Degrowth towards the safe and just operating space

Can degrowth policies move the OECD closer to reaching social thresholds within planetary boundaries?

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Abstract

As the environmental and social challenges humanity faces are intertwined, a holistic policy approach is needed to bring operations into the ecologically safe and socially just space (SJS). Degrowth has been presented as a means for high-income countries to reach the SJS. In this thesis I use a mixed methods approach of statistical analysis to identify the gaps that OECD countries face when it comes to social and ecological boundaries, and focused literature review to identify degrowth policy proposals that holistically address the identified gaps.

The main social shortcomings of the OECD were equality, life satisfaction, employment, and social support. The boundaries of all but one measured environmental indicator was overstepped. I identified 8 degrowth policy proposals that each tackle 4-8 of the lacking areas. My results support other research that indicates that degrowth measures can bring high-income countries closer to the SJS and contributes to knowledge towards sustainability pathways.

Keywords: degrowth, safe and just space, social thresholds, planetary boundaries, policy, OECD

Word count: 11996

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Table of Contents

1 Introduction

Despite decades of attempts to use policy and governance to address social and environmental challenges, mankind continues to face interconnected ecological and social crises (Gómez-Baggethun & Naredo, 2015; Vandeventer et al., 2019). Human activity is pushing the Earth-system toward and over thresholds that ensure the stability of the conditions which have allowed humanity to thrive on this planet (IPBES, 2019; Persson et al., 2022; Rockström et al., 2009; Steffen et al., 2015, 2018). Simultaneously, a systemic social crisis of inequality (Bourguignon, 2018; Jackson, 2019), weakening of democracy (International IDEA, 2021) and unmet basic needs (FSIN, 2019; World Bank, 2018) must be addressed.

The interconnections between environmental and social challenges are well documented. Environmental degradation can be exacerbated by inequality (Baloch et al., 2020; Boyce, 1994) and poverty (Raworth, 2012) and can in turn exacerbate both. Climate change has intensified global economic and social inequality (Diffenbaugh & Burke, 2019; Islam & Winkel, 2017) and unequally impacts people's ability to ensure basic needs such as health, food and sanitation (Raworth, 2012). There is a need for holistic approaches that bring environmental and social sustainability together. One such approach is sustainability science which attempts to bridge the natural and social sciences to find solutions to complex challenges, such as climate change (Jerneck et al., 2011). These challenges are sometimes referred to as wicked problems (Rittel & Webber, 1973). They receive this name because it can be difficult to identify solutions to wicked problems due to complex interdependencies and because solutions to wicked problems can create other complex problems (Jerneck et al., 2011). These interdependencies and complexities support the widely held view that societal and environmental challenges must be addressed simultaneously (Brundtland, 1987; Jerneck et al., 2011; Raworth, 2017).

It will be argued in this thesis, as others have claimed, that the roots of these interconnected social and environmental challenges lie in the dominant capitalist economic system, which relies on and drives an endless pursuit of economic growth (Asara et al., 2015; Bellamy Foster et al., 2011; Huber, 2009; Vandeventer et al., 2019; Wiedmann et al., 2020). Fifty years have passed since the publication of the Club of Rome's influential report on Limits to Growth which concluded that the planets limits to growth would be reached within the next century if growth trends continued. If they were altered however, we could reach a state of ecological and economic stability that could meet basic needs and provide equal opportunity to each person on Earth (D. H. Meadows et al., 1972). Now fifty years later,

no country provides basic needs to its population without exceeding the level of resource use that can be sustainably maintained globally (Fanning et al., 2022).

High-income countries are disproportionately responsible for both climate change (Hickel, 2020; Kartha et al., 2020) and global excess material use (Hickel et al., 2022). The world's richest 10% of people are responsible for 50% of global greenhouse gas emissions, and the majority of these people live in OECD countries (Chancel & Piketty, 2015). Furthermore, none of the OECD countries are on a trajectory towards reducing their environmental impact to a globally sustainable level (Fanning et al., 2022) meaning that a change is needed to avoid an ever worsening ecological crisis while social thresholds are still unmet. For these reasons I am motivated to look for solutions in an alternative economic and social structure such as degrowth that could allow OECD countries to address their environmental overshoots and social shortcomings and move closer to sustainability.

1.1 Away from the growth paradigm

Currently, the most prominent policy solutions to sustainability challenges, including the Sustainable Development Goals (SDGs) and OECD policy papers, are informed by so-called green growth where governments and international institutions use market-incentives and subsidize resource-efficient innovation with the goals of mitigating environmental impact while fostering economic growth (D'Alessandro et al., 2020; Eisenmenger et al., 2020; OECD, 2015, 2019). The pursuit of economic growth has defined the global economy for decades (Jackson, 2019). The growth paradigm, can not only be seen in the economic sphere but also in the political and social (Jackson, 2019). According to this narrative, society moves "along a single trajectory from poverty to wealth, from prejudice to rational understanding, and from power imbalances to democratic decision-making" (Johanisova & Wolf, 2012, p. 563) and what drives us on this trajectory is economic growth, which is almost used as synonymous with development and progress (Johanisova & Wolf, 2012). This narrative is so predominant that the assumption that economic growth is always desirable often goes unquestioned. (Asara et al., 2015; Jackson, 2019).

Yet critiques of the growth paradigm are numerous. Scholars have shown the limitations of market-based approaches to reduce environmental damage (Jackson & Victor, 2019; Wiedmann et al., 2013) and stay within planetary boundaries (O'Neill et al., 2018) and shown that continued economic growth relies on continual use of energy and both renewable and finite resources (Haberl et al., 2020; Hickel & Kallis, 2020; Jackson, 2009; Vadén et al., 2020). The 2019 global assessment report on biodiversity and ecosystem services discusses the limitations of market-based solutions to biodiversity loss and ecosystem degradation and mentions the need for a shift away from the current paradigm of economic

growth in order to achieve sustainability (IPBES, 2019). The most recent IPCC report on climate change mitigation (IPCC, 2022) discusses the destructive environmental impacts of economic growth by showing that it is a driver of fossil fuel use, greenhouse gas emissions and material use. The report presents various scenarios for emission reduction that illustrate that the rate of economic growth is one of the most important determinant of emissions, and the highest emission scenarios assume rapid long-term growth (IPCC, 2022). The same report presents several studies that found that degrowth (or non-growth/postgrowth) is the only approach that can lead to warming of less than 2°C (D'Alessandro et al., 2020; Grubler et al., 2018; Hardt & O'Neill, 2017; Hickel & Kallis, 2020).

Continuous economic growth on a planet with finite resources is incompatible with long-term human wellbeing as resource depletion, climate change and ecosystem degradation undermine the conditions for human existence. Furthermore, growth above a certain level does not seem to contribute to happiness (Easterlin et al., 2010), or increased life expectancy (Büchs & Koch, 2017) and has failed to reduce inequality (Bourguignon, 2018; Jackson, 2019) and eliminate poverty (FSIN, 2019; World Bank, 2018).

1.2 Degrowth, social thresholds and planetary boundaries

This thesis will analyze the potential of degrowth, as an alternative to the current economic paradigm, to address social and environmental challenges. Degrowth is an academic research field, a social movement and political debate that calls for a discontinuation of pursuing economic growth and an abolishment of the narrative of 'growth as synonymous with development'. This includes both a democratic downscaling of production and consumption to reduce energy and material use, and a restructuring of society to one where social and ecological wellbeing is prioritized over profit (Schneider et al., 2010).

Degrowth is increasingly supported by scientists and ecological economists as a means to bring the operations of economically developed nations to a level where human needs are satisfied, and the limits of the planet are respected (Fanning et al., 2022; O'Neill et al., 2018; Spangenberg, 2014; Wiedmann et al., 2020). One representation of this space is the Safe and Just Space (SJS) framework, also called the 'doughnut of social and planetary boundaries' as it combines planetary boundaries and a social foundation that is aligned with meeting basic human needs (Raworth, 2017). It is theoretically possible to reach this space but it requires a restructuring of our provisioning system to meet basic needs at a lower level of resource use (O'Neill et al., 2018). While existing policy options are sufficient for poor nations to reach this goal (Hickel, 2018), degrowth strategies are required in wealthy countries to reach the SJS at an aggregate global level (Hickel, 2018; O'Neill et al., 2018; Spangenberg, 2014).

1.3 The research gap and research aim

While humanity faces challenges that are partly rooted in the pursuit of economic growth, much of sustainability policy has been reshaped to fit the dominant growth-oriented economic system (Asara et al., 2015; Eisenmenger et al., 2020; Gómez-Baggethun & Naredo, 2015; OECD, 2015). There is a need for a policy shift towards sustainability policy that effectively tackles the specific social and ecological challenges that countries face, as well as the common roots of ecological and social degradation. Whether and how the degrowth debate contributes to this is an important question to answer (Gómez-Baggethun & Naredo, 2015).

While researchers have presented degrowth as a means to provide a good life for all within planetary boundaries (Fanning et al., 2022; Hickel, 2018; O'Neill et al., 2018; Spangenberg, 2014), more empirical evidence is needed. The aim of this thesis is to respond to this research gap in the degrowth scholarship by identifying degrowth policy suggestions that have the potential to address the specific biophysical overshoots and social shortfalls that OECD countries face as a group. I argue that such knowledge could help facilitate the transition towards operating within a safe and just space in these countries and on a global level.

To operationalize the aims of the thesis and identify the policy goals for sustainability in OECD countries and degrowth policy with the potential to reach these goals I will ask the following research questions:

1) What are the main biophysical overshoots and social shortcomings of OECD countries and what implication should this have for sustainability policy goals?

2) Through the lens of the SJS framework, what single degrowth policies can be implemented to bring OECD countries closer to social thresholds and planetary boundaries and what specific gaps do they each address?

1.4 Contribution to sustainability science

Recent IPCC and IPBES reports identify economic growth as a challenge to achieve sustainability and name degrowth as a potential solution (IPBES, 2019; IPCC, 2022). A closer look at the ways in which degrowth and sustainability are related is urgent (Wiedmann et al., 2020). Jerneck et al. (2011) present a research agenda for sustainability science with three core themes, one of which is 'sustainability pathways and strategies to fulfill sustainability goals'. It is this theme to which I aim to contribute with this thesis. Although degrowth has not been implemented large-scale, I aim to provide knowledge about the potential implications of degrowth policy for social and environmental sustainability.

A contribution of this problem-driven and action-oriented research is to create knowledge that has the potential to support national governments attempting to reach the ecologically safe and socially just operating space. Sustainability scientists have pointed out the shortcomings of our political systems to deal with sustainability challenges, partly because many challenges are global, making them difficult to address at a national level (Jerneck et al., 2011). However, as we do not currently have any strong transnational regulative bodies, this thesis will only focus on the national level of governance to reflect solutions within the existing institutional framework.

2 Theory

This chapter explains the theoretical insights that inform the empirical analysis and discussion points of this thesis and how they were used. These are firstly the Safe and Just Space framework (section 2.1) and secondly Degrowth, which is preceded by a discussion of the limits of economic growth (section 2.2).

2.1 Safe and Just Space framework

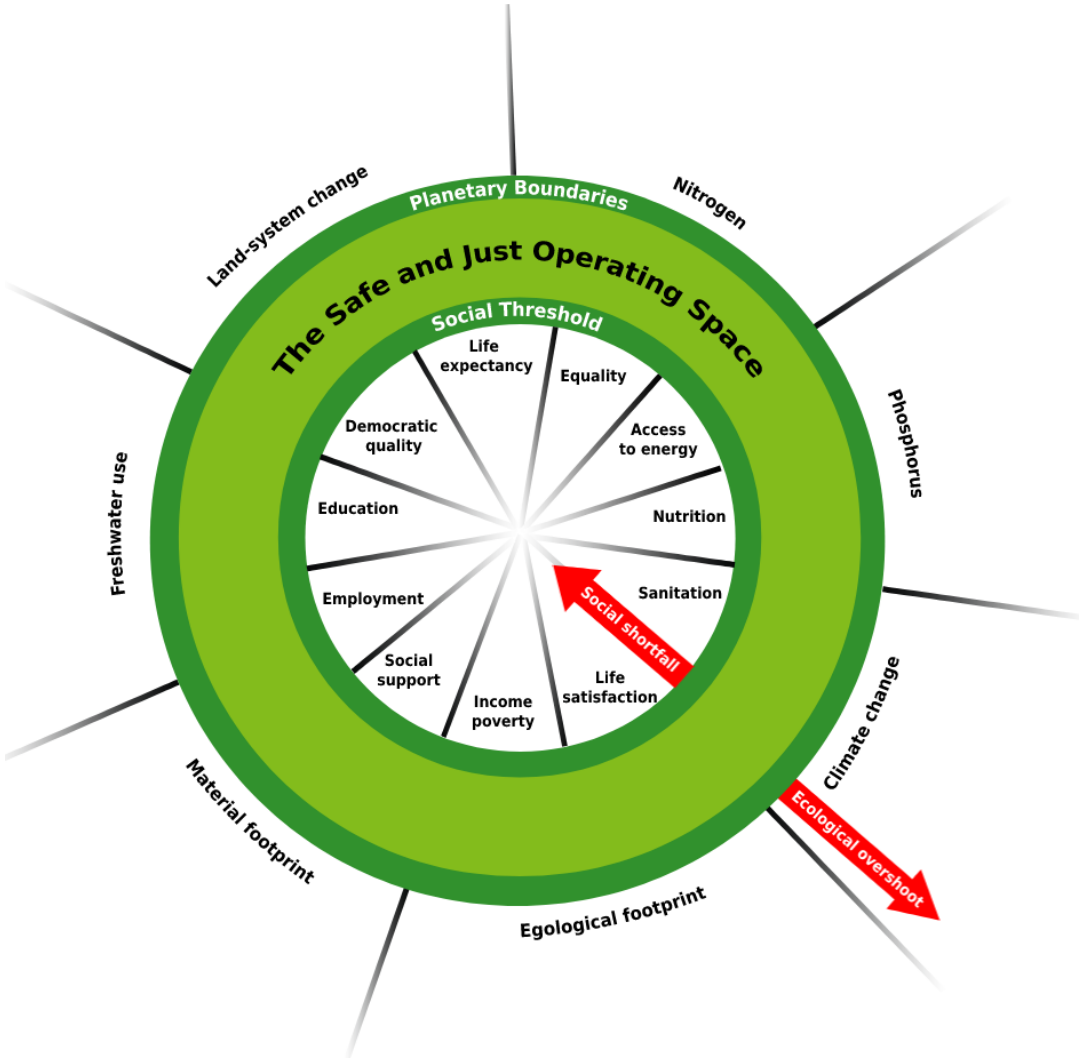
The Safe and Just Space (SJS) framework, developed by Kate Raworth (Raworth, 2017), is a framework of human wellbeing and sustainable development that provides an integrated vision of the three pillars of sustainable development, social, environmental, and economic sustainability and highlights the interconnections between the three. While there are other integrated frameworks of social and ecological sustainability the SJS framework has gained popularity for its compelling visualization (see figure 1) that makes it useful for expressing sustainability challenges to people outside academia, such as policymakers.

The SJS framework combines social and planetary boundaries because human wellbeing depends on the ability to fulfill basic needs and have dignity and opportunity without compromising Earth's life-supporting systems. If countries reach the social thresholds (inner boundary in figure 1) without overstepping the planetary boundaries (outer boundary in figure 1), they operate within the 'ecologically safe and socially just operating space' and do not compromise humanity's ability to continue to thrive.

The SJS framework provides a contrast to the mainstream framing of the economy as the center of development and environmental and social implications as economic externalities. Instead, it represents society and the environment as both the foundations and limits to economic activity and structures, that is, decisions about economic activity should be made after assessing these boundaries. Furthermore, the goal of the economy is not to grow but to bring operations into the SJS and provide wellbeing there. The framework provides a way to assess economic activity in non-monetary terms by showing how environmentally sustainable and socially just economic activity is (Raworth, 2012).

Figure 1.

Visual representation of the safe and just operating space for humanity.



Note. Environmental boundaries make up the outer boundary while social thresholds set the inner boundary. The image shows the environmental and social indicators used in this thesis. To be within the space, countries should reach the social threshold but stay below the planetary boundaries. Failing to do so is referred to as social shortfall or ecological overshoot (respectively). Image is adapted from (Raworth, 2012, p. 4).

2.1.1 Social foundation

The social foundation of the SJS framework builds on Human Rights (UN's Universal Declaration of Human Rights, 1948) and the theory of universal human needs, which was developed by Doyal & Gough (1991) and built on work by Max-Neef et al. (1991). A focus on universal human needs is appropriate to any study on sustainability and welfare because they are empirically grounded, objective, universalizable, satiable and non-substitutable, and reflect a necessary foundation for living a dignified life without harm (Gough, 2015).

The social foundation has three priorities for the indicators that should be tracked (Raworth, 2012). Firstly, ability to be well, measured here by indicators for nutrition, sanitation, life satisfaction, life expectancy, access to energy, poverty. Secondly, enabling people to be productive, measured by education and employment indicators and lastly empowerment, measured here with equality, democratic quality, and social support.

2.1.2 Planetary boundaries

The outer boundary of the SJS framework consists of the Planetary Boundaries framework developed by Rockström et al. (2009). The framework was designed to assist governance and management, and is widely used, perhaps due to the strong visual and clear messaging about limits.

The planetary boundaries framework describes a set of critical Earth system processes that keep Earth in Holocene-like conditions and regulate the stability of these conditions (Leach et al., 2013). Rockström et al. (2009b) identified nine such boundaries: climate change, ocean acidification, stratospheric ozone depletion, disruption of global phosphorus and nitrogen cycles, loss of biosphere integrity, global freshwater use, land-system change, aerosol loading, and novel entities (formerly chemical pollution).

As the Holocene is the only era in planetary history in which we know humanity can thrive, staying within these planetary boundaries preserves a 'safe operating space for humanity' (Rockström et al., 2009b). Research on these boundaries and their dynamics and tipping points is still ongoing but research has shown that six boundaries have already been crossed because of human activity. These are climate change, loss of biosphere integrity, land-system change, altered nitrogen and phosphorus cycles, freshwater use and novel entities (Persson et al., 2022; Rockström et al., 2009; Steffen et al., 2015, 2018; Wang-Erlandsson et al., 2022). The boundaries of ocean acidification and ozone depletion are currently not reached and data for aerosol loading is not robust enough to draw conclusions (Steffen et al., 2015).

2.1.3. Application of the SJS framework in this thesis

While the SJS framework does not explicitly present pathways to reach the safe and just space, the framework's social and planetary boundaries will be used in this thesis as a guideline to assess policy for sustainability. The framework provides a basis for a choice of social and environmental indicators to measure and base policy decisions on and track progress. It also presents qualifications for successful sustainability policy that will be used in this thesis to assess policy suggestions. These qualifications will now be explained and further supported.

The foundation for the framework is that social and planetary boundaries are interdependent. Precarious environmental conditions limit people's ability to thrive, and poverty can exacerbate environmental stress (Raworth, 2012). In some cases, policy that tackles environmental problems exacerbates poverty and vice versa (Jerneck et al., 2011; Raworth, 2017). For example, (D'Alessandro et al., 2020) found by modeling different scenarios that technological progress influenced by green growth policy undermines social equity. Other examples are so-called ecological-gentrification, when sustainability initiatives in urban planning have negative social impacts (Cucca, 2012), or when attempts to reduce housing inequality increase total consumption and environmental pressure (Mete & Xue, 2021). Therefore, policies should tackle both social and environmental issues to avoid risking exacerbating whichever issue is not being focused on (D'Alessandro et al., 2020; Raworth, 2017).

It follows from this that if the goal is to use degrowth policies to move closer to the SJS, they should either be implemented simultaneously as a package, or certain policies that have both social and environmental benefits should be implemented. As the OECD is still very growth-focused (OECD, 2015, 2019), it might be most promising to identify some key-policies to implement rather than hope for a full implementation of degrowth policies in the near future. This approach will be taken in this thesis.

2.2 Growth-critical economic approaches

As established in the introduction of this thesis, constant economic growth is incompatible with sustainability. Section 2.2.1 will further support this argument and section 2.2.2 will present Degrowth as an alternative economic system that offers a solution to current environmental, social, and economic issues and section 2.2.3 will explain how Degrowth is defined and used in this thesis.

2.2.1 Limits of growth

There is much evidence to support a strong correlation between economic growth and the ecological deterioration (Hickel, 2021; D. L. Meadows & Randers, 2004). The IPCC reports that continued

economic expansion of material production and consumption in high-income countries will hinder us from limiting climate change to 2°C warming (Grubler et al., 2018; IPCC, 2022) and academics have shown the limitations of market-based approaches to reduce environmental damage (Jackson & Victor, 2019; Wiedmann et al., 2013) and stay within planetary boundaries (O'Neill et al., 2018).

The idea of green growth, that is decoupling growth from material and energy throughput and related ecological impacts has received much attention in recent decades from mainstream economists and is even assumed in national and international policy such as the Sustainable Development Goals (Eisenmenger et al., 2020) and OECD environmental policy papers (OECD, 2015, 2019). However green growth is unviable as a pathway to avert environmental breakdown because economic growth is a global driver of greenhouse gas emissions (IPCC, 2022) and there is no evidence that growth can be absolutely decoupled from resource and energy use at the scale that is needed to avoid ecological disaster (Haberl et al., 2020; Hickel & Kallis, 2020; IPCC, 2022; Jackson, 2009; Vadén et al., 2020). Increasing eco-efficiency and renewable energy to lower environmental impact of production is insufficient because these improvements tend to reduce production price which increases consumption, known as the rebound effect (Kallis, 2011; Schneider, 2008; Sorrell et al., 2007).

Economic growth has also been criticized for its social limits (Hirsch, 1977). In addition to eroding the ecological conditions that are the basis for human wellbeing, research has shown that economic growth has failed to deliver on what can be assumed to be the goals of increased wealth, that is increased happiness, health, and equality. Instead the prioritization of growth has led to a decline in social capital (Johanisova & Wolf, 2012), increased individualization and marketisation (Büchs & Koch, 2017) and increasing economic inequality, which in turn decreases social cohesion (Bourguignon, 2018; Jackson, 2019). After growth has reached a level at which basic needs are satisfied, there is no increase in life expectancy (Büchs & Koch, 2017) or psychological wellbeing with more growth (Easterlin et al., 2010). Between 1950 and 1980 the trend of increasing welfare stagnated and even reversed in most economically developed countries, despite GDP continually growing during this same time (van den Bergh & Kallis, 2012).

This disconnect between growth and wellbeing after basic needs are satisfied is thought to occur partly because people then derive happiness from aspects of life that do not correlate with wealth and greater consumption increases neither happiness nor health (Fanning & O'Neill, 2019). Other reasons are that happiness is both adaptive, so people return to the same level of happiness after changes in their life, and positional meaning that if everyone becomes richer, no-one becomes happier as consumption is driven by status competition rather than needs satisfaction (Büchs & Koch, 2017;

Hirsch, 1977; Muraca, 2012). In fact, constant comparisons with others or made-up needs created by advertising can have a negative impact on perceived happiness (Muraca, 2012).

The stagnation or decline of welfare in high-income countries has also been connected to societal characteristics that are fostered by the prioritization of growth, such as competition, a fast pace of life, and a deterioration of social relationships due to the marketisation of socially valuable aspects and services such as care, public duty or spirituality (Büchs & Koch, 2017; Kallis et al., 2014; Muraca, 2012). When such aspects become commodified, people spend less time in social interactions and altruistic behavior is overtaken by profit motivations, reducing social wellbeing (Hirsch, 1977; Kallis et al., 2014).

2.2.2 Degrowth

Since growth does not contribute much to welfare in economically developed countries, it can be reasoned that implementing stricter environmental policies that result in stagnation of economic growth will not automatically reduce welfare (van den Bergh & Kallis, 2012). Scientists and economists are increasingly calling for high-income countries to shift from the pursuit of economic growth to degrowth, which has been defined as "an equitable downscaling of production and consumption that increases human wellbeing and enhances ecological conditions at the local and global level, in the short and long term" (Schneider et al., 2010, p. 512). The downscaling should be planned and democratic (Alexander, 2012; Daly, 1996) and ensure that human activity is within safe ecological boundaries (Kallis, 2011; Schneider et al., 2010; van den Bergh & Kallis, 2012).

Degrowth should not be understood only in economic terms. As GDP is viewed as an arbitrary indicator that does not reflect the level of ecological sustainability or social justice, its reduction is not a measure of degrowth. (Asara et al., 2015). Nor should degrowth be envisioned as 'less of the same'. Degrowth is a multidimensional concept that implies a broad change of the organization of our political, economic and social systems (Kallis, 2011; Sekulova et al., 2013) and a degrowth society is not only one with less consumption and production, but more importantly, with different production and consumption as well as different social relations and relations to nature, different division of time between paid work and leisure and a different role of non-paid work (D'Alisa et al., 2014).

The current degrowth debate originated early this century from ecological economists and post-development theorists (Alier, 2009; Jackson, 2009; Kallis, 2011; Latouche, 2009, 2010). The debate arose as a response to and critique of technological sustainability solutions and the framing of economic growth as a solution in sustainable development discourse (Gómez-Baggethun & Naredo, 2015). Degrowth proponents have argued and shown that technology improvements and increased

efficiency will not suffice to avoid ecological destruction, climate change and depletion of finite resources and that scaling back the economy is necessary to reduce CO_2 emissions and material use (Schneider, 2008). This is supported by the evidence of rebound effects on consumption (Schneider, 2008) and evidence that it is unrealistic to decouple growth and environmental damage (Haberl et al., 2020; Hickel & Kallis, 2020; Jackson, 2009; Vadén et al., 2020) and that the only instances where countries have significantly reduced either of these factors, without relocating their production to other countries, were during economic recession (van den Bergh & Kallis, 2012). Therefore some level of degrowth is unavoidable if we are to avoid catastrophic climate change and environmental degradation (van den Bergh & Kallis, 2012).

Academics have pointed out that degrowth will likely happen whether governments like it or not because fossil fuels will eventually run out (Douthwaite, 2012) or because of ecological limits (Kallis, 2011) but this unplanned degrowth would cause a collapse of our growth-based economic systems (Kallis, 2011) which would be catastrophic for wellbeing and equality. If, on the other hand, degrowth is planned and democratic, it can be implemented through social policies in a way that maintains or even improves wellbeing, reduces inequality, and provides basic needs to all, without overstepping the limits of the planet (Hickel, 2019; Kallis, 2011; Schneider et al., 2010).

As some social indicators, such as life satisfaction, equality, social support, democratic quality, and employment, are not tightly coupled to resource use, nations can achieve these thresholds with little to no increase in biophysical pressure (Hickel, 2018; Steinberger & Roberts, 2010). Degrowth measures can allow some thresholds to be reached without any additional pressure on planetary limits. For example, redistribution policy can increase equality and a restructuring of the labor market can secure employment (Alexander, 2012; Hickel, 2018; Schneider et al., 2010). With equal distribution of resources, high levels of human development could be reached universally without increased carbon and energy use (Steinberger & Roberts, 2010).

2.2.3 Definition and use of degrowth in this thesis

Following from what has been argued above, my premise is that degrowth is needed to avoid environmental catastrophe and that degrowth has the potential to provide basic needs that are foundational to wellbeing. As I accept that degrowth is an appropriate approach to reach the SJS I will base my analysis and results on academic literature on degrowth. I use degrowth literature to assess the potential of specific degrowth policy to move society closer to the SJS. These include measures such as redistribution policies and job guarantee, supporting local consumption and production, and dense urban structures (Cosme et al., 2017).

This thesis will take a problem-solving approach (in contrast to a critical approach) (Cox, 1981; Jerneck et al., 2011) and use existing institutions as a framework for action, by focusing on the top-down approach to implementing degrowth and attempting to identify solutions to sustainability challenges within this existing institutional framework. The top-down approach has been fairly critiqued as the Degrowth movement is largely based in grassroots social and environmental movements, and academic circles which focus to a great extent on bottom-up approaches (Asara et al., 2015; Mocca, 2020). However the state also plays a crucial role in implementing reforms to facilitate the degrowth transformation (Asara et al., 2015; Kallis, 2015; Mocca, 2020). While local-level initiatives provide great examples of how degrowth society can look and be implemented, the national level is better suited to enact broad and more radical change (Mocca, 2020).

I focus on single policy changes that will incrementally bring us closer to degrowth. This is at odds both with the common description of degrowth as a 'utopia' with a completely different social structure from our own (Kallis et al., 2014) and with the growing consensus among degrowth actors that what is needed is not marginal adjustments of current systems but rather a multi-scalar social-ecological transformation that alters the fundamentals of our system to realize a society that is radically different from our current one (Asara et al., 2015). Some even believe that focusing on incremental changes will create barriers to sustainability by strengthening the current system and thereby limiting alternatives for change (Asara, 2015; Rickards & Howden, 2012). While I agree that the end-goal of fully realizing degrowth means a radical shift from current pathways, I believe that at this stage it is useful to identify potential changes, however incremental, that can bring us closer to degrowth. For one thing it could increase public support for the transformation which is necessary for degrowth to flourish as a collective democratic movement (Asara et al., 2015; Deriu, 2012; Kallis et al., 2014).

3 Methodology, a mixed methods approach

This chapter will introduce the methodological approaches and their limitations and explain the steps I took. First, I will discuss my choice of a mixed methods approach and explain the epistemological position of the analysis.

A mixed methods approach, combining statistical analysis, a quantitative method, with a review of qualitative literature was adopted to firstly identify social and ecological policy goals for the OECD and secondly to investigate how degrowth policy proposals can contribute to these goals. One reason for using a mixed methods approach is that different data forms provide inherently different types of knowledge that can be complementary to one another leading to a more comprehensive understanding of the topic (Leavy, 2017; M. L. Small, 2011). Quantitative statistical analysis was used to answer research question 1 and to set the criteria for the qualitative literature review which was used to answer research question 2. The research design was therefore sequential, as the quantitative analysis preceded and informed the qualitative one (M. L. Small, 2011).

The method of combining qualitative and quantitative approaches has been criticized for commensurability issues, as the different methods often reflect different epistemologies and therefore their logics are incomparable (M. L. Small, 2011). There are two reasons why this critique does not apply to my research. Firstly, the two different approaches are not used to answer the same question, and secondly because the analysis of the literature as data was meant to be objective and without interpretation but did include generalization which is more in line with positivism than interpretivism. That being said, the choice to use only degrowth literature shows a form of assumption and interpretation so the approach of the literature review was theoretically informed while the analysis itself was positivist, that is objective and value-free. The same can be said about the statistical analysis where the choice of indicators was theoretically informed by the SJS framework. Therefore, the epistemological assumptions of both methods were theoretically informed positivist approaches.

3.1 Statistical analysis

Descriptive statistical analysis was used to answer research question 1: What are the main biophysical overshoots and social shortfalls of OECD countries and what implications this should have for policy goals?

3.1.1 Description of data

This type of analysis requires a selection of indicators. My choice of indicators is informed by the SJS framework and includes eleven social and seven biophysical indicators. Of the eleven social indicators, nine measure need satisfaction (access to energy, democratic quality, education, employment, equality, income poverty, nutrition, sanitation, and social support) and two measure well-being (life expectancy and self-reported life satisfaction). Five of the seven biophysical indicators (CO_2 emissions, land-system change, blue water, phosphorus, and nitrogen) measure four planetary boundaries, downscaled to the national level, (climate change, land-system change, freshwater use, and biogeochemical flows (measured by both phosphorus and nitrogen)) respectively. Additionally, the analysis included measures of ecological footprint and material footprint which are not a part of the planetary boundaries but are useful indicators of the environmental pressure of human activity.

The raw data was retrieved from the supplementary data provided in Fanning et al. (2022) and O'Neill et al. (2018). The authors of both also applied the SJS framework at a national level so the data had already been processed to suit my analysis. The values for all indicators had been downscaled to country-level and normalized to their respective social threshold or biophysical boundary described in the SJS framework so that a value of 1 represents the threshold/boundary. A value above 1 is desirable on social indicators as it means that the country did achieve the social threshold. A value less than 1 is desirable on environmental indicators as it means that the country is performing within the biophysical boundary.

To use in my analysis, I retrieved historical data from the year 2015 as this was the most recent, for OECD countries (excluding Iceland and Luxembourg as they were not included in the original dataset) for all 18 indicators.

3.1.2 Description of indicators and defined thresholds

Social indicators

Decisions about thresholds were taken by Fanning et al. (2022) and O'Neill et al. (2018). Although the goal should certainly be to provide everyone with basic needs such as sanitation and access to energy, the thresholds of indicators are often set at 95% of the population. This is because few countries report values above 95%, which reflects the difficulty of closing the gap completely, and in some cases, universal access does not necessarily imply 100% usage, such as enrollment in education. See Supplementary Information from Fanning et al. (2022) and O'Neill et al. (2018) for information on original data sources and calculations.

Life satisfaction is a measure of perceived well-being and is based on individuals' subjective assessment of how satisfied they are with their life. The values in this dataset were compiled from four surveys which had slightly different questions, all some version of "how satisfied are you with your life as a whole these days?". The minimum threshold for this indicator was 6.5 out of 10.

Life expectancy is a measure of physical health and represents the number of years that a newborn is expected to live, based on current mortality rates in the country. The threshold was set at 74 years.

Nutrition represents average intake of food and drink in calories (measured in kilocalories per capita per day). The threshold is set at 2700 kcal per person per day, as the average adult needs between 2100 and 2900 kcal per day.

Sanitation indicates the percentage of the population that uses sanitation facilities that eliminate contact with excreta, such as flush toilets, composting, and pit latrines. The threshold is set at 95% of the population.

Income poverty indicates the percentage of population living on less than 5.50 USD per day which is approximately the global average of national poverty lines. The threshold is set at 95% of population over this poverty line.

Access to energy indicates the percentage of the population that has access to electricity. A threshold of 95% with access was used.

Education was based on enrollment in secondary education as this is recognized as a driver of development and having connections to gender equality. The indicator measures the gross enrollment in secondary education and the threshold is 95%.

The indicator for *social support* shows the average of responses to the question "If you were in trouble, do you have relatives or friends you can count on to help you whenever you need them, or not?" The value of the indicator ranges from 0 to 1, reflecting the ratio of people that answer this question with a "yes". The threshold was set at 0.9 (90%).

The indicator for *democratic quality* was calculated from two indicators, voice and accountability, and political stability. The values are given on a scale from 0-10 and the threshold is set at 7.

Equality was measured by the Gini coefficient which indicates income inequality, but values are given as 1 minus Gini coefficient so that a higher value indicates more equality. The threshold for this inverted Gini coefficient is set at 0.70 which represents low to medium income-inequality.

Employment is measured as 1 minus the unemployment rate (percentage of the labor force that is unemployed but seeking work). The threshold is set at 94% employment.

Biophysical indicators

The *Climate change* indicator indicates release of CO_2 into the atmosphere and the planetary boundary is usually placed at 350 ppm of CO_2 in the atmosphere. The national thresholds were calculated by distributing a 'fair share' of carbon released between 1850 and 1988, when the 350 ppm boundary was crossed, by population size. Then, national performance was compared to each country's fair share to estimate whether, and how far, countries had crossed the climate change boundary.

The planetary boundary for *Nitrogen* is 62 Tg N y^{-1} and for *Phosphorus* it is 6.2 Tg P y^{-1}. Together they measure the planetary boundary for Biogeochemical flows. The planetary boundaries for nitrogen and phosphorus were divided by world population and multiplied by national populations to calculate national boundaries.

Land system change is defined as the amount of remaining forest cover and the global planetary boundary is set as 75% of original forest cover. The indicator used to represent this is Human Appropriation of Net Primary Production, or HANPP, which indicates the pressure humans put not only on forests but on other ecosystems as well

Freshwater use[1] describes the maximum global withdrawal of blue water from renewables stores such as lakes and rivers. The per-capita boundary was set at 574m^3 y^{-1}, based on the original planetary boundary of 4000km^3 y^{-1} (Rockström et al., 2009), although this boundary has been critiqued (Heistermann, 2017) and the literature is still evolving.

Ecological footprint is not one of the boundaries in the planetary boundary framework, but it is included as it is a well-known sustainability indicator. This is consistent with Wiedmann & Barrett's (2010) findings that this indicator is most useful as part of a range of indicators. It represents the impact of human activity in terms of how much biologically productive land and sea area (cropland, grazing land, forest area, carbon land, built-up land, and fishing grounds) a population uses to satisfy its consumption of natural resources, and to absorb its waste, including carbon emissions. To calculate the threshold, countries' per capita ecological footprint is compared to their per capita share of global

[1] Note that the global boundary for freshwater use as measured by blue water has not been reached but a very recent study shows that when measured by green water, the boundary has been overstepped (Wang-Erlandsson et al., 2022). Green water (terrestrial precipitation, evaporation, and soil moisture) is critical for biosphere functions and should be considered in the Planetary Boundaries framework. Unfortunately, I was not able to include data for green water in my analysis due to timing of the publication.

biocapacity (how fast these same biologically productive areas can provide resources and absorb waste). The ecological footprint should be lower than the biocapacity.

Material footprint is not a part of the planetary boundary framework either, but it is included as it is a useful indicator of the environmental pressure of human activity (Wiedmann et al., 2013). It indicates the environmental pressure that stems from satisfying material needs and fueling economic growth. It represents the total amount of raw materials (minerals, fossil fuels and biomass), extracted to meet a population's consumption, including upstream raw materials. The national threshold is calculated by comparing to the global boundary of 50Gt per year. This number is slightly arbitrary but has been proposed independently by several authors as the maximum threshold (Bringezu, 2015; Hoekstra & Wiedmann, 2014; UNEP & IRP, 2014).

3.1.3 Statistical analysis: Descriptive statistics

Descriptive data analysis was used to describe the performance of OECD countries on the chosen indicators, for instance how many countries overstep each indicator. The data analysis is theory-based (Aneshensel, 2013) as the choice of indicators is informed by the SJS framework, the values for each variable have been normalized to represent the theoretically defined social and planetary boundaries, and the goal of the data analysis is to assess and represent where OECD countries are operating in relation to these boundaries. The results of this part of the analysis will be used to define what goals policy for sustainability in the OECD should have.

3.1.4 Limitations

One limitation of the analysis is that I do not include all nine planetary boundaries in my analysis, due to lack of data availability. Atmospheric aerosol loading has not yet been quantified and Novel entities only very recently (Persson et al., 2022). Biosphere integrity has been partly quantified but it is difficult to downscale this boundary from the global level to the national due to huge regional variations and it was therefore excluded from the analysis due to lack of data (Rockström et al., 2009; Steffen et al., 2015).

A general shortcoming of statistical analysis is that it provides only a shallow and descriptive view, rather than an insightful and explanatory one. The results must be interpreted and therefore the insight they provide is influenced by the researcher's assumptions (Aneshensel, 2013). Indicators like the ones used in this study have limitations as to how well they capture multifaceted concepts such as equality or social support within a single value as measured values are always imperfect approximations of the true constructs (Aneshensel, 2013). There is ongoing debate and research about

the values that have been set for many of the planetary boundaries and these need to be reconsidered as new evidence emerges. However, if these limitations are kept in mind during interpretation, this approach provides useful information, especially when the goal is to gain an overview, as is the case in this study.

3.2 Focused literature review

A focused literature review was performed to answer research question 2: Through the lens of the SJS framework, what single degrowth policies can be implemented to bring OECD countries closer to social thresholds and planetary boundaries and what specific gaps do they each address?

A literature review is a research method of systematically collecting and synthesizing data from previous research (Booth et al., 2016; Jesson et al., 2011). As literature reviews integrate perspectives and results from multiple sources, they can answer research questions that would be difficult to answer in a single study (Booth et al., 2016; Jesson et al., 2011; Snyder, 2019). Focused literature reviews (FLR) are semi-systematic and differ from the better-known systematic literature reviews in the sense that the FLR approach is less systematic and comprehensive, it is performed by a single reviewer and the focus is on key research relevant to the research question with the aim of being informative, rather than comprehensively covering the research area (Snyder, 2019). Although the FLR is semi-systematic, it still involves a systematic approach. It is based on a research question and uses explicit protocol for literature search and analysis and explicit criteria for inclusion in the review (Booth et al., 2016).

The FLR can be more suitable than a systematic review when the topic is broad and has been studied within diverse disciplines (Snyder, 2019) such as is the case in my research. I chose this approach as I deemed it a better fit for my research topic and due to the short time frame and the fact that I am working alone. The aim of the FLR was to assess the potential of each policy proposal to address the social and environmental gaps identified by the statistical analysis in order to identify a list of policies that had wide-ranging impact, that is both social and environmental impact, addressing at least four of the areas (two social and two environmental) identified to be lacking in OECD countries.

Gathering policy suggestions

I gathered a list of policy suggestions to set the criteria for the literature review. For this I used two sources: a review paper by Cosme et al. (2017) and a PhD thesis by Parrique (2019). Cosme et al. (2017) listed 54 peer-reviewed articles on degrowth that proposed specific policies and Parrique compiled a list of 86 goals, 103 objectives and 213 policy instruments from campaigns of political parties, lists by

individual authors and academic literature, including (Cosme et al., 2017). There was considerable overlap between the two sources, so the combined list consisted of 81 policy suggestions. The next step was to eliminate policy suggestions that were out of the scope of this thesis. As the focus of this thesis is on national level governance, international policies and local-level policies were excluded from the list, and so were non-specific suggestions such as *promote a value change*. To simplify the list, I combined policies with similar goals, such *as limiting or regulating advertising, promoting changes in consumption patterns* and *taxing consumption* which were combined as they share the goal of reducing consumption. In the end I had a list of 39 policies.

Protocol for literature search, inclusion criteria and procedure

I gathered literature partly through a systematic search. That is, I systematically looked for literature in Google Scholar, Scopus and LUBsearch, using broad search terms such as 'degrowth' AND 'policy', and searching more specifically for 'degrowth' along with topics of policy suggestions on my list, such as 'local production and consumption', 'co-housing', or 'distributive taxation'. Most of the literature was found by snowballing-method however. That is, I found relevant key literature because it was cited in other articles that discussed degrowth and policy changes. The snowballing method was useful to identify primary sources where degrowth policy was originally suggested and its potential benefits discussed.

The conditions for including a paper in the review were that it was peer-reviewed, in English, published between 2001-2022, that it suggests one or more of the degrowth policies on my list and mentioned any of the social or ecological indicators chosen as potential benefits of the policy proposal(s) being discussed. Many articles were excluded because they did not discuss the effects of the policy-change they suggested. In the end, 48 articles were used in the analysis.

Analysis

From the chosen articles I extracted information about how each policy on the list might benefit the social and ecological indicators chosen based on the SJS framework and used Microsoft Excel to record this. Next, I identified policy proposals that impact at least two social indicators and two environmental indicators. These eight policies constitute my findings, along with descriptions of the impacts of each.

3.2.1 Limitations

The main limitation of my approach is that it was not completely systematic, making it hard to replicate. However, due to the limited time frame and the wide variety of literature needed, I deemed that I would not be able to perform a full systematic review. The snowballing-method of gathering

literature can potentially lead to a one-sided academic discussion. Using literature as data also brings the risk of bringing the limitations of other studies into the analysis.

I was aware of these limitations from the beginning, but due to my decision to assess degrowth policy-suggestions that have not been implemented on a large scale and to identify the general potential impact of such policies rather than looking at individual cases in detail, potential data sources were limited and this method seemed most appropriate. I could have looked for cases where similar policies have been implemented and tried to assess the effect, but I believe that I would have had difficulties finding enough information, and it would have been hard to generalize from these results. Instead, I attempted to overcome the limitations by using an adequate amount of peer-reviewed literature, attempting to find multiple sources for statements, and excluding statements if I found any contradictions to them elsewhere.

4 Analysis

This chapter will present the results of the analysis. The results of the statistical analysis (section 4.1) are meant to provide an understanding of the performance of the OECD through the lens of the SJS framework, as well as presenting the performance of individual countries for a more detailed understanding of the variation within the group. The failings of the OECD to meet social thresholds and stay within planetary boundaries will be used to outline policy goals for the group. The results of the literature review (section 4.2) are meant to show how degrowth policy proposals align with the identified policy goals and give examples of how they can be expected to improve performance in each area. This chapter will be followed by a deeper discussion of theoretical linkages and implications for the degrowth debate and the SJS framework.

4.1 Descriptive statistical analysis

4.1.1 Social thresholds

All 36 countries reached the social threshold for life expectancy, nutrition, access to energy, and all but one reached the threshold for education (see Table 1). These indicators will be excluded from the rest of the analysis as great improvement is not needed. A total of 4 values were missing for the remaining indicators, and it will be assumed that they represent a met threshold, since I do not have data to support the contrary.

Performance was worst overall on employment, equality, life satisfaction and social support with 23, 21, 17 and 15 countries failing to meet the threshold, respectively. Only five or six countries failed to reach the thresholds for sanitation, democratic quality, and income poverty (see Table 1).

Table 1

OECD country performance on social indicators in 2015: life satisfaction, sanitation, income poverty, social support, democratic quality, equality, and employment.

Country	Life Satisfaction	Sanitation	Income Poverty	Social Support	Democratic Quality	Equality	Employment
Australia	1.21	1.05	1.04	1.09	1.24	0.9	1
Austria	1.15	1.05	1.04	1.05	1.29	1.06	1.01
Belgium	1.1	1.05	1.05	0.98	1.2	1.14	0.92
Canada	1.24	1.05	1.04	1.06	1.32	0.98	0.97
Chile	1.01	1.04	0.95	0.88	1.11	0.54	0.98
Colombia	0.97	0.85	0.75	0.98	0.7	0.44	0.93
Costa Rica	1.09	0.99	0.93	0.96	1.17	0.51	0.91
Czech Rep.	1.03	1.04	1.05	1.02	1.2	1.15	1.03
Denmark	1.26	1.05	1.05	1.1	1.27	1.11	0.99
Estonia	0.77	1.02	1.03	1.03	1.17	0.91	0.99
Finland	1.25	1.03	1.05	1.08	1.29	1.15	0.89
France	0.96	1.04	1.05	0.99	1.09	1.01	0.86
Germany	1.14	1.05	1.05	1.04	1.22	1.02	1.04
Greece	0.77	1.04	0.98	0.89	0.94	0.89	0.41
Hungary	0.7	1.03	1.02	0.93	1.09	1.07	0.97
Ireland	1.09	0.95	1.05	1.09	1.24	1.02	0.88
Israel	1.15	1.05	1.02	0.94	0.82	0.82	1.02
Italy	0.83	1.05	1.02	1.01	1.1	0.88	0.82
Japan	0.84	1.05	1	1.04	1.21	0.95	1.08
Korea, Rep.	0.81	1.05	1.04	0.78	1	0.96	1.08
Latvia	0.84	missing	1.01	0.97	1.08	0.84	0.88
Lithuania	0.79	0.97	1.01	1.05	1.16	0.84	0.9
Mexico	0.93	0.89	0.65	0.77	0.73	0.54	1.05
Netherlands	1.21	1.03	1.05	0.97	1.28	1.09	0.97
New Zealand	1.24	missing	1	1.14	1.38	0.91	1.02
Norway	1.29	1.03	1.05	1.08	1.34	1.13	1.05
Poland	0.87	missing	missing	0.99	1.19	0.99	0.95
Portugal	0.63	1.05	1.02	0.94	1.21	0.89	0.8
Slovak Rep.	0.91	1.04	1.02	1.07	1.17	1.17	0.83
Slovenia	0.8	1.04	1.05	1	1.19	1.15	0.91
Spain	0.97	1.05	1.02	1.09	1.08	0.87	0.5
Sweden	1.21	1.05	1.04	1.05	1.28	1.13	0.96
Switzerland	1.28	1.05	1.05	1.06	1.35	1.03	1.04
Turkey	0.74	1	0.93	0.92	0.57	0.69	0.87
U.K.	1.01	1.05	1.05	1.06	1.17	0.9	1.02
U.S.	1.09	1.05	1.03	1.01	1.16	0.75	1.02
Total below threshold	17	5	6	15	5	21	23

Note. Values greater than 1 indicate that threshold is reached (green) and values less than 1 indicate that it is not.

4.1.2 Environmental boundaries

A total of 9 values were missing. Performance on environmental indicators was remarkably worse than on social indicators. All 36 countries performed out of the boundaries of ecological and material footprints (see Table 2). Only one or two countries were within the boundary for CO_2 emissions, phosphorus, and nitrogen, although data was missing for 3-4 countries for phosphorus and nitrogen. Performance was best on blue water where 31 countries were within the boundary. This indicator will therefore be excluded from the literature review. Performance was second best on land-system change with 10 countries within the boundary, plus two countries with missing data. That means that 24 countries were still overstepping this boundary.

Table 2

OECD country performance on environmental indicators in 2015: CO_2 emissions, phosphorus, nitrogen, land-system change, ecological footprint, and material footprint.

Country	CO_2 Emissions	Phos-phorus	Nitrogen	Land-System Change	Ecological Footprint	Material Footprint	Blue water
Australia	7.03	12.14	5.95	2.77	4.35	6.26	0.90
Austria	3.44	2.23	3.54	1.2	3.5	4.69	0.45
Belgium	5.42	1.07	1.7	1.15	4.08	3.45	0.64
Canada	7.9	9.17	8.99	2.25	4.67	5.12	0.66
Chile	1.46	1.07	1.36	1.96	2.46	2.51	0.73
Colombia	0.87	0.88	1.08	1.54	1.17	1.55	0.27
Costa Rica	0.99	0.55	0.79	1.16	1.5	1.18	0.44
Czech Rep.	5.6	3.69	3.64	missing	3.56	3.3	0.37
Denmark	4.44	1.12	3.71	1.18	4.25	3.57	0.44
Estonia	5.11	5.31	5.21	2.42	4.17	4.11	0.78
Finland	3.63	3.81	5.99	2.64	3.68	5.21	0.37
France	3.4	2.85	4.52	1.14	2.86	3.22	0.59
Germany	4.94	2.23	3.51	0.97	3.07	3.28	0.41
Greece	2.69	3.85	6.14	1.04	2.71	3.96	1.54
Hungary	2.11	3.37	3.29	0.9	2.06	2.13	0.32
Ireland	2.36	1.15	2.06	1.2	2.85	3.14	0.44
Israel	4.62	missing	missing	0.9	3.1	3.54	0.96
Italy	2.34	1.1	3.25	0.82	2.55	3.03	0.90
Japan	3.39	missing	missing	0.53	2.82	3.64	0.43
Korea, Rep.	2.73	3.06	1.74	0.61	3.68	4	0.50
Latvia	1.76	7.24	7.01	2.36	3.32	3.15	0.35
Lithuania	2.28	7.43	7.18	1.88	3.41	5.04	0.30
Mexico	1.88	1.95	2.14	0.83	1.65	1.48	0.76
Netherlands	4.63	1.55	1.68	1.07	3.59	3.93	0.59
New Zealand	3.77	missing	missing	2.34	3.07	3.55	0.64
Norway	4.29	3.5	6.35	2.3	3.5	5.54	0.53
Poland	3.41	3.29	3.21	1.01	2.68	3.47	0.28
Portugal	1.53	missing	2.76	1.22	2.21	2.71	1.70
Slovak Rep.	4.05	4.21	4.25	missing	2.58	5.05	0.35
Slovenia	2.88	2.05	2.05	1.75	2.8	3.41	0.45
Spain	2.25	1.67	4.87	1.01	2.25	3.39	1.35
Sweden	3.38	3.63	5.76	2.66	3.83	4.68	0.36
Switzerland	3.52	1.66	2.6	0.67	2.94	4.66	0.50
Turkey	1.38	4.38	3.65	0.76	1.96	2.3	1.11
U.K.	6.54	1.3	2.04	0.76	2.83	3.28	0.42
U.S.	10.79	5.49	7.18	1.19	5.03	4.76	1.06
Total overstepping boundary	34	30	32	24	36	36	5

Note. Values less than 1 indicate that a country operates within the respective boundary (green) and values greater than 1 indicate that it does not.

4.1.3 Findings of the statistical analysis

This part of the analysis showed that the main social shortfalls of OECD countries are in terms of life satisfaction, equality, employment, and social support. The main environmental overshoots are CO_2 emissions, nitrogen and phosphorus cycles, land-system change, environmental footprint, and material footprint. That is, all included environmental measures apart from blue water. Based on these findings, OECD countries should prioritize policy that improves these ten areas.

4.2 Literature review findings

The literature review resulted in a list of eight policy suggestions that address both social and environmental aspects that need improvement in the OECD countries, as a group. Table 3 shows the policy suggestions and their potential impact along with sources. The following sections will briefly explain each policy and how it connects to degrowth before discussing in detail how each policy can bring the OECD closer to the SJS.

Table 3

Policy suggestions and potential impact of each policy, including sources

Policy suggestion	Potential impact	Sources
Create incentives for local production and consumption	Life satisfaction, social support, employment, CO_2 emissions, land-system change and ecological footprint	(Anguelovski, 2014; Borowy, 2013; Hall, 2011; Johanisova et al., 2013; Klitgaard & Krall, 2012; Nierling, 2012)
Promote the compact city form of urban planning	life satisfaction, social support, employment, equality, CO_2 emissions, land-system change, ecological and material footprints	(Næss et al., 2019; Næss & Price, 2016; Wächter, 2013; Xue, 2014, 2021)
Create a job guarantee	life satisfaction, social support, employment, equality, CO_2 emissions, material footprint	(Alcott, 2013; Borowy & Aillon, 2017; D'Alessandro et al., 2020; Muraca, 2012; Sekulova et al., 2013)
Promote cohousing/shared living spaces (with shared chores)	life satisfaction, social support, and equality, CO_2 emissions, ecological footprint, material footprint	(Kallis et al., 2012; Lietaert, 2010)
Reduce consumption by limiting or regulating advertising, promoting changes in consumption patterns and/or taxing consumption	Life satisfaction, social support, equality, CO_2 emissions, ecological footprint, material footprint	(Alexander, 2012, 2013; Hall, 2011; Infante Amate & González de Molina, 2013; Lorek & Fuchs, 2013; Muraca, 2012; Spangenberg, 2014)
Redirect investments away from infrastructure in fast and car-based models of transport to slow-mode ones	Life satisfaction, equality, CO_2 emissions, ecological footprint, material footprint	(Borowy, 2013; Cattaneo et al., 2022)
Reduce large-scale, resource intensive production	Life satisfaction, employment, CO_2 emissions, land-system change, ecological and material footprints	(Hickel et al., 2022; Hueting, 2010; Schneider et al., 2010; Wiedmann et al., 2013)
Implement redistributive taxation schemes	Life satisfaction, equality, ecological footprint, CO_2 emissions	(Alexander, 2012; Borowy & Aillon, 2017; Fremstad & Paul, 2019; Kallis, 2011; Nicoson, 2021; Spangenberg, 2014)

4.2.1 Create incentives for local production and consumption

Re-localization is a big topic in degrowth scholarship as small, localized communities are considered the optimal political, economic, and social scale at which to implement alternatives to consumerism that are in line with degrowth (Mocca, 2020). Governments can create incentives to support the emergence of local enterprises (Alexander, 2012).

Social impact: Life satisfaction, social support, equality, and employment

Local production and consumption can increase life satisfaction and social support. When looking at handicraft production, Nierling (2012) found that the production offered people feelings of inner satisfaction and self-fulfillment and satisfied people's needs for personal affirmation through the recognition of their abilities and feeling that they are needed. People also experienced collectivity and human closeness through the mutual exchange of local production and consumption (Nierling, 2012). Participants found that their common interest in handicraft inspired community building and made them feel connected to each other. Even short encounters that were free of any obligation brought a feeling of closeness and "friendly, family-like personal feelings of cooperation" (Nierling, 2012, p. 244).

Similar effects have been found from urban agriculture which strengthened neighborhood relationships, community morale, pride and solidarity (Anguelovski, 2014; Borowy, 2013). Urban agriculture can increase life satisfaction in times of crisis, through the strengthening effect on social support (Borowy, 2013) and provide relaxation and recreation (Anguelovski, 2014). Local food production can furthermore reduce food-access inequality (Anguelovski, 2014). Additionally, increased local production can provide employment (Borowy, 2013; Johanisova et al., 2013; Klitgaard & Krall, 2012).

Environmental impact: CO_2 emissions, land-system change, and ecological footprint

Increased local production and consumption also has potential positive environmental impacts, such as reduced ecological footprint of production (Anguelovski, 2014; Hall, 2011). By reducing the need for fuel-consuming transportation it can reduce CO_2 emissions (Anguelovski, 2014; Klitgaard & Krall, 2012). Urban agriculture makes food widely available directly from or near the sites of production inside cities (Borowy, 2013). Urban agriculture can influence land-system change by reducing the pressure that agriculture places on areas surrounding cities and by improving the ecology of cities by utilizing vacant spaces for plant cultivation (Anguelovski, 2014; Borowy, 2013).

The potential of using waste as fertilizer becomes easier when agriculture is in or near urban areas, which can reduce phosphorus and nitrogen flows (Anguelovski, 2014; Cordell et al., 2009) but this would require additional policy or other support. As it is, urban gardens are hotspots for phosphorus leakage into watersheds, due to high nutrient inputs and low nutrient uptake (G. Small et al., 2019).

4.2.2 Promote the compact city form of urban planning

The idea of dense urban neighborhoods with a mix of workplaces, schools, services, and shops has received less attention from degrowth scholars than eco-villages for instance (Xue, 2021). Implementing degrowth in the urban is important because cities are hubs of economic activity and urban areas tend to be more affluent than rural (Cattaneo et al., 2022).

Social impact: life satisfaction, social support, employment, and equality

According to (Xue, 2014) the compact city form of urban planning has the potential to positively influence social support and life satisfaction, as it provides conditions that more easily create a sense of community. The dense population allows for diverse local facilities and community-based services that can create and strengthen social linkages. Walkable neighborhoods with low traffic and a variety of housing and land-use can further support this (Wächter, 2013; Xue, 2014).

The compact city can also boost employment through increased access as the dense population allows for diverse workplaces and services within neighborhoods (Xue, 2014). The diverse range of workplaces, facilities and transportation services and the walkability of neighborhoods can increase social equality through equitable access to services (Xue, 2021).

Environmental impact: CO_2 emissions, land-system change, ecological and material footprints

This policy suggestion also has potential to reduce land-system change and ecological footprint as the high density means that less land is needed for building sites, preserving agricultural land, and the natural environment around the city (Xue, 2014).

Furthermore, it can reduce CO_2 emissions and both ecological and material footprints through less energy demand and less consumption. Apartments and row-houses need less energy than single-family dwellings, due to size and energy efficiency (Næss & Price, 2016; Xue, 2014), and they have less consumption in terms of maintenance, equipment in houses, furniture and recreational equipment (Wächter, 2013; Xue, 2014). The compact city is also the most frequently suggested and adopted method to reduce transportation as it leads to shorter travel distances and therefore an increased

share of walking and cycling and lower energy consumption for transport (Næss et al., 2019; Xue, 2014).

4.2.3 Create a job guarantee

Originally proposed by Alcott (2013) as a way to decouple work from economic growth and emphasize the political right to work. The job guarantee can ensure job security and an equitable distribution of work (Sekulova et al., 2013).

Social impact: life satisfaction, social support, employment, and equality

Creating a job guarantee has the potential to positively impact all four social indicators that OECD countries need to improve. It can improve life satisfaction by removing stress related to unemployment and the fear of job loss and could enable people to quit jobs in which they are unhappy or conditions are unacceptable (Alcott, 2013). Jobs contribute to people's sense of achievement and contribution to society due to "individual and social values of producing and earning" (Alcott, 2013, p. 56) and therefore contribute to their life satisfaction. Work also "enables recognition, participation and social networks" (Muraca, 2012, p. 544), thereby contributing to both life satisfaction and social support. The impact on social support could be increased by using the job guarantee to strengthen the care and health sectors (Borowy & Aillon, 2017).

A job guarantee would respect the human right to work (United Nations, 1948) and would guarantee a just distribution of the limited resource that is paid work, thereby impacting equality (Alcott, 2013; D'Alessandro et al., 2020). We can also expect an improvement in employment (D'Alessandro et al., 2020).

Environmental impact: CO_2 emissions, material footprint

If the job guarantee would be connected to the care sector and maintenance sector, we can also expect an improvement in various environmental indicators, for instance material footprints and CO_2 emissions should decrease when maintenance is prioritized over production of new things (Alcott, 2013).

4.2.4 Promote cohousing/shared living spaces with shared chores

A policy suggestion by Lietaert (2010), cohousing describes a neighborhood with both private and shared areas that allows both a sense of community and individual privacy, with the aim of making urban life convivial and eco-friendly. This has been implemented at a small scale in many countries (Schneider et al., 2010).

Social impact: life satisfaction, social support, and equality

Shared living spaces with shared chores can increase life satisfaction by strengthening social ties (support) and increasing leisure time (Kallis et al., 2012; Lietaert, 2010). Women usually take on a larger share of housework than men so reducing the overall load of chores will reduce this gender inequality (Lietaert, 2010).

Environmental impact: CO_2 emissions, ecological and material footprints

Cohousing makes sharing easier and can change consumption behavior to more collective action rather than individual behavior. This change leads to reduced consumption and lower ecological and material footprints (Lietaert, 2010). Lietaert (2010) also noted a reduction in daily car-use, with more car-sharing and alternative transportation, which reduces CO_2 emissions.

4.2.5 Reduce consumption by limiting or regulating advertising, promoting changes in consumption patterns and/or taxing consumption

These are in fact three policies rather than one, but they share the goal of reducing consumption, which is foundational to degrowth (D'Alisa et al., 2014; Schneider et al., 2010), and therefore might be pursued together or as alternatives to one another.

Social impact: Life satisfaction, social support, and equality

If successful in reducing consumption, all three approaches can increase equality as overconsumption by the wealthy minority of humanity causes inequitable distribution of the planet's resources (Lorek & Fuchs, 2013). Taxing consumption could further increase equality if done with redistributive justice as a goal (Alexander, 2012). Limiting advertising can increase life satisfaction as advertising creates made-up needs, envy and competition that negatively impact both subjective and objective happiness (Muraca, 2012). Promoting changes in consumption behavior could potentially increase social support, if people feel connected in their attempt to reduce consumption (Alexander, 2013). This could also lead to greater life satisfaction for similar reasons as limiting advertising does.

Environmental impact: CO_2 emissions, ecological footprint, material footprint

Reduced consumption, especially of certain high-impact products such as meat (Infante Amate & González de Molina, 2013), can greatly reduce CO_2 emissions, ecological footprint, and material footprint (Alexander, 2012; Hall, 2011; Spangenberg, 2014). A shift in consumption to vegetarian diet reduces the need for phosphorus fertilizer between 20-45% (Cordell et al., 2009).

4.2.6 Redirect investments away from infrastructure in fast and car-based models of transport to slow-mode ones

Reducing car-dependence, fast transport modes and polluting infrastructure is another common topic in degrowth. Slow-mode transport leaves more space for nature and social activity and is less energy and resource intensive (Sekulova, 2014).

Social impact: Life satisfaction, equality

Shifting the focus from car-based transport to public and active transport (walking and cycling) can increase life satisfaction as increased physical activity can reduce stress and improve physical health and wellbeing (Borowy, 2013). This can also lead to more equality as these alternatives are more accessible to low-income groups and because the burdens of motorized transport, such as pollution, accidents and death, are unequally distributed (Cattaneo et al., 2022), as are the benefits of car-infrastructure. For instance, car-drivers are more commonly men while public transport users are more likely to be women (Cattaneo et al., 2022).

Environmental impact: CO_2 emissions, ecological footprint, material footprint

Car-based transport is a huge source of CO_2 emissions and other air pollution including NO_X and particulate matter (Cattaneo et al., 2022). Prioritizing individualized car-based transport requires more road infrastructure than public transport (Cattaneo et al., 2022). This shift therefore could reduce CO_2 emissions and both ecological and material footprints.

4.2.7 Reduce large-scale, resource intensive production

A reduction of production is central to degrowth (D'Alisa et al., 2014; Schneider et al., 2010). Again, this can be implemented in various ways, by taxation, bans or limits or moratoriums for instance.

Social impact: life satisfaction, employment

We might expect a reduction in production to also reduce employment. However, replacing large-scale, resource intensive production with production that does not harm the environment requires more labor and therefore environmental sustainability can go hand in hand with employment (Hueting, 2010). Hueting (2010) also showed that reducing production will lead to greater welfare.

Environmental impact: CO_2 emissions, land-system change, ecological and material footprints

Hueting (2010) presents evidence for the claim that a reduction in production is needed to reach environmental sustainability. Limiting production will reduce CO_2 emissions, land-system change, ecological and material footprints (Hickel et al., 2022; Hueting, 2010; Schneider et al., 2010; Wiedmann et al., 2013).

4.2.8 Implement redistributive taxation schemes

A demand for redistribution of wealth, power and resources between and within generations is central to degrowth (Cosme et al., 2017; Flipo & Schneider, 2008; Kallis, 2011). This policy refers to redistribution of income and wealth as a means to reduce poverty and inequality and is supported by evidence that economic inequality inherently increases with economic growth unless redistribution methods are used (Borowy & Aillon, 2017).

Social impact: life satisfaction, equality

A redistributive tax, a form of distributive justice, prioritizes wellbeing of society over private wealth (Spangenberg, 2014) and would increase equality (Alexander, 2012; Borowy & Aillon, 2017). Redistributive taxation could also provide financing for public investments that contribute to welfare, such as education and care, and in public goods such as community gardens and shared spaces, thus contributing to life satisfaction (Kallis, 2011).

Environmental impact: ecological footprint, CO_2 emissions

High incomes are a very inefficient use of resources (Alexander, 2012). People with high incomes contribute significantly more to climate change and other environmental damage than people with low and average incomes (Nicoson, 2021). Redistribution can also reduce ecological footprint and CO_2 emissions by reducing the social dynamics that drive overconsumption, such as status competition (Spangenberg, 2014).

5 Discussion

The first research question, *what are the main biophysical overshoots and social shortfalls of OECD countries and what implications should this have for policy goals,* was answered by showing that the OECD countries are operating far out of the environmental boundaries that ensure the continuation of safe and stable conditions for humanity. The only environmental indicator that was not overstepped by all or most countries was freshwater use. All 36 countries were outside the boundaries of material and ecological footprints and 83-94% of countries were outside the phosphorus, nitrogen, and CO_2 emission boundaries while 66% had overstepped land-system change. The outlook is better when it comes to social thresholds, although between 42-64% of OECD countries fail to reach the thresholds for life satisfaction, social support, employment, and equality. The OECD should prioritize policy that addresses these ten areas. According to the SJS framework, policy that is meant to achieve sustainability should simultaneously address social and environmental issues, rather than focus on one aspect only. Therefore, policy should address some of the mentioned environmental issues and simultaneously improve life satisfaction, social support, employment, and/or equality.

I answered my second research question, w*hat single degrowth policies (based on requirements from the SJS framework) can be implemented to bring OECD countries closer to social and planetary boundaries and what specific gaps do they address,* with a focused literature review. I identified eight policy proposals from degrowth literature, each of which has the potential to positively influence between four and eight of the areas that need improvement, most of them addressing six areas. These are: creating incentives for local production and consumption, promoting the compact city form of urban planning, creating a job guarantee, promoting cohousing (with shared chores), reducing consumption by limiting/regulating advertising, promote changes in consumption patterns and taxing consumption, redirecting investments away from infrastructure in fast and car-based models of transport to slow-mode ones, reducing large-scale, resource intensive production and implementing redistributive taxation schemes. By implementing these eight policies, the OECD could increase equality, life satisfaction, employment and social support while reducing CO_2 emissions, land-system change, environmental footprint, and material footprint, impacting all the social and ecological gaps except phosphorus and nitrogen cycles. None of the policies sufficiently address phosphorus and nitrogen cycles, except perhaps shifting consumption patterns, which could have an impact if diets are shifted toward less meat.

Proponents of the SJS framework and others who have applied it in research have either outright suggested degrowth measures to bring humanity into the SJS (Hickel, 2018; O'Neill et al., 2018;

Spangenberg, 2014) or suggested measures that are clearly in line with degrowth, such as transforming economies to a regenerative and distributive form (Raworth, 2017). My results further support that this is a viable approach in the case of OECD countries and add to the discussion by connecting the impact of specific degrowth policy to the planetary and social boundaries of the SJS framework. The SJS framework was intended to provide 'a compass but not a map', and to be used to inform policy for sustainability and measure progress rather than suggesting specific measures (Raworth, 2017). For these reasons I was motivated to look at the potential of degrowth policy for reaching the SJS. This research added to the 'map' by using the SJS framework both to assess success and failings of a group of countries, and to identify policy to close existing gaps.

The results from the statistical analysis fit what research has previously indicated, that high-income countries have reached a relatively high level of material wellbeing at the cost of a disproportionately high environmental impact (Hickel et al., 2022; Kartha et al., 2020). Their challenge is then to reduce their resource use while maintaining or improving wellbeing. The results of my literature review indicate that many policies suggested in degrowth literature are well suited to this challenge and can successfully move OECD countries closer to closing both their social and environmental gaps. This is further supported by the fact that the largest social shortfalls of the OECD as a group are on indicators that have little connection to resource use, employment, social support, life satisfaction and equality (Hickel, 2018). It follows that the thresholds for these indicators could be reached without increased biophysical pressure using degrowth policy such as redistributive taxation and job guarantees (Hickel, 2018). There is therefore reason to be optimistic that the degrowth policy suggestions identified in this thesis can move the OECD closer to the safe and just operating space.

My approach was to look at top-down and incremental policy changes within existing institutions, in line with problem-solving theory (Cox, 1981; Jerneck et al., 2011). Incremental policy change is at odds with the dominant view among degrowth proponents that what is needed to reach sustainability is a transformation to a radically different society own (Kallis et al., 2014) (Asara, 2015; Rickards & Howden, 2012). However, my results show that these incremental policies do have a potential to simultaneously address many of the issues that are highlighted both by the degrowth movement and the SJS framework, such as equality, climate change, resource use and life satisfaction. Furthermore, all the suggested policies address multiple areas and therefore fit the SJS recommendations for successful policy for sustainability.

The top-down approach is at odds with the local-centric perspective that is at the core of degrowth (Mocca, 2020) where the local level is seen as the most appropriate level to make fundamental changes toward degrowth and "it is taken for granted that local degrowth initiatives may achieve more in

environmental and social terms than the policies implemented by nation-states" Mocca p. 89. As Mocca (2020) points out, this local perspective is not supported by substantial arguments and has both practical and theoretical shortcomings. Mocca (2020) and others (Asara et al., 2015; Kallis, 2015) are of the view that national governments play a fundamental role in pursuing sustainability as some degrowth reforms require state action and because challenges such as climate change need to be tackled at a high level of government (Kallis, 2015). It should be noted that some of the policies identified by my analysis, such as promoting co-housing, topically fit the local perspective and require local support to be successful, although they can be implemented top-down.

The potential of solving sustainability challenges at the level of national governance has also been questioned by sustainability scientists (Jerneck et al., 2011). This is partly because of the transboundary nature of these challenges but also because of the possibility that national policy implemented to solve certain problems might simply export the problem elsewhere (Johanisova & Wolf, 2012). For instance, change in taxation or interventions in the labor market might drive corporations elsewhere. On the other hand, most regulations are currently based on national law as no form of transnational regulative institution exists and I therefore believe, despite the limitations, that identifying potential for change at this level is worthwhile.

Another addition of my research to the wider degrowth discussion is the overview of the social and ecological benefits of multiple policy suggestions. Most articles focus only on one or a few policy proposals and many articles that suggest degrowth policy make no mention of their potential benefits, other than contributing to the shift toward a degrowth society. I believe that this is a valuable area of research as it can increase support for degrowth amongst policymakers, the public and anyone interested in sustainability.

5.1 Limitations and future research

A challenge that limits the potential approaches of this research area is that there are no countries that operate within the SJS from which others could learn. This greatly limits the potential methods and data available to analyze what changes countries can make to move into this space. A similar constraint is that degrowth has not been implemented anywhere at a large scale, and therefore data on the implications of degrowth policy for sustainability is limited.

As the goal was to gain an overview of potentially useful policy, I did not take an in-depth look at each policy proposal after the literature review. It could be that they have benefits and limitations that were not covered here because they did not turn up in the literature review or did not have any implications

for the chosen indicators. Future research providing a more in-depth analysis of single policy suggestions, with case studies, would be valuable to this topic. My aim was to produce generalizable results but contextualization of the results to specific countries would be valuable to this field.

My research neglected the impact of joint implementation of multiple policies. Future research could create policy-mix scenarios and model them, such as (D'Alessandro et al., 2020) did to compare green growth, degrowth and policies for social equity. My approach did not allow for quantification of the effects so nothing can be said about how large an effect these policies will have on the indicators. That is another topic for future research.

A final aspect to consider is the environmental justice perspective. The way the data on environmental indicators used in this thesis was adjusted to the national level, by dividing environmental impact by the population of each country, assumes that each human being contributes equally to environmental damage when this is not the case. On the other hand, the per-capita approach presents a scenario where resources are equally distributed, which does not reflect reality but can be useful when considering potential for change and how we can provide a strong social foundation within biophysical limits such as was the case here.

5.2 Conclusion

The main social shortfalls of OECD countries are in terms of employment, equality, social support, and life satisfaction. The ecological boundaries of CO_2 emissions, land-system change, phosphorus, nitrogen, and material and ecological footprints were overstepped by most OECD countries. I identified eight policies proposed in degrowth literature which holistically address all these areas apart from phosphorus and nitrogen cycles.

My results inform the degrowth debate and the larger sustainability debate by supporting what has been suggested in other research that degrowth measures should be implemented in wealthy countries for them to reach the safe and just space (Hickel, 2018; O'Neill et al., 2018) and by suggesting specific policies that address the social and ecological gaps faced by the OECD. Finally, the results suggest that even incremental degrowth policy change can potentially have an impact by simultaneously addressing social and environmental challenges.

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