Regional Well-Being Disparities in Morocco and its OECD Partners

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Abstract

This article proposes a multidimensional analysis grid to assess regional disparities, transcending monetary considerations. This grid agrees overall with the common framework that prevails in the literature review that we have carried out. It is built around four dimensions of well-being: economy (development, labor market, human capital and innovation), social (health, living conditions and gender), environment and governance. Our analysis of regional disparities was based on the synthesis of fifteen indicators by constructing a Synthetic Index of Well-being (SIWB) by combining its four dimensions using an aggregative-compensative approach. This analysis covers Morocco, 35 of the OECD member countries and their 389 regions between 2000 and 2019. We have assessed the dynamics of Moroccan regions compared to those of the benchmark. Thus, we have highlighted the gaps to be made up in relation to the different areas of well-being as well as their thematic variations.

Keywords Well-being · Regional disparities · Regional policies · Composite indicators · Aggregative-compensative method · Morocco · OECD

1 Introduction

To be fully relevant, the analysis of regional disparities should go beyond the monetary aspect and cover all aspects of well-being (Stiglitz, 2015). However, the question of well-being has been little covered in Morocco and without taking into account the international environment. Moreover, the social comparison that the Moroccan population can make vis-à-vis its neighbors in nearby European countries or those whose prosperous version is overrepresented in the media, web content and social networks, could influence their own well-being. Diener et al. (2009) cite the case of Southern Europeans vis-à-vis the

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population of Northern Europe and the United States to evoke this asymmetrical comparison that can go beyond direct borders.

In addition, over the past two decades, Morocco has stepped up its cooperation and regional integration efforts both bilaterally and multilaterally, particularly with its main European partners, to get out of the middle-income trap. Furthermore, the European Neighborhood Policy, established since 2004, has shown good will to create a prosperous Euro-Mediterranean area based on close cooperation relations, at least according to article 8, paragraph 1 of the Treaty on European Union (EU) (JOUE, 2012). This cooperation with the immediate neighborhood of Morocco, which resulted in particular in the free trade agreements between Morocco and the EU in 2000,[1] has been extended to the "intermediate" neighborhood with the United States and Turkey in 2006.

Moreover, Morocco is committed to making its regions the keystone of its public policies in order to make the most of its territorial potential. Indeed, Morocco faces challenges related to territorial disparities in well-being, particularly between its peripheral and central regions, with the risk of overlapping a trap for intermediate regions with that existing for Morocco in terms of a trap for intermediate countries. Iammarino et al. (2020) highlighted the increase in economic, social and political risks incurred at the supranational level with the increase of regions in the intermediate trap in the European context. These disparities risk exasperating social tensions at the territorial level of Morocco in the same way as in the countries of the Middle East and North Africa (MENA) since 2011. Tensions in marginalized regions have resulted in anarchic revolts or through the ballot box with the rise of populism with a strong territorial anchoring calling into question the existing sources of well-being and calling for place-sensitive development policies (Muštra & Rodríguez-Pose, 2021; Rodríguez-Pose, 2018). These tensions have been revived by the Covid-19 crisis, which has undermined regions with low resilience potential, in particular those with specializations vulnerable to exogenous shocks (Boumahdi et al., 2020).

Thus, we begin in this article with a review of theoretical and empirical literature to propose a conceptual framework to assess the well-being of regions. Then, we calculate a synthetic indicator evaluating the level of regional multidimensional well-being of Morocco and 35 of its partner member countries of the OECD between 2000 and 2019 in order to highlight the gaps to be made up and to prioritize local public policies.

2 Theoretical Framework of Well-Being

The analysis of regional disparities is often done through monetary indicators such as GDP per capita. However, *«We need to focus not on what is happening on average—as GDP leads us to do—but on how the economy is performing for the typical citizen, reflected for instance in median disposable income. People care about health, fairness and security, and yet GDP statistics do not reflect their decline. Once these and other aspects of societal well-being are taken into account, recent performance in rich countries looks much worse.»* (Stiglitz, 2015).

But, what do we mean by well-being? For this, several definitions, and therefore measures, have been proposed according to the theoretical and philosophical approaches

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[1] Morocco is also one of the partners of the European Neighborhood Policy (ENP) launched by the EU in 2004.

recommended by their designers. In his theoretical review, Fleurbaey (2008) points in particular to three approaches, namely Welfarism, Resourcism and the Capability approach. Welfarism starts from the premise that the goal of morality is to improve the lives of individuals by satisfying their preferences and in fact it is often linked to (or rejected because of) the theory of utilitarianism (Keller, 2009). Indeed, Sen (1979) presents Welfarism as *«principle that the goodness of a state of affairs depends ultimately on the set of individual utilities in that state, and-more demandingly-can be seen as an increasing function of that set».*Subjective well-being is also related to this theory of utilitarianism as it refers to the different ways in which people evaluate their lives either emotionally, by reacting positively or negatively to lived experiences, or cognitively, by evaluating the degree of satisfaction of their life (Diener & Tov, 2012). As for Resourcism, it is based on the principle of an equitable distribution of resources so as to provide compensation in the event of deprivation so that they are a means of achieving equality rather than well-being (Berges, 2007). The capability approach developed by Sen (1999) seems to be a third way between the two previous approaches. It recommends taking an interest in what people are capable of being and doing, in order to assess the quality of life or to design policies conducive to human development, and not to resources, which can be used differently at the same level, nor to the satisfaction of preferences given the difficulty of designing and ordering them.

In their conceptual work highlighting the opportunity of integrating the well-being approach into the local political process, McGregor et al. (2009) define well-being as *«a state of being with others, which arises when human needs are met, when one can act meaningfully to pursue one's goals, and when one enjoys a satisfactory quality of life.».* In fact, *«all studies which seek to incorporate multiple dimensions of quality of life into the evaluation of individual and social situations can be considered, broadly speaking, as pertaining to this approach»* (Fleurbaey, 2008). These studies also share two main difficulties, namely the normative framework for observing and measuring individual capacities,[2] and the appropriate weightings of the dimensions of capacities with different measures to construct a single synthetic index reflecting social choice.

Thus, well-being, like all complex socio-economic phenomena—whose conceptualization is even more complex (Alaimo et al., 2022a, 2022b, 2022c, D'Urso et al., 2022, Maggino & Alaimo, 2021), such as climate change and sustainable growth (Maggino & Alaimo, 2022), human development (Alaimo & Seri, 2023) and sustainable development (Alaimo & Maggino, 2020)—does not result in consensus in the community academic and supra-governmental institutions. This conceptual complexity thus gives rise to a complexity of understanding the studied phenomenon of well-being and its measure(s) (Alaimo, 2022). This understanding is all the more difficult if the phenomenon under study is a tangle of complex systems made up of a wide variety of elements endowed with specialized functions forming a complex systemic hierarchy (Alaimo, 2021).

That said, despite the divergence on the conceptualization, there is near unanimity on the relevance of multi-indicator systems as tools for capturing the full complexity of the phenomenon under study. However, if these systems make it possible to provide detailed dashboards of the phenomenon, several approaches have been proposed to synthesize them, having all their strengths and weaknesses. This complexity is all the more accentuated if the spatial and temporal dimensions are declined in the study of the phenomenon since it changes and adapts to the changing needs of individuals and territories. However,

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[2] Functionings based on capabilities are often easier to observe and present a proxy for measuring capabilities.

this spatial analysis makes it possible to take into account territorial characteristics and better orient public policies at the local level (D'Urso et al., 2022). It also makes it possible to highlight the specific local levers to be stimulated to improve global well-being by highlighting the relationships between the different fields and themes and the factors that have a strong influence on equitable and sustainable well-being (Davino et al., 2018).

The prevailing consensus of the literature review, and which we have adopted, agrees on the advisability of evaluating regional disparities with a multidimensional grid transcending monetary considerations (Table 1). The literature review, both theoretical and empirical, highlights a common framework of dimensions or even themes and indicators proposed as an alternative to the monetary aspect. The apprehension often differs in a subjective way on the measures and the weights associated with them to synthesize the multidimensional analysis. Beyond claiming to constitute an exhaustive and totally consensual basis for evaluating regional disparities, we propose an analysis grid that is globally in line with the common framework identified in the literature review.

2.1 Data and Method

We have built the analysis grid around the four most frequent dimensions of well-being in the literature review: Economy, Social, Environment and Governance. Given the complexity and interest, individual and collective, of the economic and social dimensions, the latter are broken down into 7 themes: Economy (development, labor market, human capital and innovation) and Social (health, living conditions and gender). To measure regional disparities according to these different components, we have aggregated (Fig. 1) fifteen indicators[3] to build the Synthetic Index of Well-being (SIWB) as well as the synthetic indices of its dimensions: economy (SIE), social (SSI), environment (SIEnv) and governance (SIG).

The choice of these dimensions and their themes comes from our literature review and partly agree with the results of the systemic review of Fudge et al. (2021). They noted that the four most cited[4] areas of well-being are jobs and livelihoods (39%), health (38%), education and skills (34%) and the environment (30%). To measure the state of the regions in relation to these areas and themes, we used indicators that contribute to the assessment of collective well-being at the regional level as well as individual well-being (Breslow et al., 2016).

The indicators[5] that we have chosen for the measurement of well-being (Table 1) are as follows:

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[3] Annex, Table2: List of indicators. The sources of regional data internationally are those of the OECD, Eurostat, the World Bank, national databases (example of Statistics Canada) and regional databases (example of the Yukon Bureau of Statistics). Regional data in Morocco comes mainly from the High Commission for Planning (HCP), National Human Development Observatory (NHDO) and Ministry of Economy and Finance (MEF). These data from national sources have been aligned with those of Morocco established by the World Bank to preserve the harmonization of data for international comparison.

[4] The analysis is based on the review of 74 articles using the concept of well-being in research on regional development.

[5] Annex, Table3: Extract of well-being data by domain and theme of the benchmark (median and average), Turkey, South Korea and Morocco and its regions in 2000 and 2019.

2.1.1 Economic domain

2.1.1.1 Development theme GDP per capita in US Dollar, current prices, PPP[6]: Although it is a controversial indicator (Stiglitz, 2015), it is used in the literature as an indicator of resources[7] or even as a predictor of subjective well-being of nations (Diener et al., 2009). We cite, in particular, its use in constructing social well-being by Rodríguez-Pose and Tselios (2015), in measuring Ireland's progress (Central Statistics Office of Ireland, 2019) and in monitoring the sustainable development of Hungary (Hungarian Central Statistical Office, 2020). In his research for the conceptualization of ecosystem-based management using indicators of human well-being, (Breslow et al., 2016) identified[8] the use of this indicator in 9 socio-ecological assessment projects.

Share of the VA of manufacturing industry in the total VA: This indicator makes it possible to highlight the capacity of the regions to transform their primary production. We favored this indicator given Morocco's stated desire to make industrialization a lever for the development of its regions.[9] In addition to industrial added value per capita, it is used in monitoring the 2nd target of Goal 9 of the SDGs (UN, 2016). Hungary favors the share of industry in FDI to highlight the attractiveness of its economy (Hungarian Central Statistical Office, 2020).

2.1.1.2 Human capital theme Share of working people with at least an upper secondary diploma[10]: We used this indicator, which reflects both the quality of education[11] and the capacities developed by individuals in terms of functionalities specific to supporting them in the job market. This indicator has, in particular, been used by Italy in the conceptualization of equitable and sustainable well-being (BES)[12] in the domain of education and training[13] (Istat, 2022), by New Zealand in monitoring its annual well-being budget (New Zealand Government, 2021) and by Canada in the construction of its Well-being Index (Canadian Index of Wellbeing, 2016).[14] Furthermore, this indicator also provides information on subjective well-being, which we were unable to cover directly in our analysis. Indeed, higher levels of education are linked to higher subjective well-being (Helliwell & Huang, 2014)

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[6] Morocco has the lowest GDP per capita in the benchmark with 7856 $US, current PPP, against a benchmark median of 41,056 $US. The lowest values are recorded in the regions of the Atlas (Fez-Meknes (5256 $US) and Béni Mellal-Khénifra (5666 $US)) and the Ultra Atlas (Drâa-Tafilalet (5262 $US)).

[7] GNI per capita would have been more appropriate, as in the case of monitoring SDG 8, to take into account transfers, in particular those of Moroccans abroad, which are equivalent on average to 7% of GDP. However, we did not find the regional breakdown of this indicator for Morocco.

[8] His review compiled 2308 social indicators from 34 socio-ecological assessment projects.

[9] Despite a slight decline compared to 2000 (20.9%), Morocco has a relatively large share of the VA of manufacturing industries (19.5%) compared to the benchmark in 2019 (a median of 14.5%). The most industrialized regions are those of Casablanca-Settat which is deindustrializing (30% in 2019 against 35% in 2000) and Tanger-Tétouan-Al Hoceïma which is strengthening its industrialization (28% in 2019 against 21% in 2000).

[10] This share amounts to 44% in Morocco at the same level as Turkey (44%), but largely low compared to the benchmark (81%), in particular, in Marrakech-Safi (35%).

[11] Unlike the schooling input indicators which reflect neither the quality of the curricula nor the ability of individuals to transform their achievements.

[12] Il Benessere Equo E Sostenibile whose report is in its eleventh edition.

[13] One of twelve domains covering 153 BES indicators for Italy and 29 of its regions and geographic areas.

[14] Other studies have rather favored the share of working people with a higher diploma which seems less appropriate for Morocco, whose first challenge would be to pass the course of secondary education for the entire population.

Table 1 Frequency of use of selected indicators for measuring well-being by domain and theme. *Source* Authors based on cited references.

Domain	Theme	Indicator	(UN, 2016)	(OECD, 2020)	(Eurostat, 2017)	(Istat, 2022)	(New Zealand Government, 2021)	(Australian Bureau of Statistics, 2012)	(Office for National Statistics of UK, 2019)	(Bureau fédéral du Plan Belge, 2021)	(Giesselmann et al., 2013)	(Canadian Index of Wellbeing, 2016)	(Central Statistics Office of Ireland, 2019)	(Hungarian Central Statistical Office, 2020)	(Marguerit et al., 2015)	(Wallace, 2019)	(IWEPS, 2022)
Economy	Development	GDP per capita (US Dollar, current prices, PPP)															
		Share of the VA of manufacturing industry (% in the total VA)															
	Human capital	Share of working people with at least an upper secondary diploma (%)															
		Share of employment in manufacturing industry (% in total employment)															
	Labor market	Employment rate (%)															
		Unemployment rate (%)															
	Innovation	Patent applications (per million inhabitants)															
Social	Living conditions	Number of rooms per person															
		Share of households with broadband internet access (%)															
	Health	Rate of active physicians (per 1000 inhabitants)															
		Infant mortality rate (<1year / 1000 live births)															
	Gender	Gender gap in activity rate, 15-64 years old (female - male, in %)															
		Gender gap in the unemployment rate, 15-64 years old (female - male, in %)															
Environment	Environment	Air pollution (average level of PM 2.5 µg/m³)															
Governance	Governance	Participation rate in general elections															

Notes The color of the boxes indicates whether the indicator we have chosen for the construction of the SIWB exists (Green) or a proxy indicator replaces it (Yellow) or does not exist (Red) in the references consulted.
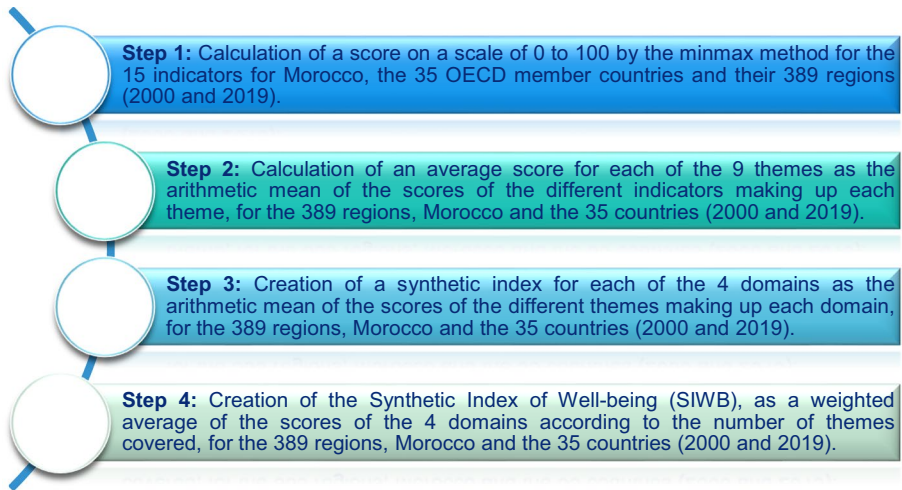

Step 1: Calculation of a score on a scale of 0 to 100 by the minmax method for the 15 indicators for Morocco, the 35 OECD member countries and their 389 regions (2000 and 2019).

Step 2: Calculation of an average score for each of the 9 themes as the arithmetic mean of the scores of the different indicators making up each theme, for the 389 regions, Morocco and the 35 countries (2000 and 2019).

Step 3: Creation of a synthetic index for each of the 4 domains as the arithmetic mean of the scores of the different themes making up each domain, for the 389 regions, Morocco and the 35 countries (2000 and 2019).

Step 4: Creation of the Synthetic Index of Well-being (SIWB), as a weighted average of the scores of the 4 domains according to the number of themes covered, for the 389 regions, Morocco and the 35 countries (2000 and 2019).

Fig. 1 Methodology for constructing the synthetic index of regional well-being (SIWB)

with a larger effect in Africa (Helliwell, 2008). In addition, education seems to have an effect on the other themes of well-being, in particular, health[15] and governance.[16]

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[15] In a study of 15 European countries, Mackenbach et al. (2019) found a gap in life expectancy between people with low and high levels of education, ranging from 2.3 years to 8.2 years in men and 0.6 to 4.5 years in women.

[16] Milligan et al. (2004) found that educational attainment is strongly related to measures of political interest and commitment in the United States and the United Kingdom, including the one we chose for the measure of governance (vote for the United States). The link is, however, not proven for this indicator in the United Kingdom.

Share of employment in manufacturing industry in total employment: This indicator makes it possible to highlight the capacity of workers to integrate more qualified and formal activities in support of the industrialization of the regions.[17] This indicator is used in the monitoring of the 2nd target of the SDG 9 (UN, 2016).

2.1.1.3 Labor market theme Employment rate[18]: This indicator is one of the most used[19] to highlight economic development but also the quality of education and training and the potential they give to individuals to transform their resources (education and training) into features [capabilities developed by Sen (1999)]. Moreover, this indicator is strongly linked to the subjective well-being of individuals (Helliwell & Huang, 2014) and makes it possible to universally account for well-being (Clark & Hodgett, 2019).

Unemployment rate[20]: Like the employment rate, this indicator is widely used[21] for the same reasons mentioned. In addition, unemployment accentuates the feeling of social exclusion of individuals leading to a loss of freedom, autonomy and self-confidence (Sen, 1999). Moreover, this indicator has a negative effect not only on the subjective well-being of unemployed individuals but also on those in employment by accentuating the feeling of insecurity (Helliwell & Huang, 2014).

2.1.1.4 Innovation theme Patent applications per million inhabitants[22]: Innovation has increasingly imposed itself as a marker of the quality of the education system and productive ecosystems. It makes it possible to highlight the knowledge capital of an economy which has the same importance, if not more, than the material capital. The most frequently used indicator is the share of research and development expenditure in GDP. Due to the unavailability of data in Morocco at the regional level, we have favored patent applications[23] as a result indicator highlighting the capacity of an economy to produce innovation through allocated expenditure (the inputs).

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[17] Morocco has a share (21%) in 2019, up compared to 2000 (13%), relatively large compared to the benchmark (a median of 11%), in particular, in the economic capital region of Casablanca-Settat (23% in 2019 compared to 18% in 2000).

[18] This rate fell in Morocco from 52% in 2000 to 46% in 2019, well below the benchmark level where it rose from 63 to 68%. The lowest rate is recorded in the Ultra Atlas Drâa-Tafilalet region (42%) which also has the lowest GDP per capita (5262 $US).

[19] This indicator was used in 12 of the references listed in Table 1.

[20] This rate fell in Morocco from 10.8% in 2000 to 9.2% in 2019 but remains at a level well above the benchmark level where it fell from 6% to 5.6%. The lowest rate is recorded in the predominantly rural and agricultural region of Béni Mellal-Khénifra (5%).

[21] This indicator was used in 9 of the references listed in Table 1. It is often supplemented by the long-term unemployment rate (Canadian Index of Wellbeing, 2016; OECD, 2020) or replaced by the rate of non-participation in the labor market (Istat, 2022).

[22] Morocco records the lowest level (10 patent applications per million inhabitants) of the benchmark (40) with the lowest levels in the southern (0) and Oriental (0) regions. This indicator is among the most discriminating in the benchmark (a coefficient of variation of 1.35) with an average (81) twice higher than the median and the highest value in the Dutch region of North Brabant (750).

[23] Also used by Italy among the twelve indicators covering the domain of innovation, research and creativity of the BES (Istat, 2022).

2.1.2 Social domain

2.1.2.1 Living conditions theme Number of rooms per person[24]: In addition to other healthy living indicators,[25] this indicator is used to measure the living conditions of people (Eurostat, 2017; New Zealand Government, 2021; OECD, 2020).[26] This indicator is also important for other social aspects, in particular the education of children (Stiglitz et al., 2009).

Share of households with broadband internet access[27]: Access to broadband allows a significant qualitative change in the social and economic aspects and allows building a knowledge society (Stiglitz et al., 2009) and creating social ties albeit virtual. The importance of the digital divide in territorial and individual exclusion has been highlighted by the COVID-19 pandemic crisis given its importance to access to teleworking, e-education and government services in times of confinement. This indicator is used to measure the well-being of OECD countries (OECD, 2020) and to monitor several targets, including that of cooperation for the transfer of knowledge between countries, namely the 6th target of the SDG 17 (UN, 2016).

2.1.2.2 Health theme Rate of active physicians per 1000 inhabitants: This resource indicator is used less and less given that it does not take into account the question of accessibility, in particular, at the local level and the question of the ability to benefit from health services. On the other hand, life expectancy (OECD, 2020), even life expectancy in good health (Marguerit et al., 2015), has been given priority. However, in addition to the unavailability of information at the local level, the question of territorial coverage by medical and paramedical health personnel is a first step that Morocco still cannot overcome.[28] Moreover, this indicator has regained importance since the pandemic. Thus, among 33 new indicators covering 8 domains, it was integrated in Italy into the 2020 edition of the BES to assess the domain of quality of services (Istat, 2021). We therefore deemed it appropriate to include this indicator in our analysis, which remains relevant as an input indicator for assessing well-being (Stiglitz et al., 2009).

Infant mortality rate[29] (Deaths under one year old per 1000 live births): In order to remedy the shortcomings of the first indicator in terms of the quality of health and the ability of people to benefit from the resources made available to them provisions, we used this indicator. Also, it provides information on levels of malnutrition, living conditions (sanitation

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[24] The level has stagnated in Morocco and its regions at around 0.7 room per person against 1.8 for the benchmark.

[25] In particular the connection to drinking water, electricity and sanitation.

[26] More specifically, a derived indicator is used, namely the percentage of households living in overcrowded conditions, i.e. with less than one room per couple, per pair of children under 12 and per person aged 18 or over.

[27] The level stagnated in Morocco at 19%, which favored mobile over wired coverage, while it increased exponentially in the benchmark regions, rising from 16 to 78%. The economic (Casablanca-Settat (25%)) and administrative (Rabat-Salé-Kénitra (25%)) capital regions are the best covered.

[28] Despite having more than doubled its coverage with 1.8 doctors per 1,000 inhabitants in 2019 against 0.7 in 2000, Morocco still records a gap relative to the benchmark (a median of 2.5 down from 2000 (2.9)), especially in the Ultra Atlas region of Drâa-Tafilalet (0.3).

[29] Morocco has significantly improved its rate, going from 23 to 14 deaths per 1,000 live births, but at a level that remains above the benchmark (4). The highest level is recorded by Drâa-Tafilalet (19) which also has the lowest coverage rate per doctor in Morocco.

and access to drinking water) and economic vulnerability (Clark, 2005; Sen, 1999) as well as, overall, on the effects of socioeconomic conditions and the efficiency of medical systems on maternal and child health (Stiglitz et al., 2009). Moreover, this indicator is based on administrative data and is therefore relatively better informed in countries where information systems are in the development phase, such as Morocco. This indicator also seems to be a good predictor of the subjective well-being of nations (Diener et al., 2009).

2.1.2.3 Gender theme Gender gap in activity rate, 15–64 years old (female–male, in %): The importance of the issue of gender inequalities in employment and wages in assessing the quality of paid work has been highlighted by Sen (1999). However, inequalities for developing countries such as Morocco begin even before reaching the labor market with entry barriers that materialize in the low rate of activity of women.[30] In addition, we have chosen this indicator at the level of the social field to synthesize the different gender inequalities (education, health, etc.) which are often reinforced and sedimented.

Gender gap in the unemployment rate, 15–64 years old (female–male, in %): We have chosen this indicator to complete the evaluation of the course of gender discrimination before and after integration into the labor market[31] (or at least the will to integrate it).

2.1.3 Environment domain

Air pollution (average level of PM 2.5 μg/m³)[32]: This indicator is widely used (Central Statistics Office of Ireland, 2019; Istat, 2022; New Zealand Government, 2021; UN, 2016) as a marker of the sustainability[33] of economic activity but also as an indicator of quality of life and health for the population (Breslow et al., 2016).

2.1.4 Governance domain[34]

Participation rate in general elections[35]: We have chosen this indicator to measure the opportunity seized by citizens to express themselves on issues concerning the development

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[30] Morocco records a significant gap between women and men in terms of activity rate (−50% points in 2019), particularly in the Oriental region (−56), relative to the benchmark (a median of −12) and which has persisted since 2000 (−49).

[31] The gap between women and men in terms of the unemployment rate widened by 0.7 to 2 percentage points between 2000 and 2019, while there is near parity in the benchmark (0.2). However, this median observation hides large disparities between the regions of the benchmark since this indicator is the most discriminating of the indicators of well-being with a coefficient of variation of 3. Thus, the extent of the differences between women and men in terms of the unemployment rate goes from 7 percentage points against women in the Turkish region of Southeastern Anatolia—Middle to 15.4 percentage points in their favor in the Turkish region of Southeastern Anatolia—East. The observation is the same in Morocco with a range of -2.3 percentage points difference in Drâa-Tafilalet to 15 percentage points in Guelmim-Oued Noun and Dakhla-Oued Ed-Dahab.

[32] The environmental issue was the most difficult to monitor at the regional level in Morocco. The air pollution rate stagnated at 33 μg/m³ of PM 2.5 against 13 for the benchmark with the highest value in the economic and industrial capital region of Casablanca-Settat (67). The lowest rate in Morocco is recorded by the mountainous region of Béni Mellal-Khénifra.

[33] This indicator has been integrated in Italy into the 2020 edition of the BES to assess the domain of environment (Istat, 2021).

[34] The rate in Morocco increased from 42% in 2000 to 51% in 2019 against a stagnation of the benchmark at 72%. The lowest participation rate in Morocco is that of the metropolitan region of Casablanca-Settat with 42% against the highest rate in Laâyoune-Sakia El Hamra (69%).

[35] This indicator was used in 7 of the references that we listed in Table 1.

of public policies (at least in their programmatic and ideological aspects). It is an indicator that also makes it possible to raise the level of democracy and fundamental freedoms that are an integral part of well-being (Stiglitz et al., 2009).

We have analyzed regional disparities through an international comparison in order to reflect the development of Moroccan regions with greater geographical coverage. This gives an idea of the potential attractiveness of Moroccan regions in an increasingly globalized world and where competitive territorial hubs make it possible to create development inflections for the whole country. Thus, this analysis covers Morocco, 35 of its OECD member partners and their 389 regions between 2000 and 2019.[36]

The advantage of this benchmark is that it encompasses both developing comparable countries (Mexico and Turkey) and developed ones (Germany, Australia, Austria, Belgium, Canada, South Korea, Chile, Denmark, Spain, Estonia, United States, Finland, France, Greece, Hungary, Ireland, Iceland, Italy, Japan, Latvia, Lithuania, Luxembourg, Norway, New Zealand, Netherlands, Poland, Portugal, Slovak Republic, Czech Republic, United Kingdom, Slovenia, Sweden, Switzerland). Moreover, in addition to its adherence to 28 OECD legal instruments, Morocco[37] enjoys associate status with four OECD committees (investment, regional development policies, tourism and the Board of Directors of the development center), the status of participant in one committee (public governance) and invitee status in five committees (working group on bribery in international business transactions, fiscal affairs, statistics and statistical policy, education policy, and SMEs and entrepreneurship).

It should be noted that the Benchmark countries account for 62% of Morocco's foreign trade, with 14.79 billion $US for Morocco's exports (51% of its total exports) and 34.2 billion $US for Morocco's imports (69% of its total imports) in 2019,[38] as well as 69% of foreign direct investment, with a stock of 34.9 billion $US in 2019.[39]

In addition, 23 of these countries are also part of the European Union,[40] Morocco's main partner with 67% of foreign trade, including a contribution of 51 points from the countries selected for the benchmark,[41] as well as 54% of foreign direct investment, with a stock of 44.6 billion $US in 2019.[42] In addition, some currently developed countries of the Benchmark had a level comparable to that of Morocco in 1960, in particular, South Korea whose GDP per capita amounted to 158 $US against 165 $US for Morocco. Finally, the countries chosen for the Benchmark best cover all the continents and the most important geographical and economic regions.

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[36] Within the limits of available data, the analysis covers the period 2000–2019 with particular attention to the base year (2000) and end of period (2019).

[37] https://www.oecd.org/mena/economies/morocco/.

[38] Authors' calculation based on data from the exchange department. https://services.oc.gov.ma/DataBase/CommerceExterieur/requete.htm.

[39] Authors' calculation based on data from the exchange department. https://www.oc.gov.ma/sites/default/files/publication/S%C3%A9ries%20stat/Investissements%20directs%20%C3%A9trangers%20au%20Maroc_Stock_Par%20pays.xlsx

[40] Including the United Kingdom, whose exit from the EU was only recorded on 01/31/2020, i.e. beyond our analysis period.

[41] Authors' calculation based on data from the exchange department. https://services.oc.gov.ma/DataBase/CommerceExterieur/requete.htm.

[42] Authors' calculation based on data from the exchange department. https://www.oc.gov.ma/sites/default/files/publication/S%C3%A9ries%20stat/Investissements%20directs%20%C3%A9trangers%20au%20Maroc_Stock_Par%20pays.xlsx.

The territorial unit used is the region corresponding to territorial level 2 of the OECD (2021) nomenclature which is consistent with the nomenclature of territorial units for statistics (NUTS 1) for European countries.

In order to correctly measure the disparities between regions in terms of well-being, it is necessary to choose an approach that makes it possible to synthesize all the indicators chosen in relation to the different areas of well-being while taking into account its complexity (D'Urso et al., 2022; Łuczak & Just, 2021; Maggino & Alaimo, 2021). The most common approach in the literature is the aggregative-compensative approach, which consists of aggregating all the indicators using appropriate mathematical methods to construct composite indicators (Boarini et al., 2006).

To make this choice, we have adopted the guide proposed by Mazziotta and Pareto (2013) which begins by distinguishing whether the individual indicators are substitutable or not (Fig. 2). In our case, we judged that the individual indicators of the same theme are substitutable and in this case we chose aggregative-compensative approach to combine the indicators. For this, two approaches can be used, one simple and easy to understand by decision-makers, which consists of aggregating the indicators in an additive way using a basic mathematical function such as the arithmetic mean in our case.

The alternative would have been to make the aggregation by a PCA. However, despite of its applicability and that it settles the question of the aggregation and the weighting in an objective way, this method remains difficult to understand and to approve by the uninitiated decision-makers, especially at the regional level. Furthermore, PCA has limitations related to the fact that it is a reflexive approach—the individual indicators denote the effects of an underlying latent variable-, and that it ignores the polarities of indicators relative to the phenomenon studied. Moreover, it only represents a limited part of the total variance, does not allow inter-spatial and inter-temporal comparisons to be made, and is purely empiricist with dimensions based on the variability of indicators and not on a theoretical conceptual framework (Mazziotta & Pareto, 2019).

Then, we made a subjective choice to give the same weight to all the indicators, all the themes and all the domains in the absence of concerted objective weights after having normalized them by the minmax method which allows to make an absolute comparison.

However, despite being widely used, the compensatory aggregate approach, which we have adopted, has been criticized, conceptually, methodologically and technically, and the non-compensatory approach has been proposed as an alternative to partially remedy to these criticisms (Maggino, 2017).

Several methodologies have been proposed for the non-compensatory approach, ranging from simple mathematical formulas to complex procedures. This is, in particular, the application of the poset adapted to the processing of ordinal data (Alaimo & Conigliaro, 2021; Alaimo et al., 2022a, 2022b, 2022c; Conigliaro, 2022; Fattore et al., 2015) and cardinal data (Alaimo et al., 2021, 2022a, 2022b, 2022c) that can have different levels of scale. It needs neither standardization nor aggregation of the basic indicators regulating the limits of the aggregative methods. A non-compensatory composite index (MPI) has also been proposed for spatial comparisons with, in addition, a variant for spatio-temporal comparisons (Mazziotta & Pareto, 2016). This variant makes it possible to appreciate the absolute changes over time by normalizing the data by rescaling the individual indicators according to the possible range of each indicator [min,max] for all the periods considered.

A third way considers a compromise between a fully compensatory method and a fully non-compensatory method, namely the partially non-compensatory method such as the midpoint of aggregation (MAP) which is only partially affected by compensability (Alaimo & Seri, 2023).

However, we will limit ourselves in this article to the compensatory approach. Indeed, this approach has the advantage of starting from a dashboard allowing a detailed reading of territorial disparities and then of making an aggregated analysis by theme, then domains then overall, in a simple and easy way to be understood by decision-makers.

The standardization of indicators by the minmax method makes it possible to put data of different scopes and units on the same scale while preserving the relationships between the original values (Han et al., 2012). This method has been widely used to assess multidimensional well-being (Greco et al., 2020; Koronakos et al., 2020; Pontarollo & Serpieri, 2020).

Thus, we brought all the new values V_i^N to the same scale [Nmin, Nmax] by normalizing the variables having a positive connotation for the high values (e.g. GDP per capita) as follows:

$$V_i^N = \frac{V_i - V_{min}}{V_{max} - V_{min}} * (Nmax - Nmin) - Nmin \tag{1}$$

And the variables with negative connotation for high values (e.g. unemployment rate) as follows:

$$V_i^N = Nmax - \frac{V_i - V_{max}}{V_{max} - V_{min}} * (Nmax - Nmin) \tag{2}$$

We have chosen to normalize the values in a scale [Nmin = 0, Nmax = 100].

2.2 Results and Discussions: Evolution of the Synthetic Index of Well-Being of Morocco, of the 35 Benchmark Countries and Their 389 Regions

Analysis of the SIWB by country in 2019 (Fig. 3) highlights North–South disparities with the highest scores in Oceania, Western Europe, including Scandinavian and Benelux countries, and North America (apart from Mexico and areas near the Arctic Circle).

Morocco has the lowest score (36) along with Mexico (46) and Chile (46) as well as the countries of South-Eastern Europe, in particular Greece (52) and the countries concerned by the last enlargement of the EU in 2004, in particular, those of Eastern Europe (Poland (51), Slovenia (55), Lithuania (55), Slovak Republic (56) and Hungary (57)) (Fig. 4).

Morocco's position is also tainted by a relatively greater regional disparity compared to other countries with a Theil entropy index of 0.018[43] pushing up the total disparities of the benchmark to 0.014 (Fig. 5). Indeed, the decomposition of the Theil entropy index highlights the preponderance of inter-country inequalities (87% of total inequalities) relative to those within countries (13% of total inequalities).

Interregional disparities in Morocco emanate from regions with large metropolises that record low SIWB scores such as Casablanca-Settat (22) and Rabat-Salé-Kénitra (28)

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[43] This value remains globally low given its normalized value (0.24/100).

against a national score of 36. They are due to the low scores in the field of the environment, with respective scores of 0 and 26 against a national score of the Synthetic Index of the Environment (SIEnv) of 53. To a lesser extent, they are due to those in the field of governance, with respective scores of 16 and 25 against a national score of the Synthetic Index of Governance (SIG) of 29 (Fig. 6).

On the other hand, the interregional disparities of the advanced countries such as Canada, Spain and Finland emanate from the peripheral territories having different ethnic, geographical and/or historical compositions. This concerns the provinces of Nunavut[44] (45) and Northwest Territories[45] (55) with a large indigenous population of Canada (65), the enclaves disputed by Morocco (Labatut, 1985) of Melilla (41) and Ceuta (48) of Spain (60), and the Svecophone autonomous territory of Åland[46] (27) of Finland (67).

Interregional disparities in Canada arise from the social domains (respective scores of 21 and 48 for Nunavut and the Northwest Territories against a national score of 71 for the Social Synthetic Index (SSI)). To a lesser extent, they emanate from the economic domain (respective scores of 25 and 35 against a national score of 42 for the Synthetic Index of the Economy (SIE)) and governance (respective scores of 32 and 44 against a national score of 55 for the SIG). The same goes for Finland with an SSI score of 57 for Åland against a national score of 74, SIE of 40 against a national score of 47 and SIG of 22 against a national score of 52. Regional disparities in Spain emanate more from the economic domains (respective scores of 14 and 17 for Melilla and Ceuta against a national score of 30 for the SIE) and governance (respective scores of 24 and 29 against a national score of 57 for the SIE).

The concentration of interregional disparities in the same geographic area,[47] such as in Canada and Spain, is noticeable in Mexico with the lowest scores in the federal states of the Isthmus of Tehuantepec to the south, namely Oaxaca (40), Chiapas (40), Puebla (40), Tlaxcala (41) and Veracruz (41) against a national score of 46. The same goes for Turkey where the lowest scores are recorded in the east of the country, in particular, in the three regions of Eastern Anatolia, namely Southeastern Anatolia—East, Eastern Anatolia—East and Northeastern Anatolia—East with SIWB scores of, respectively, 43, 46 and 49 against a national score of 60.

The analysis of the dynamics of the SIWB by country between 2000 and 2019 reveals an almost total improvement in the well-being of the territories (Fig. 7). The largest decline was recorded by the territories of Chile, which recorded a national average annual growth rate (AAGR) of SIWB of -1.2%, notably, the regions of the northern coastal desert,

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[44] Vast territory of 2.1 million km^2 and 38,780 inhabitants of Antarctica with a low density (0.018 inhab/km^2) and more than 83% populated by Inuit. This territory was created on April 1, 1999 from a Northwest Territories partition by providing it with an autonomous government. Source: Authors based on Nunavut Bureau of Statistics http://www.stats.gov.nu.ca/fr/home.aspx and Nunavut Act https://laws-lois.justice.gc.ca/eng/acts/n-28.6/.

[45] Territory of 1.1 million km^2 and 45,515 inhabitants, west of Nunavut, with a low density (0.034 inhab/km^2) and more than 50% populated by indigenous peoples (First Nations and Inuit). Source: Authors based on NWT Bureau of Statistics https://www.statsnwt.ca/ and Statistics Canada https://www12.statcan.gc.ca/census-recensement/2016/as-sa/fogs-spg/Facts-PR-Eng.cfm?TOPIC=9&LANG=Eng&GK=PR&GC=61&wbdisable=true

[46] Archipelago, which is an exception for historical reasons, being classified NUTS 1 and TL2 while it has only 19,902 inhabitants against a European standard between 3 and 7 million inhabitants.

[47] These deviations of a region from the national level on several domains of well-being have also been noted at the level of the southern provinces and the islands of Italy (Alaimo et al., 2022a, 2022b, 2022c; Davino et al., 2018).

namely the region on the Argentine-Bolivian border of Antofagasta (-1.4%) and that of Coquimbo (-1.4%). Decreases concerned, but to a lesser extent, the sparsely populated territories of Greece (-0.2%), in particular the region of the Aegean islands of the North Aegean[48] (-0.8%) and the north-west mountainous region of West Macedonia[49] (-0.7%), as well as Slovenia (-0.3%) and Iceland (-0.1%).

The regions of Morocco ($+0.8\%$) recorded the highest AAGR of the Benchmark as well as those of Poland ($+1.2\%$) and the United States ($+1.4\%$). The growth of well-being in Morocco is due to those of the domains of governance ($+3.2\%$), social ($+1\%$), particularly in terms of health ($+3.4\%$), and economy ($+1\%$), particularly in terms of innovation ($+2.5\%$) and human capital ($+3.5\%$) while Morocco's SIEnv fell by -0.2%.

The most dynamic Moroccan regions are those with the same central geographic influence (Fig. 8), namely those of the Ultra-Atlas, Drâa-Tafilalet ($+1.3\%$), the Atlas, Béni Mellal-Khénifra ($+1.2\%$), and their foothills and plains Marrakech-Safi ($+1.1\%$) and Souss-Massa ($+1.1\%$). The domains of social and governance contributed the most to the growth of well-being in these regions with, respectively, $+3.2\%, +1.9\%, +1.5\%$ and $+2.6\%$ for Drâa-Tafilalet, Béni Mellal-Khénifra, Marrakech-Safi and Souss-Massa concerning the social domain and $+3.2\%, +4.5\% +4\%$ and $+3.3\%$ concerning the domain of governance. In contrast, metropolitan regions are less dynamic in terms of well-being (Casablanca-Settat ($+0.6\%$), Tanger-Tétouan ($+0.6\%$) and Rabat-Salé-Kénitra ($+0.8\%$)) due to their declines in the environmental domain (respectively $-100\%, -0.1\%$ and -0.7%) and their weak growth in the social domain (respectively $+0.1\%, +1.2\%$ and $+0.4\%$). This core-periphery duality also noted in the case of the Colombian departments (Peiró-Palomino et al., 2021) the Italian provinces (Calcagnini & Perugini, 2019).

Regarding Poland, the growth of its well-being ($+1.4\%$) follows that of the domains of the economy ($+2.8\%$), particularly in terms of innovation ($+8.6\%$) and human capital ($+3.1\%$), and social ($+1.5\%$), particularly in terms of living conditions ($+7.1\%$). The most dynamic Polish regions are those of Mazowieckie[50] ($+1.4\%$), particularly in the field of governance ($+2.5\%$) and in the economic aspect ($+2.4\%$) of innovation ($+7.5\%$) and the social ($+1.5\%$) of living conditions ($+6.2\%$), and Śląskie[51] ($+1.3\%$), particularly in the domain of governance ($+2.1\%$) and in the economic aspect ($+2.2\%$) of the labor market ($+4.9\%$) and the social ($+1.5\%$) of living conditions ($+5\%$).

As for the United States, the growth of its well-being ($+1.2\%$) is particularly attributable to those in the domain of governance ($+5.7\%$), and to a lesser extent, in the economic aspect ($+0.1\%$) relating to development ($+1.2\%$), and the social component ($+0.5\%$) relating to living conditions ($+1\%$). The most dynamic region is the state of the oceanic archipelago of Hawaii[52] ($+1.6\%$), also in the domain of governance ($+7.9\%$) and, to a lesser extent, the economic aspect ($+0.4\%$) relating to development ($+3.2\%$) and the social component ($+0.5\%$) relating to living conditions ($+1.1\%$).

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[48] Formed from nine islands on the Turkish border and created by the 1987 administrative reform with the lowest Greek population.

[49] Rural, mountainous and sparsely populated region bordering the Republic of North Macedonia.

[50] The largest and most populated Central Eastern Voivodeship in Poland including the capital Warsaw.

[51] The densest and most urbanized Voivodeship in southern Poland, to the Chechen and Slovak border, with a metallurgical industry developed around iron and coal mines.

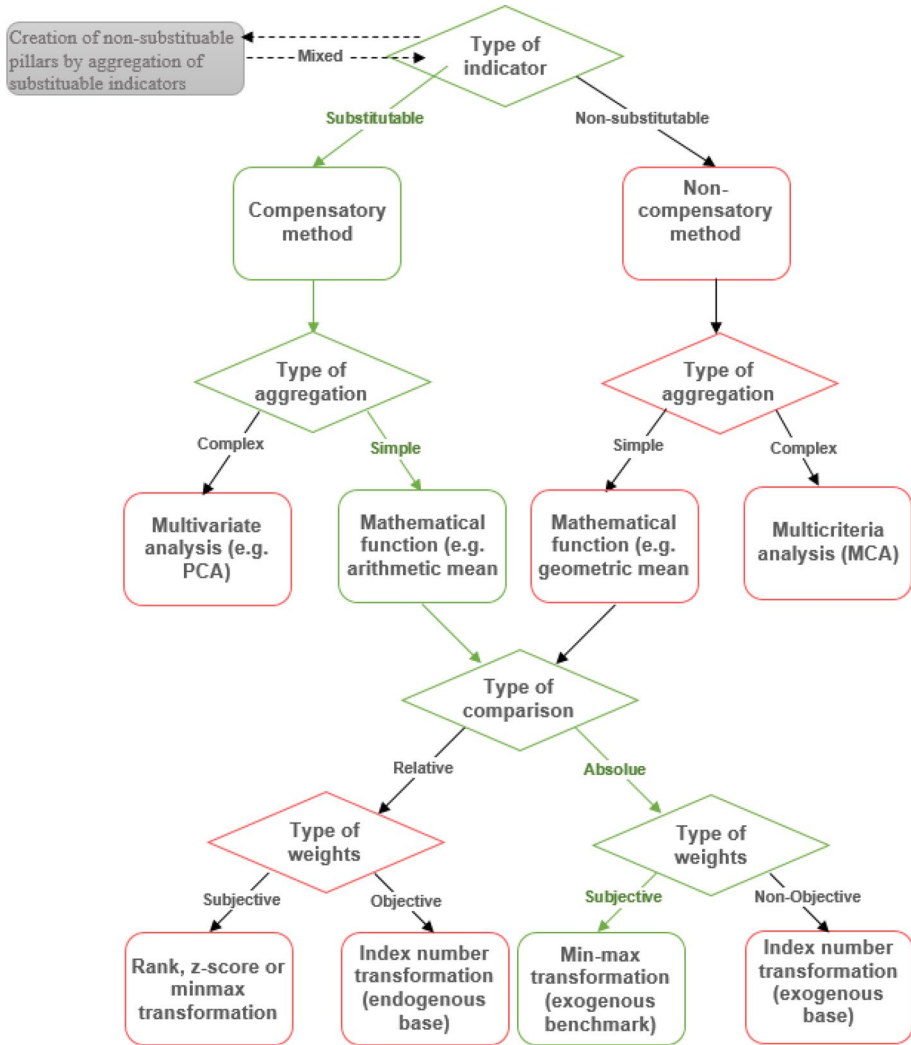[52] Last state to join the Union in 1959.

Fig. 2 Approach to choose the method for the construction of the synthetic index of well-being (SIWB). *Notes* The lines and quadrants in green represent the path chosen by the authors in the flowchart proposed by Mazziotta and Pareto (2013). *Source* (Mazziotta & Pareto, 2013) adapted by authors

This territorial dynamic, in general, and that of Morocco, in particular, was accompanied by a slight widening of regional disparities[53] with an overall Theil entropy index going from 0.012 in 2000 to 0.014 in 2019. That of Morocco evolved in the same proportions from 0.014 in 2000 to 0.018 in 2019. Beyond Morocco, this slight widening of inequalities also concerned Canada (from 0.004 to 0.005), Finland (from 0.002 to 0.004), Spain (from

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[53] This structural widening of the territorial gap has also been noted at the level of the Italian regions, which is perpetuated over time and this, on the three dimensions of well-being (D'Urso et al., 2022).

Fig. 3 Map of the synthetic index of well-being (SIWB) of the 389 regions of Morocco and the 35 countries of the benchmark in 2019 with Zoom on Morocco and Europe. *Source* Authors

0.003 to 0.005) and Greece (from 0.001 to 0.003). The decomposition of the Theil entropy index highlights the persistence of the preponderance of inter-country inequalities (86% of total inequalities on average over the period) relative to those within countries (14% of total inequalities) between 2000 and 2019.

3 Conclusion

The analysis of the evolution of the Moroccan regions compared to the regions of the benchmark has made it possible to have the right measure of the dynamics initiated during the last two decades and the gaps to be made up in relation to the various economic, social, environmental and governance domains of the well-being as well as their thematic distributions. This tree-structured analysis has made it possible to put the Moroccan regions in an international, globalized and increasingly competitive perspective, making it possible to meet the challenges they face and the inflections called upon to take, in particular, in terms of living conditions and innovation.
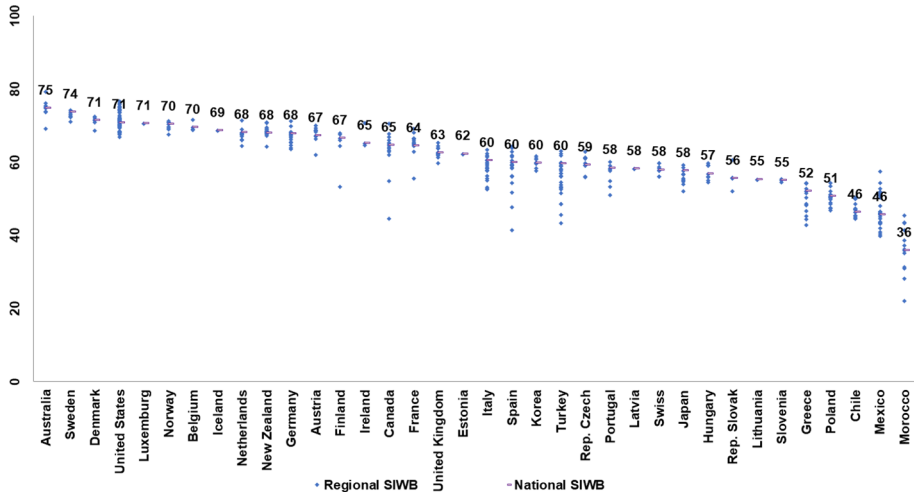
Fig. 4 Regional dispersion of the synthetic well-being index (SIWB) of Morocco and the 35 benchmark countries, in 2019. *Source* Authors
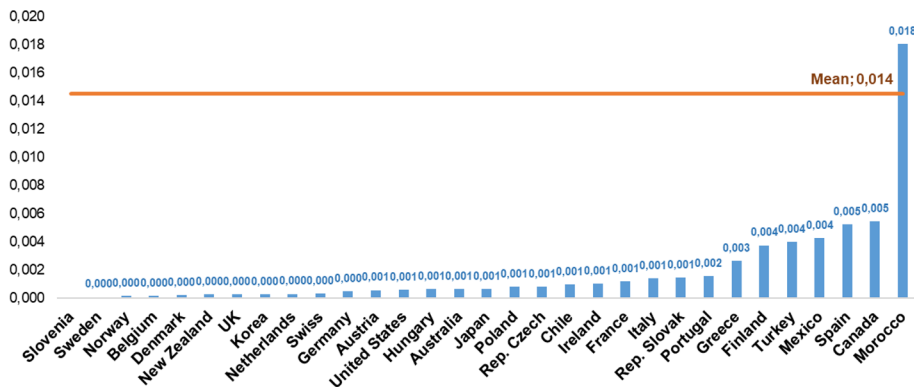

Fig. 5 Theil entropy index revealing interregional disparities in well-being in Morocco and in 30 benchmark countries in 2019. *Notes* Theil entropy index does not cover Lithuania, Latvia, Estonia, Iceland and Luxembourg, which are composed of a single region. *Source* Authors

This comparative and declined analysis makes it possible to think of localized institutional and participative measures centered on the reduction of territorial disparities on the various articulated segments of well-being. This articulation both between the latter and between the territories, with the analysis in which we have integrated the national dimension of the countries, also makes it possible to integrate territorial priorities with national ones and to bring public policies into line functional, sectoral and territorial. Our approach thus makes it possible to enrich new approaches in spatial research with new conceptual and methodological perspectives on well-being, as recommended by Mulligan (2019).
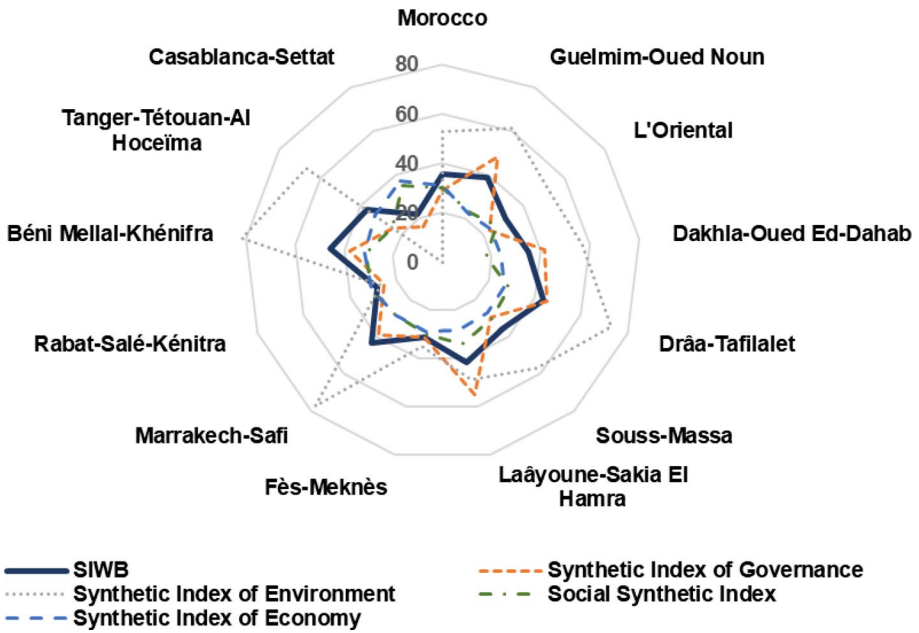
Fig. 6 Regional distribution of SIWB in Morocco in 2019, by domain. *Source* Authors
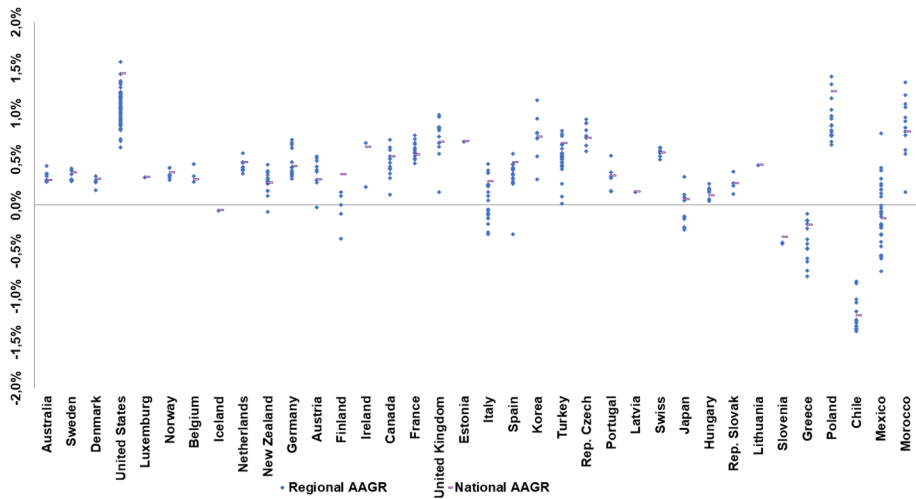
Fig. 7 Regional average annual growth rate of the SIWB of the 389 regions of Morocco and the 35 benchmark countries between 2000 and 2019. *Notes* Countries sorted from left to right according to their SIWB levels in 2019. *Source* Authors

Our approach also contributes to promoting opportunities in declining regions while those of dominant and heterodox theories are increasingly unable to consolidate the process of regional convergence (Iammarino et al., 2019).

Fig. 8 Map of the SIWB AAGR of the 389 regions of Morocco and the 35 countries of the benchmark between 2000 and 2019 with Zoom on Morocco and Europe. *Source* Authors

In addition, the conceptual framework of well-being serves as a basis for diagnosis, programming and prioritization of local development projects. Indeed, the regional councils of Morocco, which have just been elected in September 2021, are required to draw up regional development plans (RDPs) and to ensure their implementation and evaluation with attributions and interactions governed by the law.[54]

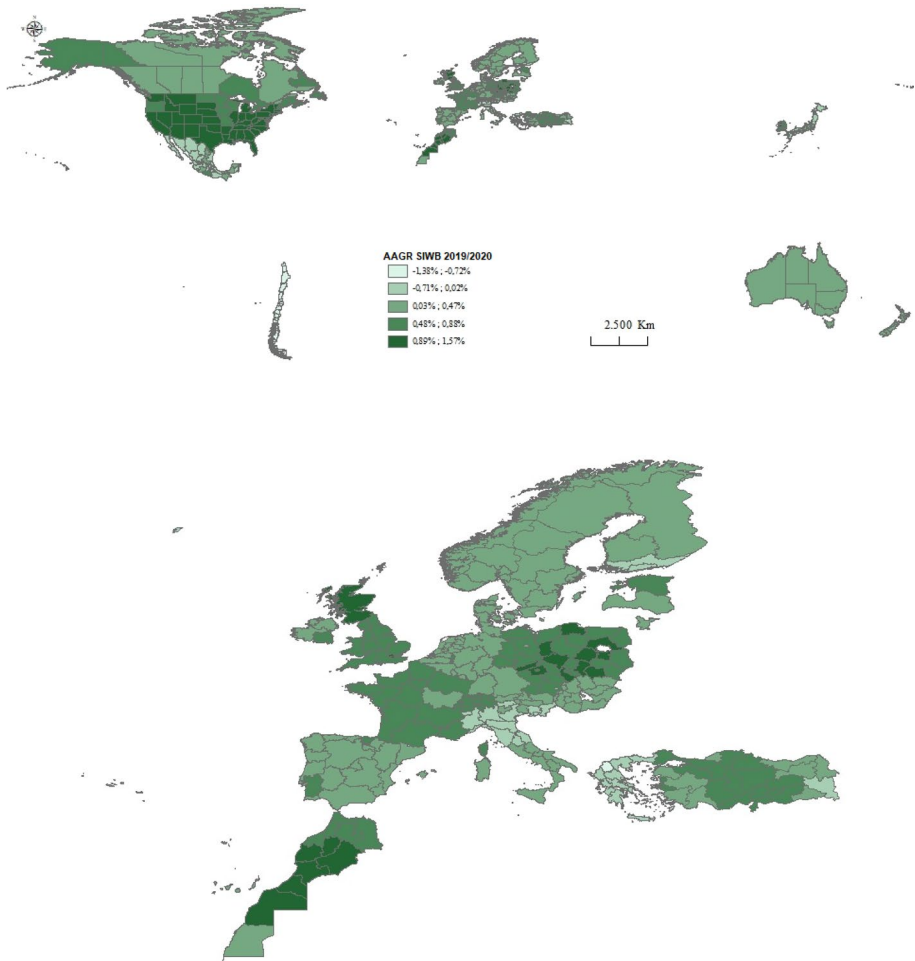Despite the interest of our aggregative-compensative approach from the point of view of its simplicity and its intuitive approach that can be assimilated by decision-makers, in

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[54] In particular, Title IX of the Moroccan 2011 Constitution relating to regions and local authorities, organic laws 111 to 114 adopted in July 2015, relating to regions, provinces and prefectures and municipalities, grant them broad prerogatives based on the principles: of subsidiarity (article 140 Constitution 2011) (own, shared and transferred competences), of solidarity (between municipalities), of cooperation (at the international level) and of accountability (evaluation and control) (Constitution of 2011). In addition, the Administrative Devolution Charter was adopted in 2018.

particular, at the local level as well as its widespread use, it has been strongly criticized from the conceptual and methodological point of view (Alaimo, 2022; Maggino, 2017). Therefore, one of the possible extensions of our analysis would be to adopt partially non-compensatory approach (Alaimo & Seri, 2023) or non-compensatory approaches (Alaimo et al., 2022a, 2022b, 2022c; Conigliaro, 2022; Fattore et al., 2015; Mazziotta & Pareto, 2016) to overcome certain limitations of our approach that come from the literature and to analyze the sensitivity of the results we found to the synthesis methodology adopted.

In the absence of data at finer territorial scales for all the benchmark countries, we devoted ourselves to the analysis of well-being at the regional level. A possible extension of this work in the event of publication of finer harmonized data would be to analyze local disparities in well-being between neighborhoods (Lelo et al., 2019), within vulnerable territories (oasis areas, mountainous areas, rural areas, landlocked areas, etc.) and between cities of different sizes. On this last point, we noted that the metropolitan regions of Morocco are less dynamic in terms of well-being than the regions with intermediate cities. This suggests to have a more particular attention in terms of public policies that should be supported by empirical evidence later. Rodríguez-Pose and Griffiths (2021) have noted the opportunity to exploit the potential of intermediary cities for improving the well-being of populations.

In addition, our analysis is based on objective indicators of well-being, while subjective appreciation is gaining more and more importance (Navarro et al., 2020; Želinský et al., 2021). Leite Mota (2021) notes the bias in favor of the material and quantitative aspect in traditional economic analysis and pleads for taking into account the subjective and qualitative aspects. The difficulty is that the subjective assessment of well-being differs between countries relative to the objective one. In addition, a benchmark would be less relevant in the absence of a "uniform" survey covering the specificities of all countries. Moreover, even at the national level, the use of specific surveys remains very expensive and very difficult to conduct, especially in times of crisis, which, moreover, is health. However, alternatives can be envisaged if only to complete the objective analysis of well-being either with the usual surveys restricted to limited spaces[55] or through the exploitation of unconventional[56] alternative data.

Appendix

See Tables 2, 3

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[55] Wu et al. (2022) deployed a survey restricted to the Chinese agricultural province of Shandong with a questionnaire around three questions relating to subjective well-being.

[56] Wójcik and Andruszek (2021) used Open Street Map data and high-resolution daytime satellite images from Google Maps to predict local well-being of 18 districts of Warsaw in Poland by non-linear machine learning algorithms. Boumahdi and Zaoujal (2023) used sentiment analysis of 174,000 press articles, published on the web from October 1991 to September 2020, to assess the subjective well-being of the oasis, peripheral and border region Drâa-Tafilalet of Morocco and identify early warnings of local subjective well-being malaise.

Table 2 Indicators selected by domain and by theme for the analysis of disparities between the regions of Morocco and the OECD Source Authors

Domain	Theme	Indicator	Unit	International data			Moroccan data		
				Source	Baseline year	Endline year	Source	Baseline year	Endline year
Economy	Development	GDP per capita	US $, current prices, PPP	OECD	2001	2017–2019	Authors, MEF and World Bank	2001	2019
		Share of the VA of manufacturing industry	% in total VA	OECD[a]	2004	2017–2019	MEF	2001	2019
	Human capital	Share of working people with at least an upper secondary diploma	%	OECD[b]	2000	2014	Authors and HCP	2004	2014
		Share of employment in manufacturing industry	% in total employment	OECD[c]	2004	2018–2019	Authors, M. Industry and HCP	2004	2015
	Labor market	Employment rate	%	OECD	2001	2019	Authors and HCP	2004	2019
		Unemployment rate	%	OECD	2001	2019	Authors and HCP	2004	2019
	Innovation	Patent applications	Per million inhabitants	OECD	2001	2015	Authors and OMPIC	2008	2016
Social	Living conditions	Number of rooms per person	Rooms per person	OECD[d]	2000–2005	2015–2019	HCP	2004	2014
		Share of households with broadband internet access	%	OECD	2010	2019	Authors, Census 2014, Telecom regulatory and World Bank	2006	2017
	Health	Rate of active physicians	Per 1000 inhabitants	OECD[e]	2001	2014–2018	Authors, HCP and M. Health	2004	2019
		Infant mortality rate	Deaths under one year old per 1000 live births	OECD	2001	2013–2019	Authors, HCP and M. Health	2004	2015

Table 2 (continued)

Gender	Gender gap in activity rate, 15–64 years old (female–male)[f]	Point of %	OECD[g]	2001	2018–2020	Authors and HCP	2004	2019
	Gender gap in the unemployment rate, 15–64 years old (female–male)	Point of %	OECD[h]	2001	2017–2020	Authors and HCP	2004	2016
Environment	Environment	Air pollution, average level of PM 2.5	µg/m³	OECD	2000	2019	Authors, World Bank and Plume Labs	2005	2021
Governance	Governance	Participation rate in general elections	%	OECD	2000–2005	2015–2019	Authors and M. Interior	2016	2021

[a]Excluding Switzerland (World Bank for country data and authors' calculations for regions based on the regional share of employment in industry).

[b]Excluding France (Eurostat for the regions in 2020 and authors' calculations based on the national data of the OECD). France has adopted a division into 13 regions since 2015.

[c]Excluding New Zealand (OECD for country data and authors' calculation for regions based on the regional share of industrial value added).

[d]Excluding New Zealand (Authors' calculation for the regions in 2000 by calibrating to the national data).

[e]Excluding New Zealand (Medical Council of New Zealand and authors' calculations for regions based on national data).

[f]For some regions, the interest of discrimination is focused on other segments of the population. Example of the province of Nunavut in Canada where the statistics differ according to belonging to the indigenous people (example of the activity rate in 2019 which was 62.3% in the province with 55.1% for the Inuit against 90, 7% for non-Inuit, a gap of -45.6 points). The same is true for other regions of Canada (Yukon and Northwest Territories) and New Zealand (Hawke's Bay and West Coast).

[g]Excluding Canada (The Regional Bureau of Statistics for Yukon).

[h]Excluding Slovenia (OECD for country data and some regions, and authors' calculation for Western Slovenia in 2000, based on 2019 value) and Canada (The Regional Bureau of Statistics for Yukon).

Table 3 Values of well-being indicators by domain and theme of the benchmark, Turkey, South Korea and Morocco and its regions in 2000 and 2019 *Source* Authors

Domain		Economy							Social							Environment	Governance
Theme		Development		Human capital		Labor market		Innovation	Living conditions		Health		Gender			Environment	Governance
Territory	Year	GDP per capita (US \$, current prices, PPP)	Share of the VA of manufacturing industry (% in total VA)	Share of working people with at least an upper secondary diploma (%)	Share of employment in manufacturing industry (% in total employment)	Employment rate (%)	Unemployment rate (%)	Patent applications (Per million inhabitants)	Number of rooms per person	Share of households with broadband internet access (%)	Rate of active physicians (Per 1000 inhabitants)	Infant mortality rate (Deaths under one year old per 1000 live births)	Gender gap in activity rate, 15–64 years old (female–male, point of %)	Gender gap in unemployment rate, 15–64 years old (female–male, point of %)	Air pollution (Average level of PM 2.5 µg/m³)	Participation rate in general elections (%)
Béni Mellal-Khénifra	00	2851	23.8	16	8	51	10.0	1	0.6	13	0.3	23	−47	4.1	13	42
	19	5666	24.1	39	17	45	5.4	2	0.7	12	0.4	10	−49	0.9	14	57
Casablanca-Settat	00	6439	34.9	30	18	54	18.0	10	0.6	26	0.9	19	−45	−6.4	64	38
	19	11,738	29.7	52	23	50	10.0	9	0.7	25	1.0	10	−44	1.8	67	42
Dakhla-Oued Ed-Dahab	00	13,566	140	29	9	41	18.3	7	0.5	20	0.3	31	−51	−7.7	28	54
	19	22,891	7.2	41	18	46	16.3	0	0.6	19	0.4	19	−53	15.0	30	60
Drâa-Tafilalet	00	2006	7.6	23	11	41	8.1	1	0.6	12	0.2	33	−56	1.8	18	48
	19	5262	7.0	42	18	42	5.6	4	0.7	12	0.3	19	−44	−2.3	19	62
Fès-Meknès	00	2748	10.8	24	15	52	9.7	6	0.6	17	0.5	25	−51	0.5	42	45
	19	5256	10.5	42	22	43	8.7	5	0.7	16	0.7	16	−50	0.2	44	52
Guelmim-Oued Noun	00	4148	17.9	19	9	41	18.3	2	0.6	18	0.3	22	−51	4.0	26	49
	19	9793	1.0	48	18	46	16.3	0	0.8	17	0.6	11	−53	15.0	27	64
Laâyoune-Sakia El Hamra	00	3302	6.2	31	9	41	18.3	3	0.6	22	0.5	16	−51	2.3	34	60
	19	13,114	16.9	55	18	46	16.3	0	0.7	22	0.5	5	−53	2.0	35	69

Table 3 (continued)

Domain		Economy							Social					Gender		Environment	Governance
Theme		Development		Human capital		Labor market		Innovation	Living conditions		Health			Gender		Environment	Governance
Territory	Year	GDP per capita (US $, current prices, PPP)	Share of the VA of manufacturing industry (% in total VA)	Share of working people with at least an upper secondary diploma (%)	Share of employment in manufacturing industry (% in total employment)	Employment rate (%)	Unemployment rate (%)	Patent applications (Per million inhabitants)	Number of rooms per person	Share of households with broadband internet access (%)	Rate of active physicians (Per 1000 inhabitants)	Infant mortality rate (Deaths under one year old per 1000 live births)	Gender gap in activity rate, 15–64 years old (female–male, point of %)	Gender gap in unemployment rate, 15–64 years old (female–male, point of %)	Air pollution (Average level of PM 2.5 µg/m³)	Participation rate in general elections (%)
L'oriental	00	3037	18.5	20	13	46	19.0	2	0.6	18	0.4	20	−61	4.6	32	38
	19	5719	3.8	41	22	43	13.8	0	0.7	18	0.7	11	−56	7.6	33	47
Marrakech-Safi	00	2468	14.3	17	10	52	8.9	4	0.6	15	0.3	24	−54	2.2	16	44
	19	5006	11.9	35	18	47	5.7	6	0.7	15	0.6	15	−54	−0.2	17	58
Rabat-Salé-Kénitra	00	5103	7.9	27	11	54	13.4	15	0.6	26	1.1	23	−44	0.5	48	42
	19	9672	13.5	50	20	46	10.7	42	0.7	25	1.2	15	−46	4.7	50	48
Souss-Massa	00	3036	12.4	16	11	51	7.4	5	0.6	19	0.3	25	−39	13.4	28	42
	19	6606	14.5	40	18	43	10.3	5	0.8	19	0.5	14	−50	1.2	30	51
Tanger-Tét-ouan-Al Hoceima	00	3431	21.1	20	15	46	9.4	1	0.6	18	0.4	26	−63	0.5	22	44
	19	8065	27.8	37	22	46	8.6	3	0.7	17	0.5	17	−55	5.2	24	48
Morocco	00	3878	20.9	23	13	52	10.8	6	0.6	20	0.6	23	−49	0.7	31	42
	19	7856	19.5	44	21	46	9.2	10	0.7	19	0.7	14	−50	2.0	33	51
Turkey	00	9078	17.4	36	19	44	11.2	1	0.8	2	1.8	14	−46	0.5	18	79
	19	27,793	18.3	44	18	50	11.1	14	1.3	46	1.4	9	−39	4.1	21	87

Table 3 (continued)

Domain		Economy						Social							Environment	Governance
Theme		Development		Human capital		Labor market		Innovation	Living conditions		Health		Gender		Environment	Governance
Territory	Year	GDP per capita (US $, current prices, PPP)	Share of the VA of manufacturing industry (% in total VA)	Share of working people with at least an upper secondary diploma (%)	Share of employment in manufacturing industry (% in total employment)	Employment rate (%)	Unemployment rate (%)	Patent applications (Per million inhabitants)	Number of rooms per person	Share of households with broadband internet access (%)	Rate of active physicians (Per 1000 inhabitants)	Infant mortality rate (Deaths under one year old per 1000 live births)	Gender gap in activity rate, 15–64 years old (female–male, point of %)	Gender gap in unemployment rate, 15–64 years old (female–male, point of %)	Air pollution (Average level of PM 2.5 μg/m³)	Participation rate in general elections (%)
South Korea	00	19,824	26.6	69	18	62	3.5	45	1.3	98	2.4	5	−20	−0.5	29	60
	19	42,753	29.0	84	16	64	3.8	282	1.3	99	1.4	3	−16	−0.4	31	77
Benchmark (Mean)	00	23,492	15.5	63	14	63	7.7	61	1.6	21	3.0	8	−21	1.3	15	69
	19	43,511	15.6	73	13	66	7.3	81	1.7	73	2.5	5	−16	1.0	14	70
Benchmark (Median)	00	23,387	15.3	68	13	63	6.0	27	1.7	16	2.9	6	−17	0.3	14	70
	19	41,056	14.5	81	11	68	5.6	40	1.8	78	2.5	4	−12	0.2	13	72

Declarations

Conflict of interest The Authors declares that there is no conflict of interest and that ethical statement is not applicable to this manuscript.

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