ISSN: 2230-9926

Available online at http://www.journalijdr.com

IJDR

International Journal of Development Research
Vol. 16, Issue, 05, pp. 70460-70475, May, 2026
https://doi.org/10.37118/ijdr.30763.05.2026

RESEARCH ARTICLE OPEN ACCESS

EXPLORING THE INEQUALITY DISCOURSE: INSIGHTS FOR UNDERSTANDING THE INEQUALITY AND SUSTAINABLE DEVELOPMENT NEXUS

[1]Dr. Sydney Armstrong and [2]Dr. Netra Chhetri

[1]Department of Economics, University of Guyana
[2]School for the Future of Innovation in Society, Arizona State University

ARTICLE INFO

Article History:

Received 15th February, 2026
Received in revised form
14th March, 2026
Accepted 29th April, 2026
Published online 30th May, 2026

Key Words:

Discourse, Dimensions, Inequality, Measurement, Multidimensional, Sustainable Development.

Corresponding author: Dr. Sydney Armstrong

ABSTRACT

Rising inequality is a defining challenge of the 21st century and while the 2030 agenda for sustainable development is far from perfect, its commitment to tackling inequalities is praiseworthy. To this end, an understanding of how the inequality discourse has evolved can help rethink sustainable development policies going forward.In this review, we examined how the inequality discourse has evolved and what this evolution means for addressing sustainable development issues. Specifically, we explored the prominent philosophical views and measurement approaches on inequality, we examined the contentions surrounding the causes and consequences of inequality and we highlighted three important channels through which inequality affects sustainable development.Philosophically, we began examining the inequality discourse with Locke (1690) and end with Milanovic (2016). In this regard, the paper revealed that the discourse on inequality has shifted from its early focus on the measurement of conditions defined as the unequal distribution of income or material goods, towards a more holistic approach of measuring unequal opportunities such as unequal distribution of life chances across individuals. We also observed that there is a constant revision of the measures of inequality, and they are beginning to account for the multidimensional way in which individuals and society experience inequality. In relation to sustainable development, our paper revealed that inequality negatively affects sustainable development by hindering economic growth, contributing positively to environmental degradation and causing health and social problems in society. With this information, we constructedthe Armstrong-Chhetri Inequality and Sustainable DevelopmentFramework for understanding the nexus between inequality and sustainable development.This framework thereforeisuseful for guiding sustainable development policies especially in highly unequal societies.

Citation: Dr. Sydney Armstrong and Dr. Netra Chhetri, 2026. "Exploring the Inequality Discourse: Insights for Understanding the Inequality and Sustainable Development Nexus". *International Journal of Development Research*, 16, (05), 70460-70475.

INTRODUCTION

The discourse on inequality has gone through several evolutionary phases. While Plato and Aristotle are seen as early thinkers, it was during the Enlightened period, especially through the writing of John Locke, Jean Jacques Rousseau and Adam Smith, the issue of inequality received more philosophical views. Traditional writers such as Locke (1690), Rousseau (1755), Smith (1759 & 1776), Ricardo (1817) and Marx (1867-1883) see inequality as the unequal distribution income or wealth among individuals in society however, these authors debate about what causes inequality among men However, contemporary writers have shifted the focus of inequality as a mere income distribution problem towards including other inequality dimensions that are important for human well-being, with further emphasis on the analysis of between and within countries inequality analysis. These scholars include the likes of Sen (1999), Green (2008), Piketty (2014) and Milanovic (2016). Further, measuring inequality has been equally contentious as the literature reveals that there has been a constant revision of the measurements of inequality and more importantly the new measures are beginning to account for the multidimensional way that individuals experience inequality.On the issue of sustainable development, while the term has been used in several instances throughout history, it became more popular in 1987 with the publication of the report 'Our Common Future' by the World Commission on Environment and Development (WCED). The commission argued that addressing the growing poverty situation and the looming environmental crisis required a sustainable development approach which they defined as development that meets the needs of the current generation without compromising future generations from meeting their own needs (WCED, 1987). Further, the inequality discourse has highlighted that the issue has significant implications for sustainable development policies and practices. In particular, inequality contributes to environmental degradationTorras and Boyce(1998), it causes health and social problemsWilkinsonand Pickett (2009a), and it reduces economic growth Galor andZeira(1993)all of which are key for achieving sustainable development (Armstrong and Chhetri, 2025). For this review paper, our focus was on highlighting how the

perspectives and measures of inequality have evolved over time and how these evolutions can help shape sustainable development policies globally.We achieve this aim by thoroughly analyzing the literature on inequality and sustainable development and as a novel contribution, we propose the Armstrong-Chhetri Inequality and Sustainable Development Framework for understanding the nexus between the two issues.Notwithstanding the large literature on inequality, in this paper, we follow a structured approach that highlights the most important discussion on inequality and sustainable development. For this paper, we start with John Locke (1690), whois widely regarded as one of the most influential Enlightenment thinkers as well as father of liberalism. The other cut-off point is drawn where the literature is still being regarded as part of the contemporary set of references. This cannot be located with a great deal of precision but has been drawn roughly around the period 1980-2025. The remainder of this paper is structured in 3 sections as follows. Section 2 outlines the methodology for selecting theliterature. Section 3 provides the results and it includes an overview of the perspectives and the measures on inequality that emerged in the 20th century, a discussion on sustainable development, the impact of inequality on sustainable development and the determinants of inequality. The Armstrong-Chhetri Inequality and Sustainable Development Framework is also presented in this section. Finally in Section 4 we offer our concluding remarks.

METHODOLOGY FOR SELECTING THE LITERATURE

Search Method: A review of the literature on inequality and its implications for sustainable development was conducted using Google Scholar, Arizona State University (ASU) library and The University of Guyana (UG) library with the only restriction being the publication date. Search terms include the following: inequality perspectives, inequality discourse, evolution of inequality, inequality measurement, historical perspectives on inequality, books on inequality, research papers on inequality, inequality dimensions, causes of inequality, consequences of inequality, inequality and sustainable development. Relevant articles were also found by scanning the references of other articles that were found (backward search) and locating newer articles that included the original cited paper (forward search). The selection of the above search mechanisms to locate relevant scholarly resources was grounded in the fact that collectively, they provide students, researchers and faculty (ASU and UG) with access to millions of information resources, world class collections and outstanding study spaces and research centers.

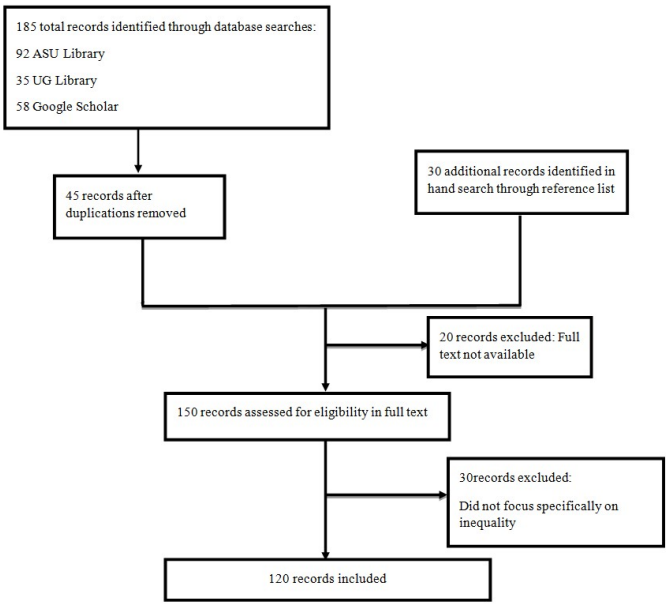
Criteria: There were three main criteria for selecting the relevant papers: 1) The papers were either written in the Englishlanguage, or it had an English language translation, 2) the paper focused on either a given inequality perspective,inequality measures, or the inequality-sustainable development nexus, and 3) the paper was written between 1600 and 2025. Therefore, studies were excluded if they were written outside of the time period, not available in full text or not submitted in an academic or professional setting. Further, while we do recognize the concerns of limiting our paper selection to the English language, the fear of misrepresenting the author(s) thoughts by applying our own translation mechanism guided our approach.

Information Extraction: Information concerning the causes, consequences, measures, perspectives and analysis of inequality and sustainable developmentwere extracted from the identified scholarly work. We reviewed each of the identified articles to determine eligibility and extracted study information. We noted various features among the research papers, in particular their findings and conclusions and below we have summarized these features which help to shed light on how the inequality discourse has evolved and the implications it has for guiding sustainable development policies.

RESULTS: PERSPECTIVES AND MEASURES INCLUDED IN THE REVIEW

Figure 1 shows the number of studies identified, screened and included or excluded at each stage of the literature selection process. A total of 120 pieces covering ten perspectives, six inequality dimensions and eight measures were included in the review. These papers also covered issues related to sustainable development. The perspectives are grouped into two categories: historical for publication dates before 1980 and contemporary for publication dates after 1980. These results are discussed in detail in the next section.

Figure 1. Flow Diagram for the Literature Selection



Source: Flow diagram was constructed by the author with guidance from Darlow and Kuang-Yi (2016)

Defining Inequality: From Unidimensional to Multidimensional: The Oxford Dictionary of Economics defines inequality as the differences in the distribution of economic stocks or flows among economic agents. For example, income inequality refers to the unequal distribution of the flow of income, whereas wealth inequality speaks to the unequal distribution of the stock of wealth (Black *et al*. 2012).Further, most if not all of the earliest work on the topic of inequality was limited to studies conducted by economists and focused on how income or wealth was unevenly distributed among individuals in society, in particular the emergence of income inequalities and their relation to economic growth (see for example Atkinson 1980, 1983; Kuznets 1955). Further, in the literature on inequality, attempts were made to differentiate between inequality of outcomes measured by income, wealth or expenditure and inequality of opportunities denoted by differences in individuals' circumstances beyond their control and this includes gender, ethnicity, environment, or family background (Dabla *et al*., 2015).However, it is important to note that inequality of outcomes is thought to arise from a number of differences in opportunities and individual's efforts as well as talent and as a result it is not easy to separate effort from opportunity. For example, the income of parents, resulting from their own effort, determines the opportunity of their children to obtain an education (Dabla *et al*., 2015). In light of this argument, Rawls (1971) suggested that the distribution of opportunities and of outcomes are equally important for developing a good understanding of the nature and extent of inequality globally.In recent years, many scholars have slowly shifted to a more comprehensive notion of inequality which is referred to as social inequality and this type of inequality takes on a multidimensional approach (for an overview see Costa, Jelin and Motta 2017, Bashi-Treidler and Boatcă(2016), Guidetti and Rehbein

2014). In this regard, inequality is rooted in other individual wellbeing aspects apart from income and wealth as it includes a differential access to power resources (see also Kreckel 2004). This is arguably the case since income and power inequalities tend to reinforce each other: less income and wealth often correlate with political inequalities, and less political power may also account for less income and wealth (Therborn, 2006 & 2013; Boyce 2008). Further, apart from social class, there exist other important factors of social inequality which include gender, ethnicity, caste, race or age. In other words, people are not only unequal because they have less money or because they possess less wealth but also because they are of a certain gender or age or because they identify with a specific race or ethnicity. The literature classifies this group-based type of discrimination as horizontal inequality as opposed to vertical inequalities which is based on individual income (Stewart, 2008). However, it is important to note that these categorizations intersect and reinforce each other (Krizsán, 2012).

In addition, it is worth noting that income and wealth are in most cases socially desired goods, but they are not the only ones. Individuals in society also value other collective goods such as security, participation and autonomy, knowledge and education along with good health and a comfortable environment but they may differ significantly in their possibilities to access these goods (Góngora-Mera, 2015). Given the multidimensional and interdependent characteristics of social inequality, Costa *et al*., 2017 defines social inequality as the "distance between positions which individuals or groups of individuals assume in the context of a hierarchically organized access to relevant social goods (income, wealth, etc.) and power resources (rights, political participation and positions)" (Costa *et al*., 2017, p.6). These distances can be placed into three basic categories of inequality (see Therborn 2013): 1) vital inequalities which refers to socially constructed unequal life chances of human organisms; 2) existential inequalities and the reference here is to the capabilities or allocated degrees of freedom of persons; and 3) resource inequalities which reflect the unequal provision of resources for human action.Recent research has also stressed the spatial character of social inequality as well as its global interdependence. For the spatial characteristic, social inequality does not only matter on an individual or group basis, but rather it may also be rooted in a particular space or territory where people live, where they grew up and where they were born into. Usually, the origin of these inequalities can be linked to specific distributional schemes within countries (regarding infrastructure, social services or fiscal transfers). As a result, territories with a strong capacity to provide a certain level of human development exist alongside territories unable to provide the most basic services to their citizens (Rodrigues-Silveira, 2013). The most visible identification of this occurrence is the stark difference in terms of well-being between a relatively wealthy neighborhood and poorer rural communities.

Regarding the second aspect, the global interdependence, several researchers have unearthed global entanglements that underline current levels of social inequality (Korzeniewicz and Moran 2009; Pieterse 2002; Boatca 2015; Burawoy 2000). From this perspective, social inequality is as a result of processes that connect asymmetrically endowed actors and spaces all over the globe. Costa *et al*. (2017) refer to this as global interdependent inequality. As Kreckel (2004) posits, this specific configuration of inequalities is not rare and in fact the vast part of social inequality affecting individuals or groups today are actually rooted in such global entanglements. Moreover, current social inequality is based to a great extent in unequal relationships that have evolved some time ago (Acemoglu and Robinson, 2012; Bashi-Treidler & Boatcă, 2016). These unequal relationships reflect the ability of certain social groups to dominate and exclude others from power and wealth through different exclusionary mechanisms, such as opportunity-hoarding and exploitation (Tilly, 1998). A deeper exploration into the issue of social inequality reveals that establishing conceptual clarity is rather challenging and not as straightforward as one might think. The reason for this is that there are a number of important questions that one must consider when delving into the concept and these include: What kinds of inequality should the term include? Should it refer primarily to economic differences or are social and cultural differences also important? Should physical or health differences be included? What should the level of analysis be, the individual, the family or some other unit, such as the household? These are just a few of the questions that are implicated in the study of inequality, and at different times and places their answers are likely to vary. This variation is also as a result of the fact that there has never been just one way of examining a social issue; rather, different concerns and interests lead to different questions and answers. However, as much as these challenges exist, one cannot deny that analysis of inequality in several dimensions is more likely to provide us with richer insights as to what is happening with inequality and more importantly how it is affecting a country's sustainable development progress.

Historical Perspectives on Inequality: Even though Aristotle and Plato are regarded as early thinkers on the issue of inequality, we begin the traditional perspectives on inequality with the writing of John Locke who is widely regarded as one of the most influential Enlightenment thinkers as well as the father of liberalismThe Enlightenment refers to the European intellectual movement of the 17th and 18th centuries where ideas relating to reason, nature, humanity and God were synthesized into a world view that gained wide assent in the West and instigated revolutionary developments in politics, philosophy and arts. Further, using a selective approach, we continue the discussion by studying the works of Jean Jacques Rousseau, Adam Smith, David Ricardo, Karl Marx and Simon Kuznets and this provided us with a better understanding of how conventional writers view inequality.In his book '*Two Treatise of Government, (1690)*' John Locke articulated his view of how the process by which private property is acquired can lead to wealth inequality over time. By introducing the concepts of appropriation of goods, Locke introduces the idea of inequality through the acquisition of private property and the maximization of Labor along with the legitimization of wealth through this process. So, the appropriation of wealth therefore refers to one's ability to produce goods through maximizing the ability of Labor to do so. Locke explained that laboring common goods helps to add value to them, and this is how one is able to acquire private property and produce legitimate profit. Further, Locke also introduces the idea of people generating a surplus of goods and trading them for other items, especially money.

Locke further argued that man's voluntary consent to use money as a medium of exchange created inequality among the people through the acquisition of private property and goods. He goes onto argue that because it is simpler to specialize in production and generate wealth through this way, some will be able to generate wealth faster and thus generate more wealth than others. In this regard, he states that individuals by using money tacitly consented to the existence of inequality. Even if they only use it to exchangefor goods and services and make transactions easier, they are agreeing to its other properties, notably its ability to store value. In this light, if some individuals produce more and save more than others, inequality will be the natural result. Whilst Locke's contention about inequality is plausible, it is limited as it does not address the distinction between natural inequality and social inequality and more importantly how natural inequality influences social inequality. These issues however are addressed by Rousseau (1755). In '*Discourse on the Origin and Basis of Inequality Among Men, (1755)*', Jean Jacques Rousseau eloquently argued that the emergence of society and the invention of property rights directly cause moral inequality among individuals. For Rousseau, inequality can be placed into two categories: 1) natural inequality which consists of differences in attributes such as age, health, strengths of body, and 2) moral or political inequality, which makes some individuals richer, more honored or more powerful than others. In this regard, Rousseau believes only natural inequality exists in the state of nature and it cannot be leveraged into political advantage due to the lack of social caste in primitive society. He pointed out that it was the coming of society which supplanted humanity from its state of nature into a state of jealousy, conflict, and inequality. With the establishment of property rights, natural inequality imperceptibly unfolded and differences between

individuals became more apparent, largely as a result of the unequal benefits derived from different economic roles. However, Rousseau would argue that equality in society would disappear when property rights came into existence and Labor became necessary. Rousseau uses John Locke's definition of property: he stated that 'anything to which man applies his labor becomes his property'. Thus, if you work in a field, you begin to imagine that your work gives you the right to that piece of land. Initially, however, Rousseau did not believe that property is unequal. If all men work equally and are equally rewarded, then all would be equal. The implication is that the way in which property is distributed is the key factor in the growth of inequality. But without property, there would be no inequality at all, and no rich or poor. Therefore, property rights enable people to cooperate and for knowledge to advance, but at the same time, it introduces more inequality between individuals. Because of property rights, the natural, physical inequality between people combined with social inequality, manifests itself in the form of material wealth, further dividing people into the rich and the poor.

Rousseau goes on to conclude that inequality is natural when it relates to physical differences between individuals. In modern societies, however, inequality is a result of a process of human evolution that has corrupted man's nature and subjected him to laws and property, both of which support a new, unjustifiable kind of inequality, termed moral inequality. Like Locke, Rousseau's position on inequality is that it is unhealthy for society however, can inequality in society foster innovation and create an atmosphere where people are inspired to become industrious? Adam Smith deviates from the position that inequality is all bad for society and provides a case for how inequality can benefit society. Adam Smith's views on inequality in society are well articulated in his two books, "*The Theory of Moral Sentiments,* (1759)' (TMS) and '*An Inquiry into the Nature and Causes of the Wealth of Nations*(1776)' (WN). To have a better grasp of his views on inequality in society, it's important for us to focus on the causes, consequences and benefits of inequality. Beginning with the causes, Smith first draws a careful distinction between natural and unnatural inequalities. He identifies five natural sources of inequalities in wages: "the agreeableness of the job' (Smith, 1776, p.24), 'the easiness and cheapness of education' (Smith, 1776, p.5-10), 'the constancy of employment' (Smith, 1776, p.11-16), 'the trust which must be reposed in those who exercise them' (Smith, 1776, p.17-20) and 'the probability of success in them' (Smith, 1776, p.21-32). Smith then identifies two natural sources of inequality in profits: the agreeableness of the business' and more importantly the risk or security with which it is attended' (Smith, 1776, p.34), that is, the certainty or uncertainty of the returns (Smith, 1776, p.33). Smith argued that the unnatural sources of inequalities come from all the government laws, rules and regulations which prevent a man from exercising his natural or sacred right to pursue his own interest in his own way, and to bring both his industry and capital into competition with those of any other man (Smith, 1776, p.687).

On the consequences of inequality, Smith contends that the unequal distribution in income and wealth in society distorts our sympathies and undermines morality and happiness. Economic inequality corrupts our moral sentiments, because it encourages us to admire the rich and the great, and to despise or neglect people that are poor (Smith, 1759, p.61). In this regard, it leads to an excessive, undue partiality and indulgence towards the rich and powerful who lack proper incentives to behave morally. In addition, Smith is of the view that inequality necessarily makes people, both rich and poor, less happy. Happiness according to Smith consists of tranquility and enjoyment, and he also added being healthy, out of debt and having a clear conscience (Smith, 1759, p.149 & p.45). Finally, Smith presented the view that inequality offers some benefits to society, and his defense of these benefits seems to rely on three distinct arguments: a trickle-down argument, the incentive argument and a social stability argument. Regarding the trickle-down argument, Smith would claim that the increase of wealth in society, especially among the rich, will eventually trickle-down and benefit the poor. In spite of the fact that economic growth will generate substantial inequality, it will be advantageous to the least well-off since it will allow more redistribution towards the poor. In this regard, Smith argues that the luxury spending of the rich provides the poor with the necessaries of life.For the incentive argument, Smith contends that economic inequality is necessary to foster competition among people and to encourage industry, innovation and entrepreneurship which are the foundations of economic growth. Smith famously claimed in WN that individuals are naturally endowed with a relentless desire ofbettering their condition, which is the foundation of savings and capital accumulation (Smith, 1776, p.341). In Smith's view therefore, economic inequalities do not foster widespread unsocial passions like hatred, resentment or envy from the poor towards the rich. In fact, inequalities foster the emulation that runs through all the different ranks of individuals (Smith, 1759, p.50). In other words, those who are richer, wiser or more talented than us are often models that we admire and try to emulate (Smith, 1759, p.114).

Lastly, the natural admiration and deference people feel towards wealth and greatness lead us to the third argument concerning the economic and social benefits of inequalities: the social stability argument. In this respect, Smith writes that our admiration of success is founded upon the same principle as our respect for wealth and greatness and that both are equally necessary for establishing the distinction of ranks and the order of society' (Smith, 1759, p.253). And for Smith the peace and order of society is of more importance than even the relief of the miserable, which is founded on our commiseration for the latter (Smith, 1759, p.226). Therefore, for Smith, we need a distinction of ranks, and thus economic inequality, to preserve peace, order and the stability of society.However, it is important to note that Fleischacker (2004); Kennedy (2005); McLean (2006) and Rothschild (2001) and other scholars who do address this question regarding how inequality affects society are generally quick to insist that Smith's primary or sole concern was with poverty and not economic inequality itself. In a highly influential article, Istvan Hont and Michael Ignatieff (1983, 1, 4) argued that "the Wealth of Nations was intended, above all other purposes Smith might have had in mind," to show that the "extreme inequality of distribution in modern society [is] compatible with the satisfaction of the needs of its poorest working members." Thus, they read economic inequality as being of little or no concern to Smith.Further, Ricardo developed his theory of economic inequality after assessing the work of Adam Smith and he interprets inequality as a result of the natural scarcity law. He was critical of Smith's viewpoint that prosperity depends on the quantity of labor a man can afford or how much money an individual possesses. For Ricardo, a wealthy individual is thought of to be subjected to the abundance of necessaries and luxuries which he can command (Ricardo, 1817). Ricardo adheres to Smith's analysis of income inequality in which the total income is divided between the three classes which are landlords, capitalists, and the proletariat. In addition, he reaffirms and further discusses an inverse relationship between profits and wages, an analysis that Smith advanced (Ricardo, 1817). However, while Smith pursues a liberal economic model that suggests that all shareholders (i.e. capitalists, landowners, and workers) would win or become more prosperous through limitless economic growth, Ricardo focused his attention more on the extent to which national products were distributed among the beneficiaries (Skousen, 2007).

Further, the Ricardian economy can be thought of as a pie where bigger slices are given to capitalists and landlords, and smaller shrinking slices are for workers. Therefore, the iron law of keeping wages low is suggested to benefit the upper classes. Influenced by Thomas Malthus' population theory, Ricardo posited that wages must remain at the subsistence level. As a result, an expansion of the labor supply will lower wages. In this regard, increasing capital investments shifts up labor demand and raises the wage rate. This increase in nominal wages in turn encourages workers to have more children and consequently, expanding population requires more food that will be manufactured more expensively because of using less fertile lands. Ricardo argued that higher wages will be necessary to maintain workers' living standards. Likewise, the capitalists may not benefit proportionally as much as they did on their extra investments simply because the profit rate would fall due to higher wages. Under these

circumstances, it is only the landowners that are the winners as they will achieve increasing rents when extra land is cultivated.Ricardo's contention reveals a specific kind of inequality where the landlords who do not contribute to any productive activities obtain social products increasingly while the capitalists and workers receive comparatively smaller parts of the wealth of society. However, one flaw of Ricardo's economic inequality theory is his assumption regarding the determination of agricultural returns. In this case, he argued that a society cultivates lands in an orderly fashion from the most to the least fertile level with a diminishing efficiency or decreasing profit rate and that the rate of return in agricultural areas dominates the industrial profit ratio. A drawback of his model is the lack of knowledge or focus on total factor productivity or technological progress. Further, the hypothesis of the relationship between agricultural and industrial rates of return is also without merit as the agricultural rate of return barely determines the profit rate in industrial areas.

Considered by many to be one of the most influential economists, Karl Marx's work concentrates largely on how capitalist mode of production perpetuates economic inequality. For Marx, private property, also the main reason for the economic crisis, gives rise to a perpetual disequilibrium in the market for commodities. According to Marx, in such a society, the working class creates added social value to the products but receives wages that are far below this value. Due to the structure of private property rights, it is the capitalist class that earns the difference between the added value and the wage payment (v), and this residual value is referred to as the surplus value (s). The capitalist would then convert this surplus value into new capital giving rise to economic inequality in society. Marx goes onto argue that the only solution to this inequality in the capitalist economy requires a complete political revolution that will lead to a complete reorganization of private property rights and mode of production. Unlike Ricardo who believed that nominal wage is the price of Labor commodity, Marx argued that the goods supplied by workers are the labor power. For Marx it is neither land nor physical capital, but rather labor that is the only source of the surplus value. Therefore, profit, rent or any kind of non-Labor earnings result from unpaid Labor, that is to say the workers produce value which exceeds what is paid to them in wages. Marx implicitly demonstrates a measurement of inequality through the rates of surplus value:

Rate of surplus value = s/v ……(1)

The rate of surplus value is an important indicator that reflects the degree of exploitation of Laborers by the capitalist class. The higher the rate of surplus value, the more unequal is the distribution of added value created by workers, and this suggests that they receive a relatively less part of that value. Notwithstanding its contribution, the Marxist theory of inequality is not without its flaws as it has revealed weaknesses mainly resulting from a lack of analysis of the adaptive abilities of the capitalist system. Likewise, capitalist systems can intervene to reduce inequality by a) setting-up and maintaining better social safety nets that are very helpful to vulnerable groups and allowing them to attain a better living conditions; and b) governments can also apply a redistribution policy through taxation policy to minimize wealth gaps so that working class are out of deplorable state in terms of absolute physical and spiritual conditions as Marx's would describe. Unlike Marx, Kuznets (1955) had a rosy picture of the capitalist mode of production. Kuznets illustrated a bell curve trend in inequality which first increases when a country begins to industrialize, it reaches a peak at the end of this industrialization process it then decreases. This structural transformation in the economy takes place by shifting from agriculture to industries, leading to an increase in income and this causes inequality to increase. Further, the declining supply of labor in the agriculture sector boosts the wage rate, reducing the wage gap between the two sectors, and inequality negatively relates to growth at this stage (Barro 2000). In other words, it is not alarming to worry about inequality because an industrialized economy can automatically restrict inequality. Kuznets' analysis of the relationship between economic growth and income inequality is inspired by the result of observing income change in the United State between World Wars I and II. However, results from his analysis of the American income distribution (and two European countries: England, and Germany) for the period of 1914-1945 is not sufficient to generalize validly for 21st century world.An explanation for an automatic fall in inequality in rich countries from 1914 to 1945 could be simply because of the World Wars, the Great Depression, and political shocks (Piketty and Goldhammer 2014). Many critiques (e.g. Anand and Kanbur 1993) point out that there has not been an apparent and significant bell curve relationship between economic growth and inequality within a country. Another evidence is an expansion in the income gap in Europe in the 1980s and 1990s (Doerrenberg and Peichl 2014). Even when supporting Kuznets hypothesis in the case of early stage of the transformation from agricultural to industrial economy, economists such as Ahluwalia (1976) and Barro (2000) cannot predict a turning point where income inequality stops accelerating, or when it starts to decline.

Contemporary Perspectives on Inequality: In contemporary literature on inequality, four names loom largely in this discussion, Amartya Sen, Duncan Green, Thomas Piketty and Branko Milanovic. We consider these authors contemporary thinkers on inequality because their scholarship advances new dimensions and suggest new approaches to the inequality discourse.In *Inequality Reexamined published* in 1992, Amartya Sen explored a different perspective on the notion of inequality. In addressing the problem of equality Sen is concerned with two basic elements to rethink - *why equality* and *equality of what*. Regarding the first question, the idea of inequality is considered in its two dimensions of the heterogeneity of human beings and the multiplicity of variables in terms of which inequality can be judged. Specifically, these components lead to divergences in the assessment of inequality in terms of different variables. In relation to the second question, Sen would critically evaluate theories presented by other thinkers such as John Rawls, Thomas Nagel, Ronald Dworkin and Robert Nozick in an attempt to understand inequality.In making a re-examination of inequality in modern times, Sen presented a case for a paradigm shift beyond what others consider as economic inequality and inequality in the distribution of resources. In his proposal, he incorporated the heterogeneity of human beings as an evaluative space for inequality. His perspective is about inequality within a pluralistic society, that is to say a society with human, cultural and religious diversity. According to Sen, human diversities are the results of variations in human needs, capacities, capabilities and interests. By widening the evaluative space of measuring inequality within society, Sen recognized personal heterogeneities physical and mental abilities as important variables for measuring inequality (Sen, 1992, p.20). In this light, he would confront John Rawls equality of incomes by offering an example of a situation where a disabled and able-bodied member of society are given equal incomes. The disabled person cannot function in the way the able-bodied can, whereby the latter has more functioning ability and well-being than the disabled individual.

Sen's approach to inequality has a wider evaluative space as it examines the impediments that prevent individuals from attaining welfare enhancement and individual capabilities. He would arguethat theories that have dealt with the issue of inequality, namely, the utilitarian theory haveseveral limitations. In this light,they failed to capture other aspects of wellbeing that are beyond the satisfaction of individual desires, for instance, participating in the life of the community. Finally, with respect to promoting equality, other theories consider satisfaction as a goal. Satisfaction is usually understood as the state of the person that follows an activity; it is not itself a form of activity, and it can even be achieved without the associated activity. Rightfully, Sen therefore argues that utilitarianism tends to undervalue freedom of individuals in realizing their agency. Sen is also critical of John Rawls' two principles of justice: the '*liberty principle*' and the '*principle of equal liberty*'. Rawls argued that these principles of justice have the merit of caring greatly about distribution since resources ought to be distributed equally among all citizens. For Sen, however, this approach has significant drawbacks. Firstly, income and wealth are not good substitutes for what people are

actually able to do and to be. In this regard therefore, people have different needs for resources, and they also have different abilities to convert those resources into proper functions. In order to reduce inequality in society it is not enough to distribute resources equally but rather to examine critically the range of capabilities of people. Sen develops the idea that society should promote equality in the space of capabilities. Since capability expresses a particular ability, it then refers to the number of abilities from which a person can accomplish things they target. Sen's proposals in Inequality Reexamined remain important even in today's society since he suggests that the problem of inequality should go beyond equal distribution of wealth and income opportunities to include expanding individual capabilities in terms of their freedom to realize things they value and reasons to value them. Sen would suggest that government policies directed at reducing inequality should critically evaluate the social affairs, cultural and religious attitude of society. We should also evaluate and eliminate cases of social exclusion that tend to harbor inequality in society.

In his book *From Poverty to Power*, 2008, Duncan Green argued that it will require a radical redistribution of power, opportunities, and assets to break the cycle of poverty, reduce the level of inequality and give poor individuals power over their own destinies. He contends that the issues of poverty and inequality are best achieved through a combination of active citizens and effective states. By 'active citizenship', Green refers to the mixture of rights and obligations that link individuals to the state. Active citizens use their political, civil, and social rights to improve the quality of civic life. As for effective states, Green suggests that the state which guarantees security and the rule of law can effectively promote inclusive economic growth which is vital for narrowing the inequality gap. For Green, poverty is manifested through multiple dimensions and in our efforts to bridge the gap between the rich and the poor, we need to raise the income of the vulnerable along with a redistribution of power, assets and create opportunities for the less fortune so that we can break the poverty cycle. According to Green, there is a need for a wider notion of wellbeing, springing from health, physical safety, meaningful work, connection to community, and other non-monetary factors. This is why good development practices build on the skills, strengths, and ideas of people experiencing multiple deprivation rather than treating them as empty receptacles of charity. An effective state will create a right framework thereby ensuring justice and democracy for their citizens. Inequality between rich and poor and men and women is a serious impediment to social wellbeing as it wastes talent by freezing out sectors of society and transmits poverty across generations. According to Green active citizens and effective states interact toreduce inequality, vulnerability and unequal power relationships.

While the questions of the concentration of power and wealth lie at the heart of political economy, satisfactory answers have been hard to come by because of the lack of adequate data and guiding theories. In his book *Capital in the Twenty-First Century*, *2014*, Thomas Piketty sought to analyze a unique collection of data going as far back as the eighteenth century, with interest in uncovering key economic and social trends and draw lessons for the future. Piketty's analysis demonstrated prevention of inequality from happening at an apocalyptic scale, but he also reveals that society has not modified the deep structures of capital and inequality as much as we thought in the optimistic decades following World War II. Piketty outlined two new laws of capitalism along with structural contradictions which, while present in most historical phases of capitalism, may pose threat to societies and politics in the 21st century. Piketty's first law states that the share of income from capital in total national income is equal to the rate of profit times the wealth-income ratio, or $\alpha = r \times \beta$ (Piketty, 2014, p.52). This law illustrates that the return on capital for long periods of history tends to be greater than national output or growth and, through inheritance, it is most likely to result in tremendous wealth inequality. Since both the economic growth rate and the demographic growth rate are slowing down, this inequality is expected to increase. Piketty's historical observation on inequality started around the last quarter of the nineteenth century and this was largely as a result of data availability. In the 1800s, the largest source of capital was land and the income from land dominated the income stream for the rich. Whereas in the 20th century that dynamic changed as financial assets, buildings and industrial assets overtook the importance of land in accumulated capital. However, while there was a decrease in wealth inequality experienced between 1914 and 1970 due to the long-term effects of capital destruction during two World Wars, as well as the high levels of taxation introduced during this period, by 2010, capital was prospering as it had not done since 1913 despite the 2008 financial crisis (Piketty, 2014, p.42). Further, the most significant consequence of this accumulation of capital is that as wealth increases, income from capital far outweighs income from labor and as a result wealth transfer from one generation to another leads to laziness and lack of productivity as money simply reproduces itself. The second law states that the ratio of wealth to income equals the ratio of the saving rate to the growth rate or $\beta = s/g$ (Piketty, 2014, p.166). This law indicates that in countries where saving rates are high and have low demographic growth, the capital inequality will become particularly pronounced. Piketty gives the following example to highlight his point. If the savings rate of 12 percent does not change, and the growth rate is halved from 4to 2 percent, the capital ratio increases from 300 to 600 percent. This is a formidable rise in the ratio between capital and income, and the strength of Piketty's argument is that he also finds this increase in his data for the period 1970-2010 (Piketty, 2014, p.26). Piketty also dealt with income inequality from Labor and even though this inequality is significant for him, it pales in comparison with wealth inequality. In relation to earned income, Piketty contends that the period between 1914-1970 saw a significant redistribution of income which led to the growth of a new large middle class and although the growth of knowledge and technology led to a significant redistribution of income, the resulting inequality was not nearly as large as that of wealth and hence not as destabilizing to democracy in the long run as the wealth inequality. In this regard, Piketty points to and substantiates a phenomenon already well-known that is, the appearance of 'supermanagers' who receive 'supersalaries' which are often higher than 100 times the average wage of the country. In terms of who makes up this category of supermanagers, it is comprised of the top executives at publicly traded firms, who earn tens of millions of dollars annually.

These have become particularly prominent in the US and the UK, and their income inclusive of stock options and bonuses places them in the top centile of earners, rivalling the income from capital of all but the wealthiest rentiers. Piketty demonstrates in a convincing manner that their extremely high incomes are in no way related to any economic contribution that they have made, nor are they necessary for achieving rapid economic growth. In fact, they have been awarded by often incestuous company boards, and encouragement for their award has come from the low level of taxation of such top earners experienced during the period of Neoliberalism. Piketty finally showed that these exorbitant incomes of supermanagers in the Anglo-Saxon countries are concomitant with stagnating and exceptionally low incomes of the bottom 50 per cent of the population, particularly in the US.In his book titled *'Global Inequality: A New Approach for the Age of Globalization, 2016'*, Branko Milanovic confronteda number of key questions regarding the issue of inequality and one such question was how has global inequality changed over the past twenty-five years? Milanovic argued that we live in a time of globalization where issues cannot be seen exclusively from national and horizontal perspective. Using his now famous 'elephant graph, he showed how the economic gains of globalization have been unequally distributed. Milanovic contends that the lower middle class of wealthy countries can arguably be considered as a loser of globalization since they have achieved little to no growth in real income during the last quarter of the century. However, China, India, Thailand, Vietnam and Indonesia have witnessed the rise of a middle class which has experienced significant growth in their real income and together, with global plutocrats, they can be seen as the winners of globalization.To understand how inequality has evolved from the past to the present, Milanovic adopts a double comparative perspective towards analyzing inequality that is, comparing inequality both within and among nations. Regarding the evolution of inequality among nations, he posits that the gap between countries widened

between 1820 and 2011, and this divergence reached its peak between 1970 and 1990. However, beyond 1980s and up until the beginning of the 21st century global inequality remained relatively unchanged. In light of this, Milanovic contends that this is due largely in part to the economic growth of China and India who appear to function as income equalizers. Another major contribution to the discourse on inequality from Milanovic is his reformulation of Kuznets's theory (Milanovic, 2016, p.46-58). Kuznets theory asserts that for countries that are industrialized, when the average income grows, inequality first increases, reaches a peak and then decreases. If this is true, why then is inequality growingin some industrialized countries? Milanovic proposes an alternative representation of the evolution of inequality suggesting that, rather than a single U-shaped curve, there is a sequence of Kuznets curves which he refers to as 'Kuznets waves' whereby inequality rise, then fall, and then rise again. To make the case for his Kuznets wave, Milanovic presented an analysis of the long-term evolution of within-nation inequality. His explanation indicates that China, where economic inequality has increased dramatically since about 1980, is actually approaching the top of its first Kuznets wave while the United States has completed its first wave and is now climbing on the second.

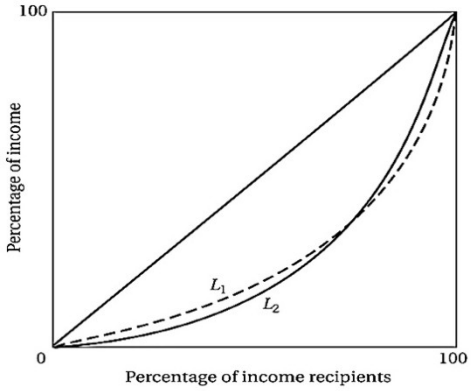
For Milanovic, during the first wave, which started from the Industrial revolution period and lasted up to 1980's, a set of benign and malign forces caused the inequality curve to shift up and down. He argued that between 1914 and 1980, the decrease in inequality passed through a phase of malign forces, such as wars and economic policies, which were shaped by left-wing politicians and the fear of rightwing advocates towards socialist movements. For the second wave, which can be traced back to the 1980s and will last throughout the 2020s, Milanovic posits that the indivisible forces shaping the evolution of inequality within nations are responsible for the increase in inequality experienced so far and these include globalization, technological progress and public policy.Milanovic identified five forces that will drive down inequality in future and these are 1) political changes and progressive taxation, 2) education and skills, 3) dissipation of rents accrued in the early stages of the technological revolution, 4) income convergence at the global level and 5) low-skill biased technological progress, are the five factors that will lead rich countries onto the downward trend of the second wave. He also stressed the role of the government in curtailing inequality. The government must work for a more equal distribution of capital ownership and education, and that continued emphasis should be placed on achieving rapid economic growth because economic growth is considered to be the best tool to reduce both poverty and inequality.The preceding discussion on inequality has allowed us to observe the evolution of the inequality discourse. While historical discussion on inequality has been insightful about the importance of income and wealth distribution, contemporary perspectives have demonstrated that the dimensions of income and wealth alone are insufficient for having a comprehensive understanding of the nature and extent of inequality in society as they omit new and emerging dimensions of inequality which are likely to have major implications for sustainable development. In the next section we will summarize the measurements of inequality with specific focus on those that emerged in 20thcentury.

Measuring Inequality

Unidimensional Inequality Measures: With the emergence of a variety of measurements on inequality, the20thcenturyobserved a considerableprogress on our understanding of inequality in society. As demonstrated by Piketty and Goldhammer (2014) the applications of mathematical techniques for research on inequality have had an advantage as the data on inequality have been better recorded. This section explores the major inequality measures that emerged in the 20th century.

The Lorenz curve: The Lorenz curve is one of the most renowned measurements of inequality as it gives fundamental robustness to the Gini coefficient. One obvious significance of the Lorenz curve is that it allows researchers to observe inequality levels across multiple countries across time. Lorenz (1905) highlighted the vital consideration of population units (e.g. households) in the analysis of how income is distributed, and he came up with a method to answer the question of whether inequality increases or decreases with respect to changes in a population. In order to construct the curve, the population distribution from poorest to richest is plotted on one axis and this corresponds to cumulative income on the other axis. In the case of an extreme equal distribution, as shown in Figure 2, the Lorenz curve is equal to a 45º line. As the distribution becomes unequal, the Lorenz curve bends in the middle. Finally, extreme inequality is represented by the curve becoming congruent to both axes.

Figure 2. Lorenz Curves with intersection



Source: (Davies & Hoy, 1995)

The major deficiency of the Lorenz method as a measure of inequality is that it creates confusing interpretations of comparative analysis when the Lorenz curves intersect (see Figure 2). To resolve this problem, Atkinson (1970) proposes an adjustment to Lorenz's measurement of inequality using a social welfare approach. However, his assumption of social welfare, which was based on aggregating homogeneous individual utility functions, does not address the issue with Lorenz approach and because of this drawback, the Lorenz curve provides only a partial ordering of distribution (Kawani, 1980).In spite ofnotable deficiency of the Lorenz curve several potential applications of Lorenz's method in the multidimensional inequality context can be seen (see Koshevoy and Mosler 1996; Lorenz Zonoid 1996; Koshevoy1998). Nevertheless, very few empirical applications of the multidimensional Lorenz method have been found due to limitations in the dimensional examination of these approaches (Arnold, 2008).

The Gini Coefficient: The Gini coefficient was initially introduced by Corrado Gini in his dissertation and seminal article (Gini,1921) and this coefficient closely relates to the Lorenz curve. In measuring inequality using this approach, the assumption is made that each individual receives the same unit of social income or wealth. Therefore, given a society with n members, an equal income distribution requires that every recipient receives $1/n$ of the total income. If any distribution does not satisfy this assumption, inequality occurs. Further, there are various ways of calculating the Gini coefficient. Sen (1973, p.31) points out that the Gini coefficient is half of the relative mean difference in income. Thus, Sen estimates inequality as follows:

$$\boldsymbol{G} = \frac{\sum_{i=1}^{n}\sum_{j=1}^{n}|y_i - y_j|}{2n^2\bar{y}} \qquad \ldots\ldots\ldots\ldots\ldots\ldots(2)$$

Where:
G is the Gini coefficient
n is the population size and
$\bar{y}$ is the average income

The Gini value varies between zero (complete equality) to one (extreme inequality). While the Gini coefficient has been widely used in many recent reports analyzing national and international income inequality, it has a number of issues. Firstly, it does not provide any clue of the inequality's causation (Ward 1978). Secondly, the

measurement does not consider the relative sensitivity of transfers between households in the middle of the distribution even though it does satisfy the Pigou-Dalton transfer principle (Sen 1973). Thirdly, it is possible to find more than one Lorenz curve for a given Gini value (Atkinson 1970) because agivenvalue of the Gini coefficient may correspond to different points on the Lorenz curves. Finally, Cowell (1988) articulates the point that the Gini's method is an inconsistent measurement when inequality is disaggregated in its components. Despite these shortcomings, it would be a grave mistake to ignore the Gini coefficient as it contains a huge intuitive appeal (Temkin 1993).

The Entropy measurement of inequality: The Theil index, a measure developed by Henri Theil (1967) measures how the distribution of income for a country differs from the population distribution of that country. In this regard, the index compares the income and population distribution structures by adding up, across groups, the weighted logarithm of the ratio between each group's income and population shares. Further, when this ratio is one for a given group, then this group's contribution to inequality is zero. And when all the groups have a share of income equal to their population share, the overall Theil measure is zero (Conceicao, 2001, p. 13).

Theil (1967) applied the theory of information and provided two indices in measurement of inequality, namely Theil T and Theil L as follows:

$$T_T = \frac{1}{n\bar{y}} \sum_{i=1}^{n} \left[\ln \left(\frac{y_i}{\bar{y}} \right) y_i \right] \quad \text{.....(3)}$$

And

$$T_L = \frac{1}{n} \sum_{i=1}^{n} \ln \left(\frac{\bar{y}}{y_i} \right) \quad \text{.....(4)}$$

where:

T_L is Theil L and T_T is Theil T; both indices vary from zero to infinity
n is the total members of a subgroup
$\bar{y}$is the average income of the subgroup; and
y_i is the income of the $i$thmember.

This technique is used in analyses that compare inequality such as urban-rural, within and between regions in a country, or within and between countries. For example, Eastwood and Lipton (2004) used Theil's technique to test the hypothesis of an offsetting trend in inequality (OTI), that is, rising intrasectoral inequality is offset by a decline in intersectoral inequality. The results of urban-rural inequality from selected developing countries rejected the OTI hypothesis.Bourguignon and Morrisson (2002) used the Theil approach to decompose world inequality spanning the period 1820-1992. Notwithstanding a similar phenomenon of increasing inequality, patterns in inequality were different from 1950 across different regions. With the Theil T index, total inequality declined marginally from 0.81 to 0.78 in the 1950s. In contrast, Theil L showed a general rise (despite a marginal decline in the 1950s and 1980s). The two Theil indices also had opposite tendencies in within-country and between-country inequality. While the contribution of within-inequality dramatically reduced from 0.89 in 1820 to 0.40 in 1992, the between-inequality rapidly escalated and thus shared six-tenths of overall inequality as measured by the Theil T index. Chotikapanich*et al*. (2012) use the Theil indices to measure world inequality in the 1990s. The contemporary world was shown to be highly unequal, albeit with a negligible decrease from 0.81 to 0.79 over the period 1993-2000. The results of inequality disaggregation are, however, influenced by the size of sub-groups (Minot *et al.,* 2003). Between inequality can increase when total inequality is decomposed into larger numbers of sub-groups (e.g. from province to district unit).The Theil indices are among the most preferred measurements of inequality because of the advantages of inequality decomposition. However, it is not without its criticisms, Adelman and Levy (1984) argued that the decomposition of Theil's Index of total inequality into between and within components cannot lead to an unambiguous quantification of the determinants of inequality since, in the presence of intercorrelation between the principles of decomposition, the decomposition overstates the contribution of the first cause considered and understates the contribution of the subsequent effects. Sen's (1973) also provided a critique of the Theil method by articulating that it is not 'exactly overflowing with intuitive sense' because the original form proposed in Theil (1967) (x; log(1/x;)) does not look like an individual welfare function.

Atkinson's measurement of inequality: The Atkinson index (also known as the Atkinson measure or Atkinson inequality measure) is a measure of income inequality developed by British economist Anthony Barnes Atkinson in 1970. The measure is useful in determining which end of the distribution contributed most to the inequality that is observed. The calculation of the index is as follows:

$$I_A = 1 - \frac{y_{EDE}}{\mu} \quad \text{.....(5)}$$

where:
$y_{EDE}$is defined as the equally distributed equivalent income; and
μ is the average real income.

Atkinson's distinguishing idea is one that places emphasis on the relationship between inequality and social welfare by aggregating individuals' satisfaction and pleasure. The measure has, of course, the convenient property of lying between 0 (complete equality) and 1 (complete inequality). Equal distribution only occurs when the mean income is equal to 'the equally distributed equivalent income', that is $u = y$EDE. The absence of these ideal conditions indicates that yEDE deviates from the mean level of income, u and the larger the difference between yEDEand u, the higher the level of inequality. Further, the result of this is that social wealth loss is proportionate to the level of inequality. For instance, If I_A = 0.25, it indicates that if incomes were equally distributed, then we would need only 75% of the present national income to achieve the same level of social welfare (according to the particular social welfare function).

Alternatively, using the social welfare function (SWF), we can calculate inequality using the following formula:

$$I_A = 1 - \left[\sum_i \left(\frac{y_i}{\mu} \right)^{1-\varepsilon} f(y_i) \right]^{\frac{1}{1-\varepsilon}} \quad \text{.....(6)}$$

In this equation, the level of inequality is clearly subject to changes in the inequality aversion degree - Ɛ. The greater the E, the greater the weight associated with the lower end of the distribution. By using the equation above, Atkinson addressed the problem of the crossing of the Lorenz curve and was able to estimate inequality with a partial ordering solution. Further, using income data from twelve countries, he was able to demonstrate that 50 out of 66 cases of pair-wise Lorenz curve comparisons suffered from the intersection problem as presented in Figure 2. In these cases, measuring inequality with the Lorenz curve could not produce informative results. However, by selecting Ɛ in the range of 1.5 to 2, the number of controversial comparisons was dramatically reduced to only five cases. The Atkinson index is advantageous in regard to the evaluation of lost value in economies due to inequity. It also provides a series of results depending upon the social attitude to inequality that is to say, the more a community is concerned about inequality, the higher the inequality aversion parameter (ε) and in light of this, the index will be greater, irrespective of the distribution being the same. However, one of the notable shortcomings of the measure is that unlike the Gini coefficient and Theil indices, Atkinson's measurement is unable to analyze inequality attributions to different subgroups; thus, it cannot be used as a decomposition technique for understanding within-inequality and between-inequality (Gisbert *et al.,* 2009).

Multidimensional Inequality Measures: Any estimate of multidimensional inequality needs to handle a number of aspects of wellbeing simultaneously. Economic inequality using income or wealth data is simple as it does not face the difficulties of social measurements. However, in the framework of a social comparison, it is vital to focus on inequality in wellbeing and its various components rather than solely on the income or wealth space (Sen 2003a).

Interestingly, most of current methods are primarily derived from the formulae to calculate economic inequality; therefore, measurements of social and economic inequality share several characteristics and have similar desirable properties such as the Anonymity, the Population principle and the Pigou-Dalton transfer principle. It is important to note however, that multidimensional inequality outperforms unidimensional inequality by including several dimensions and examining the interactions between those dimensions. The following discussion summarizes some of the most widely used multidimensional measures of inequality.

The Maasoumi index: By adapting Theil's and Atkinson's approaches and relying on the theory of information (Hirschberg *et al.,* 1991; Maasoumi, 1986 & 1999; Maasoumi and Nickelsburg, 1988), in a series of papers, Maasoumi proposes the use of a measure to compare multidimensional distributions of well-being. This approach is the first of its kind to be using the simultaneous aggregative technique. While a dimension-by-dimension approach is likely to produce inappropriate results in the analysis of inequality due to inadequate examinations of the interdependence of these dimensions (see Nilsson 2010, Justino 2012), the Maasoumi's index factors into the computation the contributions to inequality of different dimensions to a multidimensional inequality level simultaneously. Further, it is worth noting that the construction of the index has two steps, the first being the aggregation of attributes for each individual (obtaining some Si function of the Xik) and the second being applying a measure of inequality as in the univariate case.Based on the idea that different indicators of economic welfare are distributed differently, Maasoumi proposed an aggregator vector *S* with a distribution that closely follows the distributional information in each attribute, and he implicitly assumed that this was a desirable property. In particular, he suggests a multivariate generalization of the Generalized Entropy measure of divergence (Kullback-Leibler distance) or closeness between the K densities (as weighted sum of the pairwise 'divergence' terms) and arrives at a distance measure D of the following form:

$$D_\beta(S, X, w) = \sum_j^m w_j \left\{ \sum_{t=1}^n s_i \left[\left(\frac{s_i}{x_{ij}} \right)^\beta - 1 \right] / \beta(\beta+1) \right\}, \beta \neq 0, -1 \quad (7)$$

where:
$D_\beta(S, X, w)$ denotes an individual's wellbeing distribution
S_i is the total wellbeing of individual i
X is a vector of wellbeing dimensions
$X_{ij}$is the wellbeing of individual i (i=1…n) in dimension j (j=1…m), $i \neq j$
$w_j$is the weight of dimension j and
β is the cross-dimension substitutability parameter.

This function estimates dispersion in individual wellbeing (S) where the given Matrix X contains a finite number of dimensions, w is the individual weight and β is related to the degree of substitutability between attributes. Seeking a solution to minimum D_β, the distribution S should be proportional to $\left[\sum_{j=1}^m w_j x_{ij}^{-\beta}\right]^{-1/\beta}$. Then relative inequality in *S*is calculated using the following equation:

$$I_\alpha(S) = \frac{\sum_{i=1}^n p_i \left[\left(\frac{s_i^*}{p_i} \right)^{1+\alpha} - 1 \right]}{\alpha(1+\alpha)}, \alpha \neq 0, -1 \quad \text{……..(8)}$$

where:

$$S_i^* = S_i / \sum_{i=1}^n s_i \quad \text{……..(9)}$$

$p_i$is the population subgroup I and
α is the inequality aversion.

Since the date of its publication, Maasoumi's approach has been increasingly of interest. Maasoumi (1999) continues to refine his measurement and makes a comparison with other methods. A similar comparison is also found in Lugo (2007) who applies different measurements to the Argentine context. Applications of this index to Zambian and Vietnamese data are conducted by Nilsson (2010) and Justino (2012). However, outcomes using this measurement produced conflicting implications.

The Atkinson-Kolm-Sen method: This approach towards measuring multidimensional inequality originated in the foundational works of Kolm (1969) and Atkinson (1970) on univariate inequality measurement, and it was later made popular by Sen (1973). The idea of an 'equal distribution equivalent' which was advanced by Atkinson (1970) was continued by Sen (1973) and discussed further by Kolm (1976a, 1976b). These studies brought inspiration to Tsui (1995) who was able to establish the AKS absolute and relative multidimensional measures of inequality that are bounded between one and zero, where values closer to zero indicate lower levels of inequality and vice-versa. The index is developed in two stages. First, determinants of individual wellbeing are computed according to a generalized Gini SWF approach. Then, an aggregation of multidimensional inequality attributes is gauged. Tsui assumed that the sum of a strictly concave function of individual utility is equivalent to SWF. Corresponding to the two forms of utility function, the relative index of inequality (IR) is calculated as follows

$$I_R = 1 - \left[\frac{1}{N} \sum_{i=1}^N \prod_{k=1}^K \left(\frac{x_{ik}}{\mu_k} \right)^{r_k} \right]^{\frac{1}{\sum r_k}} \quad \text{……(10)}$$

or

$$I_R = 1 - \prod_{i=1}^N \left[\prod_{k=1}^K \left(\frac{x_{ik}}{\mu_k} \right)^{\frac{r_k}{\sum_j r_j}} \right]^{1/N} \quad \text{……..(11)}$$

where:

N is the number of individuals
K is the quantity of attributes
x_{ik} is the value of attribute k for individual i
μ_k is the average value of x_{ik}; and
r_k is a parameter to ensure the strictly concave individual utility function.

And the absolute inequality (I_A) is derived by the following formula:

$$I_A = \frac{1}{\sum C_k} ln \left[\frac{1}{N} \sum_{i=1}^N exp\left(\sum_{k=1}^K C_k (\mu_k - x_{ik}) \right) \right] \quad \text{…… (12)}$$

In this equation, c_k is a selected parameter that guarantees the concavity of the individual utility function.Further, Gajdos and Weymark (2005) contributed to this normative measurement by accounting for the axioms of AKS. These authors confirmed that Tsui's decomposability axiom was contentious as it violated several particular contexts.

The Inequality-Adjusted Human Development Index and the Coefficient of Human Inequality: The Inequality-Adjusted Human Development Index (IHDI) adjusts the Human Development Index (HDI) for inequality in three dimensions (Income, Education and Health) across the population. This index is based on a distribution-sensitive class of composite indices proposed by Foster, Lopez-Calva and Szekely (2005), and draws on the Atkinson (1970) family of inequality measures. Like its HDI counterpart,IHDI is computed as a geometric mean but of inequality-adjusted dimensional indices. The IHDI adjusts inequalities by "discounting" each dimension's average value according to its level of inequality. In essence the IHDI measures the level of human development when inequality is accounted for (UNDP, 2020).There are generally three steps in calculating IHDI values.

Step 1. Estimating inequality in the dimensions of the Human Development Index: The IHDI draws on the Atkinson (1970) family of inequality measures and the parameter aversion Ɛ is set equal to 1. (The inequality aversion parameter affects the degree to which lower achievements are emphasized, and higher achievements are de-emphasized.) In this regard the inequality measure is *A = 1- g/u*, where g is the geometric mean and u is the arithmetic mean of the distribution (UNDP, 2020). This can also be written as:

$$A_x = 1 - \frac{\sqrt[n]{X_1 \ldots X_n}}{\bar{x}} \quad \text{……(13)}$$

Where $\{X_1 \ldots X_n\}$ represents the underlying distribution in the dimension of interest. A_x is obtained for each variable (life expectancy, mean years of schooling and disposable household income or consumption per capita).

Step 2. Adjusting the dimension indices for inequality

The inequality-adjusted dimension indices are obtained from HDI dimension, multiply by $(1- A_x)$, this is defined by the following equation:

$$I^*_x = (1- A_x) \cdot I_x \qquad (14)$$

So, the inequality-adjusted income index, I^*_{income}, is based on the index of logged income values, I^*_{income}, and inequality in income distribution computed using income in levels. This enables IDHI to account for the full effect of income inequality (UNDP, 2020).

Step 3. Combining the dimension indices

The IDHI is the geometric mean of the three-dimension indices adjusted for inequality:

$$\text{IDHI} = (I^*_{Health} \cdot I_{*Education} \cdot I_{*Income})^{1/3} \qquad (15)$$
$$= [\,(I - A_{Health}) \cdot (I - A_{Education}) \cdot (I - A_{Income})\,]^{1/3} \cdot \text{HDI}$$

The loss in HDI value due to inequality is:

$$\text{Loss} = \mathbf{1} - [\,(I - A_{Health}) \cdot (I - A_{Education}) \cdot (I - A_{Income})\,]^{1/3} \qquad (16)$$

Coefficient of human inequality: Finally, an unweighted average of inequalities in health, education and income is denoted as the Coefficient of Human Inequality (CHI). It averages these inequalities using the arithmetic mean:

$$CHI = \frac{A_{Health} + A_{Education} + A_{Income}}{3} \qquad (17)$$

When all inequalities in dimensions are of a similar magnitude, the coefficient of human inequality and the loss in HDI value differ negligibly. When inequalities differ in magnitude, the loss in HDI value tends to be higher than the coefficient of human inequality (UNDP, 2020).There are generally 3 flaws in using the IHDI and CHI indices to measure multidimensional inequality. First, for income per capita negative and zero incomes and incomes in the bottom 0.5 percentile are replaced with the minimum value of the second bottom 0.5 percentile of the distribution of positive incomes (UNDP, 2020). The problem with this procedure is that a great portion of the global population (Those experiencing extreme circumstances) receives a higher income ranking than their current situation indicates, and this understates the true value of income inequality and by extension the true value of social inequality. Second, these indices do not account for wealth and environmental inequalities, two dimensions of inequality that have garnered significant attention over the last decade because of their increasing trends (World Inequality Report, 2018) and their impact on individuals' wellbeing (World Social Report, 2020). Third, the top 0.5 percentile of the distribution is truncated to reduce the impact of measurement errors when recording extremely high incomes. Again, this will cause an underestimation of income inequality and the overall social inequality level.

Sustainable Development: The concept of Sustainable Development gained increasing attention during the 1980s and this was as a result of the work done by the WCED. In 1987, the Commission published a comprehensive report titled Our Common Future and, in the report, it listed the most serious threats facing humanity among which were the persisting poverty situation and the looming environmental crisis. For the Commission, the solution to these threats was sustainable development which cameto be defined as "a development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs" (WCED 1987).Sustainable development was introduced by the Commission as a global political objective to guide policies in a direction that strikes a balance between the economic system, the social systems and ecological conditions (Boyer *et al*., 2016). Generally speaking, itis thought of as being comprised of three interdependent pillars of sustainability which are the environment, the economy and society. For environmental sustainability, the concerns are centered around the natural environment, that is, it focuses on things like the integrity of ecosystems and the diversity of species and how it endures and remains diverse and productive (Harris 2002). In line with this argument therefore, ecological integrity is not only important for productive economic activities but also for social well-being in terms of health and social prosperity. Moreover, the global ecosystem must be maintained in order to guarantee the reproductive capacity of the planet, and this is done by utilizing technology that promotes the absorption of CO_2 from the atmosphere, or by creating resistance to stress via maintaining biodiversity (see also Armstrong and Chhetri, 2025).

As pointed out by Armstrong and Chhetri (2025), economic sustainability isreferred to as the improvement in economic conditions such as income and wealth and material well-being of people to a preferred standard of living. However, it should be noted that economic sustainability cannot simply be thought of as sustained economic growth only. In fact, it should include other dimensions and specific types of economic activities that can promote a stable and dignified local livelihood for individuals in society but at the same time it must not destroy the environment. This therefore suggests that the economic dimension of sustainability has a vital role to play in achieving environmental and social sustainability by providing the necessary material resources needed to address poverty and inequality and achieve social prosperity or to redress environmental degradation. Finally, the social dimension of sustainable development is the least clear and the least explored dimension and has earned a reputation for being 'elusiveness' and even 'chaos' (Boyer *et al*. 2016). However, many authors perceive the social dimension as the most important pillar of the three and they argue that it acts as a mediator between the other two dimensions. Economic well-being and ecological integrity can only be achieved by social actions that lead to the formulation and implementation of adequate and binding rules (see Boyer *et al*. 2016; Armstrong and Chhetri 2025). Despite having a common interest in the area of social sustainability, academics, professionals and policymakers often hold various positions on what the concept means and how it can be achieved. However, one definition which seemed to sufficiently capture the essence of the social sustainability pillar is provided by Grießler and Littig (2005). They define social sustainability as the "quality of societies" and for these authors, "it signifies the nature-society relationships, mediated by work, as well as relationships within the society" (Grießler and Littig, 2005, p.72). In this regard, social sustainability is achieved when people improve their livelihoods and fulfill their human needs in terms of social justice, human dignity and participation with some degree of ease. This definition is also consistent with the operationalization of social development applied by the United Nations Human Development Index (HDI). It measures social sustainability by looking at knowledge and education, health, human security and rights, gender equality and participation in political and community life. Social sustainability therefore ensures equitable access to economic resources and opportunities and a healthy environment for all (Armstrong and Chhetri, 2025).

Further, the 17 Sustainable Development Goals (SDGs) which were agreed to by the members of the United Nations in 2015, collectively embodied a shared global vision of how to combine the dimensions of sustainable development into action at the local, national, and international levels and progress on these goals is measured by the Sustainable Development Goals Index (SDGI). The Bertelsmann Stiftung along with the support from the Sustainable Development Solutions Network has published the index annually in their SDG Index and Dashboards Global Report since 2016 (see Sachs *et al*., 2016; Armstong and Chhetri, 2025). The emergence of the SDGI as a measure to track a country's achievement across the 17 SDGs can be thought of as part of the extensive and still ongoing discourse and criticism of conventional measures of economic prosperity and

development (see for instance, Hicks &Streeten, 1979; Kenny, 2005; Stiglitz *et al*., 2008; European Commission, 2009; Felice, 2016). In spite of its robustness and its impact on policy and the academic community, the SDGI has been subject to severalcriticisms. One such criticism is that the scarce availability of information for many countries generally results in about 60% of the SDGs indicators being disregarded in the SDGI (Diaz-Sarachaga*et al*., 2018). Nonetheless, analyses of the SDGI can produce more insightsinto the study of the impact of social inequality on sustainable development.

The Impact of Inequality on Sustainable Development: A large section of the literature on the impact of inequality on sustainable development has focused mainly on its effect on economic development and in particular economic growth. However, the evidence discovered to date is not completely unanimous or in any way conclusive. In this regard, traditional writers such as Lewis (1954), Kaldor (1955) and Baldwin (1956) have supported the hypothesis that inequality is beneficial for development in the post industrialization period. In particular, they argue that in the absence of international demand for domestic industrial goods, a wide distribution of the income generated from the leading agriculture sector may be critical for achieving economic growth and development. On the other hand, modern writers such as Galor and Zeira (1993, 2010), Banerjee and Newman (1993) and Aghion and Bolton (1997) have demonstrated that inequality has an adverse effect on the process of development by limiting human capital investment. On the inequality-sustainable development relationship, several papers have empirically estimated this relationshipbut have produced contradictions in their findings. For example, Castells-Quintana *et al*., 2018 examined the inequality-sustainable development relationship using a panel of 117 countries for the period 1970-2010 and for their analysis, they rely on income inequality measured by the Gini Coefficient, and they approximate sustainable development using the HDI. From their analysis, they found a negative long run relationship between inequality and sustainable development but a positive short run association. On the other hand, Armstrong and Chhetri, 2025 studied the same relationship using panel data for 142 countries over the period 2010-2019. Using the CHI as the independent variable and the SDGI and the dependent variable, they found a negative relationship between inequality and Sustainable development both in the short run as well as the long run.Irrespective of this contention, one important deduction from the discourse on inequality and its impact on sustainable development is that its effect is highly complex and heterogeneous, and this depends largely on several factors, including the extent, type, and persistence of inequality, the initial level of development among other things. Nonetheless, a substantial body of this literature has examined three important channels through which inequality affects sustainable development and these channels include health and social problems, the environment and economic performance (see also Armstrong and Chhetri, 2025). This section explores some of the modern literature on these channels.

Inequality and the Environment: The literature on the relationship between the environment and inequality is extensive and many researchers have pointed out that social and power inequalities may serve to deteriorate the environment through multiple channels. In examining this relationship, the spatial pollution scale is an important characteristic for the link between inequality and the environment. As Boyce (2008) noted, many environmental pollution types are localized and are disproportionately shared by the community at the margin of society. This localized nature of environmental pollution insulates the rich people from the harm caused by its effect on health. For example, the location of hazardous waste sites often follows the logic of land segregation (Gawande *et al*., 2000), which is a consequence of social inequality (Bénabou, 1993). In this way, the relative institutional under-representation of the interests of the poorest classes can have an impact on the environment. In essence, the poorest and most vulnerable groups in society are often those who are affected in a significant way by local pollution. Torras and Boyce (1998) were among the first to provide an empirical analysis of the relationship between inequality and the environment. Relying on data drawn from the GEMS database for pollutant concentrations throughout the 1977-1991 period in 18-52 cities in 19-42 countries, they demonstrated that inequalities interact with per capita GDP levels in explaining pollution. Their results were similar to those outlined in Grossman and Krueger (1995) which confirmed the Environmental Kuznets Curve for most of the pollutants. A similar paper is Baek and Gweisah (2013). Baek and Gweisah (2013) confronted the inequality environment relationship by utilizing a logarithmic linear regression equation along with annual time series data from the US spanning the period 1967 to 2008. They found that inequality measured using income distribution and environmental degradation measured by per capita Carbon Dioxide (CO_2) emissions shared a positive relationship both in the short and long run. As a result, they concluded that greater equality of income in the US has a beneficial effect on environmental quality.Similar results were also found by Armstrong and Chhetri (2025) who showed that growing inequality leads to greater Greenhouse Gas (GhG) emission. In addition to the previously mentioned literature, other studies have shown that as the gap between rich and poor people widens, the extent of environmental damage increases. One such analysis is Gates *et al*. (2002) which found an underlying significant and negative relationship between social inequalities and the preservation of ecosystems through their negative impact on political freedoms.

Inequality and Health and Social Problems: Regarding the impact of inequality on health and social problems, there have been a number ofmajor studies, including the Whitehall Studies (Marmot *et al*., 1978; Marmot *et al*., 1984; Marmot and Shipley., 1996; Marmot, 2010)which have clearly established the linkages between the socio-economic background of individuals and health. The Marmot Review found that in England, people living in the poorest neighborhoods will, on average, die seven years earlier than people living in the richest neighborhoods (Marmot, 2010). These health inequalities are not only limited to life expectancy but also issues like infant mortality, mental health, physical health etc. The issue of inequality is not therefore an issue just of poverty but related more widely to other social and economic factors (Preston 1975; Rodgers 1979;Wilkinson and Pickett2009b; Armstrong and Chhetri, 2025). On the issue of causation however, one of the most recent, and major studies to establish causation is that of Kondo, *et al.,* 2009, who carried out a meta-analysis of 9 cohort studies and 19 cross-sectional studies involving over sixty million subjects worldwide and their overall conclusion was that income inequality did indeed have an independent effect on health. In a similar vein Wilkinson and Pickett (2009a) argue that income inequality causes health and social problems due to 'status anxiety'. Their argument was that income inequality is harmful because it places people in a hierarchy which increases status competition and this in turn contributes to poor health and other negative outcomes. In this regard, Wilkinson and Pickett (2009a) noted that the situation under which people live has a psycho-social impact on their lives, over and above their own individual circumstances. Drawing on the work of Marmot (2004), they posited that anxiety about social status is the mechanism by which income inequality causes social problems (see also Armstrong and Chhetri, 2025).

Inequality and Economic Performance: On the association of inequality and economic performance, interestingly, most of the studies that found empirical evidence for a positive overall impact of inequality on subsequent economic growth, like Forbes (2000), rely on panel data, focusing on variation within countries over time, and relate to a short-run effect. On the other hand, studies based on cross-country variation and focusing on long-run effects often found a negative impact of inequality on economic performance (Alesina& Rodrik, 1994; Easterly, 2007; Oechlin&Zweimüller, 2014; Ostry, Berg &Tsangarides, 2014). Patridge (1997) and Barro (2000) found a growth effect that depends on the level of income, being negative in poor countries but positive in rich countries. Chen (2003), on the other hand, presented evidence suggesting that the effects depend on the initial income distribution itself, with the effect of inequality being positive when initial inequality is low and negative when it is high. Considering the complexity and heterogeneity of the results, many studies have concentrated on investigating the different

transmission channels through which inequality affects economic growth. The theoretical literature has identified a wide range of different positive and negative channels that contribute to an overall impact of inequality. The positive mechanisms circled around (a) higher savings rates (Kaldor, 1956), (b) imperfect capital markets with investment indivisibilities (Aghion *et al*., 1999) in physical and human capital, and (c) growth-enhancing incentives created by inequality, for example, for capital accumulation and innovations (Mirrlees, 1971). The negative mechanisms were linked to (a) greater socio political instability and risk of social conflict and unrest, implying uncertainty of property rights and reduction of investment (Alesina& Perotti, 1996), (b) higher redistributive pressure, which in turn may lead to economic distortions and disincentives (Alesina& Rodrik, 1994), as well as unproductive waste of resources by lobbying against redistribution (Krugman, 2012; Stiglitz, 2009), (c) credit-market imperfections and high-setup costs, which reduce the possibilities of low-income groups to invest in human capital (Galor &Zeira, 1993; Easterly, 2007), (d) the importance of the middle class for aggregate demand and market size (Todaro, 1997), and (e) the link between inequality, higher endogenous fertility rates, and reduced education and growth (Barro, 2000; Ehrhart, 2009). In light of this discussion on the effects of inequality on sustainable development, the literature has identified several channels through which inequality affects sustainable development, and these include the environment (Torras & Boyce, 1998), health and social problems (Wilkinson & Pickett, 2009b) and economic performance (including Easterly, 2007). Understanding these channels therefore becomes important for formulating effective policies for addressing inequality while promoting sustainable development. In the next section, we examined some of the factors that drive inequality in society.

Determinants of Inequality: The literature on inequality identifies several factors that are responsible for influencing the level of inequality we see in society today. This section explores some of these drivers of inequality.

Government policies*:* Stiglitz (2013, 2016) argued that much of the rise in social inequality that we see today is largely due to various market imperfections and government policies that reinforce them. In particular, he believed that a major cause of rising inequality is rent seeking, which is the practice of using resources not for the production of goods and services but rather to convince policymakers to introduce economic distortions that benefit special interests at the expense of everyone else. Further, governments in developed countries have historically reduced inequality through public policies, specifically, through progressive taxes and social transfers but in the last two decades, progressive taxes have been on the decline in many rich countries (Dabla*et al.,* 2015). As a result, many advanced economies have now seen an increase in the level of social inequality, particularly, wealth inequality and this is stemming from the surge in aggregate private wealth relative to national income and the increase in wealth concentration (Chancel *et al.,* 2022). This therefore highlights the fact that there are gaps in existing tax-and-transfer systems to counteract rising inequality and in the past few years it has renewed the debate about progressive taxation, especially progressive wealth taxation. While the debate on progressive wealth taxation has been gaining momentum, progressive wealth taxes remain an exception to the rule rather than the norm across the world. Regressive taxation policies and inadequate social safety nets have also contributed to rising inequality and in many countries, racial, ethnic, and gender discrimination have amplified the effects of the other factors (Troutt, 2013). In addition, Cain *et al*. (2012) argue that urban-biased policies perpetuate inequality between urban and rural areas. Rural communities lack public investment in infrastructure and technology and this in turn discourages private investments in agriculture and manufacturing. On the other hand, Ravallion (2007) showed the effects of anti-poverty programs on inequality. He highlighted the dangers of decentralization of anti-poverty programs, which tends to increase inequality. Local governments often set poverty lines lower than national lines due to resource constraints; thus, poor people that are in identical circumstances can benefit differently from national programs with respect to their geographical location. Another study done by Hermes (2014) found that microfinance policies, which are considered as a channel for pro-poor programs, often have little influence on poverty and inequality. The reason is that the benefits from these programs can be negligible in absolute terms even though they may show a statistically significant positive impact on inequality reduction.

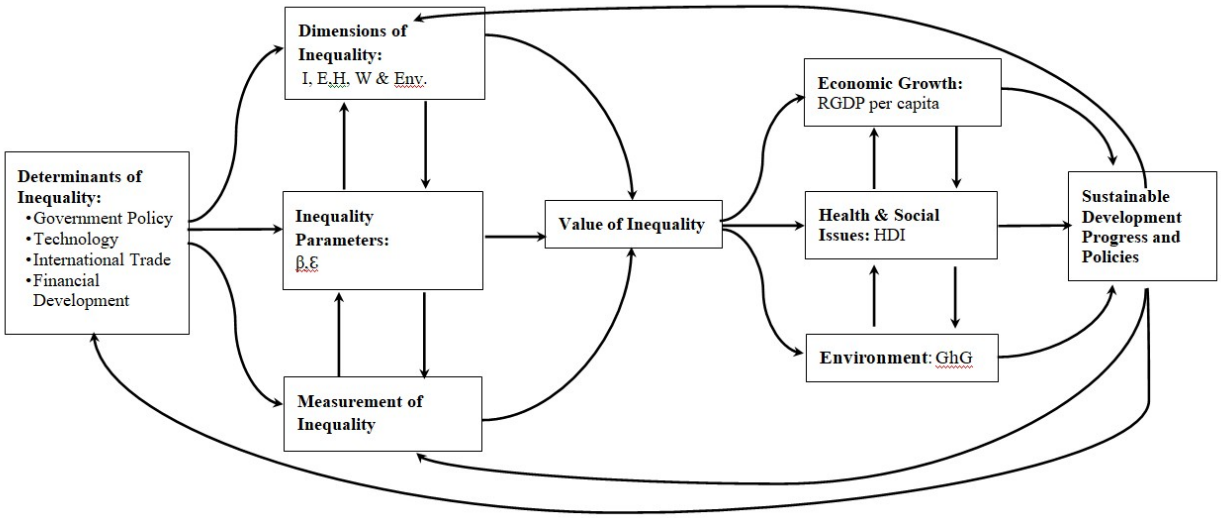
Technological advancement: Autor (2014), Milanovic (2016) and Deaton (2013) pointed to skills-biased technological change as a major cause of inequality. Advancement in technology has largely been responsible for improvements in productivity, but it has also contributed to driving up the skill premium, resulting in increased labor income inequality. The reason for this is that technological changes often disproportionately increase the demand for capital and skilled labor but at the same time reduce the demand for low-skilled and unskilled labor thus eliminating many jobs through automation or upgrading the skill level required to attain or keep those jobs (Card & Dinardo, 2002). The literature confirms that technological advancement has been found to have contributed the most to rising income inequality in OECD countries (Dabla*et al*., 2015). The evidence is similar for a larger group of emerging market economies (Dabla*et al*., 2015)

International trade*:* From an international trade perspective, a close inspection of the literature reveals controversy as to whether trade reduces or worsens inequality. Krugman (2008) rejects the argument that international trade liberalization benefits everyone and he did so on the basis that there exists no explicit causal correlation between trade openness and inequality. For example, theories of international trade have projected an increase in unskilled wages in Labor intensive countries, and thus the unskilled wage and skilled wage gap diminishes; but evidence from Mexico showed otherwise. The experiences of some LAC countries, in particular Brazil and Argentina have contradicted the free trade theory. Meschi and Vivarelli (2009) point out that inequality in developing countries can become worse when trading with developed countries. The negative effect can result from differences in the technologies utilized which in turn lead to a skill bias. This bias occurs when there are technological transfers from more advanced to less developed countries that shift the skilled Labor demand upwards, which then increases the wages paid to the skilled workforce more rapidly than unskilled wages. The widening wage gap subsequently increases inequality in developing countries.

Financial deepening*:* It is argued that financial deepening does provide households and firms with greater access to resources to meet their financial needs, such as saving for retirement, investing in education, capitalizing on business opportunities, and confronting shocks (Dabla*et al*., 2015). Financial deepening accompanied by more inclusive financial systems can thus lower inequality, while improving the allocation of resources (Dabla-Norris and others 2015). In the literature however, it is highlighted that financial development benefits the rich in the early stages of development, but the benefits become more broadly shared as economies develop (Greenwood and Jovanovic 1990). Further, some studies have found that financial development boosts top incomes the most in the early stages of development (See Roine *et al*., 2009). Moreover, inequality can and does increase as those with higher incomes and assets have a disproportionately larger share of access to finance (Claessens & Perotti 2007).

The Armstrong-Chhetri Inequality and Sustainable Development Framework: Having thoroughly explored the literature on inequality and sustainable development, we propose in Figure 3, the Armstrong-Chhetri Inequality and Sustainable Development Framework for understanding the nexus between the two issues.However, it is important to note that during this research, we did not come across any research that offered an inequality sustainable development framework and as such, this framework presented here is considered the first of its kind.

Figure 3. TheArmstrong-ChhetriInequality and Sustainable Development Framework



Source: Developed by the authors

Note that I, E, H, W and Env represent Income, Education, Health, Wealth and Environment respectively. Also, RGDP, HDI and GhG refer to Real Gross Domestic Product, Human Development Index and Greehouse Gas respectively.

According to Figure 3, to understand how inequality and sustainable development are related, one must first understand the determinants of inequality. The literature points out that these determinants of inequality which are factors that influence the level of inequality include government policy, technology, international trade and financial development. When these factors change, they influence the level of inequality by impacting a certain dimension of inequality, the inequality parameters as well as the way in which the issue is measured. For example, a government policy on inequality that is deemed effective at reducing its value can alter individuals' perception (ε) of inequality in society, force us to examine new or emerging dimensions of inequality or have us rethink the way we measure inequality.Further, the value of inequality has a negative relationship with a country's sustainable development progress as pointed out by the literature. This is so because inequality contributes to environmental degradation, it causes health and social problems, and it reduces economic growth.Finally, a country's sustainable development progress will encourage policy makers to reinforce or rethink its policies on inequality which in turn will have implications for the dimensions of inequality and the way the issue is measured. In this regard, a country that is experiencing low sustainable development progress may be forced to examine and account for emerging dimensions of inequality as well as the multidimensional impact of these dimensions.

CONCLUSION

Inequality is a defining challenge of the 21st century and understanding how the issue has evolved is important for policy makers that are pursuing sustainable development solutions. Formulating development policythrough an inequality lens challenges us to think about differences of opportunities and outcomes in society. It also brings crucial manifestations of inequality, such as gender inequalityto the forefront and helps us to understand power imbalances and their effects on sustainability outcomes.By exploring the inequality discourse, we are able to trace the evolution of the issue, particularly the ways in which it has been measured and analyzed. Traditional writers like Locke (1690), Rousseau (1755), Marx (1867-1883), Smith (1759& 1776), Ricardo (1817) and Kuznets (1955) focused their discussion on the implications of income and wealth inequality in society. On the other hand, contemporarywriters, however, believed that inequality analyses should go beyond the unequal income and wealth distribution problem to include other dimensions as well as greater comparative analysis and these includethe likes ofSen (1999), Green (2008),Milanovic (2016) and Piketty (2014).

These writers advocated for the consideration of other dimensions of inequality such as health, education, wealth and power when analyzing the issue. We conclude therefore that historical writers have provided good insights into the study of inequality in society but because of their central focus on income or wealth while ignoring other important dimensions, they are rather inadequate in providing a comprehensive understanding of the nature and extent of inequality in today's society. As most contemporary writers have argued that there is no doubt that income and wealth are socially desirable goods, but they are not the only one. Among other things, people also value good health, quality education, political participation and a clean environment but their access to these goods differs. Therefore, not accounting for the differences among the various dimensions that are important for human wellbeing will unquestionably understate the true level of inequality in society.

The inequality discourse has also highlighted that the measurements of inequality have evolved over time. Conventional measures like the Lorenz curve, the Gini coefficient, the Theilindex have been used to measure the level of inequality in society because they exhibited good qualities such as the Pigou-Dalton transfer principle. However, one major drawback to these conventional measures is that they are unidimensional in nature and as such, they fail to account for the multidimensional and interdependentnature of inequality. As a result, several multidimensional measures were developed and have been used in many contemporary inequality studies. These measures include the Maasoumi index, the Atkinson-Kolm-Sen index, the Inequality-Adjusted Human Development Index and the Coefficient of Human Inequality. Further, we conclude that while these measures are not without their flaws, they nonetheless better reflect a more accurate level of inequality in society as compared with the traditional, unidimensional measures and this is particularly important for formulating and implementing 21st development policies especially in societies that are highly unequal.

Further, the inequality discourse has revealed that there are a number of factors that are responsible for driving inequality in society, and these include government policy, international trade, technology, and financial development. We therefore conclude that addressing inequality requires an understanding of how these factors influence inequality.Finally, the inequality discourse has offered insights into the effects inequality is having on sustainable development. In particular, growing inequality negatively affects a country's sustainable development progress, and this is the case because inequality contributes to health and social problems in society, it contributes to environmental degradation, and it hinders economic progress, all of which are important for sustainable development.In

light of this discovery, we therefore conclude that promoting sustainable development requires addressing inequality in society.

REFERENCES

Acemoglu, D., & Robinson, J., A. 2012. Why Nations Fail. The Origins of Power, Prosperity and Poverty, New York: Crown Business.

Adelman, Irma & Levy, Amnon. (1984). Decomposing Theil's Income Of Income Inequality Into Between And Within Components: A Note, Review of Income and Wealth, International Association for Research in Income and Wealth. 30(1), 119-121.

Aghion, P., Bolton, P. (1997). A Theory of Trickle-Down Growth and Development. Review of Economic Studies. 64(2), 151-172.

Aghion, P., Caroli, E., & Garcia-Penalosa, C. (1999). Inequality and economic growth: The perspective of the new growth theories. Journal of Economic Literature. 37(4), 1615–1660.

Ahluwalia, M., S. (1976). Inequality, poverty and development. Journal of Development Economics. 3(4), 307-342.

Alesina, A., & Perotti, R. (1996). Income distribution, political instability, And Investment. European Economic Review. 40(6), 1203–1228.

Alesina, A., & Rodrik, D. (1994). Distributive politics and economic growth. The Quarterly Journal of Economics. 109(2), 465–490. https://doi.org/10.2307/2118470

Anand, S. & S. M. R. Kanbur. (1993). Inequality and development: A critique. Journal of Development Economics. 41(1), 19-43.https://journalijdr.com/how-social-inequality-affects-sustainable-development-evidence-cross-country-analysis-coefficient

Armstrong, S. & Chhetri, N. (2025). How social inequality affects sustainable development: Evidence from a cross-countryanalysis of the coefficient of Human inequality and the sustainable Development Goals Index. International Journal of Development Research.15(3), 68039-68046.

Arnold, B. C. (2008). The Lorenz curve: Evergreen after 100 years. Advances on Income Inequality and Concentration Measures. G. Betti and A. Lemmi, Routledge Frontiers of Political Economy.

Atkinson, Anthony & Sandmo, Agnar. (1980). Welfare Implications of the Taxation of Savings. Economic Journal. 90(359), 529-49.

Atkinson, Anthony. (1970). On the measurement of inequality, Journal of Economic Theory. 2(3), 244-263.

Atkinson, Anthony. (1999). Income Inequality in the UK. Health Economics. 8(4), 283–288.

Autor, D. H. (2014). Skills, Education, and the Rise of Earning Among the Other 99 percent. Science, 344, 843-851

Baek, Jungho&Gweisah, Guankerwon, (2013). Does income inequality harm the environment?: Empirical evidence from the United States. Journal of Energy Policy. 62, 1434-1437.

Baldwin, R. E. (1956). Alternative Theories of Distribution. Review of Economic Studies. 23(2), 83-100.

Barro, R. (2000). Inequality and Growth in a Panel of Countries. Journal of Economic Growth. 5(1), 5-32.

Bashi-Treidler, Vilna & Manuela, Boatcă. (2016). Dynamics of inequalities in a global perspective: An introduction. Sage Journals. 64(2),p. 159-171.

Bénabou, R. (1993). Workings of a City: Location, Education and Production. The Quarterly Journal of Economics. 108(3), 619–652.

Bourguignon, F. & Morrisson, C. (2002). Inequality among World Citizens: 1820-1992. The American Economic Review. 92(4), 727-744.

Boyce, K., James. (2007). Is Inequality Bad for the Environment?, Political Economy Research Institute Working Paper Series, No. 135, Amherst.

Boyce, K., James. (2008). Is Inequality Bad for the Environment? Political Economy Research Institute. 15, 267–288.

Boyer, Robert, Peterson, Nicole, Arora, Poonam & Caldwell, Kevin. (2016). Five Approaches to Social Sustainability and an Integrated Way Forward. Sustainability. 8(9), 878.

Burawoy, Michael. (2000). Global Ethnography: Forces, Connections, and Imaginations in a Postmodern World, Berkeley, California: University of California Press.

Cain, J. S., Hasan, R., & Magsombol, R. (2012). Inequality and Poverty in Asia. Poverty, Inequality, and Inclusive Growth in Asia. J. Zhuang, Anthem Press and ADB, 35-85.

Card, D., & DiNardo, J.E. (2002). Skill Biased Technological Change and Rising Wage Inequality: Some Problems and Puzzles. NBER Working Paper, National Bureau of economic Research, Cambridge, Massachusetts

Castells-Quintana, D., Royuela, v., & Theil, F. (2018). Inequality and sustainable development: Insights from an analysis of the human development index. Journal of Sustainable Development. 27(3), 448-460. https://doi.org/10.1002/sd.1917

Chancel, L., Piketty, T., Saez, E., Zucman, G. *et al*. (2022). World Inequality Report 2022, World Inequality Lab wir2022.wid.world.

Chen, B., L. (2003). An inverted-U relationship between inequality and long-run growth. Economics Letters. 78(2), 205–212. https://doi.org/10.1016/S0165-1765(02)00221-5

Chotikapanich, D., Griffiths, W. E., Rao, D. S. P. & Valencia, V. (2012). Global income distributions and inequality, 1993 and 2000: Incorporating country-level inequality modeled with beta distributions. Review of Economics and Statistics. 94(1), 52-73.

Conceicao, P., Galbraith, J.K. & Bradford, P. (2001) The Theil Index in Sequences of Nested and Hierarchic Grouping Structures: Implications for the Measurement of Inequality through Time, with Data Aggregated at Different Levels of Industrial Classification. Eastern Economic Journal. 27, 491-514.

Costa, Sergio, Jelin, Elizabeth & Motta, C., Renata. (2017). Global Entangled Inequalities Conceptual Debates and Evidence from Latin America. Berlin: Routledge.

Cowell, F. (1988). Inequality decomposition: three bad measures. Bulletin of Economic Research. 40(4), 309-312.

Dabla-Norris, E., Y. Ji, R.M. Townsend, & D. Filiz Unsal. (2015). Distinguishing Constraints of Financial Inclusion and Their Impact on GDP and Inequality. NBER Working Paper 20821Cambridge, Massachusetts: National Bureau of Economic Research.

Davies, James & Hoy, Michael. (1995). Making Inequality Comparisons When Lorenz Curves Intersect. The American Economic Review. 85(4), 980-986.

Deaton, A. (2013). The Great Escape: Health, Wealth, and the Origins of Inequality. New Jersey, Princeton University Press.

Doerrenberg, P. &Peichl, A. (2014). The impact of redistributive policies on inequality in OECD countries. Applied Economics. 46(17), 2066-2086.

Easterly, W. (2007). Inequality does Cause Underdevelopment: Insights from a New Instrument. Journal of Development Economics. 84(2), 755–776.

Eastwood, R. & M. Lipton. (2004). Rural urban income inequality and poverty: Does Convergence between Sectors Offset Divergence within Them? Inequality Growth and Poverty in an Era of Liberalisation and Globalisation. G. A. Cornia (ed.), Oxford Scholarship online

Ehrhart, C. (2009). The effects of inequality on growth: A survey of the theoretical and empirical literature, ECINEQ WP, 107.

Forbes, K.J., (2000). A Reassessment of the Relationship between Inequality and Growth. American Economic Review. 90(4), 869–887.

Foster, James; Lopez-Calva, Luis & Miguel Szekely. (2005). Measuring the Distribution of Human Development: methodology and an application to Mexico, Journal of Human Development and Capabilities. 6(1), 5-25

Gajdos, T. &Weymark, J. A. (2005). Multidimensional generalized Gini indices. Economic Theory. 26(3), 471-496.

Galor, O., &Zeira, J. (1993). Income distribution and macroeconomics. Review of Economic Studies. 60(1), 35–52. https://doi.org/10.2307/2297811

Gates, S., Gleditsch, N., P. & Neumayer, E. (2002). Environmental Commitment, democracy and inequality: a background paper to

the World Development Report 2003. World development report background papers, 27847. World Bank, Washington, USA.

Gawande, K., Bohara, A. K., Berrens, R., P. & Wang, P. (2000). Internal Migration and the Environmental Kuznets Curve for US Hazardous Waste Sites. Ecological Economics. 33(1), 151–166.

Gini, C. (1921). Measurement of Inequality of Incomes. The Economic Journal. 31(121),124–126.

Gisbert, F. J. G., De La Vega, M. C. L. &. Urrutia A. M. (2009). The extended Atkinson family and changes in the expenditure distribution: Spain 1973/74-2003. Journal of Income Distribution. 18(1), 20-41.

Góngora-Mera, Manuel. (2015). Globalización de la naturaleza y fragmentación del derecho internacional, in: Henríquez, Narda; Braig, Marianne; Göbel, Barbara and Damonte, Gerardo (eds.): Desigualdadesen un mundoglobalizado. Lima: Pontificia Universidad Católica del Perú/Centro de InvestigacionesSociológicas, Económicas, Políticas y Antropológicas. p. 165-182.

Green, Duncan. (2008). From Poverty to Power: How active citizens and effective states can change the world, 2nd ed. Rugby, UK: Practical Action Publishing and Oxford: Oxfam International.

Grießler, Erich & Littig, Beate, (2005). Social Sustainability: A Catchword between Political Pragmatism and Social Theory. International Journal of Sustainable Development. 8, 65-79.

Guidetti, G., & Rehbein, B. (2014). Theoretical Approaches to Inequality in Economics and Sociology: A Preliminary Assessment. Transcience. 5(1).

Harris, Jonathan, (2002). Basic Principles of Sustainable Development. Global Development and Environment Institute Working Paper, No.00-04.

Hermes, N. (2014). Does microfinance affect income inequality? Applied Economics. 46(9), 1021-1034.

Hirschberg, Joseph G., Maasoumi, Esfandiar, &Slottje, Daniel J. (1991). Cluster analysis for measuring welfare and quality of life across countries. Journal of Econometrics. 50(1-2), 131-150.

Justino, P. (2012). Multidimensional welfare distributions: empirical application to household panel data from Vietnam. Applied Economics. 44(26), 3391-3405.

Kaldor, N., (1955-1956). Alternative Theories of Distribution. The Review of Economic Studies. 23(2), 83–100.

Kawani, N. C. 1980. Income inequality and Poverty: Method of Estimation and Policy Applications. Oxford University Press, Oxford.

Kolm, S. C. (1969). The Optimal Production of Social Justice. In J. Margolis and H. Guitton (ed.), Public Economics. New York: Macmillan.

Kolm, S. C. (1976a). Unequal inequalities .I. Journal of Economic Theory. 12(3), 416-442.

Kolm, S.-C. (1976b). Unequal inequalities. II. Journal of Economic Theory. 13(1), 82-111.

Kondo, N., Sembajwe, G., Kawachi, I., van Dam, R., Subramanian, S. & Yamagata, Z. (2009). Income Inequality, Mortality and Self-rated Health: Meta-analysis of Multilevel Studies, British Medical Journal, 339, b4471.

Korzeniewicz, Robert & Moran, Timothy. (2009). Unveiling Inequality: A World- Historical Perspective, New York: The Russel Sage Foundation.

Koshevoy, G. & Mosler. K. (1996). The Lorenz Zonoid of a Multivariate Distribution. Journal of the American Statistical Association. 91(434), 873-882.

Koshevoy, G. (1998). The Lorenz zonotope and multivariate majorizations. Social choice and welfare. 15(1), 1-14.

Kreckel, Reinhard. (2004). PolitischeSoziologie der sozialenUngleichheit. Frankfurt a. Martin Luther University Halle-Wittenberg.

Krizsán, Andrea. (2012). Institutionalizing Intersectionality, Basingstoke: Palgrave Macmillan.

Krugman, P. (2012). End this depression now! WW Norton & Company.

Kuznets, S. (1955). Economic growth and income inequality. The American Economic Review 45(1), p.1-28.

Lewis, A. W. (1954). Economic Development with Unlimited Supplies of Labour. Manchester School. 22(2), 139-191

Locke, John. (1690). Two Treatise of Government. London.

Lorenz, M., O. (1905). Methods of Measuring the Concentration of Wealth. Publications of the American Statistical Association. 9(70), 209-219.

Lugo, M. A. (2007). Comparing multidimensional indices of inequality: methods and application. 14, 213-236.

Maasoumi, E. &Nickelburg, G. (1988). Multivariate Measures of Well-Being and an Analysis of Inequality in the Michigan Data. Journal of business & economic statistics. 6(3), 326 - 334.

Maasoumi, E. (1986). The measurement and decomposition of multi-dimensional inequality. Econometrica. 54(4), 991-997.

Maasoumi, E. (1999). Multidimensioned approaches to welfare analysis. Handbook of Income Inequality Measurement. J. Silber, Kluwer Publishers, 437-484.

Marmot, M. & Shipley, M. (1996). Do Socio-economic Differences in Mortality Persist after Retirement? 25 Year Follow-up of Civil Servants from the First Whitehall Study. British Medical Journal, 313, 1177–80.

Marmot, M. (2004). Status Syndrome. London: Bloomsbury

Marmot, M. (2010). Fair Society, Healthy Lives. The Marmot Review.

Marmot, M., Rose, G., Shipley, M. and Hamilton, P. (1978). Employment Grade and Coronary Heart Disease in British Civil Servants. Epidemiology and Community Health. 32, 244–9.

Marmot, M., Shipley, M., & Rose, G. (1984). Inequalities in Death – Specific Explanations of a General Pattern. Lancet. 323, 1003–6.

Marmot, Michael & Wilkinson, Richard. (1999). Social Determinants of Health. Oxford: Oxford University Press.

Marx, K. (1863-1883). Capital: A Critique of Political Economy, Volume III - The Process of Capitalist Production as a Whole, Chapter 15. Capital: A Critique of Political Economy. F. Engels, International Publishers. III.

Milanovic, Branko. (2016). Global Inequality: A new Approach for the Age of Globalization. Cambridge, Massachusetts: The Belknap Press of Harvard University Press.

Minot, N., Baulch, B., &Epprecht, M. (2003). Poverty and Inequality in Vietnam: Spatial Patterns and Geographic Determinants. Washington, D.C., International Food Policy Research Institute.

Mirrlees, J., A. (1971). An exploration in the theory of optimum income taxation. The Review of Economic Studies. 38(2), 175–208. https://doi.org/10.2307/2296779

Nilsson, T. (2010). Health, Wealth and Wisdom: Exploring Multidimensional Inequality in a Developing Country. Social Indicators Research. 95(2), 299-323.

Ostry, J., Berg, A. &Tsangarides, C. (2014). Redistribution, inequality and growth. IMF staff discussion note (SDN/14/02).

Pieterse, Jan. (2002). Global Inequality: Bringing Politics Back In. Third World Quarterly. 23(6), 1023–1046.

Piketty, T. & Goldhammer. A. (2014). Capital in the Twenty-first Century. Cambridge Massachusetts, Harvard University Press.

Preston, S. (1975). The Changing Relation between Mortality and Level of Economic Development. Population Studies, 29(2), 231–48.

Ravallion, M. (2007). Geographic Inequity in a Decentralized Anti-Poverty Program: A Case Study of China. Washington, D.C., World Bank.

Ricardo, David. (1817). On the Principles of Political Economy and Taxation. Batoche Books London.

Rodgers, G. (1979). Income and Inequality as Determinants of Mortality: an International Cross-section Analysis. Population Studies. 33(2), 343–51.

Rodrigues-Silveira, Rodrigo. (2013). The Subnational Method and Social Policy Provision: Socioeconomic Context, Political Institutions and Spatial Inequality, desiguALdades.net Working Paper Series No. 36, Berlin: desiguALdades.net Research Network on Interdependent Inequalities in Latin America.

Rousseau, J., Jacques. (1755). Discourse on the Origin and Basis of Inequality Among Men. Geneva.

Sachs, J., Lafortune, G., Kroll, C., Fuller, G., Woelm, F., (2022). From Crisis to Sustainable Development: the SDGs as Roadmap

to 2030 and Beyond. Sustainable Development Report 2022.
Sen, A. (1973). On Economic Inequality. Oxford, Oxford University Press.
Sen, A. (1992). Inequality Reexamined. Oxford: Oxford University Press.
Sen, A. (1999). Development as Freedom. Oxford, Oxford University Press.
Skousen, Mark. (ed.). (2007). The Big Three in Economics. New York, M.E.Sharpe. Socialist Republic of Vietnam (2013). Decision No.: 538/QD-TTg - PhêduyệtĐềánThựchiệnlộtrìnhtiếntớibảohiểm y tếtoàndângiaiđoạn 2012 - 2015 và 2020. The Government of Vietnam. Hanoi, the Government of Vietnam.
Smith, Adam. (1759). The Theory of Moral Sentiments. Clarendon Press, Oxford.
Smith, Adam. (1776). An Inquiry into the Nature and Causes of the Wealth of Nations. Clarendon Press, Oxford.
Stewart, Frances (ed.). (2008). Horizontal Inequalities and Conflict. Understanding Group Violence in Multiethnic Societies, Palgrave: Basingstoke.
Stiglitz, Joseph E. (2016). The Great Divide: Unequal Societies and What We Can Do About Them. New York: W.W. Norton & Company.
Stiglitz, Joseph. (2009). The global crisis, social protection and jobs. International Labour Review. 148(1-2), 1-13.
Temkin, L. A., (ed.). (1993). Inequality. New York, Oxford University.
Theil, H., (ed.). (1967). Economics and information theory. Amsterdam, North Holland Publishing.
Cambridge: Cambridge University Press.
Therborn, Göran, (2013). The Killing Fields of Inequality. Cambridge: Polity.
Therborn, Göran. (2006). Inequalities of the World, London: Verso.
Tilly, Charles. (1998). Durable Inequality, Berkeley, University of California Press.
Todaro, M. (1997). Economic development. London: Longman.
Torras, M. & Boyce, J., K. (1998). Income, Inequality and Pollution: A Reassessment of the Environmental Kuznets Curve. Ecological Economics. 25(2), 147–160.
Troutt, David. (2013). The Price of Paradise: The Costs of Inequality and a Vision for a More Equitable America. New York: New York University Press.
Tsui, K., Y. (1995). Multidimensional Generalizations of the Relative and Absolute Inequality Indices: The Atkinson-Kolm-Sen Approach. Journal of Economic Theory. 67(1), 251-265.
UNDP. (2020). The next frontier: Human development and the Anthropocene. Human Development Report, UNDP.
Ward, M., D. (1978). The Political Economy of Distribution: Equality versus Inequality, Elsevier North Holland.
Wilkinson, R. and Pickett, K. (2009a) The Spirit Level: Why More Equal Societies Almost Always Do Better. London: Penguin.
Wilkinson, R. and Pickett, K. (2009b). Income Inequality and Social Dysfunction. Annual Review of Sociology. 35, 493–511.
World Commission on Environment and Development, (1987). Our Common Future, Oxford: Oxford University Press.

****