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IS DEVELOPMENT STILL POSSIBLE?

A STUDY ON THE RELATIONSHIP BETWEEN
ECONOMIC COMPLEXITY AND HUMAN RIGHTS

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Abstract

Economic complexity is an economic theory and measure created by Cesar Hidalgo and Ricardo Hausmann in 2009 that captures through the outputs of an economy the capabilities contained in it and determines its level of complexity with regard to other countries. There is evidence that the economic complexity of a country is positively related to its economic growth possibilities. Economic complexity guides the industrial and development policies of some countries and regions. Nevertheless, for economic complexity to be considered a sustainable development strategy with human well-being as the final goal, its relationship with other areas needs to be investigated. This monograph studies the relationship of economic complexity with human rights, with the following research questions: Is economic complexity positively correlated to human rights? If so, what are the possibilities and obstacles to countries' complexification? To answer the research questions, a multi-method approach that includes a case study of South Korea's development and a quantitative study using regression analysis of cross-country panel data on the Economic Complexity Index (ECI) and the Social Progress Index (SPI) for more than 120 countries for the period 2010-2019 were used. Lastly, a qualitative analysis was done on the challenges and opportunities developing countries can have to implement an economic complexity development strategy considering international trade, technology dominance and corporate power, as well as macro issues such as climate change, income and wealth inequality, demographic dynamics and multilateralism. The case study showed an apparent relationship between the economic development strategy adopted by South Korea and the improvement of human rights, especially education and health. The regression analysis confirmed the existence of a positive and strong correlation between economic complexity and human rights. A unit increase in ECI corresponds to a 4.6 unit increase in SPI. Lastly, the qualitative analysis showed that challenges today outnumber opportunities in number, likelihood and impact.

Keywords: Human rights, Economic complexity, Development.

Abstract

La complessità economica è una teoria e una metrica economica creata da Cesar Hidalgo e Ricardo Hausmann nel 2009 che coglie, attraverso gli output di un'economia, le capacità in essa contenute e determina il suo livello di complessità rispetto ad altri Paesi. È dimostrato che la complessità economica di un Paese è positivamente correlata alle sue possibilità di crescita economica. La complessità economica guida le politiche industriali e di sviluppo di alcuni Paesi e regioni. Tuttavia, affinché la complessità economica possa essere considerata una strategia di sviluppo sostenibile con il benessere umano come obiettivo finale, è necessario indagare la sua relazione con altre aree. Questa monografia studia la relazione tra complessità economica e diritti umani, ponendosi le seguenti domande di ricerca: La complessità economica è correlata positivamente ai diritti umani? Se sì, quali sono le possibilità e gli ostacoli alla complessificazione dei Paesi? Per rispondere alle domande di ricerca, è stato utilizzato un approccio multi metodo che include uno studio di caso sullo sviluppo della Corea del Sud e uno studio quantitativo che utilizza l'analisi di regressione di dati a pannello transnazionali sull'Indice di Complessità Economica (ECI) e sull'Indice di Progresso Sociale (SPI) per più di 120 Paesi nel periodo 2010-2019. Inoltre, è stata effettuata un'analisi qualitativa delle sfide e delle opportunità che i Paesi in via di sviluppo possono avere nell'implementare una strategia di sviluppo basata sulla complessità economica,

considerando il commercio internazionale, il dominio tecnologico e il potere delle aziende, oltre a questioni macro come il cambiamento climatico, la disuguaglianza di reddito e ricchezza, le dinamiche demografiche e il multilateralismo. Lo studio di caso ha mostrato un'apparente relazione tra la strategia di sviluppo economico adottata dalla Corea del Sud e il miglioramento della situazione dei diritti umani, soprattutto in materia di educazione e salute. La regressione ha confermato l'esistenza di una forte correlazione positiva tra complessità economica e diritti umani. Un aumento unitario dell'ECI corrisponde a un aumento di 4,6 dell'SPI. Infine, l'analisi qualitativa ha mostrato che le sfide oggi superano le opportunità per numero, probabilità e impatto.

Parole chiave: Diritti umani, Complessità economica, Sviluppo.

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List of Abbreviations

Agenda 2030	2030 Agenda for Sustainable Development
CEDAW	Convention on the Elimination of All Forms of Discrimination against Women
CRC	Convention on the Rights of the Child
CRPD	Convention on the Rights of the Persons with Disabilities
CSR	Corporate Social Responsibility
ECI	Economic Complexity Index
EKC	Environmental Kuznetz Curve
EU	European Union
FDI	Foreign direct investment
GCI	Green Complexity Index
GCP	Green complexity potential
GDP	Gross domestic product
GHA	Global hectare
GII	Gender Inequality Index
GNI	Gross national income
GNP	Gross national product
HDI	Human Development Index
HRMI	Human Rights Measurement Index
ICCPR	International Covenant on Civil and Political Rights
ICESCR	International Covenant on Economic, Social and Cultural Rights
IMF	International Monetary Fund
LDCs	Least developed countries
LGBT	Lesbian, gay, bisexual, and transgender
M&A	Mergers and acquisitions
MDG	Millenium Development Goal
MNE	Multinational Enterprise
MPI	Multidimensional Poverty Index
NGO	Non-governmental organisation
OEC	Observatory of Economic Complexity
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary least squares
PCI	Product Complexity Index
PDP	Productive development policy
PGI	Product Gini Index
PPP	Purchasing power parity
R&D	Research and development
Rep.	Republic
SDG	Sustainable Development Goal
SERF Index	Social and Economic Rights Fulfilment Index
SPI	Social Progress Index
STEM	Science, technology, engineering and mathematics

TRIPS Agreement	Agreement on Trade-Related Aspects of Intellectual Property Rights
UDHR	Universal Declaration of Human Rights
UN	United Nations
UNDP	United Nations Development Program
WTO	World Trade Organization

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Introduction

Coming from an economically developing country, the motivation behind the topic choice lies in a personal interest in topics such as poverty, inequality, economic development and their relationship with human rights. The theory of economic complexity, created in 2009 by Cesar Hidalgo and Ricardo Hausmann, captures through the outputs (products) of an economy the capabilities contained in it and determines its level of complexity with regard to other countries. Economic complexity looks at the combinations of human capabilities as drivers of innovation. Its metrics can indicate the desirability of making new products and activities or entering new sectors and industries according to their level of complexity and, combined with the principle of relatedness, it provides tools to analyse the likeliness of success in investing in different areas.

There is evidence that the economic complexity of a country is positively related to its economic growth possibilities. Indeed, some countries and regions use economic complexity theory and metrics to guide their industrial policies. Some examples are Europe's Smart Specialization Strategy, Canada's Superclusters Initiative and China's special economic zones. Since it is used as a strategy applied to countries' productive structures to achieve economic growth, it would be interesting to understand its relationship with human development and, more specifically, with the realisation of human rights and freedoms.

Thus, the monography's first research question is: is economic complexity positively correlated with human rights realisation? To answer the question, a regression analysis of the relationship between the Economic Complexity Index (ECI) and the Social Progress Index (SPI) was done, covering the period from 2010 to 2019. Moreover, the relationship between economic complexity and human rights is exemplified in the case study of South Korean economic and social development, described by many scholars and policymakers as a miracle.

Given the expected influence of the international economic and political system and relations in the development efforts of countries, a second question was posed: what are the possibilities and obstacles to countries' complexification nowadays? To answer this question, a qualitative analysis was done on the main challenges and opportunities for countries' development. This analysis includes what entails implementing an economic complexity-based industrial policy and a review of key external issues that can influence it.

The thesis is structured as follows. Chapter I is dedicated to a literature review of the economic complexity theory that goes from the basic concepts and drivers to the relationship of economic complexity with economic growth, income inequality, the environment, social

matters such as gender equality and health outcomes, and human development. Chapter II defines the framework of the thesis by discussing the difference between human development and human rights and presenting the research questions. The chapter is also dedicated to the case study of South Korean economic development, to understand the relationship between economic complexity and human rights within this particular and unprecedented example of development in contemporary history.

In Chapter III, the first research question is answered through a quantitative study on the relationship between economic complexity and human rights realisation. It contains an introductory discussion on human rights data and associated challenges, a detailed description of the data and econometric model used and the obtained results. Finally, Chapter IV is dedicated to answering the second research question. It presents what entails adopting an economic complexity strategy and the challenges and opportunities related to the international community rules and dynamics. Specifically, international trade, technology and corporate power are addressed, as well as broader questions such as climate change, inequality, poverty and demographic shifts.

Chapter I – Economic complexity from an economic theory to a development strategy

1. Economic complexity and its index

The idea of economic complexity was first introduced to the scientific community by the Chilean physicist Cesar Hidalgo and the Venezuelan economist Ricardo Hausmann in 2009. They created an improved and empirically-based version of the theories of previous economists, such as Adam Smith with his idea that economic growth was related to the division of knowledge and labour (Hidalgo, 2021), and the endogenous growth theorists who, similarly, understood economic growth as the growth of knowledge (Hidalgo & Hausmann, 2009). The economic complexity theory was also made possible by application of complex methods such as machine learning to the study of economic geography (Hidalgo, 2021).

The theory of economic complexity is rather intuitive. Basically, it is the idea that countries' productive structures are based on collective knowledge and that the more a country has diversified knowledge and combines it in multiple ways through different structures and organisations to produce technology-intensive and diverse goods, the more complex and wealthier the country is. Furthermore, it is possible to distinguish between more or less complex countries by looking at the diversity and non-ubiquity of the outcomes of their productive structures. Hidalgo and Hausmann (2009), for example, decided to look at the export basket of countries from which is possible to compare the diversity of products countries can make and the ubiquity of those products by looking at how many countries produce the same products (Hidalgo & Hausmann, 2009).

This idea is better explained with the Lego pieces analogy presented by the theory creators:

“We can create indirect measures of the capabilities available in a country by thinking of each capability as a building block or Lego piece. In this analogy, a product is equivalent to a Lego model, and a country is equivalent to a bucket of Legos. Countries will be able to make products for which they have all of the necessary capabilities, just like a child is able to produce a Lego model if the child's bucket contains all of the necessary Lego pieces. Using this analogy the question of economic complexity is equivalent to asking whether we can infer properties such as the diversity and exclusivity of the Lego pieces inside a child's bucket by looking only at the models that a group of children, each with a different bucket of Legos, can make. Here we show that this is possible if we interpret data connecting countries to the products they export as a bipartite network and assume that this network is the result of a larger, tripartite network, connecting countries to the capabilities they have and products to the capabilities they require (...). Hence, connections between countries and products signal the availability of capabilities in a country just like the creation of a model by a child

signals the availability of a specific set of Lego pieces” (Hidalgo & Hausmann, 2009, p. 10.570).

The decision to use trade data comes from the fact that it is the most detailed and extensive dataset that captures productive activities in a standardized way¹. However, there are some limitations in using trade data as a proxy for countries’ productive capacity. The first problem is that the data thus far does not include services, a sector with increasing importance in the trade balance of countries, and the second is that there are products that are produced but not exported by a country, or vice-versa. To solve part of these problems, Hidalgo and Hausmann (2014) only considered the products in which countries had a revealed comparative advantage (Hidalgo & Hausmann, 2014). Other data sources such as patents by metropolitan area or technology and total payroll by industry or city are also used to measure complexity on a smaller scale with similar results (Hidalgo, 2021).

To calculate the economic complexity of countries, the authors use the method of reflections. Economic complexity then turns out to be a very useful tool because it gives a measure of countries’ complexity and their possibilities of growth – the Economic Complexity Index (ECI). ECI is a much more accurate tool to predict growth than other metrics such as human capital, competitiveness or quality of institutions and governance, explaining about 73% of the variation in the income across countries². It shows that countries’ income levels generally change according to their level of productive knowledge. Therefore, the gap between the income level of a country and its level of complexity reflects the country’s economic growth potential³. In synthesis, economic complexity can be understood as a driver of economic growth and the ECI as a measure of it (Hidalgo & Hausmann, 2014).

According to the ECI, in 2020, the first five more complex countries were Japan, Switzerland, Taiwan, South Korea and Germany, while the less complex countries were Papua New Guinea, Nigeria, Burkina Faso and Angola (OEC, n.d.-a). The Observatory of

¹ The country-product associations use international trade data disaggregated according to three alternative data sources and classifications: (1) the Standard International Trade Classification (SITC) revision 4 at the 4-digit level; (2) the COMTRADE Harmonized System at the 4-digit level; and (3) the North American Industry Classification System (NAICS) at the 6-digit level (Hidalgo & Hausmann, 2009).

² The result controls for countries with a significant presence of natural resources as they can have a high income without being complex (Hidalgo & Hausmann, 2014).

³ ECI is not about export-oriented growth, export diversification, country size or trade openness (Hidalgo, 2021; Hidalgo & Hausmann, 2014).

⁴ Recently with the popularisation of the economic complexity theory and methodology, other scholars published articles suggesting slight modifications (Schetter, 2019) or alternatives to the model created by Hidalgo and Hausmann (Albeaik et al., 2017; Cristelli et al., 2013, 2015; Lapatinas et al., 2019; Lo Turco & Maggioni, 2020; Sciarra et al., 2020) so it could be even more precise in capturing the complexity of countries’ productive structures and also in predicting future economic growth.

Economic Complexity (OEC)⁵ also has a Product Complexity Index (PCI) that shows that, for the year 2020, the three most complex products were metal working transfer machines, developed exposed photographic material and photo lab equipment. The less complex product ranked was cocoa beans, followed by chromium ore and tin ores⁶ (OEC, n.d.-b) It is possible to see that products like machines, chemicals or electronics are at the top of the PCI, while agricultural products and those related to extractive activities are at the bottom, reflecting the intensity of knowledge needed to perform the activities that give the cited outputs. Figure 1 shows the ECI of countries ranked by the OEC in 2020:

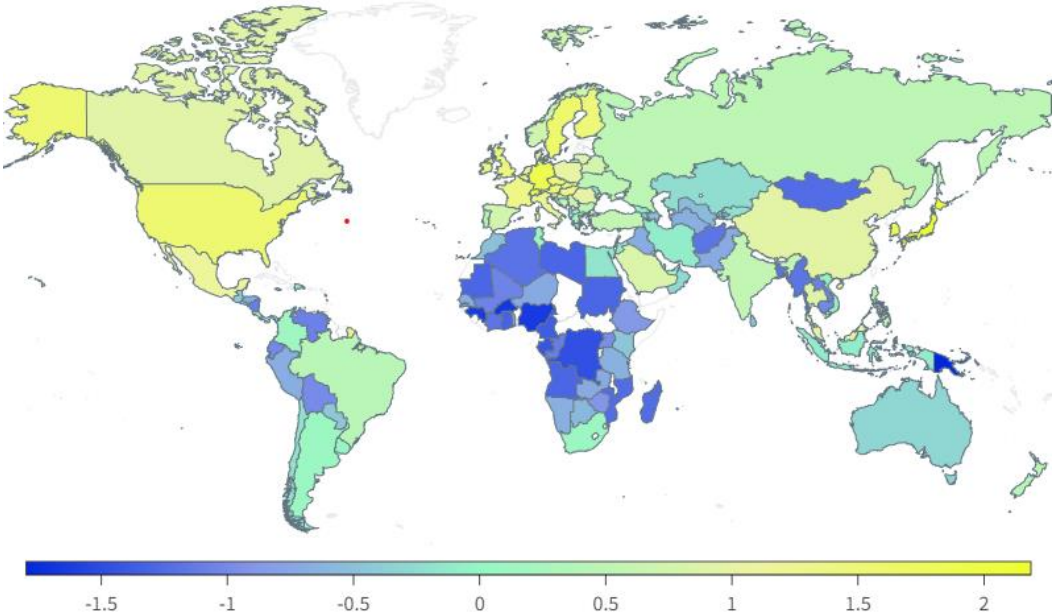


Figure 1: Economic complexity index of countries in 2020. Retrieved from OEC, n.d.-a.

The ECI is, thus, a measure that looks at the outputs of the countries’ productive structures to infer the capacities available in those countries. It does not look at the inputs that make a country more or less knowledge-intensive but is agnostic about the nature of knowledge and how it is combined and transformed into more or less diverse and complex outputs. By applying dimensionality reduction techniques, it learns directly from the data without assuming the nature of factors (Hidalgo, 2021). Yet, as it dialogues with the principle of relatedness, ECI gives a useful direction for countries to diversify and specialize, which can lead to their economic growth and development.

⁵ The OEC is a website that contains data and research pieces on economic complexity - www.oec.world.

⁶ Considering only the countries and products with available data for 2020.

2. The principle of relatedness

The principle of relatedness comes from the idea that productive or tacit knowledge, technology and skills are concentrated in space and that activities, industries and products are more or less related if they require more or less similar inputs or/and knowledge. The study of relatedness was also just recently formalized through empirical evidence. Relatedness metrics reveal path dependencies and predict a location's probability of entering or exiting an economic activity by looking at the related activities that such a location already does (Hidalgo et al., 2018).

The first scholars to measure the relatedness of products with trade data were Hidalgo et al. in 2007. They introduced the idea of the product space, which shows the probability that a country will start exporting a product depending on the number of related products it already exports (Hidalgo et al., 2007). Similarly, to determine the relatedness of industries, research areas, technologies or occupations, scholars look at the flow of labour among industries, shared labour pools, and so on (Hidalgo et al., 2018). The work of Neffke & Henning (2013), for example, indicated that firms' diversification choices are strongly associated with the skills and choices of the available human resources. This is, the possibility for a firm to diversify is dependent on skill-relatedness. To arrive at this conclusion, the authors used data on cross-industry labour flows of over 400 different industries in Sweden from 2004 to 2007 (Neffke & Henning, 2013).

Just like in the ECI, the inputs are imperfectly observed, so relatedness only allows us to see the correlation of activities without precisely knowing the nature of their relationship. Nevertheless, the principle of relatedness is strong, ubiquitous and robust as countries tend to deviate from it only in 7% of the cases (Hidalgo et al., 2018). As showcased in the review of Hidalgo (2021), the product space contains well-defined clusters (more connected products and peripheral areas (less connected products), the latter composed of less complex products (Hidalgo, 2021):

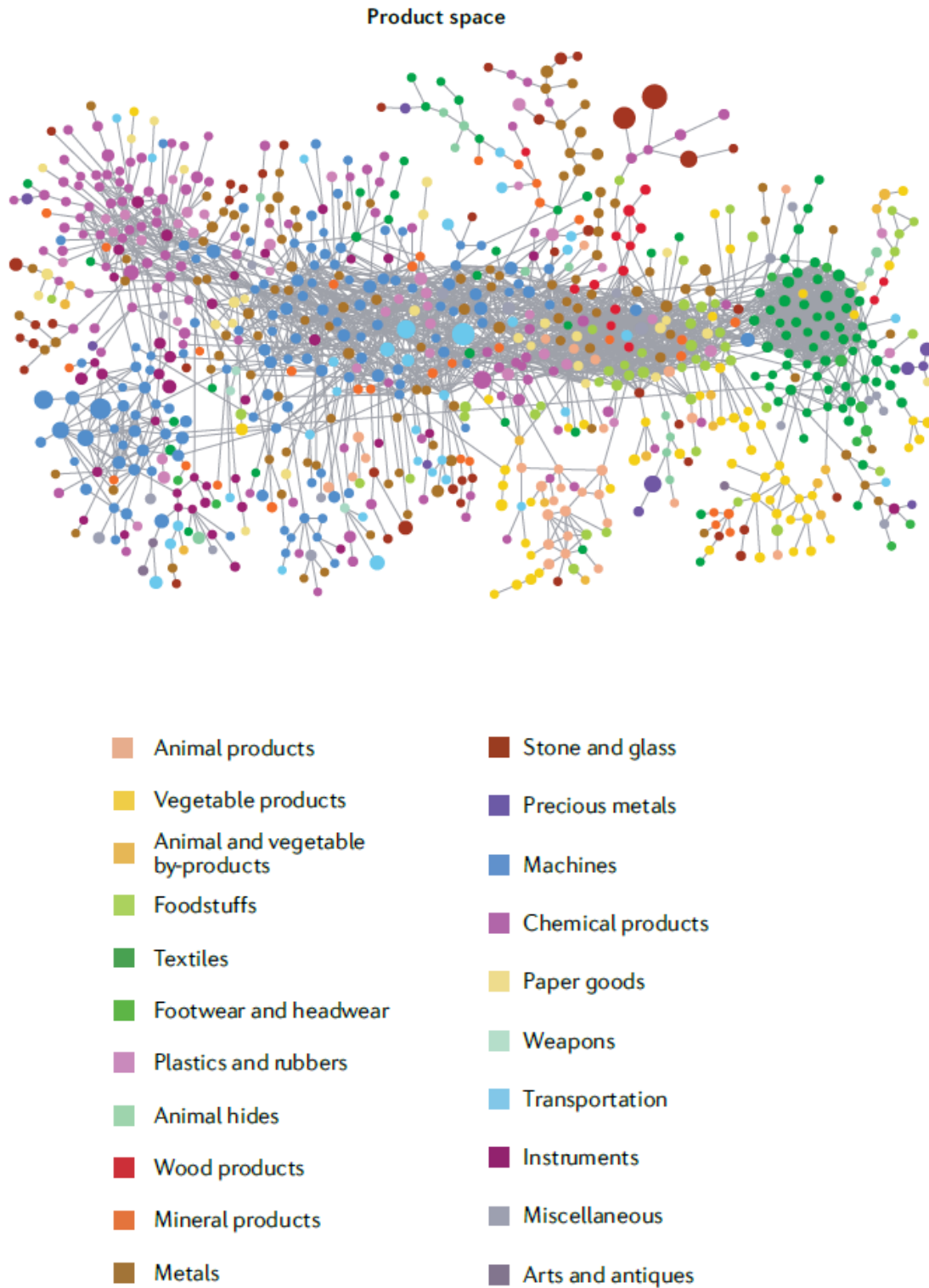


Figure 2: The product space and the categories of products with their assigned colours. Retrieved from Hidalgo (2021).

Relatedness is useful for countries not only because it identifies with fair precision how easy or difficult can it be for them to start a certain new activity in comparison to other activities, thus showing some promising pathways of industrial diversification, but also

because it shows that they need to create mechanisms of knowledge flow among industries and territories through different policies such as promoting the mobility of people or creating industrial parks. Moreover, relatedness studies go against the intuitive thought that countries should target the most related activities as they are easier to perform and state that the optimal approach is to target relatively unrelated activities during an opportunity window (Hidalgo et al., 2018).

Another “common sense” debunked by the study of relatedness is that countries need to diversify by stepping forward in their productive value chains, showing that it is actually easier for them to invest in the upstream links of their value chains⁷ as they have more knowledge of it. For example, it would be more efficient for a country that produces grains to invest in producing agricultural machines or biochemical inputs for the crops than in processing the grains (Hidalgo, 2021).

Even with the helpful information provided by the study of relatedness, it is not easy for countries to diversify and increase the complexity of their productive structures as their current level of complexity already limits their possibilities. As Hidalgo & Hausmann (2014) put it, countries face the “chicken and egg problem”. New activities require new capabilities that are not present in the country and those capabilities are not present because there is no demand for them. It adds to the fact that the more complex knowledge is, the more it concentrates in space and the more difficult it is to be diffused (Hidalgo & Hausmann, 2014).

In short, the knowledge of activities’ complexity level and possibilities of growth captured by ECI, together with the information on the relatedness of activities provided by the principle of relatedness, can usefully inform the industrial policies of countries, being a more precise than ever before guidance to specialisation and diversification that could ultimately lead to economic growth and development.

3. The drivers of economic complexity

As mentioned before, economic complexity metrics do not look at the nature of complexity. Hidalgo & Hausmann (2014) said that “(...) development is the expression of the total amount of productive knowledge that is embedded in a society. But the process by which this knowledge is accumulated has a structure that we are only now starting to understand” (Hidalgo & Hausmann, 2014, p. 48). However, with the popularisation of the economic

⁷ The upstream links of a value chain refer to the operations that are part of the manufacturing process, where the necessary basic materials for producing finished products are obtained (*Downstream Operations*, 2020).

complexity theory within the economic research field, scholars started trying to identify the drivers⁸ of economic complexity to have an even more detailed explanation of how economic complexity comes to be a reality. In the words of Lo Turco & Maggioni (2020):

“Economic complexity, indeed, may reflect the quality of local formal and informal institutions, the variety of inputs, the advances of technology, as well as a higher human capital requirement. Uncovering the elements behind the notion of complexity allows to shed light on some of the channels underlying the nexus between complexity and growth, and would favour the development of more precise insights to guide policy makers more effectively” (Lo Turco & Maggioni, 2020, p. 2).

The starting point is understanding that a complex economy's main feature is knowledge. But it refers to a particular type of knowledge that is not the symbolic knowledge learned through books but tacit knowledge, which is embedded in individuals and is, therefore, much more difficult to transfer. Moreover, individuals are not capable of accumulating large amounts of knowledge, so for a society to be collectively wiser, it needs to have several individuals specialized in specific activities, so the tacit knowledge is then distributed in coherent pieces among them. Then, to be productive, this knowledge needs to be diverse and rightfully combined through complex webs of interaction. Hence, complex economies have large networks of people that together have vast quantities of diverse relevant knowledge and that know how to combine and use it to make knowledge-intensive products (Hidalgo & Hausmann, 2014).

Considering these characteristics of knowledge and the dynamics that need to take place for economic complexity to exist, Balland et al. (2020) found out, by looking at the United States, that complex activities concentrate disproportionately in large cities and that the more complex a place is, the more urbanized it will be and vice-versa. This happens because big cities concentrate diversified human capital, institutions and organisations that create several opportunities for complex activities to happen. This finding leads to two critical considerations for policy: (1) with complexification, inequality between large cities and small cities/rural areas is likely to increase; and (2) megacities may be an important driver of development, as in the Chinese experience (Balland et al., 2020).

Naturally, the type of human capital in a location also influences its economic complexity. According to the study of Lo Turco & Maggioni (2020) on the labour content of complex products, complexity is highly intensive in STEM knowledge (Science, Technology,

⁸ The research pieces cited in the 'The drivers of economic complexity' subchapter and those cited in the following subchapters use different versions of the ECI, methods and controls to arrive at results. Such information is not mentioned throughout the text but can be consulted directly in each reference work.

Engineering and Mathematics) and in critical thinking, science and mathematics skill requirements, which means that the accumulation of this type of knowledge and skills should be encouraged in order to enhance the complexity level of industries, regions or countries (Lo Turco & Maggioni, 2020).

Looking at the demographics of complexity, Bahar et al. (2019), using a sample of 100 countries for a period of 10 years (1990-2000), showed that the birthplace diversity of the immigrant population of a country is positively correlated with its economic complexity as it contributes to the diversity of knowledge. This is the case especially for countries at intermediate levels of economic complexity and considering high-skilled immigrants (Bahar et al., 2019). Similarly, the social inclusion of LGBT strengthens innovative national capacity by fostering the accumulation of human capital skills. Moreover, the tolerance of LGBT people by a population tends to be indicative of its tolerance towards technological innovation (Vu, 2021).

In addition, Nguyen (2021) found that gender equality in employment, education, health and socio-economic and political rights is greatly beneficial to economic complexity. When looking at employment, specifically, the results demonstrate that women's participation in the industry or service sectors is positively correlated with complexity. In contrast, their employment in agriculture, self-employment or vulnerable employment are negatively correlated. To arrive at such conclusions, the author used panel data⁹ on 119 countries from 1991 to 2017 (Nguyen, 2021). Hence, according to the available research, the most inclusive society a is, the most it enables human capital development and innovation, leading to economic complexification.

The remaining and relatively recent literature on the drivers of economic complexity investigates the influence of internet usage, taxation, foreign direct investment (FDI), intellectual property rights/patents, financial development and institutional quality, among others. Not surprisingly, Lapatinas (2019) found out that internet usage is positive and statistically significant¹⁰ for complexity, suggesting that increasing access to the internet could accelerate economic sophistication (Lapatinas, 2019). Regarding taxation, Lapatinas et al.

⁹ “Panel data analysis refers to the statistical analysis of data sets consisting of multiple observations on each sampling unit. This could be generated by pooling time-series observations across a variety of cross-sectional units, including countries, firms, or randomly sampled individuals or households. This also encompasses longitudinal data analysis in which the primary focus is on individual histories” (Lavrakas, 2008). For example, in most of the works cited in the monograph, panel data is used to analyse the relationship between the changes in countries’ economic complexity in relation to changes in other aspects throughout the years or decades.

¹⁰ “Statistical significance is a determination that a relationship between two or more variables is caused by something other than chance” (Kenton, 2022, n.p.).

(2019) tried to understand what fiscal policy is better for fostering economic complexity by looking at evidence from the Organisation for Economic Co-operation and Development (OECD) countries. They found out that economies that rely less on capital taxation than labour taxation tend to be more sophisticated and that the negative correlation of capital taxes with economic complexity is stronger for high-income countries. (Lapatinas et al., 2019).

The evidence is mixed in the case of inward FDI¹¹. The study of Javorcik et al. (2018) on Turkey's manufacturing sector from 2006 to 2009 indicates that FDI may serve as a catalyst for the complexification of the economy, being the small and less sophisticated firms the ones to benefit the most from it. However, the positive technological/knowledge spill over effect only occurs when FDI is present in the downstream sectors¹² and mostly by multinationals of industrialized countries (Javorcik et al., 2018).

Differently, by broadening the study of the correlation of FDI with economic complexity to a sample of 117 countries from 1995 to 2016, Antonietti & Franco (2021) discovered that only greenfield FDI can lead to economic complexity and only for countries with certain characteristics: above-average levels of income per capita, financial development, tertiarization and an above-average level of tertiary-educated population. For other countries, only knowledge-intensive greenfield FDI relate to economic complexity. Therefore, there is no clear correlation with inward FDI in developing countries (Antonietti & Franco, 2021).

As for intellectual property rights and patents, the evidence is also mixed. A study of 52 economies done by Nguyen et al. (2020) found a positive correlation of patents with economic complexity (Nguyen et al., 2020). While Sweet & Maggio (2015), when analysing the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement), found that it positively correlated with economic complexity only for countries with an already above-average level of economic development and complexity. So for developing countries, it generally has a negative correlation or, at best, an insignificant one, thus reinforcing global productive inequality (Sweet & Maggio, 2015).

The study of Nguyen et al. (2020) also identified a short-run positive relationship between financial development and economic complexity, as an efficient financial market

¹¹ Inward FDI refers to any foreign direct investment received by a location, which can be of two types: greenfield or mergers and acquisitions. The biggest difference between the two types is that while the first implies the creation of a new business, the second refers to buying or merging with an existing company (Hintošová, 2021).

¹² "Downstream operations refer to the final processes in the production and sale of goods, where finished products are created and sold to consumers" (*Downstream Operations*, 2020, p. n.d.).

offers alternative funding possibilities for productive activities. But in the long run¹³ the relationship becomes negative because a too large financial market does not add to the sophistication or diversification of the economy (Nguyen et al., 2020).

Finally, the last cited contribution to the drivers of economic complexity is the work of Vu (2022), which approached the influence of institutional quality. With a sample of 115 countries and using the Economic Freedom of the World Index¹⁴ as a proxy of institutional quality, the author came to the conclusion that higher-quality institutions lead to higher economic complexity since well-functioning inclusive institutions would lead to human capital accumulation (better-educated population), innovative entrepreneurship and allocation of human resources in productive activities (Vu, 2022).

While it is easy to imagine that states and the institutions that compose them have a relevant impact on the productive capacity of a country, the study of the influence of institutions on economic complexity is almost inexistent and constitutes a huge gap and research opportunity within the field.

4. Economic complexity and economic growth

As briefly mentioned in the first subchapters, one of the most important contributions of the economic complexity methods is that they empirically proved a strong association between economic complexity and economic growth. Several scholars confirmed this correlation using different evidence, metrics and versions of the ECI, of which a few are briefly mentioned in this section.

Besides the basilar and already cited work of Hidalgo & Hausmann (2014), the works of Zhu & Li (2016), Stojkoski & Kocarev (2017), Gala et al. (2018) and Udeogu et al. (2021) show that economic growth is considerably related to the complexity of countries' productive structures. Of the scholars mentioned, Gala et al. (2018) were the ones to use the broadest set of countries (147) for the largest period (1979-2011). They verify that the higher the economic complexity, the higher the probability of growth and that complexity is partly explanatory of the divergence or convergence among low- and high-income countries. A focus of their work is to show how economic complexity corroborates with the structuralist

¹³ A long run/long-term effect refers to a time span of decades.

¹⁴ The Economic Freedom of the World Index created by the Heritage Foundation is composed of 28 indicators classified in five areas: size of government; legal systems and security of property rights; freedom to trade internationally; access to sound money; and regulation of credit, labour and businesses (Vu, 2022).

economic theory¹⁵, which was very strong in Latin America during the 60s, but now with the advantage of working with evidence (Gala et al., 2018).

Zhu & Li (2017) made an analysis based on 126 countries from 1995 to 2010. They investigated the correlation of economic complexity and human capital with economic growth, and the outcome was the same: complexity has a strong explanatory relation with growth. Nevertheless, they saw that human capital measured by secondary and tertiary education attainment still had a relevant role, indicating that there must be a combination of both (Zhu & Li, 2017). “Ignoring the cultivation of human capital is not conducive to the improvement of domestic production capabilities” (Zhu & Li, 2017, p. 13).

The last two studies focused on reduced sets of countries. Udeogu et al. (2021) used data from 31 OECD countries covering the period 1982-2017 to test if product complexity determines long-term economic growth, and they found that complexity indeed determines growth in the long run (Udeogu et al., 2021). Equally, when studying the relationship between growth and economic complexity in 16 countries from South-Eastern and Central Europe, Stojkoski & Kocarev (2017) arrived at a similar conclusion to other works on the topic, that economic complexity is a statistically significant explanatory variable of growth in the long run, while in the short run there is no correlation (Stojkoski & Kocarev, 2017).

This growing literature linking economic complexity with economic growth clearly indicates that for countries to develop economically, they need to create and implement strategies that include and even have as a main feature the complexification of their productive structures. This relationship, however, is not so linear and simple, and the economic development of nations is also not realized only with income growth but it has to do with the distribution of this income.

5. Economic complexity and income inequality

All the existing research on the relationship between economic complexity and income distribution or income inequality confirms that complexity strongly influences income inequality, positively or negatively. Interestingly, some of these works also show that other important factors influence this relationship and could moderate it.

¹⁵ “The structuralist view usually stresses that economic development is strongly linked to a radical transformation in the structure of production to suppress obstacles, bottlenecks and other rigidities of underdevelopment. Based on the hypothesis that the industrial structure affects both the rhythm and the direction of economic development, the structuralist literature highlights the importance of industrialisation as a process of structural change necessary to economic development” (Gala et al., 2018, p. 220).

One of the most influential studies on the relationship between economic complexity and economic inequality is the article of Hartmann et al. (2017). By using cross-country evidence (over 150 countries) from 1963 to 2008, they found that complexity negatively correlates with income inequality. This is, the more complex a country becomes, the more likely it is to decrease its level of income inequality. More specifically, one standard deviation¹⁶ in economic complexity is associated with a reduction on the Gini Index¹⁷ of 0.03 points. Another interesting contribution of this work was the development was the creation of a Product Gini Index (PGI) that associates products with levels of income inequality (Hartmann et al., 2017).

In their words, “understanding the determinants of income inequality is not simple since income inequality depends on a variety of factors, from an economy’s factor endowments, geography, institutions, and social capital, to its historical trajectories, changes in technology, and returns to capital” (Hartmann et al., 2017, p. 76). Still, the level of economic complexity of a country is not only reflective of its productive structure but also other features and dynamics, such as geographic features, human capital and institutions. Because of that, economic complexity can also partly explain income inequality (Hartmann et al., 2017).

On the other hand, Lee & Vu (2019) obtained contrary results when investigating the same relationship. Using a sample of 96 countries from 1980 to 2014, they found that economic complexity was associated with an increase in income inequality in the long term (Lee & Vu, 2020). Chu & Hoang (2020) corroborated that economic complexity is associated with higher income inequality using panel data on 88 countries from 2002 to 2017. However, they also observed that economic complexity could be associated with less income inequality if certain thresholds in education, government spending and trade openness are met (Chu & Hoang, 2020).

Other scholars also indicate that for the relationship between a country's level of economic complexity and level of income inequality to be positive or negative, there are some moderators or influencing factors to consider. For example, Fawaz & Rahnama-Moghadamm (2019), using panel data for 129 countries from 1964 to 2013, found that: (1) the average level

¹⁶ “The standard deviation is the average amount of variability in your dataset. It tells you, on average, how far each value lies from the mean. A high standard deviation means that values are generally far from the mean, while a low standard deviation indicates that values are clustered close to the mean” (Bhandari, 2022, paras 1 and 2).

¹⁷ The Gini index, or Gini coefficient, is a measure of income distribution across a population. The index ranges from 0 or 0% (perfect equality) to 1 or 100% (perfect inequality) (Hayes, 2022).

of income inequality of the top 10 trade partners influences a country's level of income inequality; and (2) trading with more economic complex countries correlates with the reduction in income inequality (Fawaz & Rahnama-Moghadamm, 2019).

Following the same line, Lee & Wang (2021) investigated if country risk could be a moderator of the relationship between economic complexity and income inequality. By employing panel data on 43 countries from 1991 to 2016, they concluded that country risk and its subdivision into areas (economy, politics, finance and others) are relevant for the complexity-inequality nexus. So economic complexity is positively associated with lower income inequality under low country risk (Lee & Wang, 2021).

In synthesis, economic complexity is a good predictor and source of economic growth, and it can also contribute to lowering the average level of income inequality of a country, taking into consideration other influencing variables. Nevertheless, there are still two types of inequalities that were not addressed so far: inequalities within and among countries, where it could be easier to see the adverse effects of relatedness due to the concentration of knowledge in some urban regions and countries.

Brazil and China serve as examples to understand the relationship between complexity and income inequality within countries. Morais et al. (2021) used panel data for the 27 regions of Brazil from 2002 to 2014. Their results showed that the relationship of economic complexity with income inequality has an inverted U-shape, so as complexity increases, income inequality also increases and decreases afterwards. This relationship, however, is mediated by each region's development level, especially considering urbanisation and gross domestic product (GDP) per capita. Thus, the regions need to reach a development threshold to feel the benefits of economic complexity in reducing income inequality (Morais et al., 2021).

Regarding China, Gao & Zhou (2018) concluded that economic complexity negatively correlates with regional income inequality when studying firm data for 70 industries in 31 provinces from 1990 to 2015 (Gao & Zhou, 2018). However, by zooming in into the intra-regional level based on export data and income survey data, Zhu et al. (2020) found that economic complexity only contributes to the reduction of regional income inequality in urban areas, deepening the urban-rural divide existent in China as there are barriers that inhibit the flow of capital and labour between cities and rural areas. The authors pointed out that the Chinese government needs to be aware of this rural-urban divide and develop strategies to make complexity beneficial to both rural and urban populations (Zhu et al., 2020).

There is a similar dynamic in the case of income inequality among countries. Within regions, only a few nations are able to complexify their economies while the others lag behind, which is the case in Europe. Through data on industries and patents from 283 regions in 32 European countries for 15 years, Pinheiro et al. (2022) saw that only the already more complex places benefit from economic complexity and are able to diversify into other (even more) complex activities. The other locations are not benefited and then focus on low-complex activities, creating a spatial inequality feedback loop (Pinheiro et al., 2022).

The greatest challenge, however, is certainly for low- and middle-income countries to catch up and become economically developed, which only a few nations have been able to do so far. Countries “stuck” in the same income level for a long time are said to be in an ‘income trap’ (Felipe et al., 2012). Latin American countries are good examples of this phenomenon. They were middle-income countries long before some Asian and European countries, but while the latter afterwards were able to become high-income countries, Latin American countries remained at the same income level (Jankowska et al., 2012).

Scholars studying the income trap see the complexification of productive structures as a way for countries to develop economically and, therefore, a crucial part of the solution to the income trap (Felipe et al., 2012; Hartmann et al., 2020; Jankowska et al., 2012). But, as seen previously, achieving this goal is not as simple as it may seem. Fortunately, the work of economic complexity scholars is increasingly providing helpful, specific and practical policy guidance. Jankowska et al. (2012), for example, said that “for small and medium-sized developing countries which are dependent on external markets for driving their productive development, PDPs¹⁸ need to be guided by the appropriate temporary incentive structures, in line with factor endowments, and be coherent with other relevant complementary policy areas” (Jankowska et al., 2012, p. 43).

Pinheiro et al. (2022), by their side, said that for complexity to take place in peripheral countries of a region such as Europe or the European Union (EU), governments and other stakeholders need to pursue complexification by upgrading existing activities and diversifying at the same time as developing less complex activities and creating new jobs in these areas so to build on existing local capabilities. This is a very challenging task that requires some prior efforts, and those could be: (1) the development of local knowledge and education infrastructure; (2) the establishment of linkages with other regions; (3) the attraction of skilled migrants; (4) the establishment of new research collaborations; (5) the

¹⁸ Productive development policies.

attraction of external firms and; (6) the improvement institutional governance (Pinheiro et al., 2022).

Finally, a very important contribution that can be used as policy guidance is the work of Hartmann et al. (2020). By comparing the experiences of countries that complexified their productive structures and became economically developed (e.g. Ireland, Singapore and South Korea) with those that got "stuck in the middle" (e.g. Brazil and South Africa), they were able to identify what was done differently between the two groups and what could be the way out for developing countries (Hartmann et al., 2020).

According to the authors, the first group had smart industrial policies that enabled them to identify and use windows of opportunities in the digital and electronic sectors and promote the acquisition of endogenous skills and access to international knowledge sources. The latter kept gravitating towards simple economic activities, did not have coherent industrial policies and suffered from social fragmentation. So countries that want to develop economically have to plan this development through industrial policies that promote economic complexity, considering the principle of relatedness and identifying these windows of opportunity to enter new industries and markets at the right time (Hartmann et al., 2020).

6. The impact of economic complexity beyond the economy

If economic complexity is to be taken as a development strategy or part of it, its impact on societal issues beyond economic growth and income inequality must be considered. Scholars recently started to study the correlation of complexity with environmental and social matters such as gender inequality, health and crime.

The most studied subject so far is the impact of economic complexity on the environment, which is not surprising when taking into consideration that the improvement of productive structures presupposes the use of more resources and energy and that climate change today is one of the biggest challenges, if not the bigger, we as a global society have to face. When looking at economic complexity and environmental protection as goals, we could assume that it is impossible to achieve both, as they seem contradictory. However, the existing studies have shown that this relationship is not so straightforward.

Romero & Gramcow (2021) demonstrated with their study, using data for 67 countries from 1976 to 2012 on greenhouse gas emissions intensity, that more complex products are associated with lower emissions and, consequently, more complex countries tend to pollute the atmosphere less (Romero & Gramkow, 2021). More specifically, "an increase of 0.1 in the economic complexity index generates a 2% decrease in next period's emissions of kilotons of

CO2 per billion dollars of output” (Romero & Gramkow, 2021, p. 1). Boleti et al. (2021) arrived at similar conclusions when studying the overall environmental performance of countries in relation to their economic complexity levels. Using the Environmental Complexity Index of 88 countries from 2002 to 2012, they saw that higher complexity leads to better environmental performance. However, it also leads to lower air quality (Boleti et al., 2021).

On the other side, according to the study by Dogan et al. (2019) that analysed the CO2 emissions of 55 countries from 1971 to 2014, economic complexity increased emissions in lower and higher middle-income countries while controlled emissions in high-income countries (Doğan et al., 2019). Similarly, Khezri et al. (2022) investigated the role of economic complexity in determining how renewable energies affect CO2 emissions using a sample of 29 countries from Asia and the Pacific from 2000 to 2018. They corroborated that economic complexity increases emissions as it increases the scale of production and the energy demand. Yet, at the same time, using solar and wind energy sources helps reduce emissions in countries of lower complexity (Khezri et al., 2022).

Thus, complexity is negative for economically developing countries and positive for the already developed ones. To be more precise, complexity is no longer harmful to the environment after a certain threshold. Neagu (2021) gave a practical example: for carbon emissions to start decreasing, France had to reach the threshold of 1.6 ECI, Italy 1.45, Finland 1.9 and Belgium 1.4. It then validates the Environmental Kuznets Curve (EKC), which is the idea that complexity growth will lead to an increase in environmental degradation and then a decrease when a high complexity level is achieved (Neagu, 2021).

So, on one side, there is the desire and right of countries to develop and on the other, the urgent need to curb emissions and preserve the environment so as not to arrive at an irreversible situation of resource crises and environmental disasters on a global scale. As with the relationship between economic complexity and income inequality, scholars believe that economic complexity can be compatible with environmental protection if moderated by institutions and policies.

Ahmad et al. (2021), for example, investigated the impact of institutional quality¹⁹ on the relationship between economic complexity and footprint²⁰ in 20 emerging economies from

¹⁹ It is an index created by the PRS Group which covers the bureaucratic quality, law & order, internal conflicts, ethnic tensions, demographic accountability, control of corruption, government stability, external conflicts, military in politics, religious tension, socio-economic conditions, and investment profile (Ahmad et al., 2021).

²⁰ The Ecological Footprint is a metric of how fast we consume resources and generate waste compared to how fast nature can absorb our waste and generate resources (*Ecological Footprint*, n.d., n.p.).

1984 to 2017, and the outcome of their work was that environmental footprint is reduced when moderated by institutional quality. Moreover, they also validated the EKC hypothesis and recommended that countries combine a solid environmental protection framework with the acceleration of the complexification process for their growth to be sustainable (Ahmad et al., 2021).

Other academics expressed their concern about the negative impact of economic complexity on the environment and proposed a series of policies for growth and development to take place ecologically and sustainably. Khezri et al. (2022) provided several specific recommendations in their work, which are: regarding energy use, for more complex countries to focus on the production of renewable energy, processes optimisation and structural changes in the industry to prevent CO₂ emissions; and for less complex countries that lack the capabilities to transition to renewable energy production and use, to direct their attention to supply and demand as well as industrial strategies to reduce emissions and innovate (Khezri et al., 2022)

In general, they also recommend that countries start using or expanding ecological technologies such as carbon capture and utilisation and implement environmental policies such as subsidies and incentives for renewable energy infrastructure, green technology investment and carbon tax. Moreover, if considering the general interest in curbing global warming as stated in the Paris Agreement, countries with the knowledge of green technologies should consider transferring it to less complex countries (Khezri et al., 2022).

Neagu (2021) made a no less significant contribution in that sense. The scholar advised companies and industrial units to integrate energy considerations in the early stages of their product design and, again, to invest in ecological technologies. Furthermore, industries should analyse their potential impact before starting any operation and design ways of mitigating any foreseeable negative impact. Regarding governments, they should have a national commitment and a realistic plan to reduce carbon emissions that incorporate both regulatory and financial measures (Neagu, 2021).

Nevertheless, shifting from current productive models to ecological ones is not simple. In the end, environmental protection is also an economic decision. In that sense, Mealy & Teytelboym (2020) observed that green products have not grown as a fraction of total trade in the last twenty years. To inform countries about their real possibilities to become complex and environmentally coherent and, therefore, provide some guidance for the creation of policies and industrial strategies toward a transition, the authors created the Green Complexity Index (GCI) and the Green Complexity Potential (GCP). The GCI gives

information on countries' current capabilities for producing ecological products, and the GCP shows countries' potential for complexification in ecological products (Mealy & Teytelboym, 2020).

As far as the research on complexity and environmental protection arrived, researchers tend to agree that both goals can be mutually achieved if efforts are made to avoid degradation during the complexification process. However, for the offer of ecological products and the investment in greener technologies to take place, the government and the private sector need to change their approach, but the demand side and public opinion also matter. According to Lapatinas et al. (2021) research, economic complexity shapes cultural values and beliefs related to environmental protection. Hence, they suggest that countries that want to implement measures to reduce degradation should be aware of cultural barriers and find the right incentives for the policies to be successful among the population (Lapatinas et al., 2021).

Now, turning the attention to the discussions on the impacts of complexity on social issues, there are, as mentioned previously, very few studies related to gender equality, health and crime. With respect to gender, scholars investigated the role of complexity on gender inequality in education and the formation of gender roles. Saâd and Ella (2019) used data from the Gender Parity Index in education and the ECI for the period 1984-2014 and concluded that economic complexity reduces gender inequalities in education, especially at the tertiary level taking into consideration the global sample (Saâd & Ella, 2019).

And Zanaj (2021) found that economic complexity is correlated with female emancipation as knowledge accumulation favours more egalitarian attitudes, while low levels of complexity are compatible with back-lashing gender roles. However, the attitudes towards gender relate only to women's position within a household. Concerning their position in the public sphere, opinions are more inclusive only in places at high levels of complexity. The study was based on the responses of 64.954 individuals from 59 different countries (Zanaj, 2021). Overall, it can be said from the existing studies that economic complexity is negatively related to gender inequality as it promotes education and the investment in human capital.

According to the research by Vu (2020), economic complexity also leads to better health outcomes since, on average, more complex countries enjoy better outcomes than less complex ones. To arrive at these results, he used panel data for 103 countries from 1970 to 2015, and the proxies for health outcomes were different mortality rates and life expectancy. Furthermore, he found that these better health outcomes were related to strengthening employment opportunities (Vu, 2020). Finally, Madni & Khan (2019) identified in their

research that economic complexity led to a decrease in violent crimes by using panel data from 34 countries from 2000 to 2014. Not coincidentally, they also observed that this positive impact on crime reduction could also be related to the increased employment opportunities (Madni & Khan, 2019).

In fact, Adam et al. (2021) analysed if economic complexity indeed led to increased employment opportunities by looking at annual data on OECD countries from 1985 to 2008 and averaged data on 70 countries from 1990 to 2010. They confirmed that complexity leads to less unemployment or more employment, contradicting the belief that technological development would induce the loss of jobs (Adam et al., 2021). In short, according to the current findings, economic complexity is related to improving health outcomes and diminishing crime, partly through creating employment opportunities for people that entail the possibility of satisfying their basic needs.

7. Economic complexity and human development

Still investigating the impacts of economic complexity besides the economy, this last subchapter is dedicated to a literature review of the relationship between complexity and human development, which is the research theme most approximated to this thesis topic, as there is no research on complexity and human rights so far. According to the United Nations Development Program (UNDP), human development goes beyond income growth and distribution because it focuses on people, their freedoms to choose and act, and the opportunities they can have (UNDP, n.d.). The most known and used measure of human development nowadays is the Human Development Index (HDI) which is composed of three dimensions: health, education and income (UNDP, n.d.-a).

Currently, there is very little research on the complexity-human development nexus, and the most extensive and influential work written so far is the doctoral thesis of Hartmann (2014). In his book, the author reflected on the insufficiency and naiveness of picking one single approach to understand development since humanity is inevitably complex and dynamic and has to be treated as such. He explained that for a society to achieve social progress, there needs to be a sustained convergence between the human development approach, which has as the final goal a free and dignified life for all human beings, with structural economic change and innovation since those approaches by themselves are not enough (Hartmann, 2014).

Through empirical research on this relationship, using a sample of 121 countries and 772 economic sectors, he was also able to conclude that complexity indeed makes a

fundamental contribution to social welfare that can be even more relevant than its contribution to economic growth. Such contribution is directly translated into providing more and new social and occupational choices; distributing economic and political power; thus, favouring democracy; and making the economic system more robust against shocks. However, complexity can also have adverse effects on human development, such as the loss of former capabilities and also the increasing costs of decision processes that could affect people's well-being (Hartmann, 2014).

Hence, there needs to be well planned and implemented strategy that combines the complexification of the economy with measures to face the possible adverse effects of this process and also measures focused on the fulfilment of immediate needs (e.g. health, food and shelter) and the creation of capabilities that enables people to be agents of change through the creation of networks and innovation that will then lead to positive, inclusive and sustainable development (Hartmann, 2014). In the author's words:

“To promote a high standard of social welfare, policy makers must find, in cooperation with the actors involved, an appropriate balance between seemingly contrary forces such as specialization and diversification, related and unrelated variety growth, regional and national policy-making or cooperation and competition. Indeed these terms are not necessarily contrary; they can, in fact, be complementary forces of development. As such, it is crucial to involve in an open and prolific manner social policy makers, civil society and sectors central to the improvement of human development (such as education, health and regional development agencies) in the industrial policy-making process, to promote mutual understanding between the different interests and needs of the different groups and promote interactive learning and innovation” (Hartmann, 2014, pp. 6–7).

Other scholars also contributed to this research line by publishing empirical studies on the complexity and human development relationship. Lapatinas (2016) studied whether economic complexity could be considered a cause of human development. Using data on 126 countries from 1965 to 2005 and 1970 to 1995 and HDI as a proxy of human development, he arrived at the result that a causal relationship cannot be established. This does not mean that complexity has no impact on human development but that their relationship evolves in dependence on other variables (e.g. institutional set-up of the economy, time, type and level of diversification) (Lapatinas, 2016).

In that sense, Le Caous and Huarng (2020; 2021) found some mediators of the relationship between complexity and human development. In their first study, the scholars analysed the mediating effect of income inequality for developing countries using data on 87 nations from 1990 to 2017. They found out that, in general, economic complexity is positively correlated to human development and this correlation is partially mediated by the reduction in income inequality (E. Le Caous & Huarng, 2020). In a more recent work, they studied the

mediation effects of logistics and international migration using data of 117 countries from 1990 to 2017. The results were also positive in this case, with logistics being a more relevant moderator as it was positive in all cases, while international migration was only significant for countries with an already high HDI (Le Caous & Huarng, 2021).

One last contribution to understanding this relationship worth mentioning is the work of Ferraz et al. (2018). The authors measured the efficiency of Asian and Latin American countries in transforming economic complexity into human development. The analysis was based on 26 countries, covering four years, from 2010 to 2014, using data on longevity, education, sanitation and employment to measure of human development. The results showed that the most complex countries, in this case, Asian countries, were the most efficient in transforming complexity into human development outcomes (Ferraz et al., 2018).

Considering the latest research, it is possible to conclude that economic complexity is an important component and driver of human development, but as with its correlation with income inequality or the environment, complexity is not inherently positive or negative. Instead, its impact depends on how it is idealized and implemented by the stakeholders and on a variety of other influencing factors known and still unknown by the scholarship. In the end, there is still a long path to better understanding the relationship of complexity with human development, even because the HDI, even if a convenient measure with extensive available data, is very limited to represent human development.

As Hartmann (2014) said, the study of this relationship opens up new possibilities to think development and can provide policymakers, the civil society and companies with new insights to foster development (Hartmann, 2014). In fact, economic complexity is already guiding industrial and development policies around the world. Some examples of this are Europe's Smart Specialization Strategy, Canada's Superclusters Initiatives and China's special economic zones. Other countries such as the United States, Italy, Mexico, Russia, Australia, Turkey, Spain and the United Kingdom used economic complexity to study their productive structures (Hidalgo, 2021). Therefore, it is crucial to understand better the effects it can have on people's agency, freedom, opportunities and well-being.

Chapter II – Economic complexity, development and human rights

8. Human development and human rights

Currently, the research on the relationship between economic complexity and social issues is limited to the literature cited in Chapter I. The themes treated so far were gender inequality, education, health outcomes, violent crimes and human development, the last being the most comprehensive. Other than that, there is a lack of studies that capture the entire scope of human development, taking into consideration, for example, the dimensions provided in the Sustainable Development Goals (SDGs) that constitute a guide internationally, at least for the current decade.

In the same way, there are no studies on the correlation between human rights respect, protection and promotion and economic complexity. A recent article introducing a special issue on economic complexity, written by some references on the theme, acknowledges the existence of this gap: “It would be interesting to explore how broader social justice issues, such as social cohesion or human rights protection, change as countries acquire more productive capabilities and become more complex. Are more complex products more sustainable in a social sense or do they require deeper forms of human cooperation that are correlated with greater social cohesion and rights?” (Balland et al., 2022, p. 6).

Therefore, this master thesis aims to contribute to filling this gap by investigating the relationship between economic complexity and human rights, parting from the premise that economic development achieved through economic complexity or any other strategy should be planned and implemented by taking into consideration human rights and the preservation of the environment and should also have as final goal human well-being in consonance with the rest of the planet.

But before investigating the relationship between economic complexity and human rights, it is necessary to distinguish human rights from human development since they are different concepts and have different implications but are, at the same time, inexorably correlated. According to the founding document of the human rights regime, the Universal Declaration of Human Rights (UDHR), all human beings are entitled to a set of 30 fundamental civil, political, economic, social and cultural rights which reflect the values of freedom, non-discrimination, respect, tolerance, justice and responsibility. Moreover, besides being universal, human rights are inalienable, indivisible, interdependent and interrelated (UN, 1948).

The human rights regime gradually came to be with the development of human rights law, comprising the two main human rights covenants – The International Covenant on Civil and Political Rights (ICCPR) and The International Covenant on Economic, Social and Cultural Rights (ICESCR) – that together with the UDHR form the so-called International Bill of Human Rights, other human right treaties and their protocols that regulate specific issues (e.g. The Convention on the Rights of the Child or The Convention Relating to the Status of Refugees), as well as resolutions, guidelines, declarations or principles that help guiding states in understanding, respecting and implementing such legal instruments (OHCHR, n.d.-a). Moreover, the regime is composed of international and regional monitoring bodies and courts that oversee member-states implementation and compliance with the agreements (OHCHR, n.d.-b).

Human development, on the other side, is an approach and an economics field of study created by the Pakistani economist Mahbub ul Haq, further popularized with the work of the Indian economist Amartya Sen and adopted by the United Nations (UN) as a guide for the organization’s work in development. This approach takes people as protagonists and beneficiaries of development and focuses on the creation of opportunities for people to enhance their capabilities and expand their freedom to choose (HDRO, 2015). According to the UNDP framework, the human development approach is composed of the following dimensions:

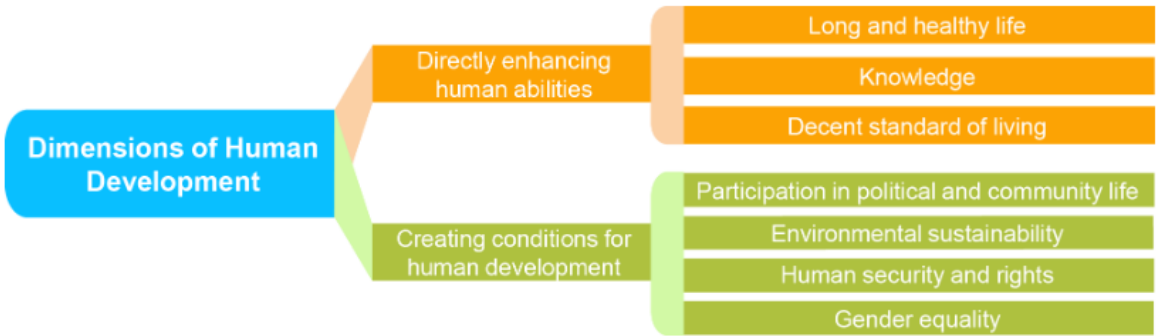


Figure 3: Diagram of the dimensions of human development. Retrieved from HDRO, 2015.

It is possible to see in the diagram that human rights are considered by the UNDP as necessary to create conditions for development, and the other elements can also be directly and indirectly paired with basic human rights such as the right to life, to health, to education, to non-discrimination, freedom of opinion and expression, right to assemble and right to democracy to cite a few.

Human development, in fact, is also formally linked to the human rights regime through the General Assembly resolution N. 41/128 of 1986 titled Declaration on the Right to Development. This document recognized as an inalienable human right to participate, contribute to and enjoy development in all its spheres so all human rights and fundamental freedoms can be realized. The protagonism given to people is in consonance with the human development approach seen before. However, the declaration also identified nation-states as the main duty-bearers for creating the conditions for development. It also pointed out that the pursuit of development must happen in full respect to other human rights and fundamental freedoms. This is, not only the realization of human rights is the goal of development, but human rights have to be respected during the development process (General Assembly resolution 41/128, 1986).

The Declaration on the Right to Development reaffirmed some principles present in the human development approach, which are self-determination, equity, freedom, inclusion and participation, adding that states have the duty to cooperate in ensuring development and eliminating the obstacles to its achievement. Finally, the declaration also mentioned the interdependence of development with peace and other human rights (General Assembly resolution 41/128, 1986).

Looking back to the creation of the international system as we know it nowadays, peace, development and human rights appear together in the UN Charter. It is stated in the preamble that the organization shall promote peace, respect for international law, human rights and social progress and better standards of living or, in other terms, human development (UN, 1945). In article 55, the organization put both development and human rights as preconditions to peace:

“With a view to the creation of conditions of stability and well-being which are necessary for peaceful and friendly relations among nations based on respect for the principle of equal rights and self-determination of peoples, the United Nations shall promote:

1. higher standards of living, full employment, and conditions of economic and social progress and development;
2. solutions of international economic, social, health, and related problems; and international cultural and educational cooperation; and
3. universal respect for, and observance of, human rights and fundamental freedoms for all without distinction as to race, sex, language, or religion” (UN, 1945, Chapter IX).

This interrelationship was reaffirmed in the statement of the UN Secretary-General in 2005, who expressed that “humanity will not enjoy development without security, will not enjoy security without development and will not enjoy either without respect for human rights” (Rashid, 2005, para. 17). In fact, the UN nowadays continues to work in these three

fronts – maintaining peace and security, protecting human rights and supporting sustainable development and climate action – plus delivering humanitarian aid and upholding international law (UN, n.d.).

It is possible to see that the organization increasingly tries to incorporate all of these areas in coordinating the international community's action to tackle global problems. The SDGs, also called the 2030 Agenda for Sustainable Development (Agenda 2030), are an example of that. They were created in succession to the Millenium Development Goals (MDGs), which in turn were a 15-year plan launched in 2000 to improve general conditions in developing countries, focusing on poverty reduction in its many dimensions (UN, 2015). The Millenium Declaration – the document that formalized the MDGs – recognized the link between human rights and development (General Assembly resolution 55/2, 2000). The eight MDGs are displayed in Figure 4.



Figure 4: The Millennium Development Goals. Retrieved from MDG Monitor, n.d.

Launched in 2015, the SDGs expanded the scope of the MDGs as they are now 17 and involve all UN Member States and stakeholders. The SDGs are, until 2030, the development strategy of the international community and they combine the main work dimensions of the UN: development, human rights protection, promotion and realization, peace, cooperation and environmental protection (UN, n.d.-b). The 17 SDGs are displayed in Figure 5.

Criticism followed the launching of the Agenda 2030. Among them, there were allegations that the goals were difficult to implement and monitor, and that some goals were inconsistent among each other or too broad and, therefore, difficult to quantify. Furthermore, the Agenda 2030 is not binding so it leaves at the discretion of the countries to decide whether to work towards its achievement or not and how to do so (Swain, 2018).

Another observation that could be made is that human rights are not explicitly mentioned in the 17 goals, not favouring the integration of these UN goals. The connection of the SDGs with human rights is, however, expressed in the preamble of the General Assembly resolution that created them, which says that the goals seek to realize the human rights of all (General Assembly resolution 70/1, 2015). Moreover, the 2030 agenda is based on human rights law and it puts human rights principles such as non-discrimination and equality at its core (OHCHR, n.d.-c).



Figure 5: The Sustainable Development Goals. Retrieved from UN, n.d.-c.

Finally, more than 90% of the SDGs can be linked to human rights, and achieving them would mean making progress in fulfilling human rights obligations (Rattray, 2019). The SDG number 1 to ‘end poverty in all its forms everywhere’, for example, is related to at least three human rights²¹:

1. Right to an adequate standard of living, codified in art. 5 of the UDHR, art. 11 of the ICESCR and art. 27 of the Convention on the Rights of the Child (CRC);
2. Right to social security, codified in art. 22 of the UDHR, art. 9 of the ICESCR, art. 26 of the CRC and art. 28 of the Convention on the Rights of Persons with Disabilities (CRPD); and

²¹ The Danish Institute for Human Rights created a human rights guide to the SDGs, linking each target within the goals to the correspondent articles contained in human rights core instruments and other sources of international law (The Danish Institute for Human Rights, n.d.). The interactive guide can be consulted at the website sdg.humanrights.dk

3. Equal rights of women in economic life, present in arts. 11, 13, 14(2)(g), 15(2) and 16(1) of the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) (OHCHR, n.d.-d).

In conclusion, human development and human rights differ from each other in two aspects: (1) human rights are much more mainstreamed, formalized and enforced since they have the status of international law, while human development is an approach adopted within the UN and, being a declaration within the human rights regime, it is not an authoritative source of international law; (2) human development focuses on outcomes or achievements, while human rights permeate more spheres of (non)action since they have to be respected, protected and promoted. This is, human rights are immediate, while human development is a goal or aspiration that requires time to be achieved. Nevertheless, both are similarly broad in scope, deeply connected as they cannot take place separately, and they have the same final goal, which is human well-being.

9. A case study on the relationship of economic complexity and human rights

As mentioned in the previous subchapter, human rights law is present in several spheres of action. Thus, it could be speculated, for example, that human rights protection and promotion either influence economic complexity through the improvement of living conditions and education that would then form a more capable and creative workforce or economic complexity influences the realisation of human rights by creating more opportunities and better economic and working conditions for people. It could also be that economic complexity and human rights mutually influence each other, and even that institutions mediate their relationship.

There is some indirectly related research on human rights' relationship with economic growth. If we consider that economic growth is largely explained by economic complexity, maybe understanding the relationship between growth and human rights could give some hints on the relationship of complexity with human rights. Cole (2017), for instance, analysed the correlation of economic growth with the respect for bodily integrity rights using data for 149 countries from 1960 to 2010. The results were that economic growth is causally before human rights conditions, and it has a positive effect on them, with low-income countries being the ones that benefit the most (Cole, 2017).

Koob et al. in 2017 analysed the inverse relationship. This is, the correlation of human rights with economic growth. Using data on 167 countries from 1981 to 2011, they found out

that freedom and participation rights positively affect economic growth in the long term, especially the rights to electoral self-determination and freedom of assembly and association (Koob et al., 2017; The Danish Institute for Human Rights, 2018).

Another study conducted by the same authors in 2018, using data on 157 from 1960 to 2012, concluded that equal access to basic education and healthcare also positively correlates with economic growth in the long term but also in the medium term (Koob et al., 2018; The Danish Institute for Human Rights, 2018). An important finding of both studies is that such positive effects are channelled through institutional and economic factors such as income equality, government effectiveness, investments and income equality (Koob et al., 2017, 2018; The Danish Institute for Human Rights, 2018).

Even if the presented studies analysed specific rights and groups of rights, a correlation between economic growth and human rights was identified, indicating the possibility of a correlation also with economic complexity. Many questions can be posed on the relationship between complexity and human rights. Due to data availability and time limitation, this thesis will focus on the influence of economic complexity on human rights realisation.

To start understanding it, I decided to look at the experience of a country that relatively recently used economic complexity strategies to develop and whether its economic development also led to the improvement of human rights conditions. The country is South Korea, officially the Republic of Korea, currently in the 5th position in the ranking of economic complexity (OEC, n.d.-a).

South Korea is a small country of 100.222 square kilometres located in the Korean peninsula in East Asia, bordered by North Korea, officially the Democratic People's Republic of Korea. It has a population of 51.582.000, almost entirely self-identified as ethnically Korean. South Korea does not have a considerable immigrant population. Most of its population lives in urban areas (81.5%). The official language is Korean, and the type of government is a unitary multiparty republic with one legislative body, the National Assembly. There is no national religion in the country but rather widely followed principles and social rules inherited from Confucianism (Bae-ho, 2022).



Figure 6: Map of the Republic of Korea. Retrieved from Encyclopædia Britannica, 2022.

This study of South Korea's development followed the country's political history timeline starting from the Japanese colonization of the peninsula that culminated in Korea's independence and official establishment, passing through the Korean War and the US military, economic and political support to South Korea during the military rule of Syngman Rhee, followed by the military governments of Park Chung-hee and Chun Doo-hwan and the return to democracy in 1988 with South Korea's first free parliamentary elections until the current days²².

9.1. From colony to independent country

When still a colony of the Japanese empire, Korea had an economy based on subsistence agriculture, with the south part of the country being geographically disadvantaged

²² The intention of this case study is not to make a comprehensive review of all the economic and political processes through which the country went through but only to understand the conditions and actions that, according to the existing literature, were the main drivers of the country's development and the improvement of human rights conditions related to them.

in comparison to the north, with only 30% of the land being cultivable (Kim, 1991). In fact, the country was not able to be self-sufficient in food (UNRISD & KOICA, 2012). The empire predatorily exploited the country for 35 years, from 1910 to 1945, but also set some basis for Korea's development later on. Some of the cultural and material legacy left by the Empire of Japan were: a small infrastructural base that was, however, almost completely destroyed in the war (Kim, 1991); some industrialization that was located mostly in the north; an efficient and development-oriented state that worked closely with private business and banks; professionalized public servers; and powerful centralized bureaucracy and national police (Seth, 2017).

Korea was liberated by the United States and the Allied Powers²³ in 1945 and became an independent country three years later. It was, however, immediately involved in a conflict of power between the United States and the Soviet Union, fostering the division of the country in two: North Korea and South Korea. The partition presented several challenges to South Korea because most industries and mining and electric power generation activities were in the north, thus remaining only with some arable land that was not enough to feed the population. Moreover, the country lost the commercial relationship with Japan and experienced the repatriation of Japanese residents, losing skilled workers (Seth, 2017).

The war with North Korea further aggravated the economic and political instability in South Korea. Widespread poverty, a worsened living standard and a deepened dependency on foreign aid were some of the outcomes of the conflict. Actually, from 1945 until the mid-60s, the country was economically dependent on the United States support (UNRISD & KOICA, 2012), with 80% of all government revenues and a significant portion of the gross national product (GNP) coming from that source (Seth, 2017). The US provided mainly food and fertilizers, as well as technical assistance for agriculture and rural development, and it was South Korea's main trade partner (UNRISD & KOICA, 2012).

From its constitution until 1960, South Korea was under the dictatorship of Syngman Rhee, a period of the country's history that could be synthesized as an in-between the colonial rule of the Empire of Japan and a development-oriented military government (UNRISD & KOICA, 2012). The country's economic strategy was import substitution industrialization (Seth, 2017) which led to economic stagnation. This time was marked by dependence on foreign assistance, economic stagnation and poverty. In 1948 South Korea was ranked as one of the world's poorest states, and it continued to be so in the 1960s (UNRISD & KOICA,

²³ The Allied Powers refer to Great Britain, France and the Soviet Union, that opposed the Axis Powers (Germany, Italy and Japan) in World War II (Encyclopaedia Britannica, 2019).

2012). It was not seen as a place to invest or as a trade partner because it did not have competitive products to export and had a corrupt government with no development plan (Seth, 2017).

Nevertheless, these turbulent years also set some basis for the country's subsequent development. One of the crucial changes implemented by the Rhee government was the land reform that put an end to a very unequal distribution of land. This policy brought stability to rural areas as 74% of the land was redistributed and small farmers could then make a profit from their harvests or establish businesses. And the previous land owners were compensated with government bonds or the possibility of building private schools on the land that would become government property, leading to the construction of several schools in rural areas (UNRISD & KOICA, 2012).

The other crucial factor was the expansion of education. Besides the incentive given to land owners to build private schools, the government also invested in this type of infrastructure in rural areas. It also invested in educating and training teachers to make such schools operative (UNRISD & KOICA, 2012). Consequently, the enrolment in primary education grew three times, in secondary education eight times and in tertiary education ten times. In 1960, 96% of children attended primary school, and there were programs for adult literacy. The same year, South Korea had the best-educated workforce for their income level (Seth, 2017).

9.2. The great economic turn

The year 1961 marked the beginning of the great turn in South Korea's economic history, and the 18-year military government of Park Chung-hee (1961-1979) was the most crucial period for the country's economic development. Park had a deep commitment to development. For such reason, in his first year of government, he created an Economic Planning Board that was a kind of "super" ministry as it not only planned the country's economic development but also had the power to allocate resources to different areas and activities. The board, with the approval and support of the president, launched five-year economic development plans starting in 1962 (Chaudhuri, 1996).

Park government's development strategy was industrialization for import substitution and export expansion. Unlike other countries, the government did not see these two practices as incompatible and adopted several strategies to make South Korean exports competitive. The devaluation of the currency, the creation of a free trade regime for exports, the provision of subsidies and the non-taxation of exporting companies' operations are examples of this

policy. The country tried to diversify its export basket by not concentrating only on products in which it had a comparative advantage but always trying to increase the complexity of the exports with the development of its industries (Chaudhuri, 1996).

It has to be noted, however, that South Korea was successful in its export strategy not only because of public policy but also due to the geopolitical dynamics of the time. The 60s to 70s were the best period for international trade and investment within the neoliberal capitalist model. Industrialized countries had growing markets, and this expansion was shared with the industrializing countries in East Asia. Moreover, the United States continued to be South Korea's biggest trade partner, and the country was under its sphere of influence during the Cold War. Due to this relationship, South Korea participated militarily and sold war-related offshore supplies to the American troops in the Vietnam War, which brought significant monetary returns (Kim, 1991).

Another very marked characteristic of South Korea's strategy was the government's strong coordination and control of the economy. Kim (1991) summarised Park's government behaviour as follows:

“(...) the Korean government's role in development can be discussed in terms of the firm and stable commitment of the political leadership to economic development and the effective exercise of power in influencing economic behavior, while maintaining flexibility in the structural adjustment process to cope with changing global markets. The “growth-first-via-industrialization” strategy adopted during the initial stage of development made good sense in a resource-poor economy with widespread poverty. The dominant courses of government action under a “hard state” rule consisted of eclectic recipes of “carrots” based on an extensive private incentive system and “sticks” based on regulation and planning by direction” (Kim, 1991, p. 52).

Industrialization in South Korea started with the defence, chemical and steel industries. The first two were seen by the government as a matter of national security during the Cold War, and the last was necessary to provide low-price supplies to manufacturing industries such as machinery and construction. Those state enterprises were essential for industrialization and economic growth because the private sector was unable and unprepared to make such large-scale investments (Kim & Sorensen, 2011).

Private companies were also included in the country's industrialisation plan, becoming the actors in implementing it. The government incentives to specific industries at a time created the so-called ‘chaebols’, big industrial conglomerates owned by families. Despite being private enterprises, their activities and performance were closely controlled by Park's administration, which also set the priorities. The non-compliance of firms could lead to disciplinary measures such as suspension of credit, recall of loans or tax audits. The

government's control of the economy went as far as nationalising the banks, controlling domestic credit, and regulating the influx of FDI, allowing it only when foreign technology was necessary and not acquirable by other means. The limits imposed on FDI protected South Korean companies from the influence of foreign interests (Chaudhuri, 1996).

The state also heavily invested in research and development (R&D). Park's government established the Korea Institute of Science and Technology in 1966 and the Ministry of Science and Technology in 1967 (Leigh, 2020). It also financed R&D in the private sector and coordinated the creation and allocation of productive knowledge in the different industries by promoting vocational and on-the-job training (UNRISD & KOICA, 2012).

With the governmental focus on industrialization and technological development for rapid economic growth, the urban-rural income disparity started to grow. The Saemaul Undong programme was launched in the 70s to redistribute wealth to the rural areas and remedy this situation. The programme was composed of policies such as rural credit, private debt cancellation, development of agriculture-related industries and land reform. In this way, Park's administration was able to improve rural infrastructure, diminish the urban-rural gap and, most importantly, greatly diminish extreme poverty, even if poverty continued to be a big problem in the country (UNRISD & KOICA, 2012).

The final balance of Park's administration on economic growth was very positive. The GNP increased 9.5% (1962-1970) and 9.6% per year (1971-79); exports grew from 2.4% to 31% of GNP; gross investment as a proportion of GNP increased from 12.8% to 35%; manufacturing grew from 13.6% to 30.6% of the GDP and absorbed 21.6% of the labour force. However, the government put social development in second place to achieve these remarkable economic results. Park's administration strictly controlled the labour force to maintain it cheap and disciplined, keeping labour unions weak and severely punishing labour unrest (Chaudhuri, 1996).

9.3. Continuing in the development path

With the assassination of Park Chung-hee in 1979, the executive power went to Chun Doo Hwan, another general and dictator who continued the economic development project started by the former president. Nevertheless, while the government type and economic goal were the same, the conditions in which Chun's administration found itself were very different. Chun started its 7-year mandate during the Second Oil Crisis that caused rampant inflation and a global trend of economic protectionism, greatly affecting South Korean exports.

Moreover, the economic structure based on big conglomerates created significant wealth inequality in the country. Given these challenges, the government had to provide new solutions to maintain economic growth (Heo et al., 2008).

Essentially, the strategy was to efficiently allocate public investment to develop industries in line with the world market dynamics, offering products in which the country could have comparative advantages while transforming an unequal and unbalanced economic development into a stable and welfare-oriented one (Kim, 1991). To do so, South Korea went through an entire economic restructuring, an inflation reduction programme and heavily invested in R&D to diversify and complexify exports.

The economic restructuring was about decreasing the economy's dependence on the chaebols and the heavy chemical industries by reducing the credit and tax incentives given to them and controlling their investments in new businesses while distributing more resources to small and medium-sized enterprises (SMEs) and liquidating unprofitable businesses through mergers and acquisitions (M&A). To control inflation and stabilize prices, Chun's administration limited government expenditure, raised interest rates and reduced credit (Heo et al., 2008).

Finally, to be able to compete in a protectionist international market, South Korea expanded its investment in research and innovation. The goal was to develop high-tech industries (Leigh, 2020). As a result, industries started to shift from labour-intensive to capital-intensive. The country then incremented its exports with high-tech goods such as computers, semiconductors and electronics while consolidating itself in the export of medium-tech goods or sophisticated manufacturing. Gradually South Korea became less dependent economically and technologically on its historic trade partners, Japan and the United States, by developing its technology, diminishing foreign borrowing and doing business with other countries in Europe and Southeast Asia (Seth, 2017).

The strategy adopted by the government worked and allowed the country to have an average growth rate of 8.7%, with the autonomy of the government and the low oil prices, interest rates and exchange rates directly contributing to such results (Heo et al., 2008). Nevertheless, like in Park's administration, growth was also achieved because of labour exploitation, especially of women (Seth, 2017) and people's freedom and civil liberties were controlled by law. Human rights were not respected, and people's well-being was not a government's priority. The only human rights instruments South Korea was part of but did not implement were the CEDAW and the International Convention on the Elimination of All Forms of Racial Discrimination (Lee, 2019).

Ultimately, the “miraculous” economic development of South Korea was mainly made during the 27 years of military dictatorships. During this time, South Korea went from a poor agrarian country in 1961 to the 12th largest trading nation in 1990. This growth was accompanied by the dramatic diminishing of absolute poverty and income inequality (Kim, 1991). Furthermore, public policy secured a mixed public and private provision of health and education that worked well in enhancing people’s access to both services to the level of most European countries at the time. Both governments were extremely successful in economically developing South Korea, and the highly educated workforce they created, organized in trade unions and workers’ organizations together with civil society and rural organizations, were the ones to fight for democracy and human rights (Seth, 2017).

9.4. The democratic South Korea

Due to increasing popular pressure, Chun guaranteed a transition to democracy after the end of his 7-year mandate that included a guarantee of human rights and freedoms and local political autonomy, besides direct popular election to presidency that would from that moment have a non-renewable 5-year mandate. In the first democratic election of the country, Roh Tae-woo, a military candidate of the governing party, won with 36.6% of the votes over the civilian candidates Kim Dae-jung and Kim Young-sam. However, the opposition was the majority in the National Assembly, undermining the legitimacy of the Roh administration and hampering the approval of its policy resolutions. In a successful attempt to gain popularity, Roh merged the two former candidates’ parties with his party (Heo et al., 2008).

In the economic field, Roh’s administration focused on enhancing social welfare through a housing policy to construct two million houses, expanding the national health care plan to include the lower quintiles and establishing a minimum wage. However, with democratization, there was a proliferation of workers’ organizations and labour unions that were not yet satisfied by the adopted measures. As a consequence of their demands, the average wage went up by 46.6% in 2 years, between 1987 and 1986. This exponential increase in wages combined with the decrease in productivity and the surge in imports led respectively to reduced international competitiveness and a trade deficit that, in turn, was translated into economic decline. In practical terms, it meant a dropping in the growth rate from 11.5% in Roh’s first year (Heo et al., 2008).

As promised by Chun, South Korea signed and acceded to some of the core human rights treaties in 1990, namely the ICCPR, the ICESCR and the CRC (OHCHR, 2022). South Korea also officially joined the United Nations and the International Labour Organization in

the following year (Heo et al., 2008). Other main treaties of the human rights regime were incorporated by the country later on, as follows: the Convention against Torture and Other Cruel Inhuman or Degrading Treatment or Punishment in 1995, the two optional protocols to the CRC in 2000 and the Convention on the Rights of Persons with Disabilities in 2007 (OHCHR, 2022).

South Korea's second elected president, and the first civilian one, Kim Young-sam, was the one to discontinue how politics were done so far. He neutralized the power and influence of the military in the government by retiring all the members of the Hanahoe, a military inner circle organization secretly created by the former dictator Chun in 1963, from the military and political positions. Moreover, it reopened the corruption case against the two previous presidents, Chun Doo-whan and Roh Tae-woo, who were respectively sentenced to life prison and seventeen years of prison. Kim Young-sam also decentralized the executive power by giving more local autonomy, further democratizing the government (Heo et al., 2008).

Nonetheless, the biggest changes made by the new president were in the economic field. Nonetheless, the most significant changes made by the new president were in the economic field. Kim's administration liberalized the foreign exchange rate, FDI and insurance, leading to an increase in the flow of foreign capital and the consequent establishment of more financial institutions (Heo et al., 2008). He decided to implement neoliberal policies also due to the intention of joining the OECD, a goal achieved in 1996. Entering the OECD was important for South Korea as it represented the country's international recognition as a democracy (Park, 2018).

However, financial institutions with foreign credit lent considerable amounts of money to chaebols without first evaluating companies' credit because of a supposed safety linked to the size of their operations and government backing, making chaebols even bigger. The foreign credit used by South Korean financial institutions was lent short-term and with high-interest rates, which was still more attractive due to the high value of the South Korean currency. This uncontrolled entry of foreign credit led to a foreign debt of 24% of the GNP by mid-1997. To make things worse, accounting practices within these companies were not transparent, and there were no clear legal procedures to deal with bankruptcies. These practices, combined with a decline in international competitiveness due to a rise in export goods prices, led to a financial crisis in 1997 (Park, 2018). As explained by Chang (2012):

“(…) many sloppy steps were taken for domestic and international financial deregulation, and no less lackadaisical corporate responses for overexpansion ultimately caused a financial runaway situation at the national level in late 1997.

The financial troubles across the South Korean economy in 1997–1998 were accompanied by corporate bankruptcies, production line reductions, layoffs, and pay-cuts, all at rampant scales (...). South Koreans confronted these unprecedented economic and social cutbacks so resolutely that the national economy was resuscitated back to its normal growth path as early as 1999. In fact, many gigantic export firms (...) came back with much stronger competitiveness and more sound financial structures. However, such corporate revitalization was not escorted by the recovery of stable employment and material life for a majority of the working- and middle-class population” (K.-S. Chang, 2012, p. 34).

With the president’s mandate ending in 1998, the next president Kim Dae-jung had to deal with the consequences of the crisis and launch policies to restore economic stability and growth. He applied for a rescue loan from the International Monetary Fund (IMF) that, in turn, demanded that the country adopt fiscal austerity measures. Kim Dae-jung’s administration (1) raised interest rates, leading to the bankruptcy of several companies and the rise in unemployment; (2) improved the institutionalization of financial transactions; (3) abolished the cap of aggregate FDI; (4) reformed chaebols through M&A; (5) enhanced the transparency of chaebols’ accounting practices; and (6) made the labour market more flexible (Heo et al., 2008).

The flexibilization of the labour market meant the legal dismissal of workers, many of whom were not subsequently reinserted into the labour market and of those who were, many on non-regular employment. Non-regular employment included contractual workers of limited duration, casual workers on a daily or seasonal basis, and part-time and home-based workers, mostly in service and agriculture, receiving half of a minimum wage and no further benefits. This employment category became very popular after the crisis when most workers were part of it, a major setback to the labour rights won by the South Korean people in 1987 (K.-S. Chang, 2012).

The measures taken by Kim Dae-jung’s administration to get out of the crisis were criticised by the UN Committee on Economic, Social and Cultural Rights, especially the large-scale worker’s dismissals and the subsequent deterioration in employment stability and the growth of income inequality and marginalisation (K.-S. Chang, 2012). In August 2001, almost four years after receiving the loan from the IMF, South Korea repaid it and was no longer under the organisation’s supervision (Park, 2018).

After the crisis, chaebols indeed improved their performance because they stopped relying on low-value-added export products to shift their focus to knowledge and technology-intensive ones, such as mobile phones, applications and semiconductors. The government also continued to invest in know-how acquisition by creating innovation centres in partnership

with the chaebols in highly populated places. These centres, which by 2010 were 105, brought together in one area universities, research facilities, industry R&D and production infrastructure. In addition, throughout the years, the governments also created and maintained techno-parks and programmes to strengthen the competitiveness of national industrial clusters (Leigh, 2020).

The following government of Roh Moo-hyun had to deal with the social and economic results of the neoliberal measures adopted by Kim's administration. Roh did not lose sight of the economic development goal while focusing on social welfare as poverty grew by 12%. He increased social welfare expenditures while producing growth, even if it diminished compared to the previous periods (Park, 2018). The subsequent governments in South Korea were all able to maintain growth at significant rates, thus demonstrating their ability to promote economic development just like the authoritarian South Korean state did, but with improved social welfare (K.-S. Chang, 2012).

This relatively stable growth was also possible because of the government's continued investment in innovation combined with an important growth in private companies' investment through tax incentives and foreign technology imports. In 2019, the private sector accounted for almost 80% of the country's R&D spending. New capital- and knowledge-intensive multinational enterprises (MNEs) started to emerge in 2010 in fields like artificial intelligence, cybersecurity and biotechnology with the financial support and technological infrastructure provided by the government (Leigh, 2020). In the words of Leigh (2020) "The South Korean government's systematic approach has been the crucial factor in creating an innovative economy adept at turning ideas from laboratories into products and industries" (Leigh, 2020, n.p.).

9.5. Economy and human rights in today's South Korea

Nowadays, South Korea is an economically developed country, with a GDP per capita that had a relatively linear increase going from 158 US\$ in 1961 to 34.757 US\$ in 2021. The higher rates of GDP annual growth were achieved, however, between the 60s and 80s, with a peak of 14.9% in 1973. Expectedly, South Korea's lowest point in terms of economic growth was in 1998, a year after the financial crisis, with -5.1%. Currently, the GDP annual growth is 4% (World Bank, n.d.-a). The level of income inequality in South Korea slightly decreased from 31.7 in 2006 to 31.4 in 2016, the same Gini coefficient as Japan, Italy and Australia (OECD, n.d.).

The government also continues to invest heavily in R&D. In 2022, it allocated 4.5% of the country's GDP to these activities, staying only behind Israel with 4.8% (IRI, 2022). Unemployment is also low in South Korea, with the fifth lower rate among OECD countries in 2020, at 3.94% (OECD, n.d.-b), and the poverty headcount ratio at \$1.90 a day in the last decade remained lower than 0.2%, except from 2010 (0.5%) due to the consequences of the global financial crisis of 2008 (World Bank, n.d.-a). South Korea is also at a very high position in the HDI, 23rd out of 189 countries and territories in 2019, with an increase of more than 25% from 1990. The increase in the score from 0.732 to 0.916 is explained by an increase of 3.3 years in mean years of schooling and 11.4 in life expectancy at birth in the same period, besides economic growth. When inequality is considered, the HDI for 2019 decreases to 0.815, still very high (UNDP, 2020).

In 2020, the life expectancy at birth in South Korea was 83 years, 28 years more than in 1960. The high and still growing life expectancy combined with a low and decreasing fertility rate leaves the country with a negative population growth rate. The ageing population will soon become a challenge for the country in terms of social security and economic productivity, a typical problem in developed nations (World Bank, n.d.-a).

In the same year, the average years of schooling in South Korea were 12.5, among the highest in the world, with males studying one year more than females (Yoon, 2021). The most recent data on the gross enrolment rate in all levels of education are close to or superior to 100%, with discrepancies by sex of 20% only in tertiary education (UNESCO Institute for Statistics, 2022). Not only do virtually all citizens have access to education, but the country is ranked among the best in the OECD Programme for International Student Assessment (PISA), a test that measures students' performance in mathematics, reading and science knowledge and skills (OECD, n.d.-a).

In addition to this, almost 100% of people in the country have access to clean and treated drinkable water, sanitation, clean fuel, electricity (World Bank, n.d.-a) and internet access (OECD, n.d.-a) both in urban and rural areas (World Bank, n.d.-a). According to the Institute for Health Metrics and Evaluation, the Universal Health Coverage Index in South Korea was 89.2 out of 100 in 2019, 29.5 more than in 1990 (IHME, 2022). The neonatal and under-five mortality rates are very low, respectively 1 and 3 per 1.000 live births in 2020 (UNICEF, n.d.), and the maternal mortality ratio was also low with 11 deaths per 100.000 live births in 2017 (WHO, 2019). Wide access to good quality health and education services turns into high productivity, with South Korea scoring 0.8 out of 1 in the Human Capital Index in the last decade (World Bank, n.d.-a).

Nevertheless, the country does not have indicators as good when it comes to gender equality. It scores 0.064 on the Gender Inequality Index (GII), being at the 11th position out of 162. The GII is measured by the disadvantages of women in the labour market, reproductive health and empowerment. South Korea does not have a higher score mostly due to political and labour market participation disparities. In 2019, for example, 52.9% of women participated in the labour market with respect to 73.1% of men, and only 16.7% had a seat in the National Assembly (UNDP, 2020). Similarly, the Women Business and the Law Index Score measures the effect of laws and regulations on women's economic opportunities through the average on mobility, pay, workplace, marriage, parenthood, entrepreneurship, assets and pension indexes. On a scale from 1 to 100, South Korea scored 85 in 2021, a significant improvement from 1970, when it scored 38.1 (World Bank, n.d.-a).

Concerning human rights, a positive remark is that all reservations made to human rights treaties during the signing or accession were later withdrawn by the country (Lee, 2019). Nevertheless, South Korea still did not accede to some core treaties and protocols. Those are the Convention for the Protection of All Persons from Enforced Disappearance and its Art. 32 on interstate communication procedure, the International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families, the Optional Protocol of the Convention against Torture, and the Second Optional Protocol to the International Covenant on Civil and Political Rights aiming to the abolition of the death penalty (OHCHR, 2022).

As well as the decision not to join the mentioned treaties, South Korea, contrary to the recommendations of human rights committees, maintains compulsory military service and the death penalty (Lee, 2019), which could be seen as deliberate decisions due to its tense relationship and negative peace with North Korea. However, the country is considered abolitionist in practice because it did not apply the law since 1997. Currently, 61 people are sentenced to death, the last in 2018 (PGA, 2022).

Notwithstanding, South Korea has made progress in enforcing human rights through the judicial sphere in the last decade. Courts have expanded the invocation of international human rights law to protect minorities and disadvantaged people, and lower courts have referred more often to international treaties instead of considering only the national legislation, especially the ICCPR (Lee, 2019). Other than that, the last evaluation of South Korea's efforts to achieve the SDGs was very positive. The country currently is at the 27th position out of 163 with a score of 77.90 out of 100, with improvements in almost all indicators besides environmental protection indicators (J. Sachs et al., 2022).

As reported by Human Rights Watch, one of the leading non-governmental organisations (NGOs) that fight for human rights, South Korea largely respects most political, civil, economic and social rights. Still, it has problems with discrimination against women, LGBT people, and racial and ethnic minorities. Moreover, the government imposed some measures to contain the COVID-19 pandemic that could be questioned in terms of privacy rights and freedom of expression, assembly and association (Human Rights Watch, 2020). Additionally, Amnesty International reported in 2021 that gender-based violence and discrimination against transgender people continued to be a problem in the country and that government measures to tackle climate change were not ambitious enough (Amnesty International, 2021).

South Korea was one of the poorest countries in the world less than 70 years ago. Today, it has achieved remarkable economic and human rights results that outperform many other developed countries. Health and education access and quality are examples of it. It still has many challenges to overcome regarding human rights and environmental protection, but these problems are shared by many nations that have developed and matured much sooner.

9.6. Analysis of the South Korean development model

Scholars give different explanations for South Korea's rapid and successful economic development, identifying external and internal factors that may have influenced it. Some of the influencing factors or causes already cited or identified in the previous session of the case study are:

- 1) The expansion of the world markets between the 50s and 70s (Kim, 1991; Seth, 2017), especially the American one due to the countries' close relationship, and South Korea's participation in the Vietnam War (Seth, 2017);
- 2) The exorbitant amount of aid received from the United States, specifically 12.6 billion US\$ from 1946 to 1976 (Seth, 2017). According to Kim (1991), while it certainly helped build infrastructure later used for development purposes, most of the aid was in the form of food and consumables that in the 50s actually deterred self-sustained agricultural development (Kim, 1991);
- 3) An efficient, technocrat state with centralised bureaucracy and national police inspired by the Japanese colonial administration, and the later economic relationship with Japan that was relocating industrial production to countries with lower costs (Seth, 2017);

- 4) The prolonged political stability brought by powerful authoritarian regimes (Kim, 1991; Seth, 2017). Those regimes were influenced by the Japanese colonial rule, the United States military and the rivalry with North Korea (Seth, 2017).
- 5) A well-educated population formed during the government of Syngman Rhee that became a very productive workforce (Kim, 1991).

Other factors not detailed previously that, according to scholars, were also important in the country's development are the homogeneity of South Korean society, the lack of natural resources and the Confucianist values that influence individual behaviour. South Korea is ethnically, linguistically and culturally homogeneous, and there are no strong social discrimination or class structures. These demographic characteristics facilitated the implementation of development plans (Kim, 1991). Moreover, besides being primarily negative for a nation, the lack of natural resources forced the government to plan and make economic decisions that a nation with abundant resources could more easily postpone (Kuznets, 1988).

Finally, the Confucian heritage shaped South Korean society's values in a way instrumental to its development. Such values are “the intrinsic value placed on education as a vehicle for self-gratification; extolment of diligence and self-discipline; respect for social order, hierarchy, and authorities; and absence of religious or ideological dogmatism inhibiting the pragmatic pursuit of ends” (Kim, 1991, p. 34). However, Confucianist values seem to have been less determinant in other aspects of South Korea's development. For example, according to the Confucian hierarchy, businessmen should have a lower social status and less prestige than farmers, scholars or government officials. However, the entrepreneurial class soon became influential during South Korea's development process (Kim, 1991).

Beyond these external historical factors or the ones specific to the South Korean society that more or less influenced the development process of the Republic of Korea, it is agreed by scholars that the main causes or drivers of development were the strategy and concrete actions adopted by the governments of Park Chung-hee and Chun Doo-hwan from the 60s to the end of the 80s. In general lines, the country's development had as main features:

- a) State's central role in setting macroeconomic policies and innovative strategies which consisted in industrialization both for the substitution of imports and the expansion of exports;

- b) Coordination and financing of the private sector by the state to accelerate the development of key industries;
- c) Flexibility and pragmatism of the government in adapting and changing its approach when needed to achieve economic growth;
- d) Heavy investment in human capital, innovation and technology;
- e) Development of other sectors contemporaneously to industrialization that brought equilibrium between regions and societal groups; and
- f) A relationship of support and control of the private sector activities by the state that influenced but did not replace private market decisions.

The characteristics of South Korea's development match many of the ideas of the economic complexity theory presented in the Chapter I. A clear example is South Korea's planned investment in education and the transformation of it into productive knowledge through creating public jobs to absorb human capital and training on-the-job within industries. Another one is the public investment in R&D to bring innovations and technology to the industries and become less dependent on foreign technology.

The creation of an industrial policy that went from essential national industries, such as steel and chemicals, to the creation of more complex ones through the financing of private companies, who then became the main actors in implementing industrialization while not setting aside other sectors essential to give the country economic and social stability, such as agriculture, is also aligned with economic complexity.

Another feature that is in consonance with the complexity theory is the complexification and diversification of products that took place gradually in South Korea and parallelly to technological, industrial and human capital development. The government became less dependent on foreign markets by substituting imports while enhancing its presence in these markets by offering a broader selection of low complexity products with a comparative advantage and high complexity ones. In addition, it identified and took advantage of an opportunity window to become an exporter of highly complex goods.

It is possible to conclude that, in a time when the theory did not exist, South Korea implemented a development strategy based on economic complexity. The country adopted and successfully carried out an industrial policy in partnership with the private sector, making South Korea less dependent on other nations while enhancing the country's presence in global markets by offering a vast range of low to highly complex products, the fruit of heavy public investment in industries, technology and human capital to produce innovations and stand out.

The economic complexity of South Korea greatly increased since the 60s. However, just like the economic complexity theory, the data available on it is very recent. At the beginning of this century, the ECI value of South Korea was 0.58 and it ranked 32nd in the world. In 2019, it had increased to 1.85 and the country was the 5th most complex in the world, as indicated in the chart (Figure 7):

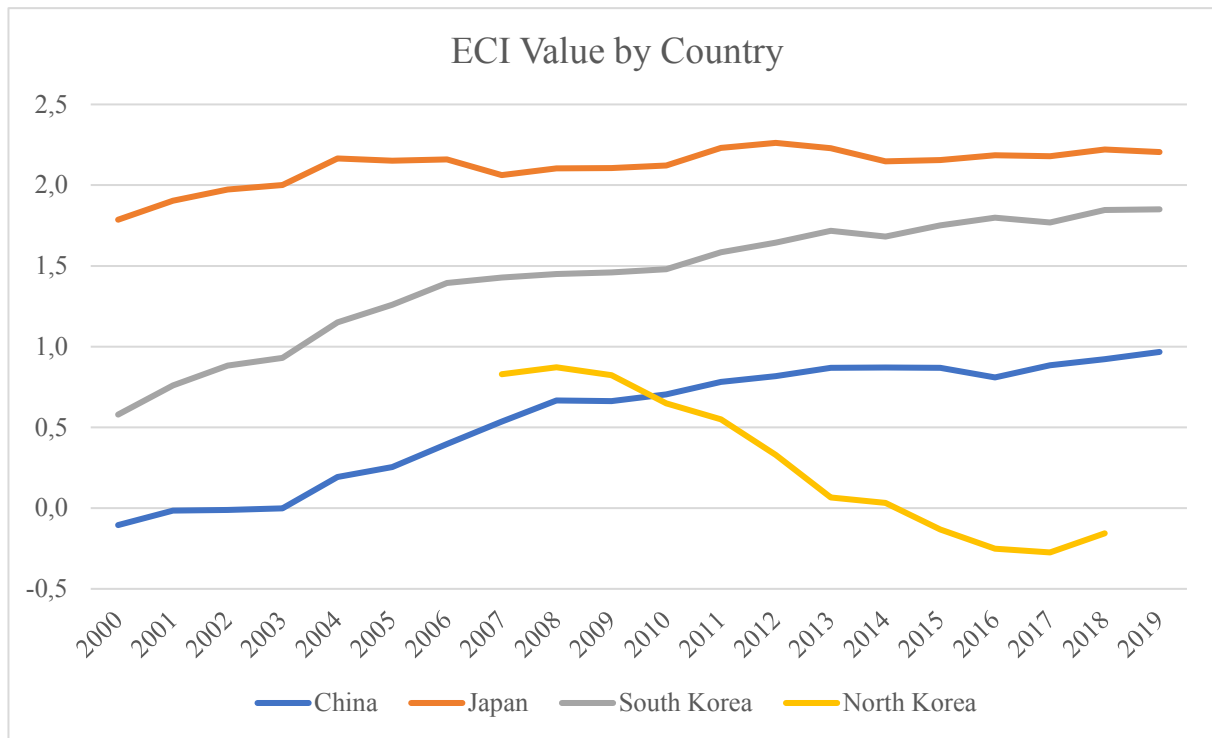


Figure 7: Economic Complexity Index (ECI) of South Korea and neighbouring countries, 2000-2019. Data sourced from OEC, n.d.-c.

As already mentioned, the impressive economic development that South Korea went through in these 27 years also had negative parts and unpredicted consequences. Economic development took place at the expense of social development. Indeed, citizens' purchasing power and access to health and education have increased during this time. However, when looking more broadly, there was no comprehensive protection of human rights, and many were violated, especially political freedoms, workers' and women's rights.

Gender inequality is one of the enduring social costs of South Korea's development trajectory. Public policies such as family planning that targeted women to increase the labour supply and control population growth failed to enhance women's position in public and private spheres. Another trade-off of the country's economic development was environmental degradation. The governments failed to implement existing environmental policies due to

their focus on generating economic growth. Both issues started to be properly addressed only after the 90s (Seth, 2017).

Therefore, in the South Korean experience, human rights and social welfare as state policies only came after economic development with the country's democratisation. The change of political regime into a democracy, as happened in South Korea, is foreseen in the thesis of Hartmann (2014) on economic complexity and human development. According to this economic complexity scholar, a planned production diversification in unrelated industries has the effect of distributing the power within a country in the long term, leading to more democratic regimes (Hartmann, 2014).

The economic policies and the greater emphasis given to social welfare by democratic governments, however, brought instability and slowed down economic growth. Unlike South Korea's dictators, democratically elected presidents appointed political allies to government posts instead of technocrats. Moreover, the presidency was limited to a single 5-year term, which can have led to short-sighted policies. Lastly, the increase of taxes to invest in social welfare led to an exodus of capital, increasing unemployment and aggravating wealth inequality among classes (Heo et al., 2008).

As put by Heo et al. (2008), "(...) the transition to democracy does not result in immediate economic growth. Instead, democratization requires consolidation, which involves institutionalization of the political and economic systems. In the process, previously dispersed interest groups as well as organized groups begin to aggregate and articulate their interest, which sometimes creates political instability" (Heo et al., 2008, p. 23).

This does not mean that democratic regimes or social welfare policies are incompatible with economic growth. As seen before, democratic governments in South Korea have been successful in maintaining a high level of economic growth, apart from specific episodes such as the 1997 and 2008 financial crises. Furthermore, there are several social democracies among the most complex and economically development countries in the world today.

According to Hartmann (2014), there needs to be a balance between pursuing social welfare and economic development since both approaches complement each other. In his words:

"Whereas economic growth does not automatically trickle down to the poor, neither is an emphasis on human capabilities alone enough to create the economic demand for such capabilities. The establishment of higher value added sectors, providing more and better jobs for the poor, needs both economic policies to create the institutional framework and subsidies required to trigger learning processes as well as human development policies

which are needed for a better educated, healthy and creative labour force” (Hartmann, 2014, p. 3).

This is, to achieve a development that is beneficial to human beings in an equitable and sustainable way, a government needs to invest in both economic complexification and social policies (Hartmann, 2014). In conclusion, many specific historical conditions allowed South Korea’s development to happen as it did. Moreover, it is not to be taken as a role model of development as it happened at the expense of human rights and the environment, which is unacceptable in today’s world. Nevertheless, it can teach other countries about the importance of investment in human capital and innovation, the complementing roles the state and private sector can have in the economy and that a carefully planned industrial policy can yield positive outcomes.

10. Research questions

It was possible to see from the study case that South Korea’s development took place first and human rights were legally guaranteed later, even if living conditions had already improved during that 27 years and some rights such as education were guaranteed. The fact is since the 60s, both economic complexity and human rights have significantly improved, even if maybe not simultaneously, and it can be inferred that while some economic development policies adopted by the government were the basis of some social problems in South Korea, this process mostly was beneficial to human rights.

Looking at the development process that South Korea went through and the apparent connected improvement of the human rights situation in the country, it would be interesting to know if economic complexity can improve or help improving the human rights situation of countries and, if yes, what are the conditions that could favour or difficult countries economic development through economic complexity. In a more direct sense, is economic complexity positively correlated to the realisation of human rights? If so, what are the possibilities and obstacles to countries’ complexification nowadays?

A multi-method study is done to try to answer these questions. The first part of it – Chapter III – is a quantitative analysis on the relationship between economic complexity and human rights, while the second part is a qualitative analysis of the current main challenges and opportunities for countries’ development identified by development, economic complexity and human rights scholars, in Chapter IV.

Chapter III – A quantitative analysis of economic complexity and human rights

11. Human rights data

To answer the first research question, ‘is economic complexity positively correlated to the realisation of human rights?’, a quantitative study will be conducted applying regression analysis, typically used in the economic field, to data on human rights and economic complexity. Quantitative analysis is still not common in the human rights field due to its nature, but the use and demand for quantitative data are certainly increasing as it turns the analysis more tangible. Therefore, before explaining the methodology and presenting and interpreting the study results, it is helpful to understand the relationship of human rights with quantitative data and what indicators can be used.

Just as there is a difference between human rights and human development, there is also a difference in the indicators collected in both fields of study. As Fukuda-Parr (2001) explained, these areas overlap but have different priorities. Human development monitoring focuses on outcomes as it is concerned with human well-being. Differently, human rights monitoring has a broader scope of indicators that, besides outcomes, also include social arrangements and the conduct of duty bearers related to them as it is concerned with securing human rights. Thus, to measure progress on human rights, duty bearers and their accountabilities need to be appropriately identified, and a criterion of performance needs to be defined in order to be able to assess their fulfilment of obligations (Fukuda-Parr, 2001).

More specifically, human development monitoring includes multi-dimensional human outcomes, participation and empowerment, and progress at the national level but also the equity and deprivation levels (Fukuda-Parr, 2001). Human rights add some new elements to data collection and use, such as structural and process indicators. Structural indicators measure actors’ acceptance, intent or commitment to human rights standards, while process indicators measure the efforts to fulfil human rights obligations (OHCHR, 2012).

Moreover, according to the Office of the High-Commissioner for Human Rights, a human rights-based approach to data should include the participation of the relevant population, data disaggregation that allow comparisons and the identification of disadvantaged groups, self-identification of the population of interest, transparency, privacy and accountability (OHCHR, 2018). This year, the UN defended the importance of properly collecting, sectioning and analysing human rights data so marginalised people can benefit from development opportunities and improving living conditions (OHCHR, 2022b).

However, much of the quantitative data that ideally should be collected is very difficult or even impossible to observe, especially regarding human rights violations. Countries, organisations and researchers then recur to working with the alleged violations that are not representative of the real number of violations but usually undercount them (Brook et al., 2020; H. Moore, 2016). To worsen the situation, only a few countries collect data in a useful way to conduct human rights monitoring and analysis, and even fewer follow the framework recommended and provided by international human rights organisations.

In 2017, the Danish Institute for Human Rights analysed countries' real capacity to collect SDG indicators. From a total of 230 indicators, only 83 are conceptually clear, have an established methodology and standards available and data is regularly produced by countries, while the other 147 indicators are not produced or available. However, even when considering only the 83 more easily collected indicators, many countries do not collect them as well. For example, in Denmark, a country with one of the highest statistical capacities, only 77 indicators are available. According to them, it will take time for data to become available in areas of critical importance for human rights if it ever does (The Danish Institute for Human Rights, 2017).

According to Brook et al. (2020), countries may not even be interested in producing human rights data:

“The first question many people ask when confronted with the limited range of global human rights data sources is often, “Why does the United Nations not produce those data?” or, “Why do governments not produce human rights data on themselves in the same way they produce economic data?” These are good questions. Sadly, however, we do not live in a world in which governments can be fully trusted to produce accurate, honest, and transparent data on their human rights practices. When we consider that human rights data are a way of holding governments accountable for violations of their international legal obligations, their hesitance is unsurprising. As it stands, most governments attempt to conceal their rights violations and often outright challenge accounts that point out the violations in which government agents have engaged” (Brook et al., 2020, pp. 2–3).

The UN and its agencies are the main providers of human rights data. However, most of it are document repositories where it is possible to obtain information on human rights law and the official conduct or position of states with regard to it (OHCHR, n.d.-d). Other than that, human rights quantitative data is dispersed on different data sets that address specific themes such as women's rights, political freedoms and poverty. One of the most used datasets is the CIRI Human Rights Project Data, created by academics on the United States, with annual data on human rights violations in 202 countries starting from 1981 and stopping in 2011 (Becker, 2020).

Besides these difficulties in accessing quality, complete, comprehensive in scope and time quantitative data on human rights respect, protection and fulfilment, some initiatives from scholars and organisations try to fill this gap. These are the Social and Economic Rights Fulfilment Index (SERF Index), the Human Rights Measurement Initiative (HRMI) and the Social Progress Index (SPI), which have in common the intention of capturing more rights in their dataset and indexes as well as giving special attention to economic and social rights that are the least measured in the field.

As its name indicates, the first one is centred on social and economic rights, specifically the right to food, shelter, healthcare, education, decent work, social security and protection against discrimination. The index measures the level of human rights fulfilment they have achieved relative to what is feasible in their per capita income levels. Therefore, it is possible to understand how well countries perform within their income limitations. Outcome indicators are assessed through time to see the country's progression and cross-country comparisons. It also provides a methodology to analyse disparities between regions and population subgroups to identify the most disadvantaged (Webb, 2016).

The Human Rights Measurement Initiative is a global collaborative project aiming to generate the best cross-country data on the 30 basic human rights. Currently, it covers 5 economic and social rights and 8 civil and political rights. It also uses the same approach as the previously mentioned index because it sets an achievement possibility frontier based on the best-observed practice for each per capita income to measure countries' performance in relation to their real possibilities (Brook et al., 2020).

Finally, the SPI combines 53 social and environmental outcome indicators to measure countries' capacity to enhance and sustain people's life quality and create conditions for them to reach their full potential. The index is based on tiered scoring levels in different areas relevant to human well-being besides economics, and it provides data from 2011 for 168 countries. The SPI is divided into three interrelated dimensions:

- 1) Basic human needs: Nutrition and basic medical care; water and sanitation; shelter; and personal safety.
- 2) Foundations of well-being: Access to basic knowledge; access to information and communications; health and wellness; and environmental quality.
- 3) Opportunity: Personal rights; personal freedom and choice; inclusiveness; and access to advanced education. (Stern et al., 2021).

The main differences among the three indexes are that the first one has a focus on social, economic and cultural rights, while the second and third ones include civil and political rights; the HRMI use conduct and outcome indicators, while the SERF Index and the SPI include only outcome indicators; and the SPI is the one that contains more elements in its analysis among the three. Ultimately, the described datasets are an improvement toward data-driven human rights research. Nevertheless, due to the use of publicly available data, none can completely fulfil the criteria for a human rights-based approach to data.

12. Data and methods

12.1. Data

The two chosen data sources to estimate the relationship between economic complexity and human rights realisation are the ECI²⁴ and the SPI. As seen previously, complexity can be calculated for locations – ECI – (e.g. countries, regions, cities) and activities – PCI – (products, industries, research areas), which are correlated. This is, a location is more or less complex depending on the activities that take place there, but the complexity of activities also depends on how enabling the environment is. The ECI can be summarized as the average of the PCI of the activities present in a location (OECD, n.d.-b).

The SPI was chosen among the available datasets cited in the previous subchapter due to its broader coverage of topics. This index combines data produced by large international institutions and NGOs as well as data collected through global surveys (Stern et al., 2021). The indicators comprised in the SPI are presented in Table 1.

Basic Human Needs	Foundations of Well-Being	Opportunity
Deaths from infectious diseases (deaths/100.000)	Women with no schooling (proportion of females)	Access to justice (0=non-existent; 1=observed)
Child mortality rate (deaths/1000 live births)	Equal access to quality education (0=unequal; 4=equal)	Freedom of expression (0=no freedom; 1=full freedom)
Child stunting (0=low risk; 100=high risk)	Primary school enrolment (% of children)	Freedom of religion (0=no freedom; 4=full freedom)
Maternal mortality rate (deaths/100.000 live births)	Secondary school attainment (% of population aged 25+)	Political rights (0 and lower=no rights; 40=full rights)
Undernourishment (% of population)	Gender parity in secondary attainment (distance from parity)	Property rights for women (0=no rights; 5= full rights)
Access to improved sanitation (proportion of population)	Access to online governance (0=low; 1=high)	Satisfied demand for contraception (% of satisfied demand)
Access to improved water source	Internet users (% of population)	Perception of corruption (0=high)

²⁴ The data and methodology used to calculate the ECI and the index limitations are addressed in Chapter I.

(proportion of population)		corruption; 100=low corruption)
Unsafe water, sanitation and hygiene attributable deaths (deaths/100.000)	Media censorship (0=frequent; 4=rare)	Early marriage (% of married women aged 15-19)
Household air pollution attributable deaths (deaths/100.000)	Mobile telephone subscriptions (subscriptions/100 people)	Young people not in education, employment or training (% of youth)
Dissatisfaction with housing affordability (0=low; 1=high)	Life expectancy at 60 (years)	Vulnerable employment (% of total employment)
Access to electricity (% of population)	Premature deaths from non-communicable diseases	Equality of political power by gender (0=unequal power; 4=equal power)
Usage of clean fuels and technology for cooking (% of population)	Equal access to quality healthcare (0=unequal; 4=equal)	Equality of political power by social group (0=unequal power; 4=equal power)
Deaths from interpersonal violence (deaths/100.000)	Access to essential health services (0=none; 100=full coverage)	Equality of political power by socioeconomic position (0=unequal power; 4=equal power)
Transportation related fatalities (deaths/100.000)	Outdoor air pollution attributable deaths (deaths/100,000)	Discrimination and violence against minorities (0=low; 10=high)
Perceived criminality (1=low; 5=high)	Deaths from lead exposure (deaths/100,000)	Acceptance of people identified as LGBT+ (0=low; 1=high)
Political killings and torture (0=low freedom; 1=high freedom)	Particulate matter pollution (mean annual exposure, $\mu\text{g}/\text{m}^3$)	Citable documents (documents/1000 people)
	Species protection (0=low; 100=high)	Academic freedom (0=low; 1=high)
		Women with advanced education (proportion of females)
		Expected years of tertiary schooling (years)
		Quality weighted universities (points)

Table 1: SPI indicators divided by dimension. Data sourced from The Social Progress Imperative, 2022.

These outcome indicators can be paired with all 17 SDGs. Within the first dimension of the SPI ‘basic human needs’, the indicators of nutrition and basic medical care are related to SDG 2 ‘zero hunger’ and SDG 3 ‘good health and well-being’. The indicators on water and sanitation are related to SDGs 6 and 12, respectively ‘clean water and sanitation’ and ‘responsible consumption and production’. The indicators regarding shelter are connected with SDGs 3, SDG 7 ‘affordable and clean energy’ and SDG 11 ‘sustainable cities and communities’. Finally, the indicators on personal safety are linked again to SDG 3 and also to SDG 16 ‘peace, justice and strong institutions’ (The Social Progress Imperative, n.d.).

Within the second dimension of the SPI ‘foundations of well-being’, the indicators on access to basic knowledge are related to SDG 4 ‘quality education’, and the ones on access to information and communications are aligned to SDG 9 ‘industry, innovation and infrastructure’, SDG 16 and SDG 17 ‘partnerships for the goals. The indicators on health and wellness are related to SDG3, and the indicators on environmental quality are linked to SDG 9, SDG 12, SDG 13 ‘climate action’, SDG 14 ‘life under water’ and SDG 15 ‘life on land’ (The Social Progress Imperative, n.d.).

The indicators within ‘opportunity’, the third dimension of the SPI, are also aligned with SDGs. Indicators of personal rights are related to SDG 1 ‘no poverty’, SDG 5 ‘gender equality’ and SDG 16. Those on personal freedom and choice are linked to SDG 3, SDG 3, SDG 8 ‘decent work and economic growth’, SDG 10 ‘reduced inequalities’ and SDG 16. The indicators of inclusiveness, instead, are related to SDG 5, SDG 10, SDG 11 and SDG 12. At last, SPI indicators on access to advanced education are linked to SDGs 4 and 9 (The Social Progress Imperative, n.d.).

Just like the SPI and its indicators are related to the SDGs, they are also related to human rights. The three dimensions of the SPI cover, at least partly, 20 rights and freedoms²⁵ provided for in the UDHR²⁶. These are:

- Art. 1 on the freedom and equality of rights to all human beings;
- Art. 2 on the entitlement of every human being to all human rights without discrimination of any kind;
- Art. 3 on the right to life, liberty and security of person;
- Art. 5 on the prohibition of torture or cruel, inhuman or degrading treatment or punishment;
- Art. 6 on the right to recognition as a person before the law;
- Art. 7 on the right to equality before the law and protection of the law;
- Art. 8 on the right to an effective remedy by national tribunals;
- Art. 9 on the prohibition of arbitrary arrest, detention or exile;

²⁵ The rights and freedoms of civil and political nature not explicitly present on the SPI indicators are all comprised within the indicator ‘political rights’. More specifically, this indicator uses data from the report ‘Freedom in the World’ produced by the international NGO Freedom House. This annual report provides information and scores on countries’ electoral processes, political pluralism and participation, functioning of government, freedom of expression and belief, associational and organisational rights, the rule of law, and personal autonomy and individual rights (Freedom House, n.d.).

²⁶ The pairing of SPI components and indicators with the UDHR instead of other human rights is because, besides being less specific and complete than the ICCPR and ICSECR, it constitutes the core, most accepted and disseminated instrument of human rights law.

- Art. 10 on the right to a fair trial;
- Art. 11 on the right to be presumed innocent;
- Art. 13 on the right to freedom of movement;
- Art. 16 on the right to marry and have a family;
- Art. 17 on the right to own property;
- Art. 18 on the freedom of thought and religion;
- Art. 19 on the freedom of opinion and expression;
- Art. 20 on the right to assemble;
- Art. 21 on the right to take part in the government and access public service;
- Art. 23 on the right to work;
- Art. 25 on the right to an adequate standard of living; and
- Art. 26 on the right to education (General Assembly resolution 217, 1948).

Moreover, the SPI is particularly concerned with equality, especially gender equality, women's reproductive and property rights, the environmental impact on human lives and environmental protection, making it a more comprehensive dataset compared to the others currently available and the most adequate to measure the progress on human rights realisation across countries.

A limitation of the SPI acknowledged by the Social Progress Imperative is the incompleteness of the index as it lacks data, for example, on violence against women and environmental degradation; and the impossibility of capturing complex issues with current indicators, such as equality of political power by gender. The SPI is updated and refined annually to accommodate more recent data and expand the geographical coverage and scope of dimensions captured within the idea of social progress (Stern et al., 2021).

Moreover, the focus of the SPI on outcome indicators constitutes a limitation for this study in covering, for example, the protection and promotion of human rights. Due to the difficulties mentioned previously, this incompleteness or partialness in data production is verified in the human rights field. There is no quantitative dataset covering the respect, protection and realisation of human rights or at least one of these dimensions for all human rights. In the same way, at the time, no dataset completely fulfils the criteria of being human rights-driven. Finally, the timespan for which data is available, from 2011 to 2021, allows the analysis to capture the relationship between ECI and SPI only for one decade.

For the quantitative study, 119 countries were selected based on the data available in both ECI and SPI for 2010 to 2019 and 2011 to 2019, respectively. The countries were then

divided into income groups based on the gross national income (GNI) per capita value in 2021 to obtain more meaningful results. Low-income countries are those with an annual GNI per capita of 1.085 US\$ or less, while lower-middle income countries have between 1.086 and 4.255 US\$, higher-middle-income have between 4.256 and 13.205 US\$, and finally, high-income countries are those with 13.205 US\$ or more annual GNI per capita. The countries included in the study are presented in Table 2²⁷:

High-Income	Upper-Middle-Income	Lower-Middle-Income	Low-Income
Australia	Albania	Algeria	Ethiopia
Austria	Argentina	Angola	Guinea
Belgium	Azerbaijan	Bangladesh	Madagascar
Canada	Belarus	Bolivia	Mali
Chile	Bosnia and Herzegovina	Cambodia	Mozambique
Croatia	Botswana	Cameroon	Uganda
Czech Republic	Brazil	Congo, Rep.	Yemen, Rep.
Denmark	Bulgaria	Cote d'Ivoire	
Estonia	China	Egypt, Arab Rep.	
Finland	Colombia	El Salvador	
France	Costa Rica	Ghana	
Germany	Dominican Republic	Honduras	
Greece	Ecuador	India	
Hungary	Gabon	Indonesia	
Ireland	Georgia	Iran, Islamic Rep.	
Israel	Guatemala	Kenya	
Italy	Jamaica	Kyrgyz Republic	
Japan	Jordan	Lao PDR	
Korea, Rep.	Kazakhstan	Mauritania	
Kuwait	Lebanon	Mongolia	
Latvia	Libya	Morocco	
Lithuania	Malaysia	Nicaragua	
Netherlands	Mauritius	Nigeria	
New Zealand	Mexico	Pakistan	
Norway	Moldova	Philippines	
Oman	Namibia	Senegal	
Poland	North Macedonia	Sri Lanka	
Portugal	Panama	Tajikistan	
Qatar	Paraguay	Tanzania	
Saudi Arabia	Peru	Tunisia	
Singapore	Romania	Ukraine	
Slovak Republic	Russian Federation	Uzbekistan	
Slovenia	Serbia	Vietnam	
Spain	South Africa	Zambia	
Sweden	Thailand	Zimbabwe	
Switzerland	Turkey		

²⁷ The greater difficulty of producing quality data in low-income countries limits their representativeness in the quantitative analysis.

United Arab Emirates	Turkmenistan		
United Kingdom			
United States			
Uruguay			

Table 2: Countries by level of income. Data sourced from UN DESA, 2022.

The mean ECI and SPI values of the contemplated 119 countries, respectively for 11 and 10-year periods show that both indexes improved throughout the years for the whole sample. Objectively, Figure 8 shows that ECI worldwide decreased from 2010 to 2014 to then exponentially increase until 2019.

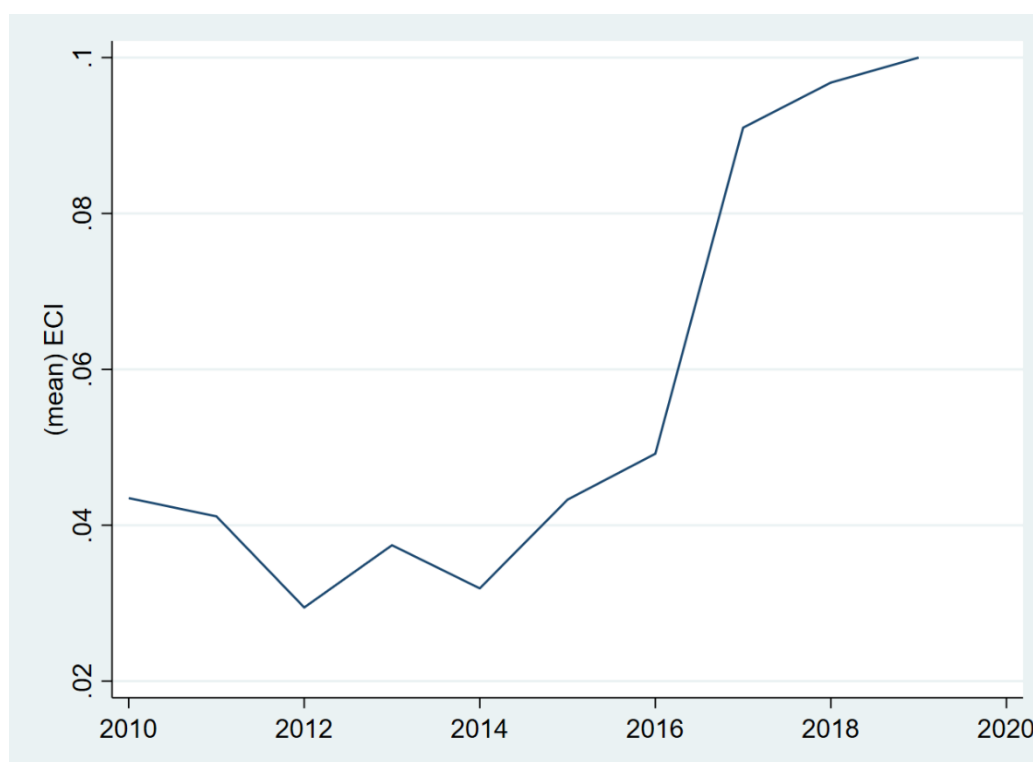


Figure 8: Mean value of the ECI for a sample of 119 countries (2010-2019). Data sourced from OEC, n.d.-a.

Differently, Figure 9 shows a more linear and discrete advancement of the SPI from 2011 to 2019. When the SPI values are divided into its three dimensions – basic human needs, foundations of well-being and opportunity – it is possible to see that the first dimension is more advanced worldwide, followed by the second and the third. However, as presented in Figure 10, the second dimension was the one that improved the most among all in the analysed period.

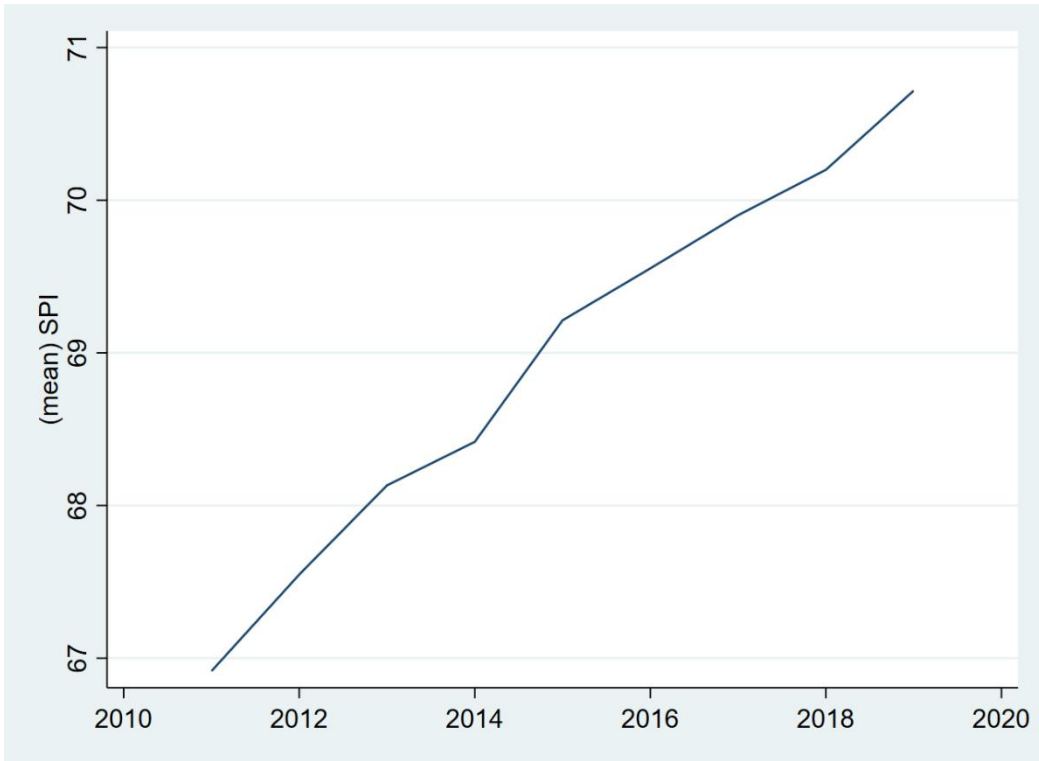


Figure 10: Mean value of the SPI for a sample of 119 countries (2011-2019). Data sourced from *The Social Progress Imperative*, 2022.

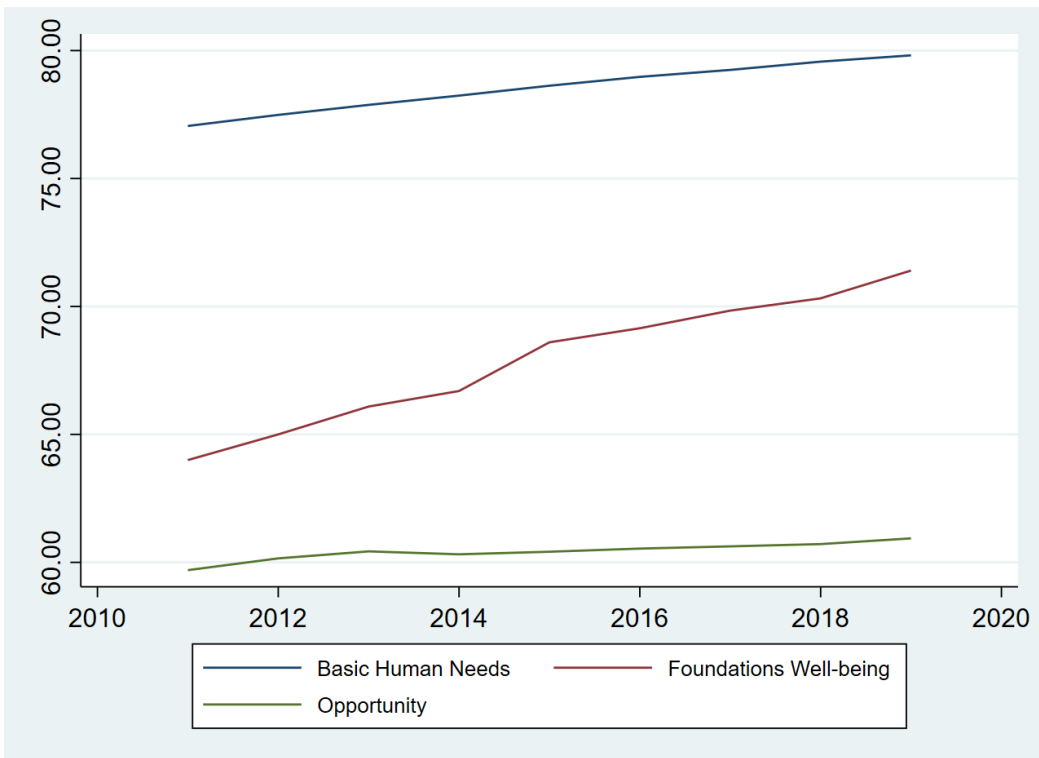


Figure 9: Mean values of the SPI dimensions for a sample of 119 countries (2011-2019). Data sourced from *The Social Progress Imperative*, 2022.

Besides the fact that the dimensions are not consecutive steps but interrelated components of social progress, it can be inferred that the difference in their levels of achievement is due to the greater complexity of advancing some elements of foundations of well-being and opportunity compared to basic human needs. One clear example is the need for a functioning education system that provides primary and secondary education and qualified professionals, infrastructure and organisation for a country to offer quality and accessible tertiary education.

Values are zero-centred in the ECI dataset used, with the least complex economies having negative ECI values (<0) while the most complex economies have positive values (>0) of more than two points above 0. In 2019, the most complex economy with an ECI value of 2.48 was Japan. As expected, given the positive relation of economic complexity with economic growth, Japan is also a high-income country with a GDP per capita of 36.362,36 US\$, occupying the 21st position within the sample. Japan does not have the highest score in the SPI, but it is at the top of the ranking. SPI values range from 0 to 100, and Japan scored 90.02 in 2019, staying at the 10th position in the sample. Instead, the country in the first position in the SPI is Norway, with 92.73 points. The same year, Norway had a GDP per capita of 76.005,22 US\$, more than two times the GDP per capita of Japan. However, its ECI was only 0.55, leaving the country at the 41st position in the sample in this regard.

Several inferences could be made about the differences in the countries' numbers. For instance, Norway has an economy heavily based on natural resources. More than 40% of the country's exports are crude petroleum and petroleum gas, followed by fresh fish and refined petroleum (OEC, n.d.-d). Moreover, it has a substantially smaller population, a scenario where it is hypothetically easier to realise human rights. Assuming that economic development, economic complexity and human rights realisation are all positively correlated, the fact that Japan is only 2.71 points behind Norway in the SPI while having less than half its GDP per capita and a much bigger population could mean that economic complexity has a stronger relationship with human rights realisation than economic development does.

Nevertheless, when looking at the other extreme, the scenario changes. Nigeria in 2019 scored the lowest in the ECI among the country sample, with -1.77. In the same year, the country's GDP per capita was 2.502,65 US\$, and it ranked 106th in the SPI, with a score of 51.73. The lowest score in the SPI was the one of Yemen, 38.38, and its GDP per capita was also lower than Nigeria's, 1.290,93 US\$²⁸. However, the country's ECI value was bigger

²⁸ The value of the GDP per capita of Yemen, Rep. is referent to the year 2018, the most recent value available at the time of this study.

than the one of Nigeria, although also negative, at -1,12. This could mean that the ECI is not related to the SPI or, at least, not more strongly related to it than the GDP as hypothesised before, or simply that the relationship between ECI and the SPI is not short-term. Without a doubt, many other factors may also influence SPI scores. Yemen, for instance, has been in civil war since 2014 (Center for Preventive Action, 2022).

At last, other data used in this quantitative analysis were some control variables. The control variables selected were total population (POP); annual growth of GDP per capita (GROWTH); trade as a share of the GDP (TRADE), net inflows of FDI as a percentage of GDP (FDI); and natural resources rents as a percentage of GDP (NATRENT). Data on the control variables were retrieved from the World Bank's database on cross-country development data named 'World Development Indicators' (World Bank, n.d.-b).

Regarding the first cited control variable, total population, it is expected that the bigger a country's population is, the more complex it is for human rights to be realised. GDP growth, FDI and trade openness, instead, are expected to increase populations' purchasing power and access to goods and services that improve their well-being in core aspects of life. Natural resource rents, while being an important source of income, the bigger they are for a country's economy, the more they can have negative direct and indirect effects on human rights realization due to increased inequality as elites or corporations dominate the exploitation and trade of such resources, political instability also due to the dispute for the exploitation of these resources, economic instability due to the fluctuance of international prices, and health and environmental impacts if these natural resources are exploited in a non-planned and non-sustainable manner.

12.2. Model specification

A pooled ordinary least squares (OLS) regression analysis was conducted in order to answer the first research question, 'is economic complexity positively correlated to the realisation of human rights?'.

To capture the correlation of *ECI* and *SPI*, the following equation was estimated:

$$SPI_{it} = \beta_0 + \beta_1 ECI_{it-1} + Z'_{it-1} \beta_z + \delta_t + u_{it}$$

Where *SPI* is the dependent variable and the *it* subscripts indicate respectively the country and the year. The coefficient β_0 represents the constant term (or grand mean), while the coefficient β_1 captures the sensitivity of *SPI* when (lagged) *ECI*, the main explanatory

variable, increases by one unit. Z'_{it-1} is a vector including the additional (lagged) control variables, such as total population, percentual of GDP per capita growth, trade as a share of the GDP, net inflows of FDI as a percentage of GDP and natural resources rents as a percentage of GDP.

Furthermore, four dummy variables were added to control for the relationship between income and the SPI. Specifically, dummy variables for high-income, medium-high income, medium-low income and low-income (this latter used as reference) countries were included. The term δ_t is a vector of year-specific dummies which are used to capture the evolution of SPI across all the countries in the dataset and control for possible macroeconomic shocks. Finally, u_{it} is the stochastic error term which is supposed to have a zero mean and constant variance. The use of lagged independent variables is motivated by preceding studies on the correlation of economic complexity with other factors that mostly identified long rather than short-term relationships. In other words, we consider that ECI might not immediately affect the SPI, but only after one year.

The same regression analysis was done for the three dimensions of the SPI so to understand if ECI could be more or less negatively or positively correlated to one or the other or not correlated at all. Finally, a second regression analysis was done to see if the ECI could have a bigger or smaller correlation to SPI according to countries' income groups. For this purpose, the dummy variables regarding the income groups were not used, and four independent variables that distinguished ECI values according to countries' income groups were added instead.

13. Results

The results of the first regression analysis (Table 3) answer the first research question by showing that economic complexity, represented by ECI, is indeed positively correlated with the realisation of human rights, represented by the SPI. More specifically, this relationship captures 85% of the variability in the data, and it is highly statistically significant. One unit increase in ECI represents an increase of 4.6 points in the SPI.

Regarding the SPI dimensions, it is possible to see that the ECI is positively correlated to all in a highly statistically significant way and slightly more correlated to basic human needs than to foundations of well-being and opportunity. The control variable population is negatively correlated to SPI, indicating that the lower the population number, the bigger the chances to achieve higher SPI levels, as expected. GDP per capita growth is not significantly

related to SPI, and trade is significantly related only to the opportunity dimension in a negative way, which could indicate a non-linear relationship between both variables. FDI is positively related to the SPI and highly positively related to foundations of well-being and opportunity. Like trade, natural resources rents are negatively and significantly correlated to SPI, foundations of well-being and opportunity. Finally, the income dummies indicate a positive correlation of income levels with SPI levels, including its dimensions.

Table 3: Pooled OLS regression analysis on the correlation of ECI with SPI and its dimensions, 2010-2019

	(1) SPI	(2) BHN	(3) FWB	(4) OPP
ECI _{t-1}	4.686*** (0.862)	5.258*** (1.142)	4.838*** (0.906)	3.961*** (1.086)
POP _{t-1}	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000* (0.000)
GROWTH _{t-1}	3.860 (3.352)	0.701 (4.845)	5.375 (3.288)	5.499 (5.806)
TRADE _{t-1}	-2.241** (1.009)	0.218 (1.229)	-2.733** (1.144)	-4.206*** (1.397)
FDI _{t-1}	8.319** (3.583)	-2.501 (5.230)	12.408*** (3.512)	15.049*** (5.434)
NATRENT _{t-1}	-18.800*** (6.921)	1.440 (9.044)	-16.647** (7.140)	-41.189*** (9.116)
<i>Income</i>				
High	29.666*** (2.140)	33.971*** (2.645)	28.888*** (2.502)	26.140*** (3.153)
Medium-High	19.624*** (1.341)	28.213*** (2.168)	18.640*** (1.675)	12.022*** (2.541)
Medium-Low	11.451*** (1.434)	17.464*** (2.508)	10.437*** (1.650)	6.453*** (2.459)
Low	Ref.	Ref.	Ref.	Ref.
Constant	50.800*** (1.306)	51.627*** (1.995)	48.955*** (1.687)	51.814*** (2.643)
Year dummies	Yes	Yes	Yes	Yes
Num. obs.	1066	1066	1066	1066
R ²	0.851	0.757	0.841	0.772

Standard errors in parentheses are clustered at country level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4, instead, shows the regression analysis results considering the ECI levels for income groups. Again, ECI has a positive and highly statistically significant correlation with SPI and its dimensions in all income levels. However, it is interesting to see that the low- and medium-low-income countries, respectively, have the strongest relationships among the indexes, followed by high-income countries and, lastly, medium-high-income countries. For low-income countries, for example, a unit increase in ECI is related to an increase of 22.2

points in the SPI and 28.8 points in the basic human needs dimension, more than twice what it represents for high-income countries.

The same results of the first regression analysis (Table 3) were verified for population, and GDP growth continued not to have a statistically significant correlation to SPI and its dimensions. Trade was again negatively correlated with the foundations of well-being and opportunity, although in a less significant way. The relationship between FDI and SPI also continued to be positive and statistically significant, as well as between FDI and opportunity. FDI this time was only positively correlated in a highly significant way to foundations of well-being. Natural resources' rents had a statistically significant negative relationship only with the opportunity dimension of the SPI. Finally, the robustness of the regression varied for the SPI and its dimensions, with the R^2 ranging from 0.67 to 0.76.

The main information that can be extracted from these regression analyses is that there is a highly statistically significant positive correlation between ECI and the SPI, including its dimensions, and these results are robust for time and income. Moreover, the ECI and SPI correlation is more significant for low- and medium-low-income countries than for high- and medium-high-income countries. Therefore, it is possible to say that adopting economic complexity as a development strategy could be even more relevant for low and medium-low-income countries due to this strong correlation with social progress outcomes besides the increase in income levels already addressed in other studies.

Table 4: Pooled OLS regression analysis on the correlation of income group-based ECI with SPI and its dimensions, 2010-2019

	(1) SPI	(2) BHN	(3) FWB	(4) OPP
ECI*HIGH _{t-1}	10.750*** (0.882)	8.189*** (0.892)	11.572*** (0.881)	12.489*** (1.213)
ECI*MH _{t-1}	5.194*** (1.193)	6.034*** (1.518)	4.991*** (1.235)	4.560** (1.986)
ECI*ML _{t-1}	14.770*** (1.647)	18.142*** (2.155)	14.089*** (1.556)	12.079*** (2.026)
ECI*LOW _{t-1}	22.292*** (2.021)	28.808*** (2.839)	21.572*** (2.139)	16.498*** (2.499)
POP _{t-1}	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
GROWTH _{t-1}	-3.528 (6.011)	-4.646 (6.015)	-2.280 (5.038)	-3.662 (9.091)
TRADE _{t-1}	-2.144* (1.226)	0.605 (1.222)	-2.715** (1.267)	-4.321** (1.755)
FDI _{t-1}	8.736** (4.252)	-0.801 (5.241)	12.547*** (4.127)	14.460** (6.038)

NATRENT _{t-1}	-2.546 (7.088)	14.144* (8.353)	-0.224 (7.236)	-21.554** (8.920)
Constant	70.648*** (1.806)	79.323*** (1.891)	67.539*** (1.886)	65.081*** (2.207)
Year dummies	Yes	Yes	Yes	Yes
Num. obs.	1066	1066	1066	1066
R ²	0.763	0.703	0.756	0.678

Standard errors in parentheses are clustered at country level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

The studied correlation is difficult to capture in a simpler and more straightforward way because economic complexity and human rights realisation are very comprehensive subjects. Human rights should be respected, protected and realised in all phases of human life; therefore, it will never be a result of a single process as it is related to many things on many levels. Similarly, it is still not possible to dissect the causes or drivers and the elements composing complexity but to get an idea of it indirectly through outcomes.

Anyhow, from what is known about both subjects, it is plausible that economic complexity and human rights realisation are related directly and indirectly. They are related as complexity is, in essence, the combination of multiple and different human capabilities. Therefore, the more capable, diverse and connected human beings are, the more they should be able to enhance their own freedom, choices and possibilities to improve their conditions. In this sense, complexity could be seen as a process that culminates in the empowerment of people.

Certainly, it is true that human rights realisation – intending the rights provided for in the International Bill of Human Rights – is important for complexity to take place as people are only able to develop and combine capabilities in a productive way if they are able first to have adequate living conditions and freedom to decide in core areas of their lives. However, a more approachable or tangible way of thinking about the human rights influence economic complexity would be through the institutions that allow societies to function. As it is out of the scope of this monography, studying the influence of institutions, especially those that protect and promote human rights, on economic complexity is an interesting path for future research.

Further research also could include either a broader dataset on human rights that comprises structural and process indicators, if there could be one, or a dataset focused on one category of indicators that englobes more human rights. Another possibility is studying this relationship in a narrower context, such as regions or countries. Moreover, these studies should cover larger periods of time, ideally decades. These alternatives would generate more comprehensive and precise results that could serve to inform policies.

Chapter IV – Global opportunities and challenges for development based on economic complexity and human rights

14. An economic complexity-based development strategy

As seen in the South Korean case study (Chapter II) and the regression analysis (Chapter III), besides being a driver of economic growth, economic complexity has a positive and significant relationship with the realisation of human rights. But what are the real possibilities for developing countries to pursue a development strategy based on economic complexity that contemporaneously respects, protects and promotes human rights nowadays? Given the diversity and complexity of countries, answering this question in full would require extensive case-by-case analysis. Therefore, this chapter will be dedicated to answering the second research question considering only the main global issues identified by historians and scholars of economic complexity, human rights, development and political science. Nevertheless, it is necessary first to understand better what a development strategy based on economic complexity entails to identify the factors of global character that may influence it.

Recapping key points of previous chapters, economic complexity is basically about the amount and diversity of human, physical and codified knowledge that a country has and its ability to combine them to produce and innovate. The drivers of economic complexity identified so far are the concentration of people in large urban centres, STEM knowledge and critical thinking, science and mathematics skills, gender equality, the birthplace diversity of the immigrant population, the social inclusion of LGBT people, internet usage, greenfield FDI's that transfer know-how to local companies, financial development in the short-term and institutional quality.

Most importantly, some academics of economic complexity mentioned throughout this paper have made some recommendations to reach higher levels of economic complexity, such as (1) developing local knowledge and education infrastructure, establishing linkages with other regions, attracting skilled immigrant and external firms, establishing research collaborations, and improving institutional governance while also upgrading existing activities and developing new less complex ones; (2) planning development through industrial policies that promote economic complexity, considering the principle of relatedness and identifying windows of opportunity; and (3) for small and medium size developing countries dependent on external markets, developing PDPs guided by temporary incentive structures in line with factor endowments and coherent with complementary policy areas.

Economic complexity can be seen primarily as a country's internal matter because most of its composition as well as many of the drivers and proposed strategies to implement it depend on the population itself and the functioning and type of political and economic institutions created by it. For instance, institutions can be described as the "rules of the game" of human interaction made of formal rules and informal constraints and how such rules are enforced (North, 1990). Despite the lack of studies on their relationship, it is not difficult to infer that institutions greatly influence economic complexity just as many other aspects of life in society, and several scholars consider them the leading causes of long-term economic development.

The most prominent theory linking economic development to institutions was developed by Acemoglu et al. (2004), they argue that institutions are the cause of long-run growth:

"Economic institutions determine the incentives of and the constraints on economic actors, and shape economic outcomes. As such, they are social decisions, chosen for their consequences. Because different groups and individuals typically benefit from different economic institutions, there is generally a conflict over these social choices, ultimately resolved in favor of groups with greater political power. The distribution of political power in society is in turn determined by political institutions and the distribution of resources. Political institutions allocate de jure political power, while groups with greater economic might typically possess greater de facto political power. We therefore view the appropriate theoretical framework as a dynamic one with political institutions and the distribution of resources as the state variables. These variables themselves change over time because prevailing economic institutions affect the distribution of resources, and because groups with de facto political power today strive to change political institutions in order to increase their de jure political power in the future". (Acemoglu et al., 2004, para. 1).

Interestingly, they use the development of South Korea as one of the empirical bases of their theory. They explained that South Korea and North Korea at the moment of separation had virtually the same features: the same language, culture, ethnic group, economy, geography, disease environment, possibilities to access markets, and a very similar income per capita. The only significant difference between the two new countries was the type of institutions they created to organize themselves politically and economically. While North Korea decided that the state would make economic decisions and abolished private property of land and capital, South Korea maintained private property and used public and market incentives to develop the economy. These decisions led to the stagnation of the first and the fast development of the latter. Moreover, even with the evident failure of the economic policies of North Korea in the following decades, the country's ruling class still maintained the same institutions, most probably for their benefit, at the expense of the population's well-being (Acemoglu et al., 2004).

Acemoglu et al. (2004) concluded that, since institutions shape incentives, organize production and determine outcomes, growth and economic development will take place when these institutions secure the enforcement of property rights for a broad cross-section of society and guarantee some degree of equality of opportunity to incentive individuals to invest in innovation and physical and human capital and impose power constraints in the ruling elites also reducing their possibilities to capture rents so that they do not shape de jure power to pursue their own interests and increase their de facto power, maintaining a power balance (Acemoglu et al., 2004).

In a more recent study, Acemoglu and Robinson (2010) further discussed and underlined the need for countries to have a good political equilibrium in order to solve the development problem. This is, finding a balance in the distribution of de jure and de facto power (Acemoglu & Robinson, 2010). Despite seeming a straightforward conclusion, finding a balance in the distribution of power within a society is a highly complex task for which there is no magic formula and that most countries have been unable to do so far for various reasons. To further complicate things, the achievement of economic development is not only determined by people and the institutions created by them, even if these may eventually be the main determinants.

According to Sachs (2003), other internal aspects such as geography and resource endowments should be considered. Geography can impose further difficulties for some countries to develop as diseases may more heavily burden them, or they may be isolated or landlocked and, therefore, more limited to trade and investment due to the higher costs of connection and communication infrastructure. Regarding resource endowments, some countries are just not technologically advanced enough to attract investment. Ultimately, in some cases, institutional changes and reforms alone cannot take countries out of a poverty trap, leading then to the need for international help, which, according to the author, should set development goals for these regions and, together with the recipients of assistance and the international community, identify and tackle the obstacles for economic development that each target country in its specificities face (Sachs, 2003).

In a similar way but focusing on the least developed countries (LDCs), most of them located in Africa and Central Asia, Collier (2008) identified some traps besides the poverty condition that greatly difficult development. These traps are (a) conflict, as many of these countries are stuck in a pattern of violent internal disputes; (b) natural resources rents

abundance because of the volatility of prices, the so-called Dutch disease²⁹ and the increased possibilities for corruption to take place; (c) being landlocked with bad neighbours due to missed opportunity to establish trade with them and profit from their growth as well as the increased costs of transportation and; (d) bad governance in small countries that can ruin the most promising prospects for a country and usually take place for the benefit of the elites that hold the economic and political power (Collier, 2008).

Moreover, the author made the statement that the main solution for these countries to get out of these traps and have the possibility of developing is to promote sustained economic growth based on export diversification. But low-income countries, besides being trapped in one or more of the above-cited conditions, usually lack both domestic and foreign private capital and suffer from an exodus of educated people that are essential for improving a countries' political and economic condition and generate growth (Collier, 2008).

Like Sachs (2003), Collier (2008) saw foreign support as part of the answer to the above cited traps and difficulties, although not only for financial aid but also in the form of military intervention for the prevention of conflicts and to guarantee post-conflict stability. He also mentioned the need for favourable international trade policies and laws/charters in themes such as post-conflict, investment and natural resources as parts of the answer to the economic stagnation of what he called the bottom billion (Collier, 2008).

Entering more specifically on the issue of economic complexity, it is possible to perceive a pattern in scholars' recommendations of strategies to complexify an economy: the adoption of industrial policy. This idea that broad-band statal interventions to support industrial upgrading and diversification are essential for countries' economic development started to regain popularity after the 2008 crisis since policymakers and economists attributed such crisis to unregulated free markets. It is a fact, however, that many economically developed countries have long before relied on statal intervention to grow economically (Lin & Treichel, 2014). The implementation of industrial policy is led by governments and depends on countries' political and economic institutions as well as on the agreement of the groups who possess the de facto power if different from those with the de jure power.

²⁹ The term Dutch disease was coined by economists to refer to the process in which the export of natural resources causes the overvalue of a country's currency compared to other currencies and, thus, its other export activities become uncompetitive. These other activities, however, are those that could be the vehicles for technological development (Collier, 2008).

Basically, an industrial policy has the main role of facilitating companies to enter new sectors that offer the potential for employment creation and economic growth (Lin & Treichel, 2014):

“While the market is the necessary basic mechanism for effective resource allocation at each stage of development, governments must play a proactive, facilitating role for an economy to move from one stage to another and to overcome the type of information, coordination, and externality issues that are inherent to the development of new activities and sectors” (Lin & Treichel, 2014, p. 71).

According to Lin & Treichel (2014), to do so, governments should (1) provide information on new activities or industries that are consistent with a country’s comparative advantage; (2) coordinate investments in new industries and infrastructural improvement; (3) subsidise activities for industrial upgrading and structural change; and (4) catalyse the development of new industries through incubation or FDI. Again, there is no recipe or predetermined set of policies to be adopted regarding industrial policy, which will ultimately depend on country-specific context (Lin & Treichel, 2014).

However, the theory of economic complexity brings some advances to industrial policy design, particularly concerning the identification of potential new activities or industries for a country to enter according to their complexity and their relationship with the activities in which a country already has a comparative advantage. By determining the position of a country in the product space, it is possible to trace various possibilities of diversification based on the complexity, technology and even level of income inequality associated with new products and the related industries and activities and their relatedness with the ones a country already does and has an advantage.

A great example of this is a study by Hartmann et al. (2019) on the structural constraints and possibilities for Paraguay’s inclusive growth. Paraguay is a landlocked upper-middle-income country of 7.356.409 people located in the heart of South America (CIA, 2022). Besides its income group, Paraguay is one of the poorest countries in the subcontinent (Statista, 2022) and a very unequal one, with a Gini index score of 43.5 in 2020 (World Bank, 2022a). Its economy heavily depends on commodity exports, mainly bovine meat and oilseeds such as soybeans and corn. Another important source of revenue is the export of electricity produced by the ITAIPU binational hydroelectric power plant. Their main imports, instead, are made up of more complex items such as broadcasting equipment, cars and chemicals, mainly for agricultural production (Hartmann et al., 2019).

Besides this strong dependence on primary goods, the study identified four paths for the country's industrial production that could also lead to different outcomes, going from less to more complex, valuable and inclusive products:

- (1) Focus only on related products and, therefore, remain in the production of basic agricultural goods which are more feasible but do not contribute to the complexification of the economy or to reduce inequalities.
- (2) Further upgrade intermediate capabilities to develop products in which the country already possesses an intermediate comparative advantage and achieve international competitiveness with them. In the case of Paraguay, however, the main potential products in this category are still not complex or valuable enough to produce significantly different outcomes compared to the first strategy.
- (3) Diversify into related higher-income products, which would bring more monetary returns while not having the same costs of developing entirely new activities. It is important to note that not all but most high-income products are also complex and inclusive.
- (4) Diversify into complex and inclusive products, moving beyond the production of primary products. Some of the possibilities for Paraguay are, for example, medicaments, vaccines or machinery used for agricultural production. This is the riskiest and most costly of the four strategies, yet the one that could provide more stable positive returns to the country (Hartmann et al., 2019).

The authors then concluded that the best strategy for industrial diversification and inclusive growth of developing countries is to choose products based both on their feasibility (relatedness) and desirability (income, complexity and inequality associated with the product). However, while economic complexity helps in showing possible paths for diversification, the designing of smart industrial policy would require other complementary studies to assess the feasibility related to a country's social, political, environmental, cultural and economic context more deeply also because economic complexity metrics still do not include the service and informal sectors. Moreover, the implementation of such a policy also implies establishing related innovation and social policies (Hartmann et al., 2019).

Investing in new industries, activities and technologies is a demanding and highly costly process with no guarantee of success. There are, however, several policies to be adopted by firms and governments to mitigate such risk. Firms usually opt for increasing their bargaining power by forming alliances with others or through M&A. Governments, among

other possibilities, can invest in the enhancement of productivity and innovation, restrict competition of foreign and domestic firms, give preferential treatment to some firms and facilitate the development of new technologies through R&D subsidies, by establishing technological standards and also by developing technologies on their own. They must, however, review their industrial policies with a certain periodicity to adapt to emerging needs or constraints (Chang & Andreoni, 2020).

Three other important internal factors to be considered for a successful industrial policy are the learning process in production, macroeconomic management and conflict management. One important aspect frequently overlooked in the process of innovation is the establishment of mechanisms for creating productive knowledge not only in research centres and universities using the formal channels we are familiar with but also in the places where production effectively takes place. Regarding macroeconomic management, it is essential to control the interest rates for the manufacturing sector to be able to borrow to invest and also control that the exchange rate does not become overvalued at the point that export firms become uncompetitive in the global markets (Chang & Andreoni, 2020).

Lastly, the authors mentioned the need for the government to manage the conflicts that may arise from applying industrial policy. This is the case because industrial policy tends to be selective, focusing or giving priority to specific sectors, industries and companies, which can negatively affect competitors and workers. Some measures to manage these conflicts can be, for example, the clear and anticipated announcement of such measures to firms, offering temporary protection, subsidies or different kinds of social insurance and, for workers, ensuring welfare state and, in addition, creating schemes of redeployment and retraining. Industrial policy becomes inclusive when the government designs and puts in place mechanisms to manage and reduce its negative impact and when the positive results are shared (Chang & Andreoni, 2020).

A related negative externality of economic complexity that must be considered is the generation of technological and economic inequality. As discussed in subchapter 5, economic complexity can be positively or negatively related to income inequality depending on related political and social factors, such as a population's level of education or the existence of redistribution policies.

“One unfortunate consequence of the growth and concentration of economic complexity is rising levels of inequality. By their nature, more complex systems also tend to be more unequal. Preferential attachment, compounding, self-reinforcing feedback loops, and multiplicative processes that are inherent to complex adaptive systems increase inequality. As a result, some individuals, organizations, and places will occupy privileged positions in

which they can leverage larger parts of an economy's structure and accumulate most of the benefits. Others will be much less fortunate, either because they have the wrong skills, they are located in the wrong place, or they face other factors that prevent them from engaging in economic activities” (Balland et al., 2022, p. 9).

Economic complexity tends to favour big urban centres, leading to uneven spatial development (Balland et al., 2022). According to Rodríguez-Pose (2018), the consequences of this spatial inequality are rising dissatisfaction and the revolt of the “forgotten” or declining places that has been translated into deglobalization movements, the election of populist representatives and, ultimately, less economic stability and less efficient policies that affect whole countries. There is a false trade-off between efficiency and equity, and prosperity is only possible when tackling spatial inequality (Rodríguez-Pose, 2018).

In that sense, an economic complexity-based industrial policy calls for policy responses to generate equitable returns for the population (Balland et al., 2022) and also for investment in less populated locations through place-sensitive interventions that do not simply provide welfare but explores the potential of such regions in a coordinated way, enhancing opportunities for the people living there. For this to happen, states have to tackle institutional inefficiencies and bottlenecks, promote entrepreneurship and the acquisition of skills, and facilitate the assimilation of knowledge and innovation (Rodríguez-Pose, 2018).

As seen, the designing and implementation of industrial policy is a very complex process because it involves political and economic institutions and is also directly affected by countries' features and limitations related to geography, natural resources, infrastructure, technology and others. Moreover, industrial policies are dependent on and also directly impact the population, which is formed by different and often contrasting interest groups with more or less cooperative relationships.

Besides all the discussed internal dynamics and factors that can influence an economic complexity-based development strategy, which is by no means exhaustive, there are several other things to be considered that regard mostly externalities or global issues and are the focus of this chapter. Economic complexity strategies or policies can be subject to positive or negative influences from the ‘external’ world just as they can be the source of negative results for a country if not properly planned and implemented. According to the topics most frequently found in the literature, the discussion will focus on international trade agreements and the role of the World Trade Organization (WTO), technology and its related international legislation and corporate responsibility and the role of MNEs³⁰.

³⁰ The categorization of the issues merely serves to render the contents clearer since all the subjects treated are interrelated.

15. Challenges and opportunities

15.1. International trade

Just as in economics in general, trade is intrinsic to the theory of economic complexity. Trade allows countries to grow, acquire knowledge and specialize in the sectors and industries they have relative comparative advantages. International trade, however, does not have stable rules, dynamics and established prices. Trade agreements change the rules of the game for the parts and also third actors; some products suffer from a higher volatility of prices than others, and trade is also influenced by other factors such as political relations and, more recently, financialization³¹.

Trade has changed and grown in the past decades with the unprecedented growth of manufacturing in developing countries led by China. The growth of manufacturing combined with a trend of trade liberalisation and transportation costs also led to the rise of global value chains (GVCs)³² as a way of organising production. However, this process was concentrated in a few countries, mostly in Asia. Other developing countries in South Asia, Africa and South and Central America have benefited only as consumers and suppliers of commodities and other agricultural products, and while manufacturing continued to be a profitable activity, primary goods prices varied greatly. GVCs, therefore, did not constitute an opportunity for most countries aspiring to manufacture to export as they became concentrated in a few regional blocks in Asia (led by China and Japan), Europe (led by the EU) and North America (led by the US) (Malherbe, 2018).

To understand the importance of GVCs, they are prominent in high-value-added sectors such as electronics, machinery, chemicals, transportation equipment and automobiles. These sectors account for 45% of all trade and are closely linked to investment activities. Labour-intensive sectors where GVCs are relevant are textiles, apparel and leather products. Only in food, a major sector for economically developing countries, and a few other sectors GVCs are minor and static. Therefore, this agglomeration effect seen in GVCs puts developing countries at a disadvantage when seeking to industrialise. Indeed, the relocation of production stages to a developing country also depends on what the country has to offer in

³¹ “Financialization is a process whereby financial markets, financial institutions, and financial elites gain greater influence over economic policy and economic outcomes. Financialization transforms the functioning of economic systems at both the macro and micro levels” (Palley, 2007, p. 2).

³² “In a GVC, the manufacture of a product is divided into different stages or components of production, each performed in a different country and often by a different company⁵. The full value chain of a product also includes pre-manufacturing stages such as design, and post-manufacturing stages such as marketing and distribution” (Malherbe, 2018, p. 4).

terms of location costs, supply of materials and services needed for production, human capital and political and institutional stability (Malherbe, 2018).

Atkin et al. (2021) went in a similar direction when pointing out that while international trade can, in theory, be beneficial to most countries, the evidence so far shows that there are “good” sectors that generate positive dynamic spill overs but are, however, too competitive for developing countries to enter, and “bad” sectors which are not conducive to growth but many times what is left out for less competitive countries to specialize in (Atkin et al., 2021). Another factor that constitutes an additional challenge to developing countries is financialization. According to Chang and Andreoni (2020), financialization, which involves multiple actors and takes place at different levels, cannot channel resources to the places and sectors that need it the most. Moreover, it has exposed countries to several risks (Chang & Andreoni, 2020).

“The financialization of the global economy and the lack of global regulations in the areas of capital flows, as well as tax avoidance and evasion, have weakened governments in both developed and developing countries. In particular, the capacity of governments to set and maintain favourable macroeconomic conditions for growth, to finance infrastructural investments, and to run effective industrial policy has been declining dramatically as a result of financialization” (Chang & Andreoni, 2020, p. 342).

All of the above-presented challenges are greater if we turn our focus to the LDCs. To briefly contextualize, LDCs are today a group of 46 countries in which 1.1 billion people are living (UNCTAD, 2022). They are the world's poorest and most fragile countries today (Nurse, 2016). LDCs today face additional problems ranging from soaring debt exacerbated by the COVID-19 pandemic to climate vulnerability and lack of or poor access to energy. In international trade, their share of exports is around 1%, and the majority of the countries in this group depend on the trade of primary goods, mostly commodities. Their main exports make them vulnerable to price volatility, global crises and shocks (UNCTAD, 2022).

LDCs also suffer from a lack of private capital. Capital inflows are very difficult due to the higher costs of operations due to the lack of adequate infrastructure and the higher instability of these countries compared to other economically developing nations. Almost exclusively, the private capital entering LDCs is for the extraction of natural resources. Aggravating the situation, the bottom billion also suffers from private capital outflows, much of it in illegal ways. And according to Collier (2008), since Asia took advantage of the window of opportunity of the '80s and '90s to enter the international manufacturing market, LDCs will have to wait a long time for a wage gap big enough from Asian countries to be created to then break out into global markets (Collier, 2008). If we recall the traps and further

issues facing the bottom billion mentioned at the beginning of the chapter, developing by themselves is indeed a complicated task.

Presented the challenges related to global market dynamics, there are also some issues related to the international systems of trade regulations and agreements to be considered. The international organisation responsible for regulating and thus creating a more stable and predictable environment for international free trade to take place is the WTO. Currently, the organisation has 160 member-States that represent 98% of world trade (WTO, 2022d). Established in 1995, the WTO is responsible for administering trade agreements, reviewing and monitoring national trade policies, settling trade disputes and building the trade capacity of developing economies. The decisions within it are generally taken by consensus. Moreover, it serves as a multilateral trading system that works in rounds (WTO, 2022c), the last in Doha in 2001 (WTO, 2022b).

The agreements and regulations on trade established by the WTO certainly influence countries' internal policies regarding industrialisation and technological development³³. There is no consensus among the scholarship about the challenges or opportunities posed by the WTO on industrialisation, some arguing that the organisation gives enough space and instruments for countries to follow a development strategy based on industrialisation while others believe that it actually imposes restrictions and that the WTO as an institution does not provide countries with the support needed to develop their economies.

According to Singh and Jose (2016), the applicability of the WTO's framework of disciplines varies according to members' income level and vulnerability. Therefore, economically developed countries must comply with many more regulations than less economically developed ones. Moreover, the authors argued that the WTO is positive for development because regulating the policy space mitigates arbitrary policy actions and provides investors with enhanced certainty and clarity for operating. However, they also mentioned that some flexibility might be beneficial in areas of common interest, for example, environmental issues (Singh & Jose, 2016).

Differently, Chang and Andreoni (2020) define the rule of the WTO as a new institutionalised form of imperialism over the global economy by developed countries. They recalled that the policy space developing countries have to implement industrial policies has been getting narrower over the past thirty years. They argued, however, that besides the growing constraints, there is still room for action because (1) some industrial policy measures

³³ Technology is addressed in subchapter 15.2.

are domestic and not subject to international agreements (e.g. infrastructural investments, subsidies for training or R&D, tax incentives or the use of state-owned enterprises); (2) many industrial policy measures still do not have restrictions as no consensus was reached around them; (3) countries can make use of tariffs; (4) the WTO only bans subsidies for export promotion; and (5) while it is difficult to regulate FDI, countries can regulate joint ventures, technology transfer and impose limitations to foreign equity ownership (Chang & Andreoni, 2020)

For LDCs, the policy space offered by WTO is bigger than for the broader group of economically developing countries. The organisation's framework offers some flexibilities for LDCs that facilitate the implementation of industrial policies, such as exceptions for numerous provisions in different agreements and longer transitional periods to implement some agreements or some provisions within them. Under the WTO Generalised System of Preferences, LDCs can receive non-reciprocal preferential treatment for their products. Nevertheless, due to their difficult and complex realities, LDCs often are not able to take advantage of the exceptions, waivers and other possibilities provided by the WTO (Nurse, 2016). It seems like the WTO thus far has been of little help to the countries that most need it.

In the view of Collier (2008), the WTO could have a more prominent role in the development of LDCs by changing the dynamic of the negotiation rounds where transfers and deals are no longer confused (Collier, 2008). This would be possible through the following process:

“Only once the transfer round was concluded would the bargaining round be permitted to start, and this would put pressure on the rich countries to make acceptable offers. But only once the bargaining round was concluded would the transfer round come into effect, and this would put pressure on the bottom billion to facilitate the bargaining process rather than wreck it. Further, if the bottom billion wanted more than they had received at the end of the transfer round, they would have to get it through bargaining” (Collier, 2008, p. 174).

Beyond the WTO, the development of the LDCs requires a collective effort by the international community represented by its monetary, financial and trade organizations and regional trade blocs. The OECD protection of agriculture and developed countries' escalation of tariffs according to the complexity of products, for example, are not conducive to LDCs' development. Even the schemes designed to benefit LDCs, such as the EU 'Everything but Arms', are usually too complicated, exclusive and applicable for a too short time. Moreover, considering the space occupied by Asian countries in manufacturing at the global level, economically developed nations should temporarily lower tariffs for LDCs compared to their Asian counterparts for them to be able to compete. Finally, since sustained economic growth

is essential for development, aid in LDCs should be directed toward raising their industrial infrastructure to internationally competitive levels. LDCs, in turn, should also lower their trade barriers since these also do not contribute to their growth (Collier, 2008).

Scholars also point to trade agreements as possibly greater barriers for states to implement industrial policy than the WTO. Bilateral free trade agreements increased from 50 in the mid-90s to more than 250 (Chang & Andreoni, 2020). There is a recent growth also in mega trade agreements between regional blocs or groups of countries, such as the Regional Comprehensive Economic Partnership or the Trade in Services Agreement (Singh & Jose, 2016) that is being negotiated or even the EU-Mercosur Trade Agreement currently under a revision, signature and ratification process (MDIC, n.d.). These agreements are wide-ranging, have a higher level of constraints compared to the WTO and impose higher entry standards to markets that will probably extend to producers from countries not part of such agreements. In that sense, developed economies must create an inclusive environment for less-developed economies to participate in global trade in fair conditions (Singh & Jose, 2016).

15.2. Technology

Technological development is another substantial part of an economic complexity-based development strategy which is influenced by internal and external factors. Regarding the external dimension of technology creation or acquisition for productive purposes, the main current issues are the international intellectual property regulations, knowledge spill overs generated by FDI, the dominance of knowledge-intensive industries and data-based innovation by few players, and the general transformation of the labour market due to automation.

The main international instrument that regulates intellectual property is the WTO TRIPS Agreement created in 1994. Seen the multiple and often divergent standards countries apply to recognise and protect intellectual property rights and the consequent tension generated on international business relations, the TRIPS Agreement standardises the rights on international commercial relations, including enforcement measures and a dispute settlement mechanism (WTO, 2022a).

Just as with other WTO trade agreements and regulations, there are contrasting views among academics on the TRIPS Agreement's effects on technology production and transfer. While some argue that the agreement is a guarantee and incentive for companies to develop new technologies, others say that it constrains technology transfers and makes it difficult for developing countries to copy existing technologies useful for them. The TRIPS Agreement,

like other WTO agreements, leaves a certain policy space for countries according to their level of economic development by, for example, leaving at countries' discretion the decision on the conditions under which an invention is patentable, the establishment of exceptions and limitations to patent monopoly and the prevention of intellectual property rights abuse by right holders through different policies (Singh & Jose, 2016).

Nevertheless, it can be argued that, given that the TRIPS Agreement provides protection for 20 years for any invention of product or process and that historically economically developed countries have been the producers of knowledge and technology while developing countries have mostly been consumers, it can improve the costs for consumers and further encourage the privatisation of knowledge, impacting on developing countries' public initiatives in the manufacturing sector (Siddiqui, 2016).

Moreover, the transfer of technology and knowledge from the producing countries to developing nations in the form of FDI linkages or by being part of GVCs is oftentimes the best chance these countries have to insert themselves in knowledge-intensive industries (Chang & Andreoni, 2020; Nurse, 2016), but this is usually not the case as transnational corporations use this and other international regulations to impose entry barriers such as patents, quality standards, copyrights, trademarks and other instruments to solely capture value from the hosting markets (Chang & Andreoni, 2020).

A related issue is that even when no legal impediments are present, many developing countries are not able to absorb the knowledge and technology available through FDI and the participation on GVCs. The lack of investment from transnational corporations in backward and forward linkages to its operations abroad is also motivated by the countries' lack of skills and scale to process intermediate goods and perform more sophisticated activities, as well as the lack of resources to invest in technological upgrading (Chang & Andreoni, 2020). Technology and knowledge transfer cannot take place if countries do not have the capabilities to absorb them (Nurse, 2016).

However, technological development can also be part of the solution to countries' lack of capacity to host more complex industries and, with conducive conditions, absorb knowledge and technology from them to upgrade national industries. New technology and business models make skills and specialised inputs less dependent on locations and more linked to global networks. The maintenance of machinery, which usually requires specialised personnel for set up and repair, is increasingly done remotely. In the same way, commercial services, that today represent a bigger cost for firms than transportation, are being digitalised and, hence, can be managed and housed abroad (Malherbe, 2018).

Another important improvement brought about by technological development is the online connection of logistic systems, which can greatly diminish border processing times. This is especially important because border processing time in less economically developed countries are the longest, lasting up to more than a month, and it is estimated that every extra day of waiting reduces a country's trade by 4%. With the digitalisation of these services related to manufacturing activities, the relocation of firms to developing countries not still integrated into GVCs has become a less distant prospect. But the digitalisation of services linked to manufacturing can also further difficult the expansion of such services in emerging economies (Malherbe, 2018).

Currently, manufacturing is shrinking in size in almost all countries and being replaced by the services sector, including digital ones. However, services have been historically much less relevant for economic growth and development than manufacturing and, thus, are not an alternative with real potential for emergent economies in the near future (Hauge, 2022). In order to develop their industries, developing countries must be prepared to grab the opportunities resulting from technological development. Besides having stable functioning institutions and reliable legal systems, they must invest in physical infrastructure and information and communication technology, facilitate the delivery of offshore services and invest in human capital creation for the manufacturing roles of the future (Malherbe, 2018).

Notwithstanding, the top end of industry and services, which are the knowledge-intensive manufacturing GVCs and the data-driven technological intangible products, is virtually impossible to enter. MNEs from the global North are technologically dominant in high-complexity goods and strongly protect their property rights while having privileged access to markets and cheap labour around the globe through GVCs, using their advantages for expanding profit shares and, on the other side, deepening asymmetries between hosting countries' and their own countries' industries (Hauge, 2022).

The so-called big tech may be even more problematic because of their dominance of data-driven innovation. Google, Amazon, Facebook, Apple and Microsoft are intellectual monopolies because they have exclusive access to data and predate knowledge from smaller companies and research centres. By outsourcing parts of innovation processes without giving authors intellectual ownership and giving only small margins of the profits generated by their work, these companies expand their rents and increase their already much greater economic power. They are widely and strongly protected in legal terms by the United States government and international regulations, basically having a free pass to consolidate their position as the

biggest innovators in information and communication technology and concentrate most of the benefits from it (Rikap & Lundvall, 2020).

For developing economies, these intellectual monopolies constitute a problem in many ways. Big tech do not contribute significantly to the creation of adequately remunerated and secured jobs and do not pay taxes consistent with their rents. They weaken the incentives of countries to build strong knowledge basis due to their predatory practices and are involved in national security and espionage issues. Big tech are greatly responsible for deepening the digital divide that affects companies and users, and, considering the current state of international relations and law, it is improbable that individual countries or regions have the de facto capabilities to regulate these companies' operations (Rikap & Lundvall, 2020).

One last identified challenge related to technological advancement that is perhaps the most talked about within the academy is the loss of jobs due to automation. It is generally assumed that it will adversely affect manufacturing industries in developing countries (Malherbe, 2018). A study conducted by Diodato et al. to understand if the human capital in the United States could withstand the current technological change substantiates this idea. The scholars concluded that technological development affects whole knowledge domains and will impact some occupations more than others. Manual and administrative skills are the ones becoming more embedded in technology and are, at the same time, peripheral in the occupational space; therefore, workers in these occupations will have to acquire different skill sets to remain employed (Diodato et al., 2018).

According to Hauge (2022), while automation will continue to cause disruptions in the workforce and labour displacement in the future, there are good reasons to believe that it will not supplant most manufacturing jobs. Technological development is associated with productivity growth and the creation of new industries and, consequently, the creation of employment. Moreover, automation technologies will not be implemented massively in developing countries soon because it is not commercially viable. Even when reshoring is considered, which means that companies decided to move their operations from a hosting country to the country of origin to make use of new automation technologies that could lower the costs of production and enhance productivity, the historical evidence is that it occurs in a smaller scale in relation to new offshoring activities (Hauge, 2022).

15.3. Corporate power and responsibility

The role of states in pursuing an economic complexity-based development strategy is reiterated throughout this monography. However, it is only possible in practical terms with

the involvement of the private sector, which effectively carries out most of the work. With globalisation, corporations have grown bigger than ever, and their operations affect multiple countries besides their own. Not unexpectedly, export-oriented firms and those operating overseas are usually the biggest and most dynamic ones within their home countries and fewer of them also internationally. Therefore, it is crucial to understand how enterprises operating abroad influence host countries, especially regarding the respect and realisation of human rights. This session focuses on the operations of MNEs in developing countries.

MNEs have become major actors in international relations as they have acquired unprecedented market power (e.g. trillion-dollar companies such as the previously cited Amazon) and resources larger than those of many nation-states (Chang & Andreoni, 2020). They have influenced the foreign policy of countries as powerful as the United States through lobbying (Kim & Milner, 2021) and can also shape the global governance agenda (Giuliani, 2018). The logic under which such companies operate is the one of maximising profits in a liberalised and hyperconnected global economy. While international business led to stunning increases in living standards and productivity in the past centuries – with states also playing a significant role – markets also have concentrated power, degraded the environment and violated human rights (Stiglitz, 2012).

As denoted by Chang and Andreoni (2020), “as a result of financialization, corporate governance and investment decisions of (...) companies can be captured by short-term oriented financial interests, leading to declining investments and missed opportunities for innovation — what some have called ‘predatory value extraction’” (Chang & Andreoni, 2020, p. 347). Since companies work for their benefit, the role of regulating their operations so also to benefit and not harm citizens is, as a rule, assigned to states. Unfortunately, for several diverse reasons related or not to fulfilling self-interests, governments have continuously failed in managing globalised capitalism to the point that it has generated many negative and dangerous outcomes such as exorbitant income and wealth inequality among and within countries, pollution of the air, sea and land, sub-employment, and degradation of values related to accountability and justice (Stiglitz, 2012).

Giuliani (2018) went further by saying that global capitalism is responsible for the greatest challenges future generations will have to face: the cited rising inequality, global warming, modern types of slavery, child labour and other human rights struggles. She attributed these challenges not only to the functioning of the international economic system but significantly to corporate wrongdoing. According to the author, wrongdoing became a widespread structural problem that does not necessarily occur on purpose. Still, it regularly

harms people and the environment and is very hard to observe due to companies' lack of transparency. Just as it is hard to observe, wrongdoing is also challenging to control, even for economically developed countries with well-established institutions (Giuliani, 2018).

Since wrongdoing is not easily observable, besides some scandals that at times come to light, there is not much literature on it. The existing studies show contrasting views on how harmful MNEs can be when compared, for example, with local companies or depending on the sectors in which they operate. However, most studies converge in the idea that MNEs are powerful enough to cause significant harm in host communities and, thus, need to be subject to further or more efficient control by the states and civil society.

A literature review done by Giuliani and Macchi (2014) showed that positive or negative impacts of MNEs' activities on the economy and human rights of developing countries were mediated by internal and external factors such as state capacity, the type of technology employed, the subsidiary³⁴ strategy of seeking either resources, market or efficiency, among others (see Table 5). Another important finding of their study was that the more autonomous a subsidiary is from the parent company, the more scope it has for irresponsible business conduct, especially in countries with lax institutional controls. Moreover, since they are separate legal entities, the parent company – the MNE – cannot be held responsible for unlawful and wrongful acts of its subsidiaries (Giuliani & Macchi, 2014).

	Economic impacts	Human rights impacts
External		
<i>A. Host country</i>		
Social capability	Positive	Positive
State capacity	Positive	Positive
Civil society (MNCs' strong engagement with)	Positive	Positive
<i>B. Industry</i>		
High competition	Negative in the short term/potentially positive in the long term	Negative
Low technology		
• Traditional sectors	Positive	Negative
• Primary sectors	Insignificant	Negative
High technology	Positive conditional with low technology gap	Mixed/Inconclusive
Internal		

³⁴ A subsidiary company is a business entity fully or partially controlled by a parent company that owns at least 51% of the subsidiary shares. The parent company and the subsidiary are separate entities in terms of taxation, regulation and liability (CFI, 2022).

C. MNC		
Nationality of parent (advanced versus emerging country)	Mixed	Mixed
D. Subsidiary		
Subsidiary investment strategy		
• Resource-seeking	Insignificant	Negative
• Efficiency-seeking	Insignificant to negative	Negative
• Market-seeking	Positive	Insignificant to positive
Subsidiary innovation and entrepreneurship	Positive	Positive
Subsidiary autonomy (minority stake)	Positive	Positive

Table 5: Mediating factors and MNC's impacts: a summary of the empirical literature review. Retrieved from Giuliani & Macchi (2014).

With a focus on labour rights, Colovic et al. (2019) used evidence from Mexico to suggest that MNEs are less likely than local firms to violate workers' rights. The study also indicated that weak institutions in the host economies do not affect MNEs but enhance the likelihood of local firms not respecting workers' rights. Unexpectedly, it showed that MNEs also negatively influence local firms regarding respect for labour rights (Colovic et al., 2019). Similarly, a study by Selwyn (2019) on the impact of GVCs on labour rights, using evidence from China's electronics sector and Cambodia's garment sector, suggested that GVCs generate new forms of worker poverty. According to the author, participating firms in developing countries receive few rents from the lead companies while having to meet high productivity targets. To do so, local firms super exploit workers by paying very low wages that force them to work overtime in order to subsist, causing physical and emotional degradation (Selwyn, 2019).

Most recently, Ullah et al. (2021) showed that in the past two decades, most of the firms from which there is evidence of human rights violations are from developed countries and are part of formal and informal commitments for the protection of human rights and sustainability. More specifically, the scholars uncovered 273 violations committed by 160 MNEs from 2022 to 2017, including child labour, abuse against female workers, harassment, poor working conditions, land grab, underpaying and racial discrimination. These MNEs are part of the UN Global Compact³⁵ and have reported compliance with the International Labour

³⁵ The UN Global Compact is a non-binding framework for sustainable and socially responsible business policies created in 2000. It is composed of ten principles regarding human rights, labour, anti-corruption and environmental protection that companies can adopt on a voluntary basis (United Nations Global Compact, n.d.-a). So far, 20.769 companies from 179 countries adhered to the initiative (United Nations Global Compact, n.d.-b).

Organization. Moreover, 90% of these also have a social responsibility and/or sustainability committees within their organisations. The violations committed by MNEs often go unpunished in developing countries, and they can lead to political and economic instability in the affected countries (Ullah et al., 2021).

As mentioned previously, it is still not possible to have a clear picture of the impact of MNEs on human rights or the environment due to the difficulty in gathering evidence. Most of the cited literature focuses on a few examples. Nevertheless, even if the influence exerted by MNEs can be stronger or weaker and more positive or negative than what it seems, it is undeniable that they significantly impact societies. The evidence also suggests that what has been done so far by the public sector in relation to international business, both in economically developed and developing countries, is not enough to guarantee equitable economic gains and human rights protection and realisation for societies.

It is not an easy task to regulate global capitalism and the last attempt to create a binding treaty at the international level failed, giving place to another non-binding instrument: the UN Guiding Principles on Business and Human Rights of 2011 (Business & Human Rights Resource Centre, n.d.). Scholars point to different strategies that can be adopted for that purpose and they mostly agree that it needs to be at the international level and that the private sector needs to be more involved than they are now for a significant positive change to be achieved.

Mende (2020), for instance, proposes a new way of thinking about business responsibility for human rights since the current frame of private and public is not adequate in times of global governance. According to the author, it could be useful to include a new additional category which he called the business-societal in between and beyond the public-private dichotomy to cover the interrelated and complementary roles of the two. By tracing the interdependencies and effects of business in the public, private and human rights regime, this threefold approach could provide a basis for developing societal forms of business responsibility and, ultimately, strengthen the respect, protection and realisation of human rights (Mende, 2020).

As seen above, companies' part to international commitments and that adopt corporate social responsibility (CSR) frameworks, and policies are still very prone to violate human rights. Ruggie (2018) pointed out that MNEs' structure – one economic entity with separate legal entities – creates a gap in global governance and the mandatory-voluntary dichotomy rather difficult than helps to deal with corporate globalisation because (1) the scope of CSR has never been adequately defined, and (2) a binding international treaty or regime is

unpractical. Therefore, more attention should be paid to the interplay of the two spheres (Ruggie, 2018).

“(…) creating an overarching legal regime, whether within human rights law as the current Ecuador and South Africa led initiative has framed it, or some other framing, seems highly implausible, not only on political but also on sheer logical grounds. It would involve harmonizing aspects of often vastly different bodies of national, sub-national and international law – for starters, investment law, trade law, corporate law and securities regulation, tax laws, consumer protection law, labor law, anti-discrimination law, other areas of human rights law, and criminal law, and impinge on underlying conceptions of property rights and private contracts. The point is not that these are unrelated, but that they embody such extensive problem diversity, institutional variations, and conflicting interests, not only across states but even within them, that any attempt to aggregate them into a general treaty, a global constitutional order of sorts, would have to be pitched at such a high level of abstraction that it would be without practical meaning” (Ruggie, 2018, p. 329).

Finally, some academics discussed the need for further regulations to be implemented at different levels. According to Giuliani (2018), innovation per se does not lead to positive change, and the answer is not in corporations doing more good things but stopping harming. She proposed some ways forward in regulating global capitalism, namely (1) innovation of companies’ organizational processes and governance models; (2) education on environmental, social and human rights issues in business schools; (3) inclusion of the harmful impact of companies on environmental, social and governance indexes to include harmful instead of only their good doings; and (4) the incorporation of environmental and social clauses in bilateral and multilateral treaties on investment and trade as well as on the functioning of arbitration tribunals (Giuliani, 2018).

Ullah et al. (2021) emphasised that the level of publicness, transparency and accountability for human rights violations needs to grow and that commitments made by corporations must be subjected to higher scrutiny and accountability by civil society. MNEs must set parameters and develop processes and systems to comply with international legislation and to prevent human rights violations in developing countries where they operate, especially regarding labour rights that are the most disrespected. And the media, NGOs and other civil society organisations should be legally empowered to investigate the wrongful conduct of these companies (Ullah et al., 2021).

16. The big questions

Humanity is facing life-threatening challenges caused by its own economic and political systems. According to world leaders, international organisations and academics, inequality and human-led climate change are the two biggest problems for the current and

next generations. They are interrelated, affect and are affected by population growth, migration and the previously addressed international trade, technology and the operation of corporations. All of these issues can largely determine the fate of development and human rights realisations, and the current scenario is not promising. The current state of global inequality and poverty, climate change and shifting demographics are briefly presented in this subchapter.

This section was written while the UN Climate Change Conference COP27³⁶ At that moment, emissions of heat-trapping gases have warmed the world by 1.1 degrees Celsius since 1750, and the temperature is expected to reach 1.5 degrees Celsius in the next decades. This human led raising in temperature directly impact life on the planet as it raises the sea level by between 0.3 and 2.4 meters; enhances the intensity and strongness of hurricanes; prolongates the wildfire season; causes changes in precipitation of rain and snow; provokes more droughts and heatwaves and defrosts the arctic. The severity of these effects will depend on actions taken and future human lifestyle (Jackson, 2022). Indeed, according to the World Meteorological Organization, the last 8 years have been the warmest on record. In 2022, extreme heatwaves, drought and devastating floods have affected millions of people (WMO, 2022).

Contemporaneously, the ecological footprint, a comprehensive measure of how much area (measured in hectares) of biologically productive land and water is consumed by countries or individuals for the production of resources and absorption of waste (Global Footprint Network, n.d.-a), shows a deficit at the global level in relation to its biocapacity since 1970 (Global Footprint Network, n.d.-b), which is, in turn, the capacity of ecosystems to regenerate the natural resources people demand (Global Footprint Network, n.d.-a). The latest data available, from 2018, showed that biocapacity per person was 1.6 global hectares (GHA)³⁷ while the ecological footprint per person was 2.8 GHA, which means that people are using 1.2 GHA more natural resources than the earth can regenerate (Global Footprint Network, n.d.-b).

The overexploitation and depletion of natural resources linked to environmental degradation, climate change and poverty threaten fundamental activities such as food

³⁶ The Conference of the Parties (COP) is the supreme decision-making body of the UN Framework Convention on Climate Change (UNFCCC) It generally takes place every year for parties to review the implementation of the UNFCCC (UNFCCC, n.d.-a) The UNFCCC ultimate goal is preventing dangerous human interference in the environment. It entered into force in 1994 and is ratified by all UN Member-States (UNFCCC, n.d.-c).

³⁷ “A global hectare is a biologically productive hectare with world average biological productivity for a given year” (Global Footprint Network, n.d.-a, n.p.).

production. Today the world produces more food than it consumes, and hunger is more related to the lack of access to food. However, climate change is expected to cause significant agricultural productivity loss. Interestingly, food systems in the way they are established today are part of the problem because they cause land degradation, greenhouse gases emission, biodiversity collapse, pollution and resource depletion (Dury et al., 2019). Estimates show that agriculture can become up to 50% less productive by 2080, especially in low- and medium-income countries near the equator (Ahlenius, 2009; Cline, 2007). Developing countries and LDCs are the most fragile to climate change effects not only in terms of agricultural production but also in the susceptibility to diseases and natural disasters because of their geographical position, fragility and lack of preparedness and resources. These countries are, on the other side, the ones who contributed less to climate change (Hallegatte, 2022) (see Figure 11).

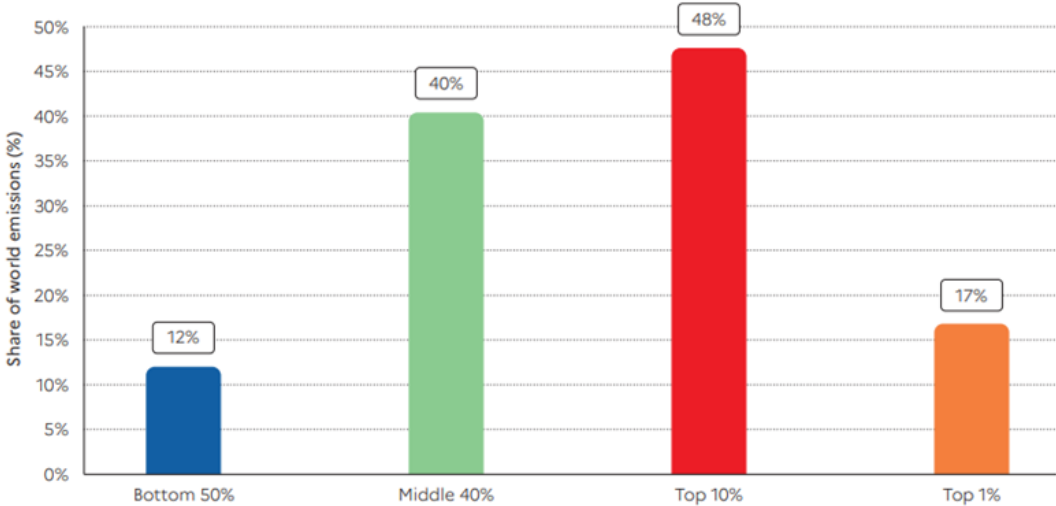


Figure 11: Global carbon inequality, 2019. Group contribution to world emissions (%). Retrieved from Chancel et al (2021).

The international community created the Paris Agreement during COP21 in Paris in 2015 to limit global warming below 1.5 degrees Celsius above pre-industrial levels. To this end, countries have made pledges focused on curbing greenhouse gas emissions through low or zero-carbon solutions (UNFCCC, n.d.-b). Nevertheless, keeping the global temperature at such levels requires much more comprehensive and coordinated efforts and investments at many levels than a transition to clean energy (Global Footprint Network, n.d.-b). Indeed, if implemented, countries’ pledges under the Paris Agreement would keep the temperature at 2.4 to 2.6 degrees Celsius by 2100. If not changed, the policies in place will lead to a 2.8 degrees Celsius increase (UNEP, 2022).

Countries will have to promote a systemic and rapid transformation of food and financial systems, electricity supply, industry, transport and construction sectors to meet the goal of staying under 2 degrees Celsius. Food systems demand the decarbonization of food supply chains, improvements in small-scale food production, the protection of nature and a change in the demand side, this is, dietary changes. The financial system must become an enabler of transformation through resource allocation where most needed. Electricity supply is the most advanced of the cited sectors, but a transition to renewable energy sources and universal coverage is still far from being achieved. Finally, the industry, construction and transport sectors' transformation towards zero-carbon emissions is also underway but at a much slower pace and concentrated fashion than necessary (UNEP, 2022).

The other great challenges of our era connected to human-led climate change are the staggering income and wealth inequality between and within countries and the poverty that also results from it. Both inequality and poverty are difficult to measure, and the metrics adopted so far are far from consensual. They are complex and multidimensional concepts because they involve not only economic factors such as purchasing power to satisfy basic human needs but manifest themselves in more or less political power, participation, and access to health and education services, among others (Holton, 2020).

The poverty line set by the World Bank at 2.15 US\$ a day at 2017 purchasing power parity (PPP) rates (updated in September 2022) gives us an estimation that in 2019 (latest data available) 685 million people were in extreme poverty (World Bank, 2022b). However, as Reddy (2020) explained, there is a gap between official indicators and the societal understanding of poverty. The criterion to determine what poverty is and what is not significantly influences conclusions on how much poverty there is and where, resulting in unsatisfactory priority setting and policies (Reddy, 2020).

“Although poverty is expected to be nearly “eliminated” by 2030 in regions other than sub-Saharan Africa at the lowest poverty lines, this is not true at higher poverty lines. The projected regional composition of future poverty is also greatly dependent on the choice of poverty line, because poverty in the other world regions increases markedly at higher lines. These conclusions qualify the widespread presumption that addressing the problem of absolute poverty worldwide requires a singular focus on sub-Saharan Africa. Especially at higher poverty lines, income poverty is a global problem, and sustaining growth throughout the developing world is important for its reduction” (Reddy, 2020, p. 1).

In fact, The World Bank also provides data considering two higher poverty lines of 3.85 US\$ and 6.85 US\$. At this second higher poverty rate, there would be approximately 1.8 billion poor people in the world in 2019, and at the highest one, there would be 3.59 billion poor people (World Bank, 2022b). According to the organisation, the two higher poverty lines

are relevant respectively for lower-middle and upper-middle-income countries, while the lowest one is recommendable to guide low-income countries' policies (World Bank, 2022c).

But going beyond monetary poverty, the Multidimensional Poverty Index (MPI) estimates that at least 1.2 billion people in 111 developing countries are living in acute multidimensional poverty today. Multidimensional poverty takes into consideration several dimensions of life that are not necessarily related to monetary poverty but that constitute a more comprehensive measure closer to what is socially understood by poverty. The global MPI, for instance, includes indicators of nutrition, child mortality, years of schooling, school attendance, cooking fuel, sanitation, drinking water, electricity, housing and assets. Moreover, the MPI determines the intensity of poverty by the overlap of deprivations in the different indicators. MPIs can also be adapted for countries and regions, adding and changing indicators and dimensions as well as giving more weight to dimensions the population considers more relevant. The MPI can be a great tool to guide policymaking if properly used (UNDP & OPHI, 2022).

Estimations of global income and wealth inequality are no less appalling. According to the World Inequality Report of 2022, the top 10% of the world population captures 52% of all income and 76% of wealth at PPP. At the same time, the bottom 50% captures only 8.5% of all income and 2% of global wealth. Since 1980 within countries' inequality is gradually becoming more pronounced than between countries, representing almost 60% of global inequality among individuals. Moreover, the wealthier population also benefit more from annual wealth growth. Indeed, the top 1% of the population captured 38% of the total wealth growth between 1995 and 2021 (Chancel et al., 2021).

According to a study conducted by Ahmed et al. (2022), inequality contributes to the deaths of 21.300 people every day using conservative estimates. Inequality impacts almost all aspects of human life and is determinant in limiting or even impeding social progress and the realisation of human rights. It is significantly responsible for poverty, hunger, lack of access to health care, and gender-based violence, among many others (Ahmed et al., 2022). One recent and clear example of the impact of income inequality on human lives is the COVID-19 vaccine administration. While high-income countries had coverage of more than 170 per 100 people by January 2022, low-income countries had less than 20 for 100 people in the same period (see Figure 12) (Institute for Policy Studies, n.d.)

Economic deregulation is among the leading causes of income inequality, undermining social protection and allowing massive tax avoidance (Holton, 2020). But besides the evident necessity of better regulating markets, when looking for a possible

solution, progressive wealth taxation as a way of tackling inequality is almost a consensus among scholars nowadays (Ahmed et al., 2022; Atkinson, 2015; Chancel et al., 2021; Holton, 2020; Piketty & Goldhammer, 2014). Another frequently proposed solution is the effective redistribution of resources through social programmes and the creation of reliable welfare states (Ahmed et al., 2022; Atkinson, 2015; Chancel et al., 2021; Holton, 2020).



Figure 12: COVID-19 vaccine doses administered per 100 population at January 19, 2022, by income group. Retrieved from Institute for Policy Studies. (n.d.).

Adding up to the presented issues, it is essential to consider the expected demographic dynamics of the century to think about development. Migration, for instance, in the current scenario can be seen as both a challenge and an opportunity for origin and destination countries depending on the goals and policies in place. The movement of people is intertwined with geopolitics, poverty and inequality, natural events, technology and political conflicts and is often politically instrumentalised as a menace. This phenomenon is, nevertheless, relatively modest. Data from the International Organization for Migration shows that in 2020 3.6% of the global population were migrants, which equates to 281 million people (McAuliffe & Triandafyllidou, 2021).

The problem with migration is the forced displacement of people. With the current war in Ukraine, we have reached the milestone of 100 million forcibly displaced people in 2022. While this new wave of Ukrainian refugees is being somehow managed, many others originating in the global South have not been addressed. Temporary residency with a foreseen

return, resettlement to other countries and, to a considerably less extent, integration are the measures adopted by some countries. Many of these countries, however, also greatly difficult the processes for people to access the available solutions. Other countries directly close their borders to asylum seekers, refugees and people in need of international protection. In the last decade, the adopted solutions to manage displacement rarely met the demand. However, forced international migration numbers are small in comparison to internally displaced people, whose needs are also much less addressed (UNHCR, 2022). Predictably, internal and external displacement is expected to grow with the impact of environmental issues resulting from pollution, biodiversity collapse and climate change (McAuliffe & Triandafyllidou, 2021).

One last crucial demographic data to take into account is population growth. The UN projects that by 2100 there will be 4.2 billion more people worldwide. The previous 4 billion people were added to the world in over 50 years. This time, the global population is expected to top 11 billion in less than 80 years and then cease growing. Differently from the last 4 billion, the new 4 will be old, with virtually no children besides in Sub-Saharan Africa. Specifically, roughly 3 billion people are expected to be added to Africa, of which 2.1 billion are working-age, 500 million children and 500 million elderlies. The remaining 1.1 billion will be composed of 1 billion elderlies in Asia and other 450 million more in other regions, with a significant decrease in children and working-age adults in the world apart from Africa (Lam, 2017).

To keep up with the growing workforce, Africa will have to create new jobs at a very fast rate. In the rest of the world, the challenge will be to absorb 2 billion additional elderly (Lam, 2017). Moreover, the additional 4 billion people will live in a different planet than the previous 4, with a significantly degraded environment to which they will put even more pressure (Grossman, 2017). In a world where more than 800 million people are going hungry (WHO, 2022), guaranteeing food for additional 4 billion people is a major challenge worsened by productivity loss caused by climate change, especially in Africa (Grossman, 2017).

Another challenge this expected population growth represents for human rights realisation is decent housing. According to professor Cohen (2012), the next billions of people will live in cities. This can become a big problem if adequate planning of cities and the construction of decent housing do not take place. There can be a proliferation of slums around big centres and the resulting waves of infectious diseases linked to a lack of proper sanitation systems, as well as a growth in violence and warfare due to poor living conditions, and lack of

access to basic services and economic opportunities. Another thing to bear in mind regarding the concentration of population around big cities is that these cities are disposed mainly around coastlines, which are particularly prone to natural disasters that, as previously mentioned, are expected to grow due to climate change (Cohen, 2012).

Some of the biggest global challenges were covered throughout this subchapter: human-led climate change and environmental degradation, poverty and inequality, migration and populational growth. These topics are interconnected and are affected by international dynamics. As exemplified by the COVID-19 pandemic, most, if not all, of these issues require at least some type of international coordination to be addressed timely and efficiently. Indeed, most of them are covered by at least some framework or agreement created by international organisations. Nevertheless, states' commitments before the international community have repeatedly proven not to be a warranty of positive action.

At this very critical moment in human history, where today's actions will strongly determine global living conditions in the near future, the prospects for international cooperation are becoming increasingly unlikely. We are experiencing a crisis of multilateralism (McAuliffe & Triandafyllidou, 2021; Pinto, 2022) with a fragmentation of power among countries, the most relevant players being the United States and China. According to Pinto (2022), the outcome of the war in Ukraine and the following United States presidential elections will be particularly relevant for the future of multilateralism (Pinto, 2022).

“The most likely scenario for grand multilateral organizations is one of transformation. In the upcoming years, relations in the anarchic international system will be characterized by increasing competition, regionalization and, in some cases, fragmentation. The war in Ukraine has proved, in the most dramatic way, that it takes more than goodwill to sustain liberal principles. Meanwhile, Beijing has been following its global ambitions, combining both soft and hard power and – despite its rhetoric – privileging national interest over global concerns” (Pinto, 2022, n.p.).

Concluding Remarks

Economic complexity theorists emphasise the importance of creating and combining human capabilities in a planned and coordinated way for the economic growth and development of societies. The main finding of the monography is that higher levels of economic complexity is strongly correlated with human rights realisation as measured by the outcome indicators of the SPI. Specifically, the regression analysis shows that 1 point increase in economic complexity leads to a 4.6 increase in social progress. This idea is also supported by the case study of South Korea's development.

Another central proposition reaffirmed throughout the monography is that state action is needed for economic growth not to be an end on itself but benefit societies in an inclusive way, and that redistribution policies are not incompatible with growth. If economic complexity is to be the basis or part of a development strategy, the concerning public administration needs to be active in regulating market dynamics and guiding industrialization efforts. The state needs, furthermore, to predict and tackle the positive and negative effects of such a plan on society and the environment.

Besides the need for states' planning and action in agreement and coordination with the different sectors within a country, there are several issues of a global order far less controllable by single states that can strongly influence their development. International trade, technological dominance and corporate power can be significant influencing factors. A low-income country, for instance, usually does not have relevant bargaining power nor enough competitiveness in international markets and depends on the import of more complex products and technologies. Oftentimes, it is also less economically and politically powerful than the multinationals that operate in the country.

Completing an already complex picture, climate change and environmental degradation-related challenges, poverty and inequality, population growth, migration, and forced displacement must be considered when thinking about development. These challenges mainly result from political elites historically working solely for their benefit, corruption, and global capitalism. In a hyperconnected world, these issues also need a global and multilevel coordinated response which, looking at the current developments in international relations, is very difficult to take place.

So, is development still possible? Yes and no. Some degree of development is possible for some countries. For that to happen, a country would need at least a peaceful society, adequate economic planning, leadership, functioning institutions, population support, social

and economic policies and an environment conducive to development, including international trade and politics, and, in some cases, the availability of international aid and support. It is hard to imagine development taking place in every economically developing nation and even harder when considering countries' contrasting political and economic interests, with cooperation not being a recurrent practice. When it takes place, cooperation is not conducive to real positive outcomes even when the questions at stake threaten life. Once again it seems like realism is explaining world affairs and that real positive change is difficult to happen if not on a small scale in circumscribed locations.

On a final note, in addition to the previously mentioned research limitations concerning the data and scope, we acknowledge the generality with which the topics were treated. The attempt was precisely to make a wide-ranging analysis and give an overview of international relations. The relationship between economic complexity, human rights and the environment can and should be analysed in more restricted areas, using different metrics and more complete data to generate valuable inputs for the creation of development projects and policies.

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