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Application of sustainability concept in selected sub-regions: The case of Finland as member of the European Union

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Outline:
- Sustainability the organizing principle for meeting human development goals in a region.
- Describe Economic, social and environmental factors that sustainability affect.
- Comparative analysis of sustainability to the ecosystem and the relevance to human survival.
- The key role that sustainability brings on the economic development of a region.
- Analysis of the impact of sustainability on the social, economic and environmental systems.

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AUTHOR'S DECLARATION

I hereby declare:

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In Pardubice on May 31,2020 **George Owusu Aning**

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ANNOTATION

The aim of this work was to identify the specific programmes embarked on by the Finnish government in chalking the success in sustainable development, and to highlight the thematic areas measurable in line with the Sustainable Development Goals. The work was partially theoretical analysis of sustainable development in the study area.

The research arrived at its objective through the use of secondary sources of data analysed qualitatively. Data on sustainable development from local (Finland) regional (EU) and international (UN and its bodies, and OECD) levels were accessed and assessed to allow for a comprehensive conclusion with regard to the country's local efforts and programmes that guide their commitment to the SDGs.

Social and academic programmes were the channels through which sustainable development ideas are inculcated into the public. Finland has been successful in all the thematic areas that were investigated, standing tall among countries in the World development.

The country's effort towards sustainable development permeates every aspect of their local, regional, and state level policies. The office of the prime minister is the spearhead for the agenda, its commitment and readiness to enhance the campaign is evident in the policies of both private and public organizations. Sustainable development policies are consciously interspersed in policies of sector ministries. Among the various themes where sustainable development was practically measured were climate change, relative to renewable consumption and production, energy efficiency and sustainable usage of ecosystem services.

Other areas include assessments based on the following dimensions of human well-being and societal development; sustainable society index (SSI), World happiness index (WHI), the World's most literate Nations, corruption perception index (CPI), good country index (GCI), fairness for children, and open data index (ODI).

KEYWORDS

Sustainable development, economic sustainability, environmental sustainability, social sustainability, Finland, pillars of sustainable development.

ANOTACE

Cílem této práce bylo identifikovat konkrétní programy zahájené finskou vládou při křídění úspěchu v udržitelném rozvoji a zdůraznit tematické oblasti měřitelné v souladu s cíli udržitelného rozvoje. Práce byla částečně teoretickou analýzou udržitelného rozvoje ve studované oblasti.

Výzkum dosáhl svého cíle pomocí kvalitativně analyzovaných sekundárních zdrojů dat. Byly zpřístupněny a vyhodnoceny údaje o udržitelném rozvoji z místní (finské) regionální (EU) a mezinárodní (OSN a její orgány a OECD) s cílem umožnit komplexní závěr, pokud jde o místní úsilí země a programy, které řídí jejich závazek vůči SDG.

Komunitní a akademické programy byly kanály, díky nimž jsou myšlenky udržitelného rozvoje vštěpovány veřejnosti. Finsko bylo úspěšné ve všech tematických oblastech, které byly zkoumány, a mezi zeměmi světového rozvoje je vysoká.

Úsilí země o udržitelný rozvoj prostupuje všemi aspekty jejich místních, regionálních a státních politik. Kancelář předsedy vlády je v čele agendy, její závazek a připravenost na posílení kampaně je patrná v politikách soukromých i veřejných organizací. Politiky udržitelného rozvoje se vědomě prolínají v politikách resortních ministerstev. Mezi různá témata, ve kterých byl udržitelný rozvoj prakticky měřen, byly změna klimatu, relativní spotřeba a výroba obnovitelných zdrojů, energetická účinnost a udržitelné využívání ekosystémových služeb.

Mezi další oblasti patří hodnocení založená na následujících dimenzích lidské pohody a rozvoje společnosti; index udržitelné společnosti (SSI), index štěstí světa (WHI), nejznámější

národy světa, index vnímání korupce (CPI), index dobré země (GCI), spravedlnost pro děti a index otevřených dat (ODI).

KLÍČOVÁ SLOVA

Udržitelný rozvoj, ekonomická udržitelnost, environmentální udržitelnost, sociální udržitelnost, Finsko, pilíře udržitelného rozvoje.

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LIST OF ABBREVIATIONS

CFC - Chlorofluorocarbon

CPI – Corruption Perception Index

CHP - Combined Heat and Power

DW - Deutsche Welle

EC - European Commission

EPI - Environmental Policy of Integration

EU - European Union

FNCD - Forestry and Nature Conservation Department

FTSE - First Tier Sustainable Equilibrium

FIBS - Finnish International Baccalaureate Society

FCSD - Finnish Commission on Sustainable Development

GDI - Gender Development Index

G II - Gender Inequality Index GDP - Gross Domestic Product

GNI - Gross National Income

GHG - Greenhouse Gas Emission

HDI - Human Development Index

IAEG - Inter-Agency Expert Group

IDRC - International Development Research Centre

IEEP – Institute for European Environmental Policy

IGPCC - Inter-Governmental Panel on Climate Change

IUCN - International Union for Conservation of Nature and Natural Resources

LPG - Liquid Petroleum Gas

MDG - Millennium Development Goals

MONET - Monitoring of Sustainable Development Project

NCSD - National Commission for Sustainable Development

NIHW - National Institute for Health and Welfare

OECD - Organization of Economic Cooperation and Development

SDG - Sustainable Development Goals

SDNS - Sustainable Development Solutions Network

TBL - Triple Bottom Line

TNS - Transparent Network Substrate

UN - United Nation

UNCED - United Nations Conference on Environment and Development

UNPD - United Nations Population Division

WCED - World Commission on Environment and Development

WHI - World happiness index

INTRODUCTION

In making a strong case for the future of the World one would against all forms of intuition and faith consider the practical steps required to realize such projections. The issue of a predictable global threat has occupied the global public debate over the years in the midst of a World characterised by abundant technological knowledge and population growth incomparable to no other generation of humanity (Gretchen & Barbara, 2012). The impatient global population growth has been described as a major factor to contend with in our aspiration to sustain the humanity and the ecosystem that supports man's life (Shaker, 2015).

Sustainability is defined as the practice of maintaining the process of productivity indefinitely through the effort of humans by consciously replacing used resources of equal or greater value without debasing or incapacitating the ecosystem from carrying out its natural mandate (Elliot, 2012). The object of any theoretical/hypothetical or conventional framework on sustainable development is aimed at a addressing the interplay between an agenda for the carrying capacity of the natural system and social, environmental and economic challenges confronting humanity (Finn, 2009).

The root of sustainable development can be traced to the ideas regarding sustainable forest management developed and propagated in Europe during the 17th and 18th Centuries (Ulrich, 2007). In his response to a growing rate of public awareness of the indiscriminate and careless depletion of the timber resources in England, John Evelyn proposed strongly the idea of growing and planting of trees as national and patriotic duty of every citizen who owns land in England (Blewit, 2015). This policy according to Blewit will stop the careless destruction and rapacious exploitation of the natural resources. This policy gained currency years after the ruthless destruction of the natural forest reached its alarming rate in Europe and elsewhere (Perez-Carmona, 2013).

The ideation of sustainable development introduced by John Evelyn then became the term adopted by relevant institutions as the organizing principle for meeting the goals of humanity of each generation while concurrently maintaining the integrity of the natural ecosystem to provide ecosystem services upon which the economy and the society thrive (Turner, 1998). Moreover, the ultimate definition of the term sustainable development is the desire to meet human needs in an era of a teeming global population in a world characterize by inadequate

resources and technological advancement where individual survival takes precedents over the collective good while at the same time pre-empting the undermining of the ecosystem to cater for the needs of the unborn generation (Mowforth and Munt, 2015).

Adopted and popularized in the Brundtland Report in 1987, the concept has shifted its focus more towards economic, social and environmental protection for the current and future generations. There is, however, a growing concern for humans to as a matter of international, national and regional commitment find a mutual consensus to commit to the aspiration to mitigate the destruction of the ecosystem in a sustainable way.

Anthropogenic activities border the environment when such activities are unguarded and unregulated. Technological advancement at its apogee has enabled man to overpower nature by taming and abusing the ecosystem in order to satisfy our greed. Technological change effectively increases the supply of resources by contributing to new discoveries and allowing deeper and advance extraction of stocks that could not have been reached before (British Pertoleum , 2009).

The uncontrollable upsurge of global population means that human beings expand their settlement and breadbasket in order to accommodate the population and to feed the millions of mouths. Such every day and natural aspirations of humans have dire consequences for the ecosystem (Goudie, 2015). The ecosystem is responsible for the source of all humans needs.

Continuous exploitation of the ecosystem for human satisfaction without a committed effort to replenish it presages a dangerous shortage of natural resources for the sustenance of the future generation. For instance, Kolawole, (2001) pointed out that the global food security has been questioned recently, with unprecedented increase in food prices as a result of a palpable effects of climatic conditions on agricultural production, soaring of oil prices concomitantly rising the cost of production, increase in the use of food items for other basic human products and a slash down on government's spending on agriculture. According to a United Nations' report, humanity is facing a drastic problem of water scarcity (United Nations, 2009). Population boom accounts for the destruction of a huge fraction of the natural habitats, as the population expands human's needs expand concurrently. According to Kartz & Weaver, (2003) environmental sustainability still remain in a realm of phantasm due to hasty industrialization, urbanization and population rise, with the public pathetically

oblivious of the effects of unsustainable anthropogenic activities on the land (Katz & Weaver, 2003).

As a matter of fact, the survival interest of the current generation must not be sacrificed for the interest of the future; neither must the interest of the future generation be mortgaged by our quest to meet the needs of the current generation. The Sustainable Development Goals (SDGs) which is a sequel to the Millennium Development Goals (MDGs) outlines the responsibility of member states of the United Nation (UN) to integrate the recommendations therein in their domestic policies so as to sustain their states under the three main thematic areas of social, economic and environmental, captured in 17 comprehensive points to be accomplished by 2030 (United Nations, 2015).

While the objective is to offer a set of universal goals that meet the exigent environmental, social and economic problems confronting the World, individual member states that signed in 2012 and adopted the document in 2015 are responsible for enacting policies that oversee the attainment of these goals. As a member of the United Nations, what are the efforts made by Finland in pulling her weight towards their commitment to the SDGs? This work evaluates the outcomes of sustainable development goals of Finland consequent to their policies and programmes designed and implemented, with respect to the three main thematic areas of economic, social and environment which are foundational to attaining the SDGs.

The purpose of the thesis comprises also besides sustainability strategy of the member state of the EU is the progressive contribution to the theoretical aspects of sustainability. A wide array of literatures, reports and legal documents on sustainable development were subjected to intense analysis and criticism.

The aim of the work is to evaluate the outcome of the country's policies and programmes within the concept of sustainable development in terms of their effectiveness and efficiency toward the global effort to sustain the globe and the people within.

The following are the objectives of the thesis;

1. To find out the areas of social sustainable developments in Finland.
2. To find out the areas of economic sustainable developments in Finland.
3. To find out the areas of environmental/industrial sustainable development in Finland.

4. To analyse the country's effort towards local and regional sustainability efforts in terms of programmes and policy commitments.

The following research questions were formulated to provide meaning to the objectives of the work.

1. What are the inclusive criteria for identifying sustainable development in Finland?
2. What are the indices for measuring Finland's sustainable economic developments?
3. How do we measure the contribution of Finland in reducing industrial impacts on the climate change?
4. What approach is adopted by the government in ensuring the involvement of its citizens in sustainable development; thus, either a bottom up or top down approach?

1 CONCEPT OF SUSTAINABLE DEVELOPMENT

In order for the term ‘’Sustainable Development’’ to be understood, there is the need for it to be defined from literal as well as operational point of view. In principle, the term sustainable development suggests a World where life is comfortable for every human being regardless of their geographical location and the generation they belong, practically, the term connotes that individual human beings must endeavour to simplify their desires in order to preserve the ecosystem for future generations. This chapter conducts serious inquiry into the concept of sustainable development by interrogating the various concepts by various scholars and from various organizations’ point of understanding.

Allen (2007) avers that term sustainable development is an organizing principle for meeting human development goals while simultaneously sustaining the ability of the natural system to prove the natural resources and ecosystem services based on which the economy and society depends for survival.

Sustainable development is defined as a sort of development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs (Shah, 2008). According to Shah, the concept extends beyond the merely material needs to include values, relationships, freedom of thought and opinion, act and start and or partake in any discussion of public interest. All amounts to sustainable life, morally, and spiritual wellbeing.

According to Manickam, Krishna, Shanti, & Radhika, (2014) the concept of sustainable development encapsulates the ideation of nature as metaphorically having certain rights, that have stewardship of the World and the essence of putting the beneficiary of the services of the ecosystem at the forefront of resolving global issues emanating from their own interactions with nature. Sustainable development recognizes that human and society growth must be both inclusivity and environmentally healthy to reduce poverty and shared responsibility where global citizens participate in the process and share in the outcome equitably and continue to secure the fertility and fecundity of nature to supply the needs of the future generation.

Yeng & Ye, (2015) conceptualize sustainable development as a mode propounded when humanity faces environmental pressures and threat from all facets with the purpose for the harmonious development and environmental safety. Yeng and friend defined such threat as the product of the inevitable interaction between society and nature, this, to the writer's interrupts in the regional sustainable development aspirations. While the interaction is crucially inevitable the end product creates a situation that presage a threat to the integrity of nature to successfully undertake similar interaction with future generation.

Certain intangible elements of the sustainable development goals include equity and justice; these according to Christopher & Barry, (2017) are indispensable in assessing the success of any policy of sustainable development. Sustainable development is generically regarded as orbiting in a coalescing formation around economic development, social development and environmental protection (Becker, 2014). New Oxford American Dictionary, (2005), defined sustainable development as something that is able to be upheld or defended. By the antecedent of the definition offered by the New Oxford American Dictionary, sustainable development is the development that can withstand the test of time, and the second part of the definition suggests that sustainable development is the kind of development that can be protected and preserved from the adverse impact of events and processes.

The Brundtland committee provides an all-encompassing definition of sustainable development; the commission defined sustainable development as a lifelong commitment by humanity to reasonably preserve the ecosystem's capacity to provide services to the future generation after having tap same services for their sustenance (Brundtland Commission, 1987).

The sustainable development goals (SDG) outlined by the United Nation touches on seventeen core thematic areas that emphasis a holistic approach to defining and attaining sustainable development for all. These seventeen core points captured in the SDG document include; (1) No poverty, (2) Zero hunger, (3) Good health and well-being, (4) Quality education, (5) Gender equality, (6) Clean water and sanitation, (7) Affordable and clean energy, (8) Decent work and economic growth, industry, (9) Innovation and infrastructure, (10) Reduced inequality, (11) Sustainable cities and communities, (12) Responsible consumption and production, (13) climate action, (14) life below water, (15) life on land (16) peace and justice strong institutions and (17) Partnership to achieve the goals.

All attempts to conceptualize sustainable development must find meaning within the seventeen core areas aforementioned, not because it emanates from the authority of the UN or endorsed by the Brundtland commission but also sanctioned by dictionaries. All the seventeen thematic areas hinge on three main pillars being economic, social and environmental aspirations. The sole and incontrovertible goal of the SDGs is to create a ‘’Paradise’ on earth. While this principle sounds lavishing and tantalizing, human beings are responsible for turning the idea from a mere fantasy to reality by operationalizing the nitty-gritty enshrined in the SDGs. In view of this, this thesis will be defined respective of the seventeen areas that form the subject matter of the SDGs.

2 METHODOLOGY

This chapter discusses the methods used for data collection, explanations and presentation of findings. Qualitative and quantitative approaches were employed to explain the various variables identified from the data assembled. Secondary data was used. Data were sourced from reputable organizations from within and outside the study area. Relevant internal as well as international institutions were recourse for information relative to the objectives of the study.

The aim of the research was to assess the outcome of sustainable development programmes and projects embarked on by the government of Finland in meeting the goals as enshrined in the Sustainable Development Goals anchored on the three main pillars of; social, economic and environmental commitments.

2.1 Research Design

Descriptive survey design analysis was employed to gather data, analyse them, and present the findings on the current sustainable development programmes and projects in the study area. Since the study is aimed at researching into the current programmes and projects, descriptive research presents itself as ideal for the work. Aarts (2005) concludes that descriptive research design is suitable for a research if the researcher aimed at presenting a clear overview of the current state of affairs.

According to McCombes, (2019) descriptive survey research allows the researcher to describe situation or phenomenon accurately based on data assembled. Descriptive research also allows the researcher to use a wide array of quantitative and qualitative methods to investigate one or several variables. In the words of McCombes, descriptive survey design allows the researcher to assemble large volumes of data on evaluating the level of satisfaction with a company's products; institutions performance assessment appraisal and organizations service and estimating public opinion on political and social topics This make the method highly recommendable for a study of this nature.

2.2 Study approach

The study employed both qualitative and quantitative approach for the collection of data and interpretation of results. Statistical data in the form of numbers, frequencies and percentages were sourced for analysis; this data were normally in the form of numbers, this justifies the use of the quantitative approach because it normally deals with numbers and statistics in presenting trends and records according to (Streekferk, 2019). Conclusions made by other writers on the research topic in the form of words and meaning, particularly those that relate to the study area were used and this provided cogent grounds for the application of qualitative approach.

Lehaney & Vinten (1994) argued that qualitative approach to data interpretation relies on words and meanings. The justification for the use of the two approaches simultaneously is that there were two different forms of data, those that needed quantitative interpretation and another that needed to be qualitatively interpreted.

The advantage derived from the deployment of the two approaches is that, they dealt with any possible vacuum that could have occurred in the process of interpretation if only one approach was used; in view of this the strength of one approached offset the other where the weakness of the other was exposed.

2.3 Study area

The research was undertaken in Finland one of the countries within the European Union. Historically, considered a former colony of the Soviet Union Finland is the eight-largest country in Europe. The country has a population of 5.518 million (Worldometer, 2020). Its administrative capital is Helsinki. With a Gross Domestic Product (GDP) of $252,301, the country is ranked the 42nd richest country in the World (Worldometer, 2020). Finland is among the three countries that joined the European Union (EU) in 1995 (Bache & Stephen, 2006). Located in the northern part of Europe, Finland is bordered by the Baltic Sea, Gulf of Bothnia with Sweden to the west, Norway to the north and Russia to the east (WorldAtlas, 2018).

Finland is committed to reaching the goals in the sustainable development documents both at home and in their bilateral and multilateral cooperation. Finland's development cooperation supports this commitment. The country membership to the European Union makes them a force to reckon with in the campaign for global sustainable agenda, particularly in the area of environment (Ministry of Foriegn Affairs, 2018). Noted as one of the countries committed to attaining the sustainable development goals, Finland has a strong tradition where successive governments have a common uncompromising policy that back their sustainable programmes.

Institutional bodies and organization that were used for the study shared common interest in sustainable developments. The baseline for selection was determined by the date for their establishment, since the sustainable development goals (SDGs) serves as the foundation for measuring indicators for sustainable development. Institutions that were primarily established consequent to the adoption of the SDGs were used predominantly for the study.

The selection of Finland for this study was informed by their worthwhile measurable efforts in all the three thematic areas aforementioned. The country's commitment to sustainable development goals have been commended by international and regional bodies, their seriousness to the agenda extends the boarders of the country, for instance their role in providing tangible and intangible aid to economically weak countries in their effort to adhere to the standards indicated in the agenda2030 inspires the use of the country as the study area for any academic writing on sustainable development such as this.

The country's sustainability development is popularly hinged on the three pillars of economic, social and environment. Measuring the level of compliance by states to the Sustainable Development Goals is founded on the three key thematic areas of society improvement, economic improvement, and environmental improvement, all under the auspices of strategic long-term sustainable policies and programmes. Finland lives up to the standards of sustainable development that touches on all the three pillars outlined previously.

Their successes were quantitatively measured. The thesis is to examine sustainable development programmes and projects in Finland and assess the indicators of success.

2.4 Data collection

Source of data collection were institutions operating in Finland as well as those outside the geographical boundary of the country. Reputable sites, such as those of European Union (EU), Inter-governmental panel of climate change, (IPCC) organization of economic cooperation and development (OECD) European Statistics (Eurostats), European Commission (EC), Environmental statistics and accounts, the Sustainable Development Solutions Network (SDNS) and the Institute for European Environmental Policy (IEEP).

Finish sources included; Statistics Finland (SF), National Institute for Health and Welfare (NIHW), Natural Resources Institute of Finland (NRIF), Finnish National Commission on Sustainable Development (FNCSD) and Inter-Agency and Expert Group (IEAG). Statistics Finland compiles data measuring Finland's progress on global Sustainable development Goal indicators of the UN 2030 agenda periodically (Ministry of Foreign Affairs of Finland, 2018). The website served as reliable and authentic source of information for the work.

Timelines for the data collected was between 2000 and 2019. This does not suggest that data length should extend between the two extremes but could be in between them. Although the SDGs which provide a framework for the work was adopted by countries in 2015, the country have chalked some success in sustainable development prior to 2015, this is why data pre-dating 2015 were also assessed. However, a chunk of the data was based on 2015 to 2019.

2.5 Chapter Summary

The study employed descriptive survey design for data collection and interpretation. Data was obtained from secondary sources and were analysed using qualitative and quantitative approaches. Study area was Finland one of the countries deeply committed to the ideals of the SDGs. Data on sustainable development from local, regional and international organizations and institutions were accessed and assessed.

Some of the regional sources of information are European statistics (Eurostats), European Commission (EC), Environmental statistics and accounts Sustainable Development Solutions Network (SDNS). Internal sources of information were obtained from statistics Finland, National Institute for Health and Welfare (NIHW), Natural Resources Resource Institute of

Finland (NRIF). International source of information includes the inter-governmental panel on climate change (IGPCC) and organization of economic cooperation and development.

3 THEORETICAL BACKGROUND OF SUSTAINABLE DEVELOPMENT

Under this chapter the researcher provides a brief historical account of the term sustainable development and provides a snapshot of the definition put forward by experts in the field. It also assesses the explicit definition offered by MONET a major stakeholder in the sustainable development agenda. Prominent models that throw more light on the topic were also deciphered and critiqued so as to ground the thesis on a distinctive, yet powerful perspective.

Some models for informing proper micro and macro sustainable policies were also delved into. The various nuances and conflicting issues differentiating the definitions were interrogated in one of the sub-chapters, and finally the modern document on sustainable development; the Rio+20 was discussed, as it provided the indicators by which the empirical chapter of the thesis was founded. In view of the avalanche of models and concepts of sustainable development with various relevance and publicities, the approaches and concepts in this study have been selected to provide support for the aim of the thesis.

The objective of this diploma work is partly to convey a sort of survey of theoretical concepts with regard to their possible application in real regional development, partly demonstrating the possibilities in the scope evaluation of measures and policies implemented in Finland within the context of local, regional and global commitment to sustainable development.

3.1 History and definition of sustainable development

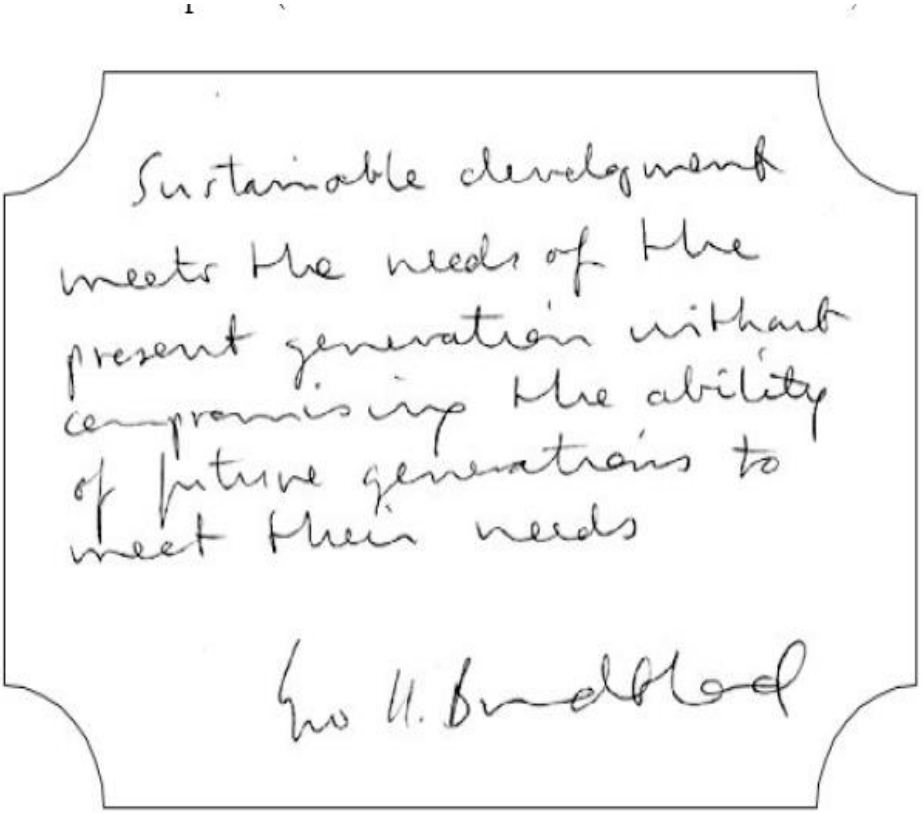
Sustainable development as a universal term became the fundamental guiding principle for the development of humanity by the close of the last millennium. According to Keiner, (2005) its success emanates from the underpinning reflexions on problems of human existence recognized at the time, increasing concern about excessive exploitation of natural resources and economic growth to the peril of environmental preservation.

The basic ideation of sustainable development was conceptualized by Calrowitz when he edited the initial book on forest science (Keiner, 2005). Carlowitz had propounded that a moment would arrive in the history of mankind when timber would be as important as our daily bread is today, consequently timber resources should be optimized with keen caution in

a manner that will balance timber growth and its usage. This according to Carlowitz will ensure an unending lumbering and perpetuity of its usage for the survival of the human race.

At the backdrop of his claims, he proposed that mankind should endeavour to manage his economy in a fashion that he would not be deprived of timber resources, and in areas where we lumber we are enjoined to travail to ensure replanting in order to replenish the forest (Carlowitz, 1713 cited in Kasthofer, 1818). As forestry projects into the interest of generations yet unborn, the opinions of Carlowitz is premised on an unabated use of resources as the central theme of sustainable development. Rebranded in a wider socio-political and economic vision by the World Commission on Environment and Development or the Brundtland Commission in 1987, sustainable development is a global responsibility.

Figure 1: Definition of sustainable development (autograph of Gro Harlem Brundtland)



Source: www.researhgate.net (2015)

Since the ratification of the Brundtland Commission's report on sustainable development by World stakeholders in sustainable development, the definition of the term has been subject to many modifications and redefinition by various scholars from different perspectives (Keiner,

2005). The relative largely unspecified definitions offered to sustainability differ radically. In fact, the diversity in definition of the term is vast today, more than any other period in the history of the term. However, innumerable definitions of sustainable development are underscored by the idea of viability of the natural resources and ecosystem services in relation to respectable living standards of people and economic growth of societies.

3.2 The Swiss Monitoring of Sustainable Development Project (MONET)

In an attempt to offer precise definition and full operational explanation to the fundamental principle of sustainable development, institutions and relevant organizations of international and regional interest have defined the term, for instance the Swiss Monitoring of Sustainable Development projects (MONET) premises their definition of the term on the 10 Bellagio Principles which say that any evaluation of the progress toward sustainable development should be informed by a precise vision of sustainable development (Hardi & Zdan, 1997).

On this basis MONET modified the definition offered in the Brundtland commission report adopting instrumental elements such as, justice, intra-generational and intergenerational equity, maintenance of options, meeting of societal needs, and maintenance of bio-diversity. Consequently, MONET opined the following definition to sustainable development:

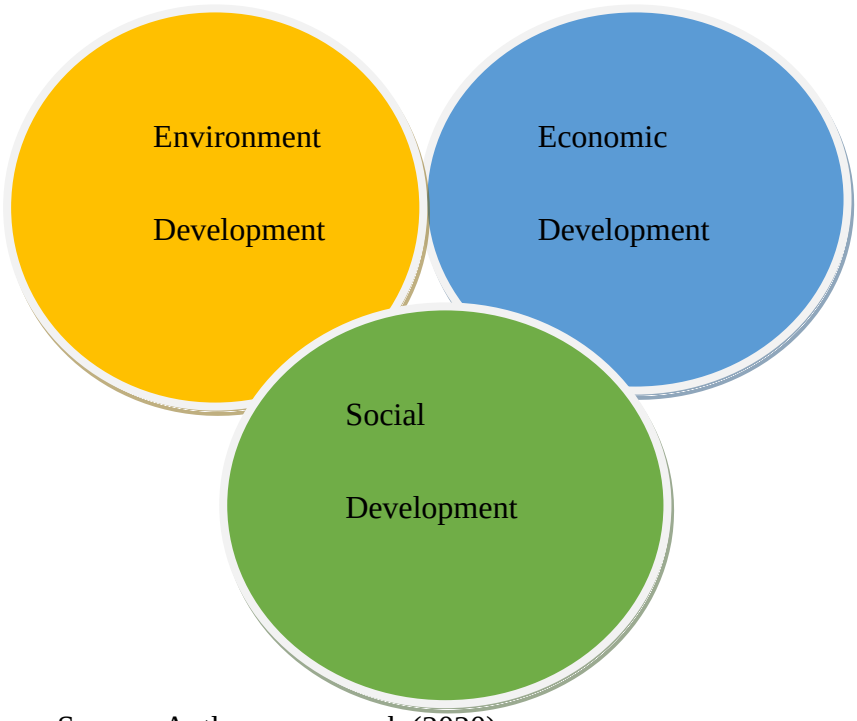
''Sustainable development means ensuring dignified living conditions with regard to human rights by creating and maintaining the widest possible range of options for freely defining life plans. The principle of fairness among and between present and future generations should be taken into account in the use of environmental, economic and social resources.

Putting these needs into practice entails comprehensive protection of bio-diversity in terms of ecosystem, species and genetic diversity, all of which are the vital foundations of life.''

3.3 Analysing the models of sustainable development

What spurs on the popularity and general acceptability of the term comes from the simplicity of a particular model adopted to facilitate its easy understanding; hinging the term on three axis of environment, economic and social; the conservation and preservation of the environment, the growth of the economy and guarantee of social equity. Generally, the term and ideation of sustainable development hinges on these three development facets.

Figure 2: the three main pillars of sustainable development presented as interlocking



Source: Authors own work (2020)

This model is also referred to as three-legged interlocking model. It is premised on the fundamental aspects of the society and takes into account the quality of human life. It suggests without sacrificing the interest of the current generation the need to preserve the capacity of the ecosystem to continue to provide services to the next generation.

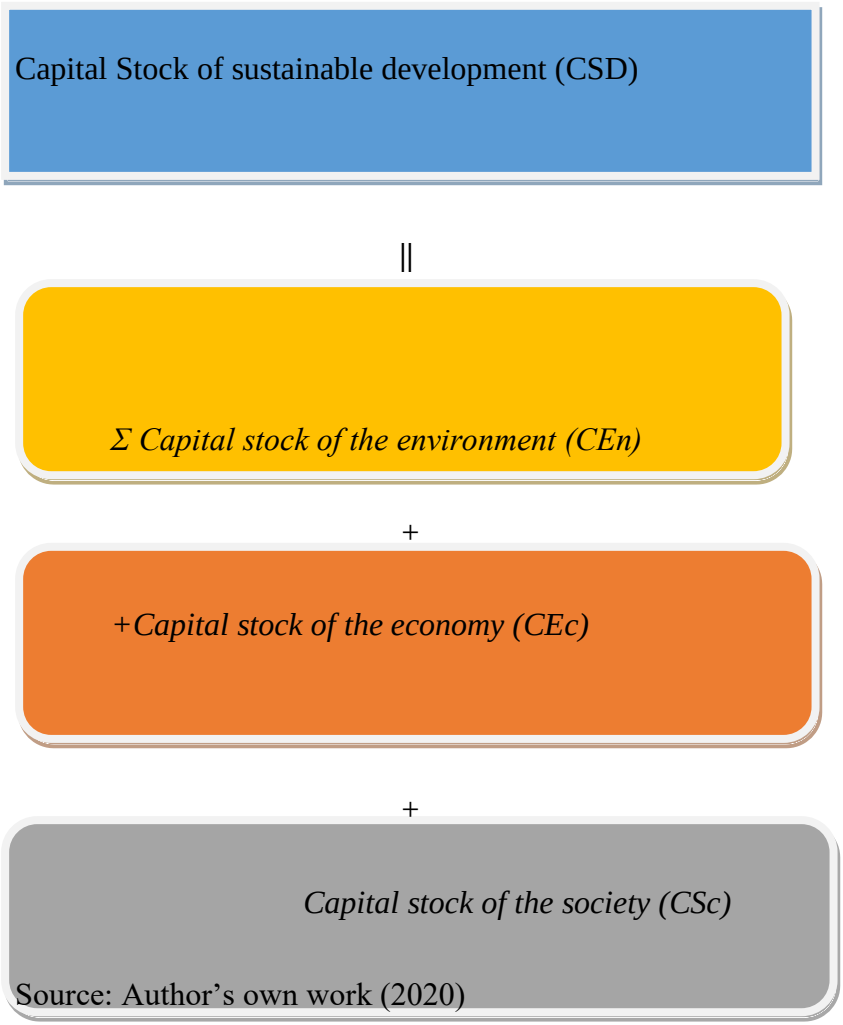
3.3.1 Capital stock model of sustainable development

A committee under the auspice of The World Bank created a model called capital stock model, this model was inspired basically by the idea that if human being live off their interest without consideration of the capital that insure the basis of future human prosperity, our means of survival is undermined at long round.

The model offered a precise definition in tune with the principles enshrined in the Brundtland commission's report; it defines ecological capital for the preparation process to include

biodiversity, landscape, mineral resources, clean air and potable water. According to this model; human and social capital is equivalent to health, social security, social integration, freedom and justice for all, equality of opportunity, and peace and tranquillity without whimsical conditions. The following equation is used to represents the model.

Figure 3: capital stock model of sustainable development



Source: Author's own work (2020)

3.3.2 Prism model of sustainable development

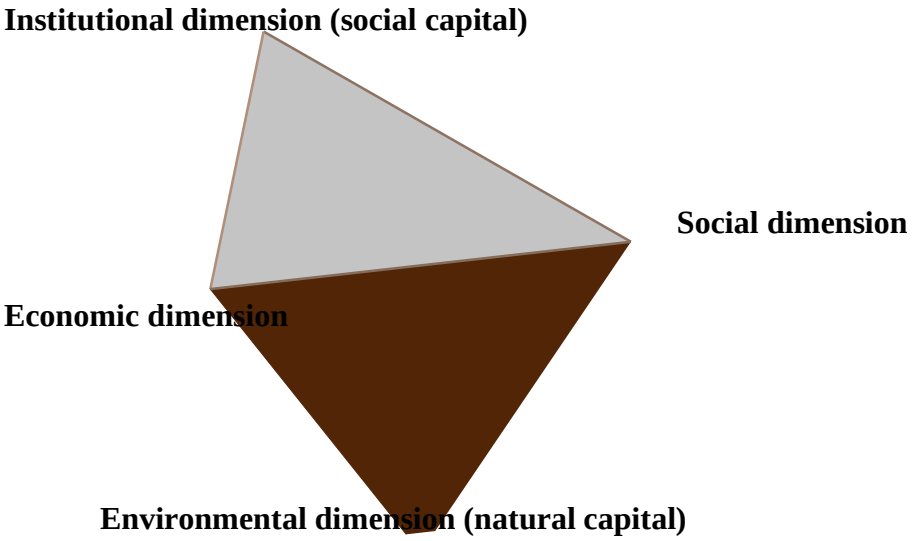
In the last decades, several scholars and experts have hypothesized several moving alternative workable theories to the traditional three throng sustainability theory. Among these intriguing models are the prisms and eggs. This model of sustainable development was borrowed from the Wuppertal school (Spangenberg, 2002 & Valentin & Spangenberg, 2000).

Not radically deviating from the traditional triangle model of sustainability, this model hinges on the following dimensions.

- Economic dimension or anthropogenic capital development
- Environmental dimension or natural capital development
- Social dimension or human capital development

The model stipulates that the above three dimensions should serve as the basis for institutional dimension. In any form the prism of sustainability assumes, there are three recognizable indispensable norms required for effective action. According to Valentin & Spangenberg, 1999 there are indicators employed to appraise the extent to which one has gone when juxtaposed with the overall vision underpinning sustainable development.

Figure 4: Prism of sustainable development



Source: Stenberg, (2001)

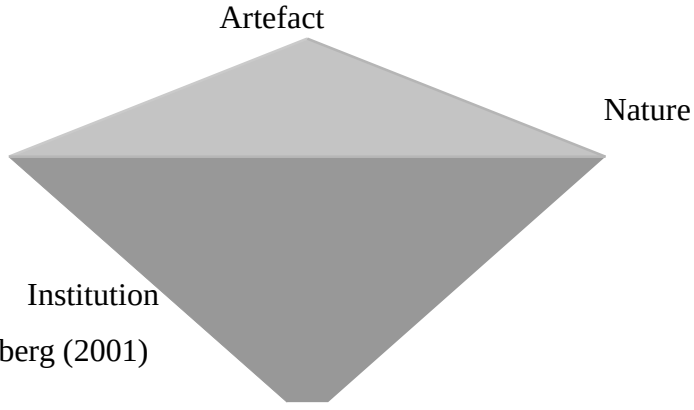
The prism theory has been subjected to a couple of criticism by experts in the field of sustainable development. For instance, Kain (2000) avers that the economic aspect of the dimension has the propensity to encapsulate facets from all the four dimensions, subsequently making the description and analysis messier and mind boggling. Kain proceeds to rectify the supposed confusion that clouds clearer comprehension of the term by proposing the MAIN prism of sustainable development. Kain adopted the terms, Mind, Artefact, Institution and Nature in an attempt to acquit the prism from the bondage of expressions of the term as social and economic, adjudged to blur easy understanding. According to Kain, his modified model of prism brings a new and powerful distinctive perspective to the existing models of sustainable development by offering a precise and full explanation of the term.

3.3.3 The MAIN prism model of sustainable development

The environmental aspects or natural capital consists of all natural ecosystem services, subdivided into stocks of non-renewable and renewable resources within the larger spectrum of the universal ecosystem. Stocks of materials existing in the natural environment, those are both scarce and useful for economic purposes such as for production or consumption, in its raw state or upon minimal processing.

On the other hand the economic dimension represents all the anthropogenic material products such as factories and road infrastructure. The social dimension is to be viewed as the consciousness of the individual such as the overall acquired knowledge and personal experience. The institutional dimension has to do with the organization of the society such as government formation and relation between people and the society.

Figure 5: MAIN prism model of sustainability



Source: Stenberg (2001)

When one considers the two prism models discussed, one could figure out the possibility of anthropogenic capital, social capital and human capital to increase concurrently at the same volume. According to the models, the focal point must be on the interaction between the four dimensions. Spangenberg, (2002) posits that there is the possibility for all the four dimensions to be attained simultaneously.

The prism model of sustainability continues to be the target of criticism for the fact that the various components are independent and that there appears to be no time factor considered in the model, which by the definition of the WCED is an essential ingredient (Thatcher, 2014).

3.3.4 The egg of sustainability and well-being

Another criticism to the prism models is that it concerns itself less with environmental dimension or natural capital. Critics hold that the environment is the pivot around which the other two revolve; to them the natural ecosystem provides the basis upon which the social capital and the human capital thrive. They argue that without the environment the society and the people within the society do not hope to survive, consequently environmental protection is vital in sustaining the social capital and the human capital.

Consequently, the view proposes a model which is radically opposite to the prism model of sustainability, a type which prioritizes the environment as mankind's major focus of sustainability. Critics advances their argument in favour of the supreme importance of natural capital ahead of the other two dimensions on the basis of the following formulae of economic and human capital growth. To them natural resources can be conceived as natural capital assets, distinctive from physical and human capital, as they are not created by social capital or by human capacity. Natural capital is potentially vital input in the function of countries production which is the basis for economic growth and development—thus Y=f (K, L, N), where Y is output, K is capital, L is labour and N is natural resources.

Originally developed by the International Union for the Conservation for Nature (IUCN) in 1994, the International Development Research Centre (IDRC) has been major proponents for the adoption of the egg of sustainability model to replace the popular three pillars of society, economy, and environment (Guijt & Moiseev, 2001).

The egg of sustainability represents the relationship that exists between people and the ecosystem as subset of the other, typical of egg yolk. The simple implication is that people live in the ecosystem and survive on its services, and that they are mutually responsible for the survival of each. The perfect analogy is that the egg is good only if the white and the yolk are in health condition, in the same manner can the society boast of health only if the people and the ecosystem are in perfect shape.

According to Birdsall & Steers, (1993) natural capital is a movement which sees the economy of the World as operating within the larger economy of the environment and that the ecosystem services sustain the people within it. This suggests that we should attached value to everything, from human intelligence and histories, to minerals, trees and bacteria. Sheehan, Sweeny, Rasmussen, Wils, Mahon, & Stenberg, (2017) postulates that only in our commitment to recognize this necessary inter-relation with the earth resources can our daily responsibilities such as businesses and the people they are intended to assist, continue to exist.

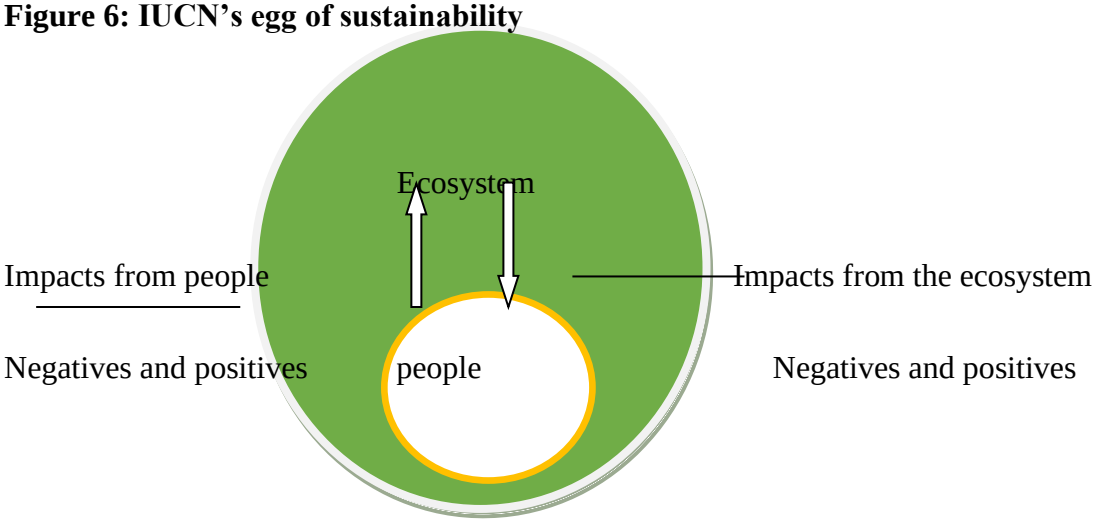
Social and economic activities can only take place if the chain of ecosystem services is not broken. Raw materials, industry spaces for manufacturing and jobs creation, constitutional qualities such as sports, health, education, and road are the essential material offered by the natural ecosystem, in the words of Auty, (2001) this synthesis also expatiates the evolution of thoughts regarding how perceptions of environmental services in the form of natural resources has advanced over time, not excluding their role as determinants of economic and political outcomes.

There is enormous threat to the survival of the human race owing to the speed at which natural resources (non-renewable) are running out. According to Bevan, Collier, & Gunning, (1989) the World's shrinking stock of resources of clean, fresh water for human consumption pose dire threat to public health, global and regional peace and the environment. The natural ecosystem must consequently, be considered as a penultimate global interest ahead of the other two facets of the triangle or prism models; the kernel of the egg in sustainable development mode debate is that social, economic, and institutional dimensions can only suffice if they are discussed within the greater interest of the environment's ability to sustain life.

A different way of putting the argument is that non-renewable resources exist in exhaustible quantities, in that every unit of non-renewable resources used up reduces the quantity in stock for future consumption. By this it is logically imperative for the environment to be given precedent over the other two pillars in the triangle. Again, it has been argued that the length at which even the renewable resources mature after usage borders the mind and give credence to the environmental dimension espoused by the egg in sustainability model.

Binswanger, (2009) defines non-renewable resources as that do not grow or renew themselves over time. For instance, it takes over hundreds of millions of years for decayed tress to transform to coal and oil Blundell & Armstrong (2007), while Conrad, Kruger, & Frenzel, (2001) indicates that it takes hundreds of years for other kinds of trees to mature for harvest.

Figure 6: IUCN's egg of sustainability



Source: International Development Research Centre, (1997)

Busch-Lüthy, (1995) propounded a similar egg model of sustainability, this time around switching priority in favour of the economy and society rather than people as the kernel of interest. These egg models put the natural environment at the centre of the sustainable development debate, on the premises that without the capacity of the ecosystem to provide essential services, social and economic progress is a fantasy. It is factual that all the theories of sustainable development are oversimplified and out of touch with reality, they are broadly adopted in spatial planning to propagate and defend development alternatives.

The academic debate on the future of spatial development is punctuated by the term sustainability which is the initial hypothesis for concepts and guidelines for sustainable spatial development.

Also, it is interesting to observe, how economic market such as investors, policy makers and implementers at both regional and national level have been adopting the term ‘’sustainability ‘’ in meeting their interest and influencing the political trajectories.

Economic actors use the same term and toe the popular line of argument developed previously by proponents of a green society in order to mitigate the rising impact of economic growth on the environment. Lastly, the application of the concept of sustainable development by persons of relative economic and political interests has resulted in equity between facets of sustainable development relative to the need for more in-depth protection and promotion of ecosystem services (Wolrd Bank, 2000).

3.3.5 The two-tiered sustainability equilibria model

In his book envisioning sustainability three-dimensionally Lozano, (2008) proposed that the concentric circles theory of sustainable development is overly focused on anthropogenic impacts and uses the economic subsystem as its centre-stage for advancing its cause. Lozano, rather argues that in any initial step towards any real pragmatic approach to sustainable development, there should be an overlapping approach using all the three dimensions as fundamental premises for advancing the debate on sustainable development. This is what is normally referred to as the First-tier sustainable equilibrium (FTSE).

The first step of the model presents the interdependence at a single point in time. The second step, emphasis time as the critical dimension by presenting the FTSE as an optimal cylinder, consequently it opines that if too much focus is placed on either the present or the future, we run the risk of contorting the cylinder to form a cone.

The kernel of the model is that any measure adopted to achieve sustainability in the present impinges on the capacity to achieve sustainability in the future. The last step has to do with knocking down into the collective consciousness of leaders that sustainable development is an ever-unending process requiring the time aspects to bend on itself to form a doughnut shape. This underpins the notion that policies on sustainable development in the current

circumstance, provides a repository of information and strategies for future sustainable development.

All the models have been criticised for one palpable defect or the other, apart from the two-tiered sustainability equilibrium model. It has so far stood the test of time and has been a major influence in modern policies and measures for effective sustainable development.

3.4 Digesting the concepts of sustainable development

Sustainability is vitally one of the issues anchored on dual positions of scarcity of natural resources or the abundance of it in our present world to meet our needs or future generations to meet theirs (Wikinson & Pickett, 2009). Interest groups for sustainable development consider their appeal in the following areas of concern; the depletion of the available finite resources or the absence of it, ruthless degradation of resources, the intentional or otherwise destruction of the ecosystem for immediate short-sighted gratification or importantly as lack of comprehension of the complexity that interplays between resources (Thatcher, 2014).

For major parts of the history of mankind, the size of our population was minimal and optimal for the capacity of the earth to carry and sustain it, this eluded man's thoughts and projections about loss or inadequacy of resources. At periods where there was limitations in the available resources there was effective reallocation of resources or resources were given ample time to undergo natural renewal (Bates, Kundzewicz, Wu, & Palutikof, 2008).

Recently, scarcity of resources and consequent careless destructions of natural capital stocks have resulted in dire human realities such as adverse impact on human health and total well-being, pauperism and malnourishment Hecht, Fiksel, Fulton, Yosie, & Hawkins, (2012) as well as unhealthy dismantling of the social system.

Hecht and friends Hecht, Fiksel, Fulton, Yosie, & Hawkins, (2012) aver that the problem deserves to be approached from a multidimensional perspective as it is complex and multifaceted. There is the urgent need to broadly improve and expand infrastructural development for water systems, sanitation and drainage system, as well as urban development and growth, reduce hunger, soothe poverty, and promote the dignity of people to form the society whose interest we long for, control the flippant emission of greenhouse gases, stop the incessant bio-accumulative and toxic chemicals and preserve the biodiversity.

Sustainable development is basically a social justice programme that emphasis equitable development to meet the needs of humans whiles at the same time recognizing that the protection of natural resources is vital for the fulfilment of these needs. Johnson, Everard, Santillo, & Robert, (2007) have postulated that there are innumerable amount of definitions and altercation of the original definitions put forward and officially accepted by the World Commission on Environment and Development (WCED, 1987).

The most referred to definition for sustainable development is the one offered by the WCED in 1987 ‘’development that meets the need of the present without compromising the ability of future generations to meet their own needs’’ the definition provided by the WCED can be divided into three main aspects, firstly, the definition states categorically the intra generational and inter-generational demands that cut across geographical space and time (Thatcher, 2014). Secondly, there is an inherent demand for equitable development, covertly implied, just and equitable opportunities for all persons. Lastly the definition is overly anthropogenic centred as human needs are superfluously emphasised without consideration for ecological needs. This position was given credence at the United Nations Conference on Environment and Development UNCED, (1992)’s Rio declaration which reiterated that human beings are the centre of interest for sustainable development.

On the other hand of the debate, the International Union for Conservation of Nature and Natural Resources IUCN, (1991) provides a counter-balancing conceptualisation of the term by switching the emphasis from human beings to the environment in their definition of sustainable development. ‘’ improving the quality of human life while living within the carrying capacity of supporting ecosystems’’.

A critical analysis of the definitions provided by WCED and IUCN, the sustainable development evaluation group—Monitoring of Sustainable Development Project (MONET) defined the term as the means that ensure dignified living conditions regarding the rights of human beings by creating a broader range of options that allow individuals to freely choice life policies for sustainable living (Altwegg, Roth, & Scheller, 2004).

MONET’s definition is unpinned by the idea that the principle of fairness between present and future generations must be considered in the larger picture in the utilization of environmental, economic and social resources. To students of this school of thought, putting

these special needs into pragmatic measures involves comprehensive preservation of the bio-diversity, specifically, the ecosystem species and genetic multiplicity; all could be regarded as vital for humans' survival.

Altwegg opines that the definition offered by MONET is premised on the modification of the WCED definition of 1987. Aside the palpable incorporation of the obvious terms; biodiversity and ecosystem needs, one outstanding facet of the definition is the reference made to environmental, economic and social resources. Popularly referred to as Triple Bottom Line (TBL), these three pillars of sustainable development propose a perfect balance among these three dimensions (Pigou, 2006).

Neumayer, (2003) has pointed out certain nuances between weakness and strength. As pinpointed by some experts according to the weak argument, environmental resources can be substituted by human resources only if the sum of the stock of resources does not change, for instance enhance social and economic lives could be compensated by loss of biodiversity in agriculture. On the other hand, strong sustainability dictates that different forms of resources can complement each other but cannot replace it in nature for instance a loss in the functions of the ozone layer is also a threat to human existence.

Daly, (1996) & Neumayer, (2003) were stern critics of the weak approach, according to the two scholars, due to the fact that several of the environmental resources are problematic to quantify monetarily and therefore making them irreplaceable for instance fresh water and air, any attempt to replace them are almost an impossible venture, or waste emanating from production is not a factor in the equation. Sustainable approach initiated from the plain of strong sustainability approach has been condemned as a non-starter, since it would be presumed that we are confident of the requirements of the future or inhuman as it suppresses the surviving resources of humans (Beckerman, 1994).

The Natural Step provides another scientific definition of sustainable development inspired by the Laws of Thermodynamics (Robert, 2002). The Natural Step definition is hinged on four major principles, in their definition, a society committed to sustainable development tries to eradicate the concentration of materials stored in the Earth's belly, concentration of substances that have been the by-product of society, the debasing of the natural process, and condition preventing individual members of the society from meeting their most basic needs

of life (Robert, 2002). There is however a very thin line that separates the definitions provided by the Then Natural Step and the IUCN, the only slightest point of digression is the emphasis on conventional science instead of theories of justice and equity.

Upham, (2000) pointed out that despite that The Natural Step (TNS) proved scientific in outlook with its definition, it mostly makes unfounded appeal base on emotions and rhetoric that embodies science to court the interest of followers.

As noted, there are countless variants embedded in the literature, all attempting to provide clarity to the term sustainable development. This chapter which is foundational to the theoretical drive of this thesis summarised the definitions of the term that are predominantly used in the literatures. Kates, Parris, & Leiserowtiz, 2005) indicated that the definition vary in three main areas; first, determining what is to be included in sustainable programme, for instance biodiversity, ecosystem products, community or society, history, second, what needs to be developed, for instance wealth, states, tradition and customs, heritage, education, justice, third, the length of period, for instance across one lifecycle, intra-generation, precise or ad infinitum.

It must be considered with absolute reflections that a conflict in definitions of the term is inevitable. One interesting argument is that certain definitions that seem to sacrifice the needs of the present generation for environmental preservation is completely condemned as problematic on the basis of ethics, and definitions that tend to sidestep the importance of the environment as the sustenance of lives are regarded as a complete deviation from the essence of sustainability. Beckerman, (1994) comes into the fray with the position that any attempt to define sustainable development is destined to fall into any of the categories of moral distaste or logical superfluity.

According to Redclift, (2005) the term sustainable development is inherently paradoxical, since human development is directly responsible for environmental degradation, to Redclift humans cannot hope to develop without having to border the ecosystem that provides the resources for development. What has been identified in all the definitions is a common agreement on the interactions between humans and their environment as they bid to survive. All the definitions differ on the grounds of precedents proposed for each of the dimensions, thus social sustainability, economic sustainability and environmental sustainability.

However, strong each model or theory tends to be in terms of providing a workable theoretical framework within which sustainable development can be universally achieved; all the three dimensions must be given equal attention in any project or programme towards sustainable development. Since one, the component of the society is the indisputable reason the ecosystem services are useful. Without humans, ecosystem service are useless, two human beings survival cannot be possible without the services provided by the ecosystem, so that protection of the environment is protection of human dignity, third societal development improves the quality of human lives, therefore economic activities must happen in order to perpetuate human existence. Careless and gross exploitation of the ecosystem undermine the very existence of humanity and excessive preservation of the ecosystem service to the interest of the future generation is potentially detrimental to the lives of the current generation.

3.5 Fundamental macro and micro policies for sustainable resource management

Ongoing research on sustainable resource management has identified abundant resource stock as vital cause of policy failure (Richard, 2003). Richard posits that in several developing countries the chief obstacle to effective management of natural resources is poor governance, as a result, renewable resources are subject to irresponsible mining and non-renewable resources are crassly exploited with serious ramifications from pollution pollutions of all forms (Woolcock, Pritchett, & Isham, 2001).

According to Richard the aforementioned situation is occasioned by the fact that the primary sector is the largest relative to Gross Domestic Product (GDP) so that the disparity in the rate of natural resource rents influences macro level policies in critical ways. Many of developing countries are rich in resources, a situation that motivates powerful states to unleash resource rents in a manner that upsets the economy, plunging it into an abyss of economic despair, subsequently weakening growth of the economy and environmental friendly policies (Tiffen & Mortimore, 2016). The recent thrust to economic globalization in the form of free and open, free movement of capital across geographical boundaries, and unregulated migration is by and large the effects of the dismantle of national boundaries for economic reasons (Birch & Cobb, 1981).

A World Bank report on development and the Environment proved ineffective to confront the basic question- will it be appropriate or inappropriate for the South if the North grows in their resource utilization. The popular answer is that it is always in the interest of the North as growth in the north increase markets for exports in the south and for funds for donation/aids and investment by the North in the South. In corroboration with Prisbisch structural policy model the alternative opinion is that growth in the North worsen things in the South by declining the capacity of the resources and ecology to provide the needed support for their economies sufficiently. Marsden et al, posit that such an interaction enhances the already worrying reality of global income inequality and global political volatility (Marsden, 1994 cited in Daly, 1996).

Pragmatic macroeconomic and microeconomic policies are crucial determinants for an effective and efficient sustainable development programmes. The structural approach to effective sustainable development outdates the current solution propositions running the nooks and cranny of the literatures; however, since it comprehensively encapsulates all the three dimensions prominent in the literature, the researcher adopted it as the background for developing and expanding on the theoretical approach to sustainable development issues.

It is based on liberal approach to worldwide development based on the ethos of justice and equity for all, trade expansion and equitable redistribution of resources. It proposes industrialization for the developing countries and expansion of domestic trades under the supervision of governments.

3.5.1 The Structuralists approach

In order to create a healthy balance between rich industrialised economies and poor raw material based economies, structuralists like Prebisch proposed a downward trajectory relative to trade for primary commodities vis avis manufactured goods exported by developed countries. He posited that any rise in production in primary commodities benefits industrialised countries, while production rise in industrial countries results in higher wages and profits in those countries instead of having a rippling effect on prices of manufactured goods exported by developed countries (Prebisch, 1964 cited in Richard, 2003).

Prebisch therefore concluded that developing countries must facilitate the process of industrialization with policies that protect the interest of local industries that supply the demand of the local market. The scholars of structural economies support planning and non-market distribution of resources accomplished through a number of controls under the supervision of the government and incentivizing local producers to invest into the domestic economy, prices and foreign commerce. This sustainable development strategy was dominant in the 1950s and 1980s. The structuralist approach which dominated for a decade received a barrage of criticism from major economic scholars like Bauer and Yamey (1957) and MacBean (1966) who preferred the doctrine of competitive advantage by David Ricardo, they argued that primary commodity exportations are the sole way that countries in their formative periods of development can generate the foreign revenue requisite to pay for basic imports and acquit themselves from foreign debts. Moreover, an opening out of trade draws the attention of foreign investors and enhances transfer of technology. The act of growth is therefore augmented by maintaining free domestic and foreign markets for goods and services and by allotting capital in open capital markets.

A fundamental flaw espied in the argument of the structuralist is that it underrates the tendency for governments in developing countries to mismanage resources and hamper both domestic and external investment (Lal, 1983).

Based on hindsight knowledge, the high risk failure in policy determination unexpected indicates that developing countries' governments need to restrict their efforts to ensure friendly environment, with much focus on their economic activities on fiscal discipline, monetary and exchange rate strategic measures for the purpose of stabilizing domestic prices and pre-empting balance of payment (Lal, 2015). Nonetheless, governments of developing countries must endeavour to intercede to rectify market failure consequent to investors' inability to accrue the gains of their investments (Brandon & Raman, 2014). According to Sachs & Warner, (1985) these investments take the form of infrastructure investment, education, on the other hand failure can occur when producers are incapable of absorbing the full cost of their actions, due to environmental obstructions.

This line of debate was seen as gaining strong hold in the field of economic sustainability following the decline of growth in the already disturbed economies of developing countries in the 1970s and the unprecedented growth witnessed in the East Asian emerging industrial

economies, which showed traces of liberal economic measures. What was distinctive in these newly industrialised countries in Asia was the timely intervention by governments to stimulate the market within a global market of comparative advantage (Scherr, 2007).

The Washington consensus outlines an instructive summary of the fundamental strategic policies vital for achieving optimal environment for sustainable economy (Williamson, 2006).

- A diversified taxation base should be matched to public expenditure in order to maintain a fiscal discipline.
- Public expenditure should be decoupled from administration, defence, informal subsidies and ambitious unprofitable projects and focus much on areas that offer dividends, particularly, those that enhance property distribution, including education, health and social amenities.
- Protect property and intellectual rights without incurring much cost, such as right of the informal sector.
- Ensure a competitive exchange rate and mitigate domestic price fluctuations, such as subsidies that mitigates useless over-consumption.
- Promote and maintain competitive markets, including efficient fiscal markets that enhance entry of domestic and foreign companies and facilitate the proficient allocation of investment.

In the latter part of the 1990s, a new opinion that concerned itself with the need to focus on the alleviation of poverty on the basis of, for instance assets distribution in favour of the poor. Williamson (1996) proposed that redistribution of wealth and public transfer should be more strictly directed towards those within the category of extreme poverty. The establishment of a suitable economic environment must be informed by the need to align the country's investment with its underlying issue of comparative advantage, therefore improving the use of inadequate capital and scarce human capital to allow for the recovery of the economic rates (Syrquin & Chenery, 2009).

Speedy economic development and growth within a liberal trade system persuades the application of new forms of technology, which purposes to enhance efficient use of resources to combat the incessancy of pollution (Birdsall & Wheeler, 2010). This process according to

Birdsall and Wheeler aids the removal of domestic price disturbance, including subsidies that motivate wasteful consumption of energy.

Moreover, the undesirable consequences of the cost of externality that emanate from air and water pollution can be mitigated by incorporating the damage caused to environment and health into prices in the form of appropriate instrument of economy such as taxes, charges or marketable license and mostly recommended through emission targets under the management of government strict supervision (Odum, 2006). A panacea to the problem of externalities, being positive or negative, is to internalize all cost involve in production as well as benefits into the prices of the product, but this could be impossible to attain without the express intervention of the government.

One negative fallouts of externality happens when the burning of fossil fuels produce various pollutants that directly damage human health, while at the same time emit voluminous quantity of destructive greenhouse gases such as methane and carbon dioxide contributing to the menace of global warming (Pigou, 2006).

The positive outcomes of externalities such as the use of road infrastructure constructed by fossil fuel companies, at the same time serving as means of transportation for the country, and the production of employment to the host country by large multinational companies whose activities are injurious to the environment. Maybe the powerful nations would have mutually consented to propagate development without growth as panacea to the problem of universal sustainability. Development was defined as improvement in resource efficiency and growth as expansion of resource throughput. Growth was understood by critics as antieconomic or retrogressive that at the margin growth tends to cause environmental cost to increase faster than production returns, consequently making the poor poorer, rather than rich.

Another major point of disagreement between the proponents of development without growth and the critics is that the suggestion in general is anti-economic growth disguised as pro-economic growth.

Developing economies face dire repercussions as they wait for the rise of their incomes before they concentrate on tackling environmental damages and the careless use of natural

capital. Their most basic concern as a developing country is firstly to fend for their basic needs such as provision of food, water and health, while the issue of environmental protection plays second fiddle. This rational mindset of developing countries is according to Richard (2003) the prime cause of policy failure in developing countries.

3.6 The Earth Summit

The struggle to maintain a decent global society that promises of a continuity of the human race and simultaneously preserving the ecosystems' capacity to serve is behoved on all member states of the United Nation (UN). All members are enjoined by law to apply the measures mutually agreed upon by signatories to a common pact ratified in the Earth Summit held in Brazil in 1992. The United Nations Conference on Environment and Development (UNCED) also referred to as the Rio de Janeiro Earth Summit was born in response to member states to cooperate mutually on issues of sustainable development.

The creation of the summit was necessitated by the enormity of the issue of sustainability for one or few members to effectively tackle it. The Earth Summit was consequently created to serve as a platform for effective collaboration among member states.

Many non-state actors such as non-governmental organizations have since the creation of the summit shown similar interest and development to the matters raised and discussed in the conferences (UN, 2018). A decade after the first summit was held, the United Nations Conference on Sustainable development was held. The issues addressed served as the foundation for measuring sustainable development programmes and projects by member states. The following are brief summary of the issues in Rio+20 summit.

- Systematic scrutiny of patterns of production, particularly, the production of toxic components, including lead in gasoline, or poisonous waste including radioactive chemicals.
- Alternative sources of energy to replace the use of fossil fuels which the delegates proclaimed the causal factor for climate change.
- New reliance on public transportation systems in order to reduce vehicle emissions, congestion in cities and the health problems caused by pollution in the air and smoke.

- The continual usage of the limited stock of water supply in the World.

Since the creation of the Rio-pacts it has chalked an important success on the consensus on climate change convention consequently leading to the Kyoto Protocol and the Paris accord. On major undertaking was to not carry out any activities on the lands of indigenous people that would amount to debasing the environment or that would be culturally disruptive (United Nations, 2015).

The convention on biological diversity was opened to be undertaken by signatories to the pact at the Summit, the convention proposed a start towards redefining the measures that do not intrinsically motivate the removal of the natural vegetation cover of the ecological regions and term uneconomic growth (EPA Alumni Association, 2012). The Earth summit produced the following documents of sustainable development.

- Rio declaration on environment and development
- Agenda 21
- Forest principles

In order to ensure that member states recognize the legal implication of the pacts signed, legal documents binding member states were made available for signing by member states.

- Convention on biological diversity
- Framework convention on climate change
- United Nations convention to combat desertification

Considering the fact that Finland is a signatory to all the pacts and sustainable principles enshrined in the broader documents of sustainable development agreed on by the Rio Earth Summit, the practical assessment of sustainable developments of Finland in would be limited to the issues addressed in the Rio-20 pact enumerated above.

4 RESEARCH ANALYSIS OF KEY ISSUES

The United Nation's Conference on Environment (UNCED) held in Rio de Janeiro in 1992 created a linkage between socio-economic development and the environment. The conference endorsed the declaration made in Rio on sustainable development and action plans for attaining them. In 2005 in Johannesburg the United Nation World Summit on sustainable development was ratified.

In respect of their responsibilities to sustainable development in all dimensions, Finland devised its own local action plans to strategically achieve the agenda (21) which spells out the indicators of sustainable development. Sustainable development policies and programmes have been established and implemented. A framework known as the National Strategy for Sustainable Development was adopted in 2006 by the government, an array of public actors, supported a wider promotion and implementation of the strategic proposals enshrined in the document.

National projects and plans intended to promote and facilitate sustainable consumption and production announced in 2005, has been practically implemented and evident in the country.

In 2007 the country adopted the Finland's Development Policy Programme, the programme among other things set targets and indicators to eradicate poverty consequent to the Millennium Development Goals, in respect of sustainable development ethos. A revised version on a national climate and energy strategy was adopted in 2008 alongside the development and deployment of many other sector plans and programmes with similar intent. In 2009, a comprehensive national resource strategy encompassing all the three dimensions of sustainable development was submitted to the prime minister and since then a whole lot of success have been chalked by the country. Under this section of the paper, the researcher analysis the parameters for determining the successful outcomes of the implementations of the comprehensive sustainable development plans and strategies in the country by comparing the progress of the country with respect of attainment of the sustainable indicators in the SDGs with other countries.

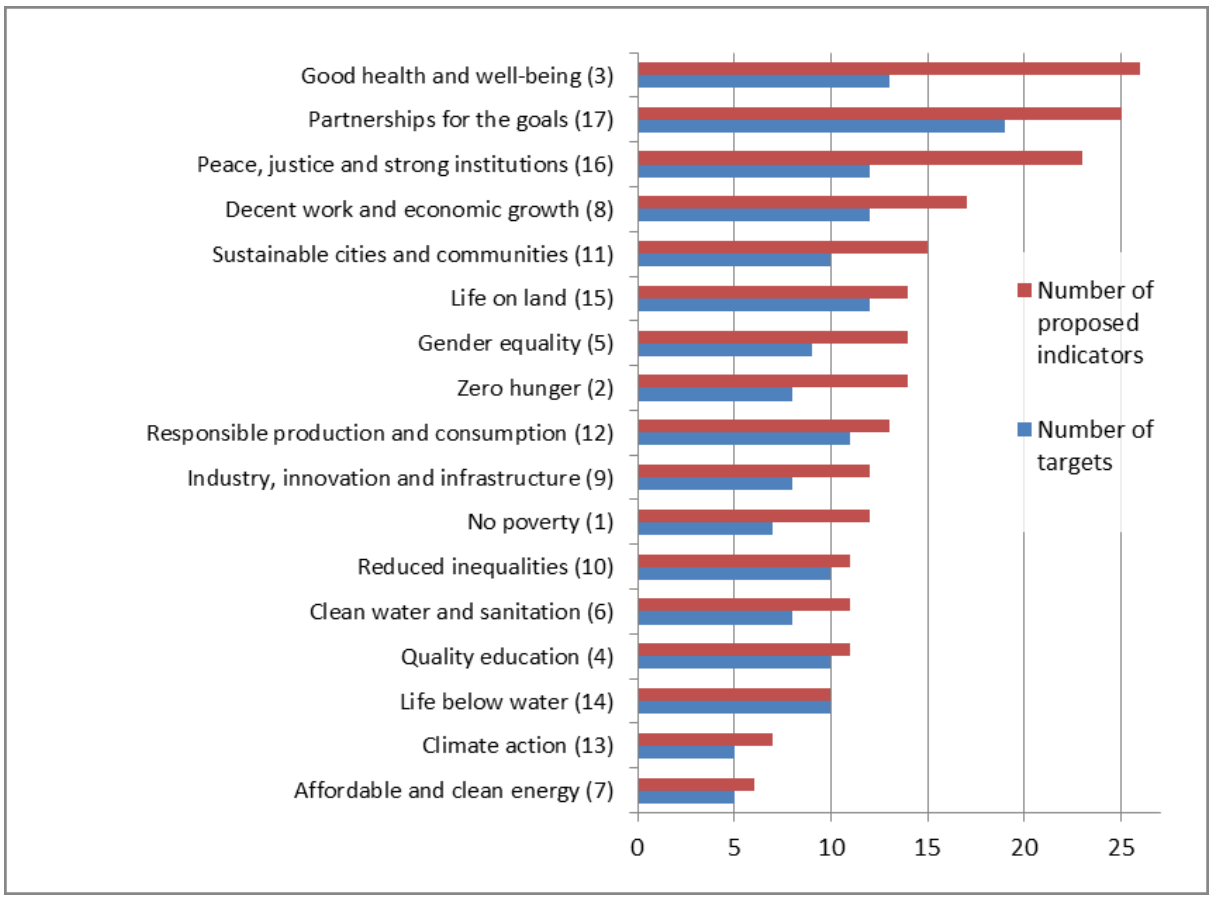
The agenda 2030 plan of action towards sustainable development by the United Nations came into force on 2016 January. The document is composed of 17 goals and 169 targeted areas of

development to be attained by 2030. This chapter provides an overview of the current situation by analysing the level of commitment by Finland through highlighting the key indicators of sustainable development within the framework of the Agenda 2030. The evaluation is based on international indicator-based comparisons with the issues in the Agenda 2030 document.

The United Nations developed a framework for indicating sustainable developments to facilitate the monitoring actions for the implementation of the 17 goals and the 169 sustainable development targets. Development indicators were undertaken by the Inter-Agency and Expert Group (IEAG) (Lyytimaki, Eeva, Satu, Mikael, & Korhonen, 2017).

The following figure presents the United Nation's sustainable development 2030 indicators and number of targets for all member states.

Figure 7: The number of sustainable development targets and the proposed indicators in respect of the Agenda2030 SDGs. figures in parenthesis represent the number of SDGs discussed.



Source: IEAG (2020)

Their publication covers all the 19 goals in the SDGs, some of them have being merged while others have been isolated and given a specific explanation, thus, some of the indicators are used to described more than one target, shifting the number of proposed indicators from 231 to 240 (Lyytimaki, Eeva, Satu, Mikael, & Korhonen, 2017). By average, each target was ascribed 1.4 element of indication, shown in figure 2. It is noticed that the highest relative zero and indivisible good health and wellbeing of the proposed indictors is relative to SDG 3. Life beneath water (SDG4) was the only one whose aim was used to describe each target with only one aim.

In assessing the sustainable development indicators in Finland, the researcher compares the success of Finland among other countries within the regional efforts of the European Union. Information was gathered from every aspects of sustainable development in every part of the country to represent the country as a whole, since government's policies on sustainable

development cut across every city or town and such can be collectively used to appraise the effort of the government.

The keys areas would encompass environmental, economical and social sustainable developments encapsulated within the framework of the United Nation sustainable development 2030 indicators.

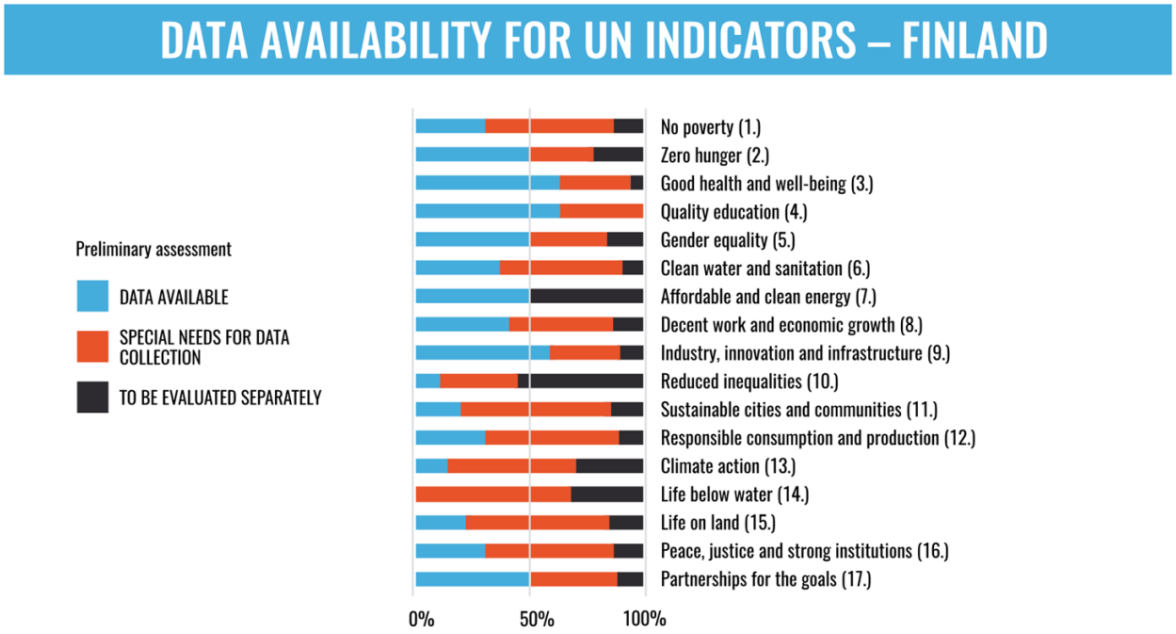
4.1 Assessment of data availability at national level

The United Nation formulated a set of highly achievable qualitative agenda for indicating sustainable development goals (The Finsih Environment, 2016). The aims of the objectives set in the term of reference of the document indicate development over a reasonable extended period in Finland. Moreover, the indicators portray development in the case of the most helpless persons in the society, particularly, either by age or gender. In many countries it is a daunting task to have such indicators at national levels (Pimentel, Cooperstein, Randell, & Sorrentino, 2017).

The Avain2030 project assessed the readiness of data in respect of the indicators stipulated by the United Nation at national level (Lyytimaki et al, 2017). The mission was inspired by the express opinions of researchers who engaged in the project on the availability and accessibility of data from local sources (quantitative). The evaluation, however, was based on natural selection and includes a greater degree of luck and intuition. Data gathered on the proposed indicators was adopted as foundational for the appraisal. Consideration was given to setting up of sustainable development ideals; especially where the interpretation of the indicators formulated was unrestricted.

At long round the appraisal exposed striking problems in the availability of data for indicating development in Finland. It was found out that data amounting to over hundred describing sustainable development was readily and easily assessable in the country in local Finnish databases, for instance statistics created and stored by Statistics Finland, the Finnish national institute for Health and Welfare (Office of the Prime minister , 2016). Most of the indicators were qualitative in nature, indicating whether a country has accomplished certain vital obligations or not. The figure 8 presents data available for UN indicators in the case of Finland.

Figure 8: Data availability for indicators for Finland



Approximation of the availability of data relative to inter-national indicators determined by the United Nation: the case of Finland: Source: Lyytimaki, Eeva, Satu, Mikael, & Korhonen, (2017).

With respect of the initial assessment conducted, separate investment in the attainment or processing of further data will be needed to supply adequate information for almost hundred indicators. Due to the use of one indicator to determine a target, the ambiguities thereof obstructed a dependable assessment of the data accessed and assessed within the ambit of the Avain2030 programme.

4.2 Linkages between international and national indicators- Finland

There exists a vast overlapping influence between international sustainable goals and thematic areas of sustainable development indicators employed in the case of Finland. Nonetheless, the indicative areas defined by the various indicators by the UN are broadly similar in outlook. It must be pointed out that the exception to the case was clean water and sanitation (SDG6) since it was accorded only partial focuses in the case of Finland indicators.

Table 1: links between UN sustainable indicators and national indicators in Finland

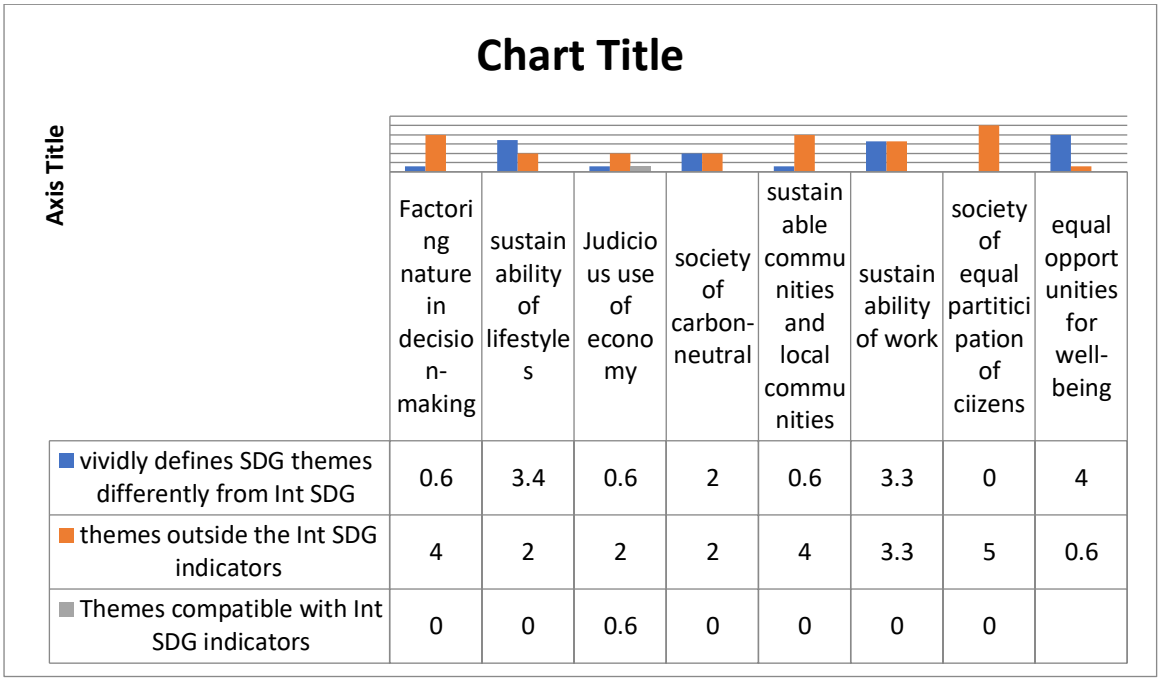
UN sustainable development goals	The linkages	Topic areas of sustainable indicators of Finland
1. No poverty		Equal opportunities for well-beings
2. Zero hunger		
3. Good health and water		Society of participating citizens
4. Quality education		
5. Gender equality		Sustainable work
6. Clean water and sanitation		
7. Affordable and clean energy		Sustainable cities and local communities
8. Decent work and economic growth		
9. Industry, innovation and infrastructure		Carbon neutral society
10. Reduced inequalities		
11. Sustainable cities and communities		Resource wise economy
12. Responsible production and consumption		
13. Climate change		Sustainable lifestyles
14. Life below water		
15. Life on land		Respect for nature in decision-making
16. Peace, justice and strong institutions		
17. Partnership for the goals		

Source: Authors computation (2020)

Rather, unexpectedly, the internationally accepted sustainable development indicators were found to have less direct connection with the indicators stipulated by the National Commission for Sustainable Development (NCSD). A critical comparative analysis of indicators in the course of the Avain2030 programme revealed that only two out of the 17 UN sustainable development indicators were captured in the Finland's current sustainable development indicators Lyytimaki et al, 2017.

Indicators 17, 6, and 2 considered broad base services and indicators 7, 2, and 1 being renewable energy's share of overall consumption. Within Finland's indicators, over one third defines similar areas to the SDG indicators but is given varying time series as their defining bases. For instance, the theme '' Society of participating citizens'' are particularly, incongruous with none of the international indicators proposed by the UN.

Figure 9 : Links between UN indicators and Finland's



	Factoring nature in decision-making	sustainability of lifestyles	Judicious use of economy	society of carbon-neutral	sustainable communities and local communities	sustainability of work	society of equal partitication of ciizens	equal opportunities for well-being
vividly defines SDG themes differently from Int SDG	0.6	3.4	0.6	2	0.6	3.3	0	4
themes outside the Int SDG indicators	4	2	2	2	4	3.3	5	0.6
Themes compatible with Int SDG indicators	0	0	0.6	0	0	0	0	

Source: Author's own work (2020)

The global indicators proposed by the United Nations provide broad-based monitoring requirements for the Agenda2030 goals and targets. In Finland just like any other countries, however, certain formidable problems and the exigency to facilitate development encumber the adoption and application of these stated indicators at the national level of development. Among these issues are the numbers of indicators, political suitability, database, thematic areas and public opinion (FIBS, 2019).

Some scholars have attributed the inability of nations to apply these proposed indicators to the vastness of the numbers. In Finland one of the major challenges inhibiting implementation of the indicators is the very high number of indicators in term of development and communicating on the indicators (Rosenström 2009; Lyytimäki 2014). The size of the number of the indicators contributes to intensive resources usage during the formulation of the indicators, collection of data and maintaining them.

Since the themes identified are broadly scattered between the operational functions of the numerous government branches; hindrances to information collection and the utilization of existing reporting machinery are consequences in the case of Finland. The indicators

proposed by the UN can be effectively punctuated by major challenges of data collection at state's level; moreover, the availability of data for all the indicators proposed is an arduous task for governments. The challenge is not an exceptional case for Finland, where even systems for collecting and maintaining statistics are advanced and broad.

4.3 Assessing Finland in the light of the Agend2030 sustainable development indicators

The indicators proposed by the Inter-Agency Expert Group (IAEG) for evaluating the targets of the Agenda2030 have been critiqued to be overly broad as a result hindering their implementation by countries (FNCD, 2014B). These indicators underwent continuous development trying to create a common base by which inter-national comparison could be possible, though it has since 2016 not been fully developed for implementation, countries have their own set of indicators used to measure their level of commitment to the SDGs (Weitz et al. 2015). As discussed previously, Finland's indicators are not totally in synch with the Agenda2030 indicators yet their effort towards sustainable development is worthwhile. Based on their own domestic indicators I look at how far they have gone.

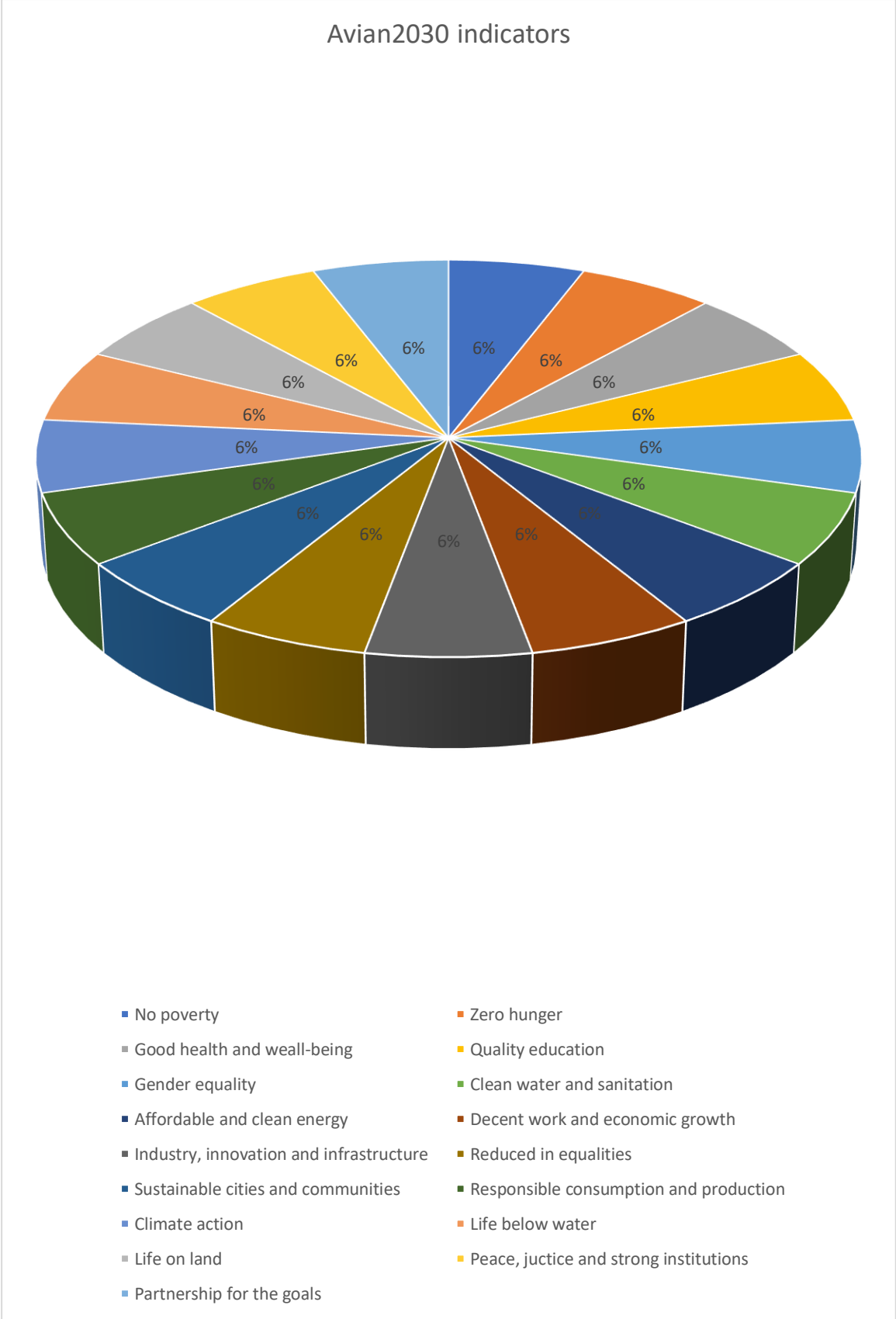
The Avain2030 serves as the basis for determining the position of Finland, the Avian2030 programme adopted two indicator-based for the comparison, directly related to the broader framework of the Agenda2030 and the 17 goals enshrined in the SDGs (Sachs, Schmidt-Traub, & Durand-Delacre, 2017). In spring 2016 Jeffrey Sachs published the most recent preliminary comparison for SDGs index. The local sustainable development project of Finland the Avian2030 adopted the index, on the basis of the index a final version was published later.

According to Sachs et al, (2017) giving interpretation to the indicators outlined by the Avian2030 does not radically deviate from the objectives intended by the Agenda2030 but the indicators used includes many value-based decision, those who made the comparison stressed that the results in Finland only fit to be used as a starting point for the debate. The essential valued-based option is the choice of the indicator. There has been recognizable variation in the indicators. In Finland, no consideration was made to the national interest, owing to the low number of indicators chosen by the Avian2030 project.

Current information about international indicators to advance on reliable comparison is hard to come by, for instance Seppälä et al. (2016b) indicated that waste management in the sustainable development goals 12 spans the years 2009-2013. The recycling of waste in Finland has seen massive and rapid changes recently, as a result of swift transformation of the waste management system, such as the transfer from placement of waste in landfills to recovery energy.

Figure 10 presents result of individual goals calculated. In the analysis, it was identified that Finland's effort towards SDG 8 and 13 was discouraging, they are identified by red in the diagram; these colours indicate poor performance. It is worth clarifying that SDGs 14 and 12 described as poor and good offset the other, blurring key themes at the sustainable development goals on the international front.

Figure 10: Broad assessment of the implementation of the Agend2030 goals and targets, based on Avian2030



Source: Author's compilation based on data from Sachs et al, (2016)

The sustainable development Goals have been arrangement in order of their numbering by the Agenda2030, starting from No poverty as 1 to Partnership for the goals as 17. The colours then represent the assessment criteria for evaluating the indicators where green means excellent, yellow means moderate and red means poor. How the country is performing in line with the indicators cited in the Avian2030 judged on the basis of theAgenda2030 which states the indicators in different thematic expressions has been displayed by the figure 11.

The Environmental Policy of Integration (EPI) positions Finland on the top due to its practical commitment to the 2050 carbon-neutral agenda (EPI, 2019). The programme was adjudged the most farsighted sustainable development by the EPI because it encompasses broad-base assessment impact on health, fish stocks, climate and energy, biodiversity and habitat, water resources and air quality (EPI, 2019).

Success chalked by Finland in sustainable development indicators is not only the role of government, however, private organizations, private business entities as well as non-profit organization have contributed greatly in meeting the goals in the Avian2030. A survey on sustainability in Finland by FIBS in 2019 showed that as many as 87% of corporate bodies and expert in the country that participated in the research stressed that climate change has been an important focus for their companies in the past half a decade. The participants claimed that climate change is taken more important than ethics and the economy (FIBS, 2019).

FCSD, (2019) identified that Finland typifies excellent example of how environmental sustainability can be attained with respect of the indicators of the Agenda2030, according to the commission broad-based and meticulous data on the environment coupled with distinguished level of technological acuities lays the foundation of the country's environmental policies. Finland invests hugely in environmental policies, and its low population density and comparatively large size of its virgin forest facilitates natural conservations (FCSD, 2019).

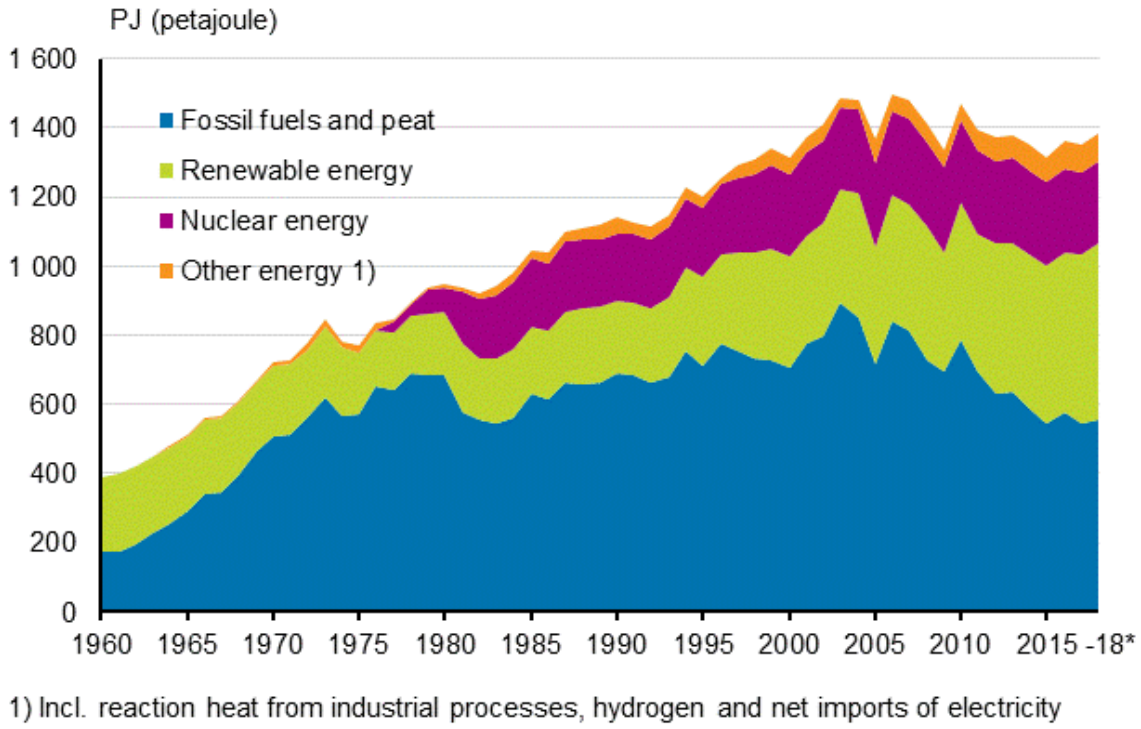
4.4 Climate change and energy in Finland

Climate experts in Finland suggested that mean yearly temperature could increase by up to 2-7 degrees, while annual rainfall could increase by 5-40% (IPCC, 2015). It has been estimated and confirmed that Finland's contribution to the total global emission could be said to be small in absolutely, yet considered very high in terms of per capita. It is very tasking to reduce to the level recorded in 1990, which under the Kyoto Protocol is Finland's target (Suomi, 2018).

The demand for energy and natural resources in Finland is concentrated in the Northern part of the country and it is increasing, however, the projection of dire future and practical change witnessed in the change of the climate has compelled citizens of the country to efficiently use energy. The country is a pacesetter in co-generation, the manufacturing of combined heat and power (CHP), this system allows the user to obtain electricity for local grid and heat to warm their homes and for industrial purpose (IPCC, 2015).

Renewable energy sources contribute to a quarter of overall energy used in Finland- regarded as a very huge magnitude by international benchmark. It was worth mentioning that a greater proportion of this form of energy is produced from residues produced as by-product in pulp, and paper and wood industries scattered around the country; such as bio-sludge and chippings from wood products. It has been a popular practice in Finland for almost half their woods burnt to generate energy. Source of energy produced and used in Finland are presented in figure 11.

Figure 11: Total energy consumption in Finland (1960-2018+)



Source: Statistics Finland (2019)

Directing consumption and production towards reduced material and energy usage has been identified as a major important means for the economy of Finland to contribute to global and regional sustainable development (FNCD, 2014B). A systemic input-output model a macro-economic level in the country provides a rich new data for identifying life-long effects on the environment and other aspects of the country such as the society and the economy, the system aids experts in finding strategic measures to enhance sustainable production and consumption (Hass, Brunvoll, & Hoie, 2014).

Finland's focus on energy and public policies is explained by the fact that almost 40% of all energy is consumed in buildings, deductively; the saving potential for the country is vast Has et al,(2014). In order to cut down greenhouse emission into the atmosphere, the office of the prime minister has embarked on a number of energy savings, increased energy efficiency and greater use of renewable energy programmes.

One major sustainable invention is the investment in the production of fuel efficient automobiles for public and private usage, since the introduction of energy efficient vehicles, the number of purchase electric cars have been increasing with appreciable speed, signalling the readiness of the country to transform its automobile industry from fossil fuel to renewable energy. Thus, a change-over to cleaner fuels- environmentally friendly diesel and gasoline, electricity, liquid petroleum gas (LPG) and other options of sustainable apt fuels.

4.4.1 Registration of passenger cars in Finland 2013-2018, by type of fuel

Up to date, registration of new diesel propelled passenger cars has seen significant decrease. In 2013 around 38.6 000 new passenger vehicles were recorded as registered with the states' institution (Statistics Research department, 2020). It was identified that the figure from 2018 witnessed nearly ten thousand in reduction. On the other hand, fuel cars such as petrol, electricity and natural gas rose significantly.

The drift in increment in electric passenger cars purchase was identified in the registration of Tesla branded motors. While the yearly number of new cars registration plummeted, the registration nonetheless increased from two cars in 2013 to over 170 cars in five years (Statistics Research department, 2020).

Tesla cars were used for the study since Tesla Cars are the leading electric passenger cars producers in Finland. It has over 900 electric cars on the roads of Finland (Statistics Research department, 2020).

In spite of the fact that Tesla passenger car registration being unstable, Tesla brand is ranked as the leader in the electric car industry in the country, with the highest number of cars on the roads of Finland since 2018. The most popular model of the American automotive manufacturer is the all-electric, five door sedan Model S having more than 700 cars on the road as of the end of 2018. The sedan model S is an improved version of Tesla passenger cars in terms of energy efficient capacity.

Table 2: Car registration by fuel type 2013-2018

Fuel type	2013	2014	2015	2016	2017	2018
Petrol	64,094	64,171	69,069	77,034	79,034	84,700
Diesel	38,635	41,353	38,829	39,463	36,064	28,936
Electric	50	183	243	223	502	776
Petrol/electric	101	212	400	1,116	2,401	4,797
Petrol/CNG	83	86	140	127	368	979
Petro/ethanol	402	344	105	14	1	-
Natural gas	21	37	-	-	65	182
Diesel	66	51	15	93	152	135
Other	24	37	18	38	-	-

Source: Statista Research Department (2020)

4.5 Finland and other OECD countries

Considered on the basis of sustainable development goals and targets, international comparisons of indicators published provide a rough assessment of the indicators in countries. The figure 13 provides selected statistics based comparison congruent with all the UN SDGs found in the indicator database of the OECD. The document provides the premises for assessing the success of country-based indicators under the guidelines of the Avian2030 project for sustainable development areas in Finland.

Information gathered by the Organization of economic cooperation and development (OECD) were used as benchmark for the assessment, because the object of the comparison was to highlight Finland's effort against other developed countries. Again, the statistics provided by the OECD which served as the basis for the analysis can be broadly considered as reliable and political calculation input into the information it gathered as vital (Seppälä, et al., 2018).

Aside this kind of statistical data, the OECD published several specific sector by sector assessment and national reviews. Suomi (2018) published by the OECD, and Kuinka, Suomi,

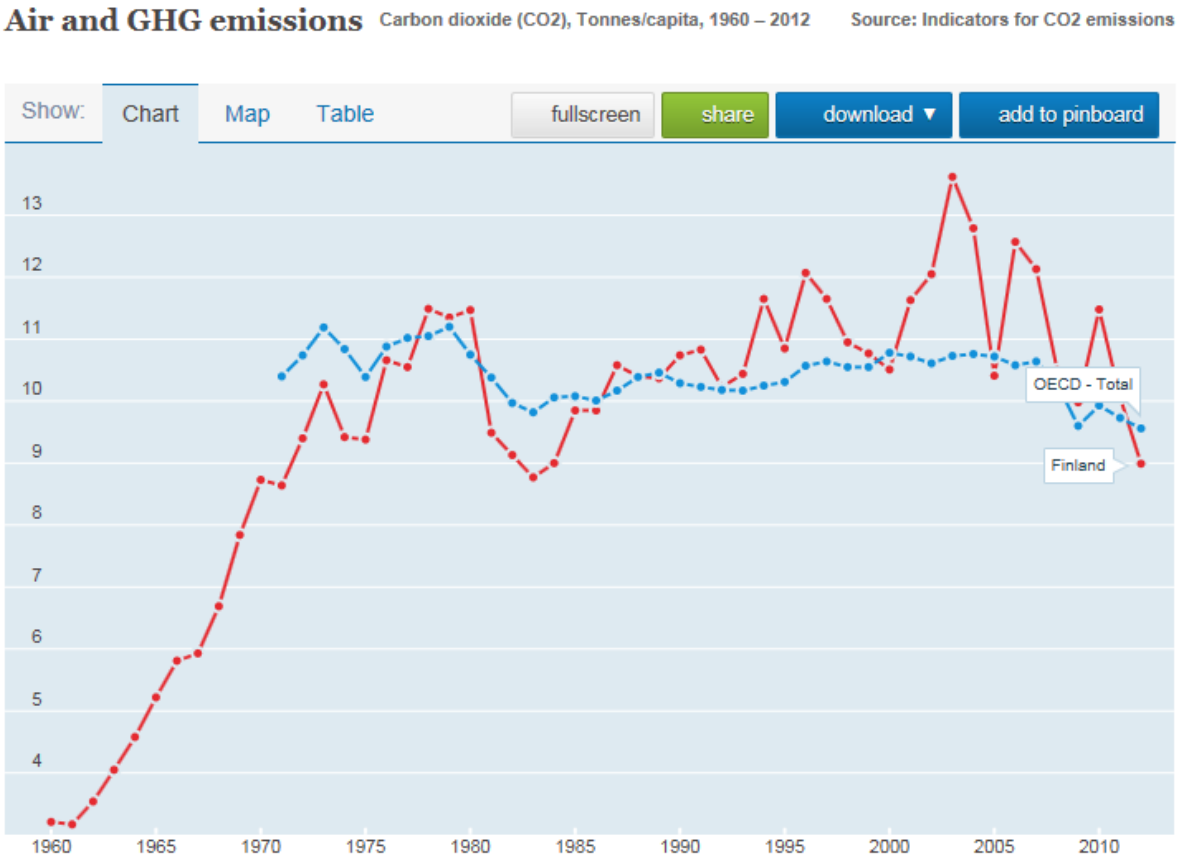
Sijoittuu, Vertailussa (2018) published by the OECD are among the latest summary of the issues pertaining in Finland. The organization of economic cooperation and development's economic survey for Finland in 2018 focused its attention on recent data on economic activities; however, the OECD also publishes country-specific data, (Suomi, 2018).

The figure displays the indicators for specific SDGs imported from the website of the OECD and regarded as the most significant for the study area (Finland). In the process of selection, all comprehensive accounts necessary was included for the targets and the indicators for them. Indicators regarded as being vital regarding the achievement of the SDGs are included, irrespective of whether it was included in the SDG description by the UN. Identified themes relative with the UN proposed indicators are given with their indicators.

Data sourced from the OECD websites reveals that most of the indicators only date back couple of decades, even before the birth of the Avian2030 projects. Nonetheless, certain indicators enhance long-term overviews for some countries if not all. The indicator evaluating the emission of carbon dioxide in Finland goes back to the 1960s (Suomi, 2018), yet it does not provide a broad-base backdrop for a rational comparison with the remaining OECD countries until the 1970s. In view of the missing link in the dates, the indicator does not show industrialization in Finland as of recent years as compared to some of the other countries.

The indicator is still relevant because it enables one to make a comparative analysis of the pace at which CFC emissions have been cut drastically since the 1960s in Finland.

Figure 12: Air and Greenhouse emissions for Finland and OECD countries (1960-2012



Source: OECD air and Greenhouse Gas emission indicator (2016)

Greenhouse gas emission (GHG) in the EU-28 in 2017 went down by 22% compared with the levels recorded in 1990, indicating a total reduction of 1240 ton of carbon-dioxide, this shows that the EU is on track to exceed the 2020 and 2030 targets agreed on, thus, to reduce GHG emissions by 20% before 2020 and 40% by 2030 (Eurostat, 2020). The success is a result of total practical commitment by member states of the Union, the contribution to the reduction in greenhouse emission by Finland cannot be overestimated in assessing the total success by the EU-27.

Finland's commitment to drastic reduction in greenhouse emission as stipulated in the Avian2030 document is evident in the trend of their contribution to the overall greenhouse emission by the EU-28. The trend for 2015 and 2017 represent a massive reduction in the figures for 1990 to 2010. With a share of only 1.3% of the total EU-27 emission, Finland is a major force to reckon with in the fight towards sustainable environment of the SDGs.

The Table 3 below presents the percentage of contribution of Finland in the EU-27 2020 and 2030 agenda for CO2 emission reduction.

Table 3: Total greenhouse gas emission by country in the EU by international aviation, indirect CO2 etc- 1990-2017

	1990	**1995**	**2000**	**2005**	**2010**	**2015**	**2017**	**EU28SHARE(%)**
EU-28	5722.9	5397.8	5287.2	5362.0	4917.5	4470.3	4483.1	100 %
Belgium	149.7	157.6	154.5	148.9	137.1	121.6	119.4	2.7 %
Bulgaria	102.8	75.5	59.8	64.5	61.1	62.2	62.1	1.4 %
Czechia	199.8	158.7	151.1	149.5	141.7	129.5	130.5	2.9 %
Denmark	72.1	80.1	73.2	68.8	65.5	50.8	50.8	1.1 %
Germany	1263.2	1138.1	1064.7	1016.5	967.0	931.6	936.0	20.9 %
Estonia	40.5	20.3	17.4	19.3	21.3	18.3	21.1	0.5 %
Ireland	56.6	60.3	70.3	72.0	63.4	61.7	63.8	1.4 %
Greece	105.6	111.8	128.9	139.9	121.0	98.2	98.9	2.2 %
Spain	293.3	335.3	397.1	452.6	370.1	351.8	357.3	8.0 %
France	556.6	553.8	567.0	570.7	528.0	477.3	482.0	10.8 %
Croatia	32.4	23.2	26.1	30.3	28.4	24.6	25.5	0.6 %
Italy	522.1	538.3	562.1	589.2	514.7	443.7	439.0	9.8 %
Cyprus	6.4	7.9	9.2	10.2	10.3	9.1	10.0	0.2 %
Latvia	26.5	13.0	10.6	11.6	12.7	11.6	11.8	0.3 %
Lithuania	48.5	22.5	19.6	23.0	20.9	20.5	20.7	0.5 %
Luxembourg	13.1	10.7	10.6	14.3	13.4	11.6	11.9	0.3 %
Hungary	94.2	75.9	73.9	76.2	65.7	61.3	64.5	1.4 %
Malta	2.3	3.0	3.1	3.2	3.2	2.5	2.6	0.1 %
Netherlands	226.4	239.3	229.8	225.8	224.1	207.5	205.8	4.6 %
Austria	79.5	80.9	82.1	94.5	86.9	81.0	84.5	1.9 %
Poland	475.0	445.7	396.3	404.3	413.1	392.3	416.3	9.3 %
Portugal	60.8	70.8	84.3	88.1	71.7	71.1	74.6	1.7 %
Romania	248.9	187.8	143.6	151.7	124.4	117.2	114.8	2.6 %
Slovenia	18.7	18.8	19.1	20.6	19.7	16.9	17.5	0.4 %
Slovakia	73.4	53.3	49.2	51.3	46.4	41.8	43.5	1.0 %
Finland	**72.3**	**72.8**	**71.3**	**71.2**	**77.4**	**57.2**	**57.5**	**1.3 %**
Sweden	72.7	74.7	70.4	68.6	66.4	55.7	55.5	1.2 %
U K	809.9	767.6	741.9	726.2	642.1	541.5	505.4	11.3 %
Iceland	3.8	3.7	4.4	4.4	5.2	5.4	5.9	0.1 %
Lichtenstein	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.0 %
Norway	51.9	51.8	55.7	56.3	56.6	56.1	54.4	1.2 %
Switzerland	56.7	56.1	57.2	58.3	58.5	52.9	52.6	1.2 %
Turkey	219.8	248.4	300.5	340.6	404.6	483.4	537.4	12.0 %

Source: author exported from European environmental agency Eurostat (2020)

4.6 Analyses of Sustainable economic development in Finland

The major premise for advancing the argument on sustainable development is the need to expand peoples' liberty and wellbeing; such is the main aim and the principal attitude towards sustainable development. In view of this, the provision of the economic needs of people is inevitable in the cause for attaining sustainable economic development.

It must be recognized that in the presence of inequalities in human development, the much hankered aspirations enshrined in the Agenda2030 for sustainable development cannot be fulfilled.

Human societies are irreparably damaged, and the capacity of its components undermined when inequalities are deep seated within. Social integration and cohesiveness is effectively eroded while the people's trust in the government is undermined when the economy of the country is precarious.

As a leader in global sustainable development, Finland is one of the countries in continental Europe whose human development index is commendable considering the well-being of the average Finnish. Under this chapter the researcher analysis the human development index of the country from various aspects of the economy, it then makes a comparison between Finland and other countries within the OECD, in order to appreciate the level at which the sustainable economic indicators of the Agenda2030 have been attained in Finland.

4.6.1 Human Development Index (HDI) value and rank

In 2018 Finland recorded a Human Development Index of 0.95; this put the county's human development in a higher group with a rank of 12 among 189 countries globally (UNDP, 2019). Finland's HDI value improved from 0.784 to 0.925 between 1990 and 2018 representing 18.0%. As shown in the table below the country's progress with regard to each of the indicators. Life expectancy at birth incremented by 6.5 years, the mean years of school increased by 5.0 years with expected years of schooling improving by 4.3 years. Gross National Income (GNI) per capita between 1990 and 2018 appreciated by 48.5% (UNDP, 2019).

In order to ensure that data provided allows for cross-country comparison, data on human development index is sourced from international database from the United Nations Population Division (UNPD) - life expectancy database, the United Nations Educational, Scientific and Cultural Organization Institute for Statistics- the mean years of schooling and expected years of schooling data and the World Bank – GNI per capita data.

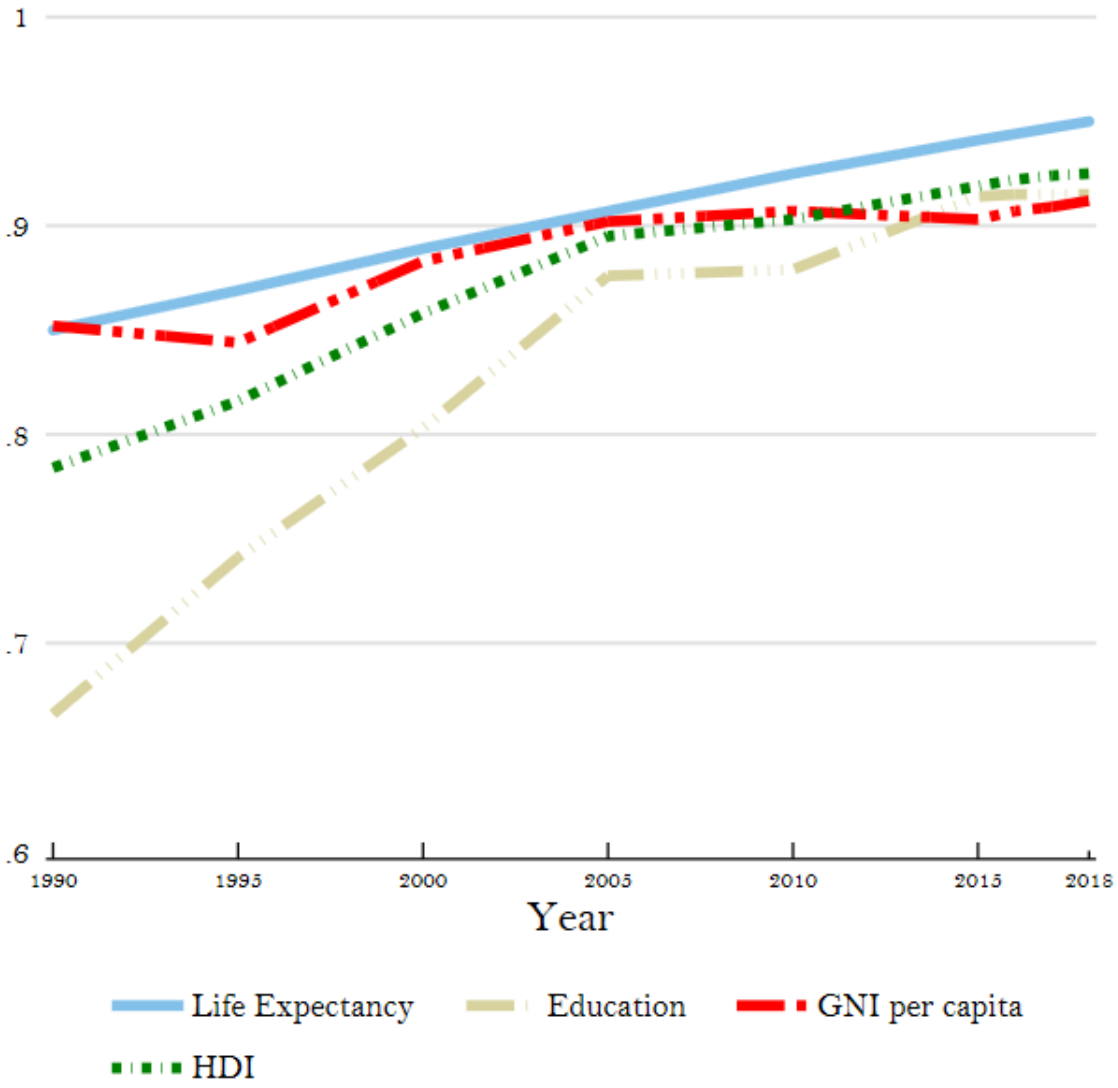
The Human Development Report (2019) provides information of the 2018 HDI values and ranks to cover 189 countries, IHDI for 150 countries, GDI for 166 countries and GII for 162 countries.

Table 4: HDI trends based on consistent time series data

Period	Life expectancy at birth	Expected years of schooling	Mean years of schooling	GNI per capita	HDI
1990	75.3	15.0	7.5	28.133	0.784
1995	76.5	16.3	8.6	26.722	0.816
2000	77.8	17.7	9.3	34.658	0.858
2005	79.0	17.2	12.0	39.285	0.895
2010	80.1	16.9	12.3	40.389	0.903
2015	81.2	19.3	12.4	39.473	0.919
2016	81.4	19.3	12.4	40.609	0.922
2017	81.6	19.3	12.4	41.142	0.924
2018	81.7	19.3	12.4	41.779	0.925

Source: UNDP (2019)

Figure 13: Trends of Human development Index for Finland on life expectancy, education and GNI per capita (2018)



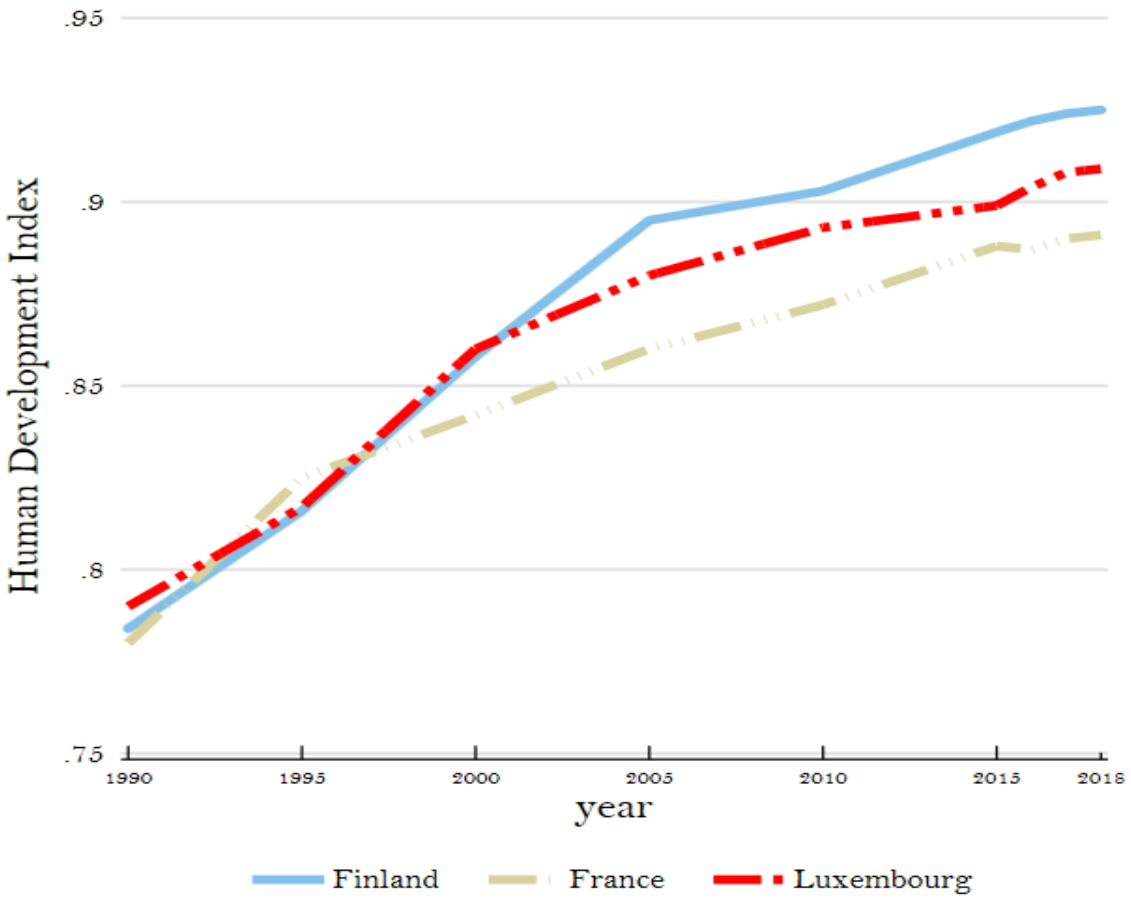
Source: UNDP (2019)

Figure 14 shows that Finland's sustainable development programmes for improved economic lives of its people are positive and has seen tremendous increase from 1990 to 2018. Human development index is one of the best in the World as it put the country in the 12th position out of 189 countries. Life expectancy has seen significantly consistent increased since 1990 up to 2018. Same is education and GNI per capita.

4.7 Comparative assessment of progress with other countries

The country's progress in human development measured by the human development index is progressive from 1990 to 2018. In order to appreciate the height of progress it was instructive for the researcher to compare the case of Finland and other countries. Finland, France and Luxembourg for instance showed different degrees of progress for their HDIs trend shown by figure 14.

Figure 14: HDI trend for Finland, France and Luxembourg (1990-2018)



Source: UNDP (2019)

Figure 14 indicates that HDI growth in Finland bests that of the two countries, and it has been like that from 2000 to 2018. Finland's sustainable development programmes under the

auspices of the Avian2030 which mimic the SDG indicators have been the vehicle for effective implementation of the themes and their indicators. The fruits of successful economic policies are clearly evident in the country. The office of the prime minister points out that environmental sustainability without accounting for the human capital of the citizens are pointless unless it is link to the total economic freedom of the citizens, in view of that policies that are meant for arriving at the indicators of decent work and economic growth (SDG 7) were given equal measure of attention like the environmental areas such as responsible consumption and production (SDG 11).

4.7.1 Analysis of Gender Development Index (GDI) of Finland

The Gender Development Index (GDI) was used to determine the rate at which equality is demonstrated between men and women in terms of development opportunities and privileges for both sex. The GDI measures gender inequalities in achievement in the three fundamental dimensions indicating human development; health, education, and economic empowerment. The first dimension is measured by life expectancy for men and women, the second dimension is measured by expected years of schooling for male and female for adults, age at 25 and older and the third dimension is measured by estimated GNI per capita for men and women.

In this analysis, GDI of Finland is measured against Denmark and Norway against the overall indicators for OECD countries. Countries are grouped on complete deviation from gender parity in Human Development Index. So country groupings consider inequality in favour of both men and women.

The calculation used 166 countries. The female Human and Development Index value for Finland was 0.920 for women and 0.929 for men in 2018, this subsequently put the country in group one. GDI values for the two comparing countries are 0.980 for Denmark and 0.990 for Norway.

Table 5: Gross National Income for Finland compared with other countries and OECD, 2018

	F-M ratio	HDI values		Life expectancy at birth		Expected school years		Mean years of schooling		GNI per capita	
	GDI valu	Male	Fem	male	Female	male	Fem	Male	Fem	Male	female
Finland	0.990	0.929	0.920	8.9	84.6	8.5	20.1	12.3	12.6	48,689	35,066
Denmark	0.980	0.938	0.920	78.8	82.8	8.4	19.8	12.4	12.7	56,732	41,026
Norway	0.990	0.955	0.946	80.3	84.3	7.4	18.8	12.5	12.6	75,688	60,283
OECD	0.96	0.903	0.882	77.3	83.0	6.0	16.6	12.1	11.9	50,530	31,016

Source: Author's own computation based on data from World Bank (2018)

4.7.2 Analysis of Finland's Gross Inequality Index

The Gross Inequality Index was introduced by the HDR; the GII reflects gender-based inequalities in basic areas, thus health, empowerment, and economic activity. The economic activity is estimated by the labour market engagement rate for male and female, the empowerment is estimated by the share of parliamentary seats for women and completion of secondary and higher school for both gender and the reproductive health is estimated by maternal mortality and adolescent birth rates. In this document Gross Inequality Index is explained by the denial in development as a result of the deepness of inequality of achievements for both genders.

Data from the Gross Inequality Index for 2018 shows that Finland has a value of 0.050, which puts the country on the 7 position out of 162 countries. As of the time this work was completed, Finland has 42% parliamentary seats for women, and 100% record of adult women with at least secondary level education, some records can be said of men. It is revealed from the table 5 that for every 100,000 live births, 3.0 mother loss their lives from pregnancy complications, adolescent live birth rate is 5.8 births per 1.000 women within the ages of 15-19. The rate of female participation in their labour market is 55.0% and 62.2 for

their counterpart men. When Finland's progress is compared to that of Denmark and Norway it is revealed that Finland's record is better than the two in all areas of the GII.

Table 6: GII of Finland compared with other countries for 2018

	GII Value	GII Rank	Maternal mortality ratio	Adolescent birth rate	Female seats in parliament (%)	Population with at least some secondary education (%)		Labour force participation ratio (%)	
Finland	0.050	7	3.0	5.8	42.0	100	100	62.2	5.0
Denmark	0.040	2	6.0	4.1	37.4	89.4	89.2	65.9	8.1
Norway	0.044	5	5.0	5.1	41.4	94.8	96.1	66.7	0.2
OECD	0.182	-	14.0	20.5	30.1	87.7	84.4	68.5	1.6

Source: UNDP (2019)

4.7.3 Comparison of the emphasis on human well-being and social issues

The socio-economic sustainable development dimension targets the attainment of better living standards for the citizens living in a decent society. These are in respect of the following SDGs, 3 and 11 which emphasize good health and being and sustainable cities and communities respectively. Within the broader perspective of the Agenda2030 for the attainment of the SDGs, the aforementioned dimensions are indicated by sustainable communities and local communities and sustainable lifestyle in the Avian2030 of the Finnish policy document. Here a comparison is drawn between Finland and other countries so as to allow for the accentuation of the success of Finland in its sustainable development agenda in the area of wellbeing and decent society.

The assessments are based on the following dimensions of human well-being and societal development; sustainable society index (SSI), World happiness index (WHI), the World's most literate Nations, corruption perception index (CPI), good country index (GCI), fairness for children, and open data index (ODI).

Table 7: Human wellbeing and social issues

Rank	SSI Human wellbeing	World happiness index	World's most literate Nations	Corruption perception index	Good country index	Fairness for children	Open data index
1	Finland	Denmark	Finland	Denmark	Ireland	Denmark	Taiwan
2	Iceland	Switzerland	Norway	Finland	Finland	Finland	UK
3	Germany	Iceland	Iceland	Sweden	Switzerland	Norway	Columbia
4	Japan	Norway	Denmark	New zeal	Netherland	S. land	Finland
5	Sweden	Finland	Sweden	N. lands	N. Zealand	Austria	Uruguay
6	Denmark	Canada	S. land	Norway	Sweden	N. lands	Australia
7	Norway	Netherlands	US	S. land	U K	Ireland	Denmark
8	Austria	N. Zealand	Germany	Singapor	Norway	Estonia	Norway
9	Hungary	Australia	Latvia	Canada	Denmark	Slovenia	France
10	Ireland	Sweden	N. lands	Germany	Belgium	Latvia	US

Source: Researchgate technical report (2018) Agenda 2030 in Finland on key questions and indicators of sustainable development.

Finland ranked first in sustainable society index (SSI) human wellbeing among the ten countries compared; this is an indication of the effective implementation of workable sustainable development projects outlined in their strategic documents presented to the prime minister. The category is determined by access to good healthy life, good medicines and access to recreational facilities that ensure good health practices. Ranked as the fifth happiest country, Finland record is evident in their ranked on SSI human wellbeing.

As pointed out in the previous analysis of the gross inequality index of Finland compared with other countries for 2018, the country recorded 100% of population with at least some secondary education, the country placing first in the World's most literate nations is due to their sustainable education policies. It ranked second in the corruption perception index, meaning the country's effort at preventing and combating corruption is regarded a success.

The good country assessment was based on democratic credentials of the countries, and Finland position tells of a progress in the area of good governance.

Fairness of children was also assessed, it determines how children are prioritized due to their vulnerability, the provision of essential needs for children, such as health, education and protection of children's right.

4.8 Observations

A continuum of related themes of sustainable development were consciously infused into administrative sectors and comprehensively reflected in the strategies formulated by numerous sectors of the country's administration. These thematic areas are climate change, relative to renewable consumption and production, energy efficiency and sustainable usage of ecosystem services. Certain element of the policies for sustainable development incorporates the social dimension which is the well-being of citizens. Most importantly it was identified that almost all sectors of the countries administration are aimed and committed to as a matter of state's policy to the realization of the guiding principles of sustainable development through their activities.

In evaluating the strategic policies designed by specific ministries before 2009, it was revealed that all their visions and missions strategies touched on the concept of sustainable development either in direct terms of indirectly. The frequency at which sustainable development is discoursed in the plan document profoundly differs, same as the scale of discussion. A typical case is identified within the portfolio of the Ministry of Transport and communication and the ministry of agriculture and forestry, the themes of sustainable development is recognized as a very sensitive area of focus, unlike the ministries of interior, justice and finance where the theme is less considered a major policy target. Those notwithstanding there are several interfaces for meeting sustainable development goals between the various sectors of the administration at various junctions of development.

It should be clarified at this point of the discussion that, the achievement of the country in the area of sustainable development is a result of state level policy directions, gradually knocked into the collective consciousness of the people over time. The most crucial objective of the Finnish National Commission on Sustainable Development (FNCSD) is to make the principle

of sustainable development part of state policy practices of sector administrations. In Finland's public sector it was not uncommon to hear that Finland is the pioneer and pacesetter of sustainable development, the topic is considered a lifelong learning process of the society (Office of the Prime minister , 2016).

The country's low population density and comparatively unused natural ecosystem facilitates the conservation of nature. The country, by international benchmark has cities that are small and naturally endowed with green terrains. Finland has attained, particularly, success in conservation of nature recently as a result of the ban on hunting of certain endangered animal species (Jari, 2017). Sustainable areas relative to the environment, sustainable use of energy and climate variation have been possible due to target setting by administrations. The thematic areas are premised on the country's national strategic actionable plans, and on international commitment.

The success of Finland's economy is to a large extent a result of technical know-how and innovative programmes, typified by their global success in the area of export of information and communication technologies. The role of investment by business entities, the State, local administrations and the research and development sector participation in the work towards sustainable technologies. From 1980 till 2015 the proportion of GDP attributed to the research and development sector increased consistently and significantly. A total of 4.9 billion Euros was invested in research and development alone, accounting for 3% of the country's GDP (Finnish Environment, 2015).

In 2001 alone it was estimated that the private sector spent 3.6 billion Euros on research and development. Finland's technical expertise can be found in areas including metallurgy, pulp and paper production, low level of emission energy technologies and fuels, waste water treatment and waste management technologies (Finnish Environment, 2015).

It should be emphasised that the country's massive investment in research and development contributed hugely to their success in sustainable economy. Over half of the state sponsored research and development is linked to sustainable development, the programmes offered by the Academy of Finland are infused with sustainable synopsis. As said of the role of private companies in attainable the ''Finland we want'' private companies cooperate with state institutions and bodies in financing and conducting researches. In several institutions where

researchers are trained critical subjects on sustainable development are programmed and taught. Co-operation among the educational, research and environment sector has been tighter, and practical effect of measures is comparatively better in the area of sustainable agenda.

In spite of the commendable concerted effort by the state institutions, educational, research and development organizations, private companies and individuals, multi-sectoral approach is recommendable to be improved.

The glorious story told of the Finnish human development aspects is explained by the role of legislation that safeguard the health and safety of employees covering all workplace within the economic boundaries of the country (Finnish Environment, 2015). The impact of the legislation accounts immensely for the economic wellbeing and human development of the people, for instance in the 1980s it was estimated that around 100.000 workplace accidents occurred yearly, however, since the passage and implementation the law the rate per annum has gone down significantly.

Critical aspect of Finland's democracy includes the participation of citizens, transparency and freedom to decide to be part of the political process. These are instrumental in strengthening democracy of the country, the result is found in the item under the World' happiest country, where Finland is among the first four, social inclusion and regional cohesion, promotion of gender equality and enhancing the opportunities for women in Finland is evident in the percentage of women holding parliamentary positions.

5. CONCLUSIONS

In broader perspective, sustainable development is achieved under the following guidelines; the need to meet sustainable economic development, the need to meet sustainable environment, the need to meet sustainable society and the need to operate within global responsibilities. The inclusive criteria for identifying sustainable programmes was the three pillars of the term being; environment, social and economic, in the case of Finland sustainable programmes anchored on these three key thematic areas, such were espied in the various sector ministries programmes under the auspices of the office of the Prime Minister.

The contribution of the country in reduction of industrial impacts on climate change was measured in terms of the number of cars that use electric powered cars rather than diesel, petrol and fossil fuels. Table 2 illustrates car registration by fuel types. The rise in the number of electric car registration affirms the reduction of industrial impacts on climate change. When compared with other OECD countries it identified that Finland is a force to reckon with in the effort to combat air and greenhouse emissions. Moreover figure 12 ‘’ total energy consumption in Finland’’ indicates that the use of renewable energy and Nuclear energy are ascending while the use of fossil fuels and peat are descending.

Finland’s focus on energy and public policies is explained by the fact that almost 40% of all energy is consumed in buildings, deductively; the saving potential for the country is vast. One major sustainable invention is the investment in the production of fuel efficient automobiles for public and private usage, since the introduction of energy efficient vehicles, the number of purchase electric cars have been increasing with appreciable speed, signalling the readiness of the country to transform its automobile industry from fossil fuel to renewable energy. Thus, a change-over to cleaner fuels environmentally friendly diesel and gasoline, electricity, liquid petroleum gas (LPG) and other options of sustainable apt fuels.

The contribution of Finland in the area of economic sustainability was measured in the several areas of Human Development Index, such as; Gross Inequality Index, Gross domestic products, and World Happiness Index. Their record in 2018 of 0.95 put the country in a higher group with a rank of 12 out of 189 countries measured. The country’s records on these areas are commendable and efforts at such feats are attributable to the commitment made by the government and the citizens. The strength of the country’s economy is a strong

indicator of the country's capacity to realize its sustainable aspirations, where the economic fundamentals of the country is weak its sustainability aspirations are bound to peter out. Again as highlighted in the theoretical part, ignoring the wellbeing of the citizens in favour of the next generation is not a proper way to address a holistic sustainable development, in the same way the current generation cannot rapaciously utilized the existing resources to the detriment of the next generation.

The economic improvement of the citizens is vitally important to the Finnish government. Table 5 illustrates the Gross National Income per capita; Finland did extremely well for both male and females. Their effort in life expectancy and Education attest to the country's splendid performance in the economic sustainability. The percentage of citizens in who have completed at least certain level of formal education was 100. Gross National Income (GNI) per capita between 1990 and 2018 appreciated by 48.5%.

The government of the country under the office of the Prime minister is the spearhead in the sustainable development agenda. The country's approach to the dynamics of the subject can be regarded as a bottom up approach since evidence from the country proves that the ideation is inculcated in the citizens in schools, school curriculums are infused with the ethos of sustainable development. The education sector has universities that offer sustainable development programmes, for both local and international students from across the globe.

This work is crucial in the global debate on ideal sustainable development in that it has brought forth and digested a chunk of the theoretical backgrounds of sustainable development. The analysis of the variety of seemingly conflicting and concurring theories on sustainable development is vital in appreciating the local, regional and global effort to addressing issues of sustainable development from a broader perspective. The theories allow for proper understanding of the term sustainable development and its applicability in state governments', regional governments' and global governments' terms of references for sustainable projects and programmes.

Certain aspects of the country's policies towards sustainable development must be emulated by other countries. The country tackles the issues in the SDG with certain level of seriousness. Their financial and resource commitment to research and development is highly recommended for progressive pursuance of sustainable development goals.

The country should open up their doors for students from developing countries to attend their sustainable development-oriented schools to acquire knowledge in the subject, since it is a global hands-on-deck effort. And again, industrialized countries should endeavour to cut down the use of fossil fuels such as diesel to the use of electric powered transportations. Polluted air has been linked with the rapid spread of the COVID 19, Smoking and dirty air increase the risk of chronic illnesses that leave patients more vulnerable according to DW News science centre, in view of this, states leaders and governments should not only pay lip service to the SDGs, but take practical steps to it such as aiding poor countries respect nature while the rich advanced countries cut their luxury and affluent lives.

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