (0.050)
	SOC	0.369*** (0.101)	-0.287* (0.153)	-0.229* (0.136)
	ECO	0.399*** (0.096)	0.288** (0.133)	0.400*** (0.121)
	Population	-0.027 (0.035)	-0.596*** (0.180)	-0.131 (0.079)
	R^2	0.312	0.796	0.070
	Adjusted R^2	0.296	0.765	0.049
SOC	Constant	0.260*** (0.027)	0.278*** (0.038)	0.324*** (0.035)
	FDI	-0.098** (0.041)	-0.001 (0.026)	0.002 (0.027)
	ENV	0.193*** (0.053)	-0.078* (0.041)	-0.087** (0.040)
	ECO	0.386*** (0.066)	0.417*** (0.062)	0.413*** (0.060)
	Population	-0.047* (0.025)	0.264*** (0.095)	0.037 (0.055)
	R^2	0.335	0.898	0.229
	Adjusted R^2	0.319	0.883	0.211
ECO	Constant	0.135*** (0.034)	0.191*** (0.048)	0.157*** (0.046)
	FDI	0.154*** (0.041)	0.026 (0.030)	0.028 (0.030)
	ENV	0.229*** (0.055)	0.103** (0.047)	0.138*** (0.045)
	SOC	0.423*** (0.073)	0.550*** (0.081)	0.514*** (0.075)
	Population	0.066** (0.026)	-0.182*** (0.110)	0.032 (0.059)
	R^2	0.448	0.898	0.254
	Adjusted R^2	0.435	0.883	0.237

Note. $^{***}p < 0.01$, $^{**}p < 0.05$; $^{*}p < 0.10$.

On the *pooled* model, *population growth* has a negative, significant influence on the SOC pillar (β = -0.047, $p < 0.1$) and positive, significant influence in the ECO pillar (β = 0.066, $p < 0.05$). When using the fixed effects model, *population growth* has a negative and significant influence on the ENV pillar (β = -0.596, $p < 0.01$), on the ECO pillar (β = -0.182, $p < 0.01$) and a positive and significant influence on the SOC pillar (β = 0.264, $p < 0.01$). In the *random effects* model, *population* does not significantly influence any of the pillars. Thus, depending on the model used, the H7, H8 and H9 hypotheses may or may not be empirically supported.

It is also emphasized that the results in all models show that the three pillars are significantly influenced by each other, which reinforces the empirical confirmation of hypotheses H1, H2 and H3 done previously by the Pearson´s correlation.

After performing the regressions models presented in Table 13, the hypotheses were tested to determine which of the models is more robust to estimate the ENV, SOC and ECO pillars.

As per Table 13, in the models where ENV and SOC are the dependent variables, the F test, show that the *fixed effects* model is more adequate than the *pooled OLS* model. The Breusch-Pagan test has revealed that the *random effects* model is more adequate than the *pooled OLS* model. However, the Hausman test choose the *fixed effects* model as the more adequate comparatively with the *random effects* model.

Regarding the ECO dependent variable, the F test, show that the *fixed effects* model is more adequate than the *pooled OLS* model. The Breusch-Pagan test has revealed that the *random effects* model is more adequate than the *pooled OLS* model. However, the Hausman test choose the *random effect* model as the more adequate comparatively with the *fixed effects* model.

Table 13

Test result for panel model choice

Pillar	Test	Statistic	*p*	Results
ENV	F test	19.211	0.000	Fixed effects model
	Breusch-Pagan	196.936	0.000	Random effects model
	Hausman test	20.164	0.000	Fixed effects model
SOC	F test	44.694	0.000	Fixed effects model
	Breusch-Pagan	374.306	0.000	Random effects model
	Hausman test	16.341	0.003	Fixed effects model
ECO	F test	35.745	0.000	Fixed effects model
	Breusch-Pagan	386.802	0.000	Random effects model
	Hausman test	8.427	0.077	Random effects model

Concluding, *fixed effects* model suit ENV and SOC behavior analysis and ECO is more suitable to be studied by the *random effects* model. Thus, according these models we can state that the H7 and H8 hypotheses are empirically supported and the Hypothesis H4, H5, H6 and H9 are not empirically supported.

5.3. Synthesis

By analyzing Table 14 we conclude that H1, H2, H3, H7 and H8 are empirically supported. At this point, with the results of Table 14, it is also possible to answer research question number 1 "*Are the three dimensions of sustainability (TBL) increasing with FDI?"*, and the answer is that FDI does not statistically influence the pillars of sustainability, as the H4, H5 and H6 hypotheses are not empirically supported. Regarding the specific question number 2, "*Are each one of the dimensions influenced by the others or is influenced by population growth and FDI?",* it is now possible to conclude that in fact, the TBL pillars influence each

other's, that is, Hypothesis H1, H2 and H3 are supported. Regarding *Population Growth,* it positively influences the *Social* pillar and negatively influences the *Environmental* pillar, which means that H7 and H8 are confirmed and H9 is rejected.

Concluding, the general question is answered by saying that FDI is not caring for sustainability on Sub-Saharan countries with low income.

Table 14

Synthesis of the results as per the formulated hypothesis

Hypothesis	Description	Conclusion
H1	There is a positive relationship between the *environmental* and *economic* pillars on Sub-Saharan countries.	Confirmed
H2	There is a positive relationship between the *environmental* pillar and the S*ocial* pillar on Sub-Saharan countries.	Confirmed
H3	There is a positive relationship between the *social* pillar and *economic* pillar on Sub-Saharan countries.	Confirmed
H4	There is a positive influence of FDI on the *economic* pillar on Sub-Saharan countries.	Rejected
H5	There is an influence of FDI on the *social* pillar on Sub-Saharan countries	Rejected
H6	There is an influence of FDI on the *environmental* pillar on Sub-Saharan countries.	Rejected
H7	Population Growth influences the *environmental* pillar.	Confirmed
H8	Population Growth influences the *social* pillar.	Confirmed
H9	Population Growth influences the *economic* pillar.	Rejected

6. Discussion

This work assessed the influence of FDI and *Population Growth* on the three pillars of sustainability as well as the correlation between these pillars.

The days we are living as well of the upcoming years and decades must rely on sustainability and on the knowledge obtained on this field, as well as its relation and integration with the political and decision-making structures. In this case, regarding the need for sustainability and sustainable management policies in doing business abroad.

The confirmed hypothesis H1, H2, and H3 that refer to the correlation between the three pillars of sustainability, *Economic*, *Environment* and *Social* - where it is observable an positive relationship in all - are results in the same direction with the Costanza et al. (2016) work and its theoretical framework we used. Assuming the fact of the existence of pillars *sharing* the same indicators, it is a reasonable assumption to state that is the reason for the obtained result in this study.

The only model that showed an influence of FDI on the TBL pillars was the *pooled model.* This model is employed when we use a different sample for each year/month/period of the panel data. *Fixed effects* or *random effects* are used when we are going to observe the same sample, such as individuals/countries/states/cities/etc. (Wooldridge, 2010). By applying this reasoning on this study, *pooled* model is definitely not the most adequate, comparing with the remaining models

On the scope of the influence of FDI on the TBL pillars on these specific countries, the values presented on the most fitted models used are not significant on a way that we can state, without any doubt, that this influence effectively exists. Therefore, the hypothesis concerning this relation must be rejected. And these results are also following many studies by the fact that conclusions and results are not unanimous. Contrary to Jun et al. (2018) conclusions, there is no evidence in our study of a negative influence of FDI on the *Environmental* pillar.

Regarding FDI and the *Economic* pillar, results are not contrary nor in favor to the Iamsiraroj and Ulubasoglu (2015) and Campos and Kinoshita (2002) results. Once again, there is no evidence of a positive and significant influence.

Regarding SDG´s, results show a positive relation between FDI and SDG7 (*Affordable and clean energy*), SDG8 *(Decent work and economic growth*), SDG11 (Sustainable Cities and Communities), SDG14 (*Life below water*) and SDG15 (*Life on Land*). These results are partially in accordance with the study of Aust et al. (2020) as SDG 7 and 14 are also positively influenced by FDI in this study. However, analyzing the *forest* and not only the *tree*, evidence is also that it is not possible to confirm the first research question.

On the *Population Growth* discussion, this variable has a negative effect on the Environmental pillar and positively affects the *Social* pillar, not having any influence on the *Economic* pillar. In this sense, result are partially in accordance with Imasiku and Ntagwirumugara (2020) as they state for a relation between population growth and demand for food, energy, land and water, with negative consequences for the *environment* as land is going scarce and positive ones for the *social* pillar as efforts made allows people to have access to energy, water and other related goods.

7. Conclusions

Our main goals were achieved as the research questions were answered. TBL pillars are positively and significantly correlated. FDI does not significantly influence the TBL pillars.

Regarding Population Growth and the TBL pillars, it influences the *Social* and *Environmental* pillars. The first on a positive way and the second on a negative way.

Having in mind the moderate correlation between the TBL pillars we may conclude that if FDI could positively and affect one of them, it would probably be affecting the remaining ones, not in the same mode, but maybe in a longer period of time or in a way that could only be proven, measured or applied using different scales, reasonings and approaches.

This conclusion is an interesting thought as, on the scope for the Sustainability policies that must be implemented globally, if FDI shows efficacy on its positive influence with one of the pillars, this fact might be an *open door* to total positive influence on the remaining ones, and – therefore - achievement of the SDG´s, showing concern for the planet and for the upcoming generations. On a business point of view, it might as well be a way of gaining legitimacy on doing business abroad.

7.1. Limitations

This study – like similar studies that have analyzed countries in this region – has faced strong difficulties to retrieve data in a constant, prompt and regular way. And this obstacle has forced us to drop several countries as well as a considerable number of SDG indicators, reaching the point of being necessary to not insert some of SDG due to the nonexistence of their indicators. Most of these countries lack strong, democratic institutions, have a poor/ nonexistent statistical capacity and this overall missing of data was a severe limitation for this study. Having this *handicap* in mind and for future studies, it might be wise to enlarge the sources of data such as the one from ONG´s and compile it in a way that some missing information issue in a specific indicator, might be solved with its existence in other data source.

7.2. Policy recommendations

Data is important to decide how to act. Governments must pursuit the SDG´s for the 2030 agenda and to do so, there is a constant need for data, to understand the results and the trends and to correct the deviations. Without consistent, regular data obtained from each country on the planet, efforts on achievement might be useless or in the wrong direction.

Also, the analyzed literature as well as the results on this study show some contradiction/ambiguity regarding the effects of FDI on sustainability. At this point and with global warming and global social discontent on the agenda, with enterprises and governments not acting in accordance with signed treaties or with weak ones, it would be right time not to have ambiguous or inconclusive results. FDI, should and must effectively increase the TBL pillars scores, without any doubt. Multinational companies investing abroad as well as their stakeholders, must be aware of the need for increasing the Social, Environmental and Economic improvements on the host countries, and this improvement must be objective, measurable on a period and with no ambiguity on the analysis of the results.

In the same way, it is government´s responsibilities to implement conditions to attract FDI, always keeping in mind the TBL pillars scores on their countries. On the countries under our scope, the creation of political and social stability could be the trigger. Also, by having enterprises acting on a sustainable way, developed countries will create conditions for population on the host countries of FDI not to migrate. As per the sad reality we are facing about migration and once again, we can state that *sustainability* is the trend word, and it will be for a few more decades, at least.

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Appendix I – The 404 SDG indicators of the WB

Series Name
Access to clean fuels and technologies for cooking (% of population)
Access to electricity (% of population)
Access to electricity, rural (% of rural population)
Access to electricity, urban (% of urban population)
Account ownership at a financial institution or with a mobile-money-service provider (% of population ages 15+)
Account ownership at a financial institution or with a mobile-money-service provider, female (% of population ages 15+)
Account ownership at a financial institution or with a mobile-money-service provider, male (% of population ages 15+)
Account ownership at a financial institution or with a mobile-money-service provider, older adults (% of population ages 25+)
Account ownership at a financial institution or with a mobile-money-service provider, poorest 40% (% of population ages 15+)
Account ownership at a financial institution or with a mobile-money-service provider, primary education or less (% of population ages 15+)
Account ownership at a financial institution or with a mobile-money-service provider, richest 60% (% of population ages 15+)
Account ownership at a financial institution or with a mobile-money-service provider, secondary education or more (% of population ages 15+)
Account ownership at a financial institution or with a mobile-money-service provider, young adults (% of population ages 15-24)
Adjusted net savings, excluding particulate emission damage (% of GNI)
Adolescent fertility rate (births per 1,000 women ages 15-19)
Adolescents out of school (% of lower secondary school age)
Adolescents out of school, female (% of female lower secondary school age)
Adolescents out of school, male (% of male lower secondary school age)
Agriculture, forestry, and fishing, value added per worker (constant 2010 US$)
Air transport, freight (million ton-km)
Air transport, passengers carried
Annual freshwater withdrawals, agriculture (% of total freshwater withdrawal)
Annual freshwater withdrawals, domestic (% of total freshwater withdrawal)
Annual freshwater withdrawals, industry (% of total freshwater withdrawal)
Annual freshwater withdrawals, total (% of internal resources)
Annual freshwater withdrawals, total (billion cubic meters)
Annualized growth in per capita real survey mean consumption or income, bottom 40% (%)
Annualized growth in per capita real survey mean consumption or income, total population (%)
Aquaculture production (metric tons)
Average transaction cost of sending remittances from a specific country (%)
Average transaction cost of sending remittances to a specific country (%)
Bank capital to assets ratio (%)

Series Name
Bank nonperforming loans to total gross loans (%)
Battle-related deaths (number of people)
Bird species, threatened
Births attended by skilled health staff (% of total)
Bribery incidence (% of firms experiencing at least one bribe payment request)
Broad money growth (annual %)
Broad money to total reserves ratio
Capture fisheries production (metric tons)
Cereal yield (kg per hectare)
Children in employment, female (% of female children ages 7-14)
Children in employment, male (% of male children ages 7-14)
Children in employment, total (% of children ages 7-14)
Children out of school (% of primary school age)
Children out of school, female (% of female primary school age)
Children out of school, male (% of male primary school age)
Children out of school, primary
Children out of school, primary, female
Children out of school, primary, male
CO2 emissions (kg per 2010 US$ of GDP)
CO2 emissions (kg per 2017 PPP $ of GDP)
CO2 emissions (kg per PPP $ of GDP)
CO2 emissions (metric tons per capita)
Coal rents (% of GDP)
Commercial bank branches (per 100,000 adults)
Completeness of birth registration (%)
Completeness of birth registration, female (%)
Completeness of birth registration, male (%)
Completeness of birth registration, rural (%)
Completeness of birth registration, urban (%)
Compulsory education, duration (years)
Contributing family workers, female (% of female employment) (modeled ILO estimate)
Contributing family workers, male (% of male employment) (modeled ILO estimate)
Coverage of social insurance programs (% of population)
Coverage of social insurance programs in 2nd quintile (% of population)
Coverage of social insurance programs in 3rd quintile (% of population)
Coverage of social insurance programs in 4th quintile (% of population)
Coverage of social insurance programs in poorest quintile (% of population)
Coverage of social insurance programs in richest quintile (% of population)
Coverage of social safety net programs (% of population)
Coverage of social safety net programs in 2nd quintile (% of population)
Coverage of social safety net programs in 3rd quintile (% of population)
Coverage of social safety net programs in 4th quintile (% of population)
Coverage of social safety net programs in poorest quintile (% of population)
Coverage of social safety net programs in richest quintile (% of population)

Series Name
Coverage of unemployment benefits and ALMP (% of population)
Coverage of unemployment benefits and ALMP in 2nd quintile (% of population)
Coverage of unemployment benefits and ALMP in 3rd quintile (% of population)
Coverage of unemployment benefits and ALMP in 4th quintile (% of population)
Coverage of unemployment benefits and ALMP in poorest quintile (% of population)
Coverage of unemployment benefits and ALMP in richest quintile (% of population)
Current account balance (% of GDP)
Debt service (PPG and IMF only, % of exports of goods, services and primary income)
DEC alternative conversion factor (LCU per US$)
Demand for family planning satisfied by modern methods (% of married women with demand for family planning)
Disaster risk reduction progress score (1-5 scale; 5=best)
Droughts, floods, extreme temperatures (% of population, average 1990-2009)
Educational attainment, at least Bachelor's or equivalent, population 25+, female (%) (cumulative)
Educational attainment, at least Bachelor's or equivalent, population 25+, male (%) (cumulative)
Educational attainment, at least Bachelor's or equivalent, population 25+, total (%) (cumulative)
Educational attainment, at least completed lower secondary, population 25+, female (%) (cumulative)
Educational attainment, at least completed lower secondary, population 25+, male (%) (cumulative)
Educational attainment, at least completed lower secondary, population 25+, total (%) (cumulative)
Educational attainment, at least completed post-secondary, population 25+, female (%) (cumulative)
Educational attainment, at least completed post-secondary, population 25+, male (%) (cumulative)
Educational attainment, at least completed post-secondary, population 25+, total (%) (cumulative)
Educational attainment, at least completed primary, population 25+ years, male (%) (cumulative)
Educational attainment, at least completed short-cycle tertiary, population 25+, female (%) (cumulative)
Educational attainment, at least completed short-cycle tertiary, population 25+, male (%) (cumulative)
Educational attainment, at least completed short-cycle tertiary, population 25+, total (%) (cumulative)
Educational attainment, at least completed upper secondary, population 25+, female (%) (cumulative)
Educational attainment, at least completed upper secondary, population 25+, male (%) (cumulative)
Educational attainment, at least completed upper secondary, population 25+, total (%) (cumulative)
Educational attainment, at least Master's or equivalent, population 25+, female (%) (cumulative)
Educational attainment, at least Master's or equivalent, population 25+, male (%) (cumulative)
Educational attainment, at least Master's or equivalent, population 25+, total (%) (cumulative)
Educational attainment, Doctoral or equivalent, population 25+, female (%) (cumulative)
Educational attainment, Doctoral or equivalent, population 25+, male (%) (cumulative)
Educational attainment, Doctoral or equivalent, population 25+, total (%) (cumulative)
Employment in agriculture (% of total employment) (modeled ILO estimate)
Employment in agriculture, female (% of female employment) (modeled ILO estimate)
Employment in agriculture, male (% of male employment) (modeled ILO estimate)
Employment in industry (% of total employment) (modeled ILO estimate)
Employment in industry, female (% of female employment) (modeled ILO estimate)
Employment in industry, male (% of male employment) (modeled ILO estimate)
Employment in services (% of total employment) (modeled ILO estimate)
Employment in services, female (% of female employment) (modeled ILO estimate)

Series Name
Employment in services, male (% of male employment) (modeled ILO estimate)
Energy intensity level of primary energy (MJ/$2011 PPP GDP)
Exclusive breastfeeding (% of children under 6 months)
Exports of goods and services (% of GDP)
Exports of goods and services (annual % growth)
External debt stocks (% of GNI)
Female genital mutilation prevalence (%)
Female share of employment in senior and middle management (%)
Firms expected to give gifts in meetings with tax officials (% of firms)
Firms with female participation in ownership (% of firms)
Firms with female top manager (% of firms)
Fish species, threatened
Foreign direct investment, net inflows (% of GDP)
Foreign direct investment, net inflows (BoP, current US$)
Forest area (% of land area)
Forest area (sq. km)
Forest rents (% of GDP)
GDP (constant 2010 US$)
GDP (constant LCU)
GDP (current LCU)
GDP (current US$)
GDP growth (annual %)
GDP per capita (constant 2010 US$)
GDP per capita (constant LCU)
GDP per capita (current LCU)
GDP per capita (current US$)
GDP per capita growth (annual %)
GDP per capita, PPP (constant 2017 international $)
GDP per capita, PPP (current international $)
GDP per person employed (constant 2017 PPP $)
GDP, PPP (constant 2017 international $)
GDP, PPP (current international $)
General government final consumption expenditure (annual % growth)
General government final consumption expenditure (constant 2010 US$)
GNI (constant 2010 US$)
GNI (constant LCU)
GNI per capita (constant 2010 US$)
GNI per capita (constant LCU)
GNI per capita (current LCU)
GNI per capita (US$)
GNI per capita growth (annual %)
GNI per capita, Atlas method (current US$)
GNI per capita, PPP (constant 2017 international $)
GNI per capita, PPP (current international $)

Series Name
GNI, PPP (constant 2017 international $)
GNI, PPP (current international $)
Gross capital formation (annual % growth)
Households and NPISHs Final consumption expenditure (annual % growth)
Immunization, DPT (% of children ages 12-23 months)
Immunization, HepB3 (% of one-year-old children)
Immunization, measles (% of children ages 12-23 months)
Imports of goods and services (annual % growth)
Incidence of HIV, ages 15-49 (per 1,000 uninfected population ages 15-49)
Incidence of malaria (per 1,000 population at risk)
Incidence of tuberculosis (per 100,000 people)
Individuals using the Internet (% of population)
Industry (including construction), value added per worker (constant 2010 US$)
Inflation, consumer prices (annual %)
Informal employment (% of total non-agricultural employment)
Informal employment, female (% of total non-agricultural employment)
Informal employment, male (% of total non-agricultural employment)
Intentional homicides (per 100,000 people)
Intentional homicides, female (per 100,000 female)
Intentional homicides, male (per 100,000 male)
Investment in energy with private participation (current US$)
Investment in transport with private participation (current US$)
Investment in water and sanitation with private participation (current US$)
Level of water stress: freshwater withdrawal as a proportion of available freshwater resources
Literacy rate, adult female (% of females ages 15 and above)
Literacy rate, adult male (% of males ages 15 and above)
Literacy rate, adult total (% of people ages 15 and above)
Literacy rate, youth (ages 15-24), gender parity index (GPI)
Literacy rate, youth female (% of females ages 15-24)
Literacy rate, youth male (% of males ages 15-24)
Literacy rate, youth total (% of people ages 15-24)
Lower secondary completion rate, female (% of relevant age group)
Lower secondary completion rate, male (% of relevant age group)
Lower secondary completion rate, total (% of relevant age group)
Mammal species, threatened
Manufacturing, value added (% of GDP)
Manufacturing, value added (current US$)
Marine protected areas (% of territorial waters)
Maternal mortality ratio (modeled estimate, per 100,000 live births)
Medium and high-tech Industry (including construction) (% manufacturing value added)
Merchandise trade (% of GDP)
Methodology assessment of statistical capacity (scale 0 - 100)
Mineral rents (% of GDP)
Mortality caused by road traffic injury (per 100,000 people)

Series Name
Mortality from CVD, cancer, diabetes or CRD between exact ages 30 and 70 (%)
Mortality from CVD, cancer, diabetes or CRD between exact ages 30 and 70, female (%)
Mortality from CVD, cancer, diabetes or CRD between exact ages 30 and 70, male (%)
Mortality rate attributed to household and ambient air pollution, age-standardized (per 100,000 population)
Mortality rate attributed to household and ambient air pollution, age-standardized, female (per 100,000 female population)
Mortality rate attributed to household and ambient air pollution, age-standardized, male (per 100,000 male population)
Mortality rate attributed to unintentional poisoning (per 100,000 population)
Mortality rate attributed to unintentional poisoning, female (per 100,000 female population)
Mortality rate attributed to unintentional poisoning, male (per 100,000 male population)
Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (per 100,000 population)
Mortality rate, neonatal (per 1,000 live births)
Mortality rate, under-5 (per 1,000 live births)
Mortality rate, under-5, female (per 1,000 live births)
Mortality rate, under-5, male (per 1,000 live births)
Multidimensional poverty headcount ratio (% of total population)
Multidimensional poverty headcount ratio, children (% of population ages 0-17)
Multidimensional poverty headcount ratio, female (% of female population)
Multidimensional poverty headcount ratio, household (% of total households)
Multidimensional poverty headcount ratio, male (% of male population)
Multidimensional poverty index (scale 0-1)
Multidimensional poverty index, children (population ages 0-17) (scale 0-1)
Multidimensional poverty intensity (average share of deprivations experienced by the poor)
Natural gas rents (% of GDP)
Net official development assistance and official aid received (current US$)
Net official development assistance received (constant 2018 US$)
Net official development assistance received (current US$)
Net official development assistance received (current US$)
New business density (new registrations per 1,000 people ages 15-64)
Nondiscrimination clause mentions gender in the constitution (1=yes; 0=no)
Number of people spending more than 10% of household consumption or income on out-of-pocket health care expenditure
Number of people spending more than 25% of household consumption or income on out-of-pocket health care expenditure
Nurses and midwives (per 1,000 people)
Oil rents (% of GDP)
Over-age students, primary (% of enrollment)
Over-age students, primary, female (% of female enrollment)
Over-age students, primary, male (% of male enrollment)
Patent applications, nonresidents
Patent applications, residents

Series Name
People practicing open defecation (% of population)
People practicing open defecation, rural (% of rural population)
People practicing open defecation, urban (% of urban population)
People using at least basic drinking water services (% of population)
People using at least basic drinking water services, rural (% of rural population)
People using at least basic drinking water services, urban (% of urban population)
People using at least basic sanitation services (% of population)
People using at least basic sanitation services, rural (% of rural population)
People using at least basic sanitation services, urban (% of urban population)
People using safely managed drinking water services (% of population)
People using safely managed drinking water services, rural (% of rural population)
People using safely managed drinking water services, urban (% of urban population)
People using safely managed sanitation services (% of population)
People using safely managed sanitation services, rural (% of rural population)
People using safely managed sanitation services, urban (% of urban population)
People with basic handwashing facilities including soap and water (% of population)
People with basic handwashing facilities including soap and water, rural (% of rural population)
People with basic handwashing facilities including soap and water, urban (% of urban population)
Periodicity and timeliness assessment of statistical capacity (scale 0 - 100)
Personal remittances, received (% of GDP)
Physicians (per 1,000 people)
Plant species (higher), threatened
PM2.5 air pollution, mean annual exposure (micrograms per cubic meter)
PM2.5 air pollution, population exposed to levels exceeding WHO guideline value (% of total)
PM2.5 pollution, population exposed to levels exceeding WHO Interim Target-1 value (% of total)
PM2.5 pollution, population exposed to levels exceeding WHO Interim Target-2 value (% of total)
PM2.5 pollution, population exposed to levels exceeding WHO Interim Target-3 value (% of total)
Population living in slums (% of urban population)
Portfolio investment, net (BoP, current US$)
Poverty headcount ratio at $1.90 a day (2011 PPP) (% of population)
Poverty headcount ratio at national poverty lines (% of population)
PPP conversion factor, GDP (LCU per international $)
PPP conversion factor, private consumption (LCU per international $)
Preprimary education, duration (years)
Prevalence of anemia among women of reproductive age (% of women ages 15-49)
Prevalence of current tobacco use, females (% of female adults)
Prevalence of current tobacco use, males (% of male adults)
Prevalence of HIV, female (% ages 15-24)
Prevalence of HIV, male (% ages 15-24)
Prevalence of HIV, total (% of population ages 15-49)
Prevalence of moderate or severe food insecurity in the population (%)
Prevalence of overweight, weight for height (% of children under 5)
Prevalence of overweight, weight for height, female (% of children under 5)
Prevalence of overweight, weight for height, male (% of children under 5)

Series Name
Prevalence of severe food insecurity in the population (%)
Prevalence of severe wasting, weight for height (% of children under 5)
Prevalence of severe wasting, weight for height, female (% of children under 5)
Prevalence of severe wasting, weight for height, male (% of children under 5)
Prevalence of stunting, height for age (% of children under 5)
Prevalence of stunting, height for age, female (% of children under 5)
Prevalence of stunting, height for age, male (% of children under 5)
Prevalence of undernourishment (% of population)
Prevalence of underweight, weight for age (% of children under 5)
Prevalence of underweight, weight for age, female (% of children under 5)
Prevalence of underweight, weight for age, male (% of children under 5)
Prevalence of wasting, weight for height (% of children under 5)
Prevalence of wasting, weight for height, female (% of children under 5)
Prevalence of wasting, weight for height, male (% of children under 5)
Primary completion rate, female (% of relevant age group)
Primary completion rate, male (% of relevant age group)
Primary completion rate, total (% of relevant age group)
Primary education, duration (years)
Primary government expenditures as a proportion of original approved budget (%)
Proportion of people living below 50 percent of median income (%)
Proportion of population spending more than 10% of household consumption or income on out-of-pocket health care expenditure (%)
Proportion of population spending more than 25% of household consumption or income on out-of-pocket health care expenditure (%)
Proportion of seats held by women in national parliaments (%)
Proportion of time spent on unpaid domestic and care work, female (% of 24 hour day)
Proportion of time spent on unpaid domestic and care work, male (% of 24 hour day)
Proportion of women subjected to physical and/or sexual violence in the last 12 months (% of women age 15-49)
Pupil-teacher ratio, lower secondary
Pupil-teacher ratio, preprimary
Pupil-teacher ratio, primary
Pupil-teacher ratio, secondary
Pupil-teacher ratio, tertiary
Pupil-teacher ratio, upper secondary
Railways, goods transported (million ton-km)
Railways, passengers carried (million passenger-km)
Renewable electricity output (% of total electricity output)
Renewable energy consumption (% of total final energy consumption)
Renewable internal freshwater resources per capita (cubic meters)
Renewable internal freshwater resources, total (billion cubic meters)
Research and development expenditure (% of GDP)
Researchers in R&D (per million people)
Rural poverty headcount ratio at national poverty lines (% of rural population)

Series Name
School enrollment, preprimary (% gross)
School enrollment, preprimary, female (% gross)
School enrollment, preprimary, male (% gross)
School enrollment, primary (gross), gender parity index (GPI)
School enrollment, primary and secondary (gross), gender parity index (GPI)
School enrollment, secondary (gross), gender parity index (GPI)
School enrollment, tertiary (% gross)
School enrollment, tertiary (gross), gender parity index (GPI)
School enrollment, tertiary, female (% gross)
School enrollment, tertiary, male (% gross)
Secondary education, duration (years)
Services, value added per worker (constant 2010 US$)
Share of youth not in education, employment or training, female (% of female youth population)
Share of youth not in education, employment or training, male (% of male youth population)
Share of youth not in education, employment or training, total (% of youth population)
Source data assessment of statistical capacity (scale 0 - 100)
Statistical Capacity score (Overall average)
Suicide mortality rate (per 100,000 population)
Suicide mortality rate, female (per 100,000 female population)
Suicide mortality rate, male (per 100,000 male population)
Tariff rate, applied, simple mean, all products (%)
Tariff rate, applied, simple mean, manufactured products (%)
Tariff rate, applied, simple mean, primary products (%)
Tariff rate, applied, weighted mean, all products (%)
Tariff rate, applied, weighted mean, manufactured products (%)
Tariff rate, applied, weighted mean, primary products (%)
Tax revenue (% of GDP)
tax revenue (current LCU)
Terrestrial and marine protected areas (% of total territorial area)
Terrestrial protected areas (% of total land area)
Total alcohol consumption per capita (liters of pure alcohol, projected estimates, 15+ years of age)
Total alcohol consumption per capita, female (liters of pure alcohol, projected estimates, female 15+ years of age)
Total alcohol consumption per capita, male (liters of pure alcohol, projected estimates, male 15+ years of age)
Total fisheries production (metric tons)
Total natural resources rents (% of GDP)
Total reserves in months of imports
Trained teachers in lower secondary education (% of total teachers)
Trained teachers in lower secondary education, female (% of female teachers)
Trained teachers in lower secondary education, male (% of male teachers)
Trained teachers in preprimary education (% of total teachers)
Trained teachers in preprimary education, female (% of female teachers)
Trained teachers in preprimary education, male (% of male teachers)

Series Name
Trained teachers in primary education (% of total teachers)
Trained teachers in primary education, female (% of female teachers)
Trained teachers in primary education, male (% of male teachers)
Trained teachers in secondary education (% of total teachers)
Trained teachers in secondary education, female (% of female teachers)
Trained teachers in secondary education, male (% of male teachers)
Trained teachers in upper secondary education (% of total teachers)
Trained teachers in upper secondary education, female (% of female teachers)
Trained teachers in upper secondary education, male (% of male teachers)
Unemployment, female (% of female labor force) (modeled ILO estimate)
Unemployment, female (% of female labor force) (national estimate)
Unemployment, male (% of male labor force) (modeled ILO estimate)
Unemployment, male (% of male labor force) (national estimate)
Unemployment, total (% of total labor force) (modeled ILO estimate)
Unemployment, total (% of total labor force) (national estimate)
Unemployment, youth female (% of female labor force ages 15-24) (modeled ILO estimate)
Unemployment, youth female (% of female labor force ages 15-24) (national estimate)
Unemployment, youth male (% of male labor force ages 15-24) (modeled ILO estimate)
Unemployment, youth male (% of male labor force ages 15-24) (national estimate)
Unemployment, youth total (% of total labor force ages 15-24) (modeled ILO estimate)
Unemployment, youth total (% of total labor force ages 15-24) (national estimate)
Urban population
Urban population (% of total population)
Urban population growth (annual %)
Urban poverty headcount ratio at national poverty lines (% of urban population)
Wage and salaried workers, female (% of female employment) (modeled ILO estimate)
Wage and salaried workers, male (% of male employment) (modeled ILO estimate)
Wage and salaried workers, total (% of total employment) (modeled ILO estimate)
Water productivity, total (constant 2010 US$ GDP per cubic meter of total freshwater withdrawal)
Women Business and the Law Index Score (scale 1-100)
Women making their own informed decisions regarding sexual relations, contraceptive use and reproductive health care (% of women age 15-49)
Women who were first married by age 15 (% of women ages 20-24)
Women who were first married by age 18 (% of women ages 20-24)