Associazione Italiana per gli studi sulla Qualità della Vita

AIQUAV Conference 2023

Quality of Life: Challenges and Opportunities in the Crossroads of the Mediterranean

ASSOCIAZIONE ITALIANA PER GLI STUDI
SULLA QUALITÀ DELLA VITA

AIQUAV Conference 2023
Quality of Life: Challenges and Opportunities in the Crossroads of the Mediterranean

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Antonicelli M., D'Uggento A.M., Maggino F., Marin C., Tarzia A., Trapani M. (a cura di), *AIQUAV Conference 2023 Quality of Life: Challenges and Opportunities in the Crossroads of the Mediterranean*, Associazione Italiana per gli Studi sulla Qualità della Vita, Università degli Studi di Bari Aldo Moro.

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www.uniba.it

Prima edizione: dicembre 2023

ISBN: 978-88-6629-079-7

I contributi presentati nel presente volume sono stati tutti oggetto di valutazione interna

Editing finale a cura di M. Antonicelli, A. M. D'Uggento e C. Marin

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Introduction

AIQUAV – Associazione Italiana per gli Studi sulla Qualità della Vita – is a point of reference for all those who in our country, but not only, conduct theoretical reflections and empirical research on the issue of quality of life; an increasingly crucial theme in a contemporary society strongly characterized by social imbalances, negative environmental effects, contradictions linked to economic development. On the 2023 Annual Conference, the accent will be placed on the Mediterranean, a crossroads and well-being for many populations. The conference will be held in a mixed-mode on-site/web. Both theoretical and applied contributions about well-being, opportunities but also responsibilities in the Mediterranean are solicited and welcome.

The Mediterranean has always been the theatre and crossroads of different peoples, cultures, traditions and religions. Some of the greatest civilizations of the past arose on the shores of the Mare Nostrum and have indelibly marked the course of history.

Few areas in the world match the historical density, heterogeneity and complexity of social interaction that, due to geographical proximity and mobility, have emerged in the Mediterranean world. The multiple realities that distinguish it offer a privileged point of observation for tackling the study of the problem of how communities belonging to different religions, languages, ethnic groups and traditions can interact with each other over time.

The contributions that will are collected represent an opportunity to explore some of the problems related to the interrelationship between the different peoples who inhabit the Mediterranean today, both from the point of well-being of the peoples, as well as from the demographic, statistical, socio-cultural, economic and legislative. Contributions from different disciplines were accepted and encouraged, from sociology to statistics, from law to economics, and so on.

Bari, 28/09/2023

Section I

Short papers

The impact of human rights on firms' market capitalisation

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Abstract: Since the 1970s, the issue of corporate social responsibility has evolved and expanded, taking on increasingly complex dimensions. Companies have gradually oriented their actions towards behaviour based on the ESG (environmental, social and governance) perspective, because they are aware of the relevance of these issues and considering the growing pressure from stakeholders. At the same time, the tools for voluntary and mandatory reporting of non-financial information and the reporting standards that guide companies in their reporting have evolved. In this context, investors seem to be paying more and more attention to the information disclosed by companies and orienting their decisions towards ethical and sustainable investments. Although many studies have analysed the impact of ESG variables, none have examined whether respect for human rights has an impact on company market capitalisation. Against this background, this paper aims to fill this specific gap by analysing European companies in order to provide guidance for future research as well as valid suggestions for managers and regulators.

Keywords: human rights, policy human rights adoption, cultural and gender diversity, market capitalisation, European companies.

1. Introduction

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In the last 20 years, reporting systems have changed fundamentally. Companies have moved from financial to non-financial reporting by also disclosing environmental, social and governance (ESG) aspects. This shift has been driven by increasing pressure from stakeholders, including investors, consumers as well as policy makers and individual countries. International organisations have also contributed to the development of reporting tools by issuing frameworks and guidelines to help companies report on sustainability issues. For many companies, sustainability has become a cornerstone of corporate strategy, as it is no longer just an ethical issue but also a source of competitive advantage and risk mitigation (Lamberti and Lettieri, 2009). By integrating ESG metrics, companies can demonstrate their long-term commitment to sustainability by meeting stakeholder expectations, seizing new market opportunities, enhancing their reputation, and attracting new investors. Financial markets are increasingly opting for sustainable companies that enjoy a better reputation, perform well in managing ESG risks and actively involve stakeholders in relevant decisions (Orlitzky, 2013). This consequently has a positive impact on the market value of companies.

A particularly important issue, in the social component, is human rights. This relevance is reflected in the ESG approach, as human rights permeate every aspect of corporate operations and interaction with stakeholders. Since the Universal Declaration of Human Rights (UNDHR) of 1948, the protection of human rights has been seen primarily as the responsibility of individual states. The extension of responsibility for human rights to companies has become a central issue in international politics and in business and management theory with the adoption of the United Nations Guiding Principles (UNGP) on Business and Human Rights in 2011 (Schrempf-Stirling et al., 2022). In subsequent years, other initiatives such as the International Labour Organisation (ILO), the Global Reporting Initiative (GRI) and the United Nations Global Compact (UNGP) have promoted corporate responsibility for human rights. The United Nations Agenda 2030 (UN) with its Sustainable Development Goals (SDGs) recognises the fundamental role of human rights in creating a just and prosperous world. The European Directive 2014/95/EU also obliges large companies to publish a non-financial statement containing information on policies to respect these rights. In this context, the European Commission adopted a proposal for a directive on corporate due diligence in the field of sustainability in February 2022 to enforce responsible business conduct and promote human rights and environmental due diligence in companies and their supply chains.

Respect for human rights by companies encompasses various aspects such as promoting diversity and inclusion policies, respecting workers' rights, eliminating forced labour and child exploitation, respecting international rights, respecting consumers, and considering supply chains. Establishing policies and practises that respect human rights not only avoids legal and reputational risks, but also helps companies build trust with customers, employees, and investors.

Although many studies have been conducted analysing the relationship between sustainability, ESG performance or ESG disclosure on the one hand and the market value of companies on the other, no study has yet specifically addressed the question of whether and how certain corporate policies related to human rights affect the market value of companies. Although the issue of these rights is relevant in a global context, the studies conducted to date on this topic still seem limited. Recent research shows that the quality and quantity of information published by companies on this topic is quite limited. This study aims to fill this gap in the literature by attempting to provide an answer to the following research question.

RQ: How do corporate human rights policies affect the market value of companies?

The study was conducted with large European companies that belong to the STOXX 600 Index. These companies are more exposed to financial market assessments and should generally take action to respect human rights, also because they are generally obliged by the European Union (EU) to publish the annual non-financial statement.

The remainder of this study proceeds as follows. Section two gives a brief overview of the relevant literature on human rights. Section three illustrates the development of the hypotheses. Section four explains the sample and methodology, while section five presents and discusses the results. Finally, the last section presents concluding remarks, including the implications and limitations of the study.

2. Literature review

Human rights refer to basic rights and freedoms to which a person is entitled as a human being (Griffin, 2008; Gray and Gray, 2011). As described in the previous section, human rights have only been considered in the field of corporate responsibility since 2011. In an initial study Pegg (2003) supported the idea that a link be-

tween corporate behaviour and a human rights framework was a crucial aspect. He argued that according to the liberal perspective, human rights were outside the market and thus a matter for states. Indeed, the author argues that human rights as a global concept ignores cultural differences between countries and is a form of neo-colonialism. Ruggie (2008) states that the lack of a global regulatory body to guarantee corporate accountability for human rights fosters what he calls governance gaps created by globalisation, between the scale and impact of economic forces and actors and the capacity of societies to manage their negative consequences.

As highlighted by previous studies, while these gaps in corporate governance enable human rights violations, it is assumed that companies gain so much power and influence that they have a greater responsibility to prevent human rights violations (Lopatta et al., 2022; Scherer and Palazzo, 2011). As for the difference between corporate social responsibility (CSR) and human rights disclosure, it is important to note that they differ in their theoretical underpinnings. For example, Wettstein (2009) notes that CSR touches on human rights issues but rarely specifically addresses this issue. While human rights are characterised by the moral obligation to respect them, CSR and its disclosure are often done on a voluntary basis.

In terms of institutional frameworks, the United Nations has played a fundamental role in promoting human rights in business over the past decades. The UNGP, published in 2011, contain three main pillars and related guidelines: a) states are the primary source of human rights protection (protect); b) corporate responsibility is necessary to respect human rights (respect); and c) shared responsibility between governments and business could provide redress to victims of corporate human rights abuses (remedy). In essence, this roadmap should promote new accounting and accountability practises in the context of human rights due diligence (McPhail and Adams, 2016). In light of the above, the potential contribution of the UNGP to shifting mindsets on corporate accountability becomes clear (Gallhofer et al., 2011; Sikka, 2011), specifically in identifying the scope of rights for which companies are accountable and the associated degree of responsibility in enforcing those rights. In this context, by analysing the human rights reports of 30 Fortune Global 500 companies from the mining, pharmaceutical and chemical industries, McPhail and Adams (2016) examine how the meaning of human rights and the relationship between corporations, states and citizens is discursively constructed in the narrative sphere of corporate external accountability reports. The authors did not find information on government-corporate relations, e.g. in relation to stabilisation clauses, but in general they give indications of the potential of the UNGP to facilitate new discussions on corporate accountability. In general, as many studies suggest, com-

panies have only started to integrate human rights policies into their business due to external pressure (Obara, 2017). Preuss and Brown (2012) note that companies perceive human rights as a very abstract concept, which leads to insufficient corporate disclosure. Empirical studies have shown that the human rights reported by companies are mainly labour rights. As for the factors influencing corporate human rights engagement, the following factors can be considered instead: the fact that companies have been involved in human rights litigation (Schrempf-Stirling and Wettstein, 2017), the moral commitment of managers (Sethi et al., 2011) and corporate culture (Maurer, 2009).

The KPMG survey (2017) shows that human rights disclosure lags behind other types of non-financial reporting. Chambers and Yilmaz Vastardis (2020) point out in their work that disclosure prompted by existing human rights legislation is weak and does not provide evidence of concrete human rights risks and supply chain impacts. The recent study by Lopatta et al. (2022) provides insights into the current state of human rights disclosure by the world's 500 largest companies, using a 13-item human rights disclosure score to assess the extent and quality of reporting. The study confirms a general lack of transparency and awareness of human rights compliance. The highest human rights scores were found among Australian and European companies. Schrempf-Stirling and Wettstein (2017) pointed out that sector sensitivity to higher litigation risk and institutional pressure are positively associated with corporate human rights disclosure. Their findings suggest that more stakeholder pressure and institutional requirements could improve corporate human rights accountability. Hubers and Thijssens (2023) conclude that formal institutions are fundamental to human rights reporting, both in terms of companies' willingness to disclose and the extent of disclosure. The findings also show that corporate human rights disclosure is not at the same level as other categories of non-financial reporting.

In parallel to what has been said about the general lack of disclosure of corporate responsibility for respect for human rights, it can be highlighted that while some studies have analysed the impact of ESG variables - which are a measure of a company's CSR performance - on the market value of companies, few have investigated whether the issue of respect for human rights has an impact on market capitalisation.

As regards ESG and market value, the results of the studies do not seem to coincide, and this issue is particularly relevant not only for companies but also for their stakeholders (Serban et al., 2022; Lan et al., 2021; Zhang and Cui, 2020). With specific reference to respect for human rights, Gioacasi (2015) conducted a study

of 400 companies from 10 different sectors of activity over a 4-year period in Europe, identifying the main financial and non-financial factors that contribute to value creation. The study shows that among the non-financial factors that contribute significantly to value creation are relationships with business partners, practises and policies to motivate employees and anti-discrimination practises. Previous studies aimed at examining the impact of a corporate culture of sustainability on corporate behaviour and performance provided evidence that companies that excel in sustainability – including diversity and equal opportunity policies, work-life balance, improved health and safety, and community engagement – outperform their counterparts in terms of stock market and financial performance (Eccles et al., 2011). A recent research paper looks at the relationship between corporate social performance and financial performance by comparing corporate portfolio returns with changes in the intensity of corporate social responsibility (CSR). The study shows that improving overall CSR is generally value enhancing. Corporate social performance is positively related to financial performance, but the relationship varies across CSR dimensions and is different in non-crisis periods than in crisis periods. Environmental improvements, respect for human rights and product attributes are better rewarded in times of crisis (Tsai and Wu, 2022).

Against this background, this paper aims to fill this specific gap by analysing European companies to provide guidance for future research as well as valid suggestions for managers and regulators.

3. Hypotheses development

The protection of human rights in international law takes place through binding (hard law) and non-binding norms (soft law). The former derive from international treaties or conventions which, once in force, bind the states that have ratified or acceded to them. The latter, on the other hand, are recommendations, resolutions, declarations and guidelines issued by major international organisations. These "soft law" instruments were introduced as legally non-binding instruments, but over time they have evolved into customary international law and thus binding norms (Nolan, 2013). In addition to the aforementioned UNHCR and the UNGP on business and human rights, published by UN in 1948 and 2011, there are other legally binding international conventions, such as the "International Covenant on Civil and Political Rights" (ICCPR), adopted in 1966, and numerous conventions on the "Elimination of All Forms of Discrimination Against Women" (CEDAW, adopted in 1979), Against Torture and other cruel, inhuman or degrading treatment or punishment

(adopted in 1984), on the "Rights of the Child" (CRC, adopted in 1989) and on the "Rights of Persons With Disabilities" (CRPD, adopted in 2006). Further measures to ensure respect for human rights by companies include the Guidelines for Multinational Enterprises adopted by the Organisation for Economic Co-operation and Development (OECD), the International Labour Organisation (ILO) Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy, and other standards often promoted by international organisations or by representative bodies of individual industries. In addition, there are other initiatives by individual states or associations of states relating to human rights, such as the EU directives already mentioned.

Compliance with international human rights conventions that cover a wide range of aspects, can play a crucial role in improving the reputation and image of the main companies' stakeholders such as customers and investors (Blanton and Blanton, 2007; Hamann et al., 2009; Bright et al., 2020). Among human rights, child labour and forced labour are the main issues violated by multinational companies, including in relation to supply chains. In this context, some global companies implement policies that exclude these violations, demonstrating their commitment to respecting human rights and promoting ethical behaviour. Another key issue related to human rights is respect for gender and cultural diversity in companies. Many companies promote diversity as an ethical commitment based on the fundamental principle of equality. This creates an inclusive work environment where all people are treated with respect and have equal opportunities. At the same time, gender and cultural diversity leads to a variety of perspectives, experiences and approaches. This diversity fosters innovation, creativity and the ability to solve problems in new and unique ways, while improving decision-making that takes into account a wider range of viewpoints and possible solutions.

Respect for these human rights issues has a positive impact on the company's perception and image in the global context towards all stakeholders. Indeed, ethical, sustainable and human rights compliant business practises - such as respecting human rights conventions, adopting labour policies and ensuring gender and cultural diversity - help companies to gain the trust of consumers, the global community and even investors. The practise of sustainable investing has grown rapidly (Galema et al., 2008; Orlitzky, 2013) and is expected to continue to grow (Bush et al., 2016). Investors increasingly base their investment decisions on the sustainable behaviour of companies and ESG scores published by major global agencies, which are important performance indicators for stakeholders. Indeed, attention to social aspects related to respect for human rights ensures that the company can op-

erate in a global context with a lower probability of abuse and human rights violations. Therefore, investors perceive sustainable companies as less risky, more profitable, and safer to make long and medium-term investment decisions (Knoepfel, 2001; Durand et al. 2019; Sinha et al., 2021). In addition, many investors take a values-based, ethical approach, as they do not want to support irresponsible business practises and steer clear of non-sustainable investments. This leads to the following hypotheses:

H1: The company's compliance with fundamental human rights conventions has a positive impact on market capitalisation.

H2: Adopting corporate policies that exclude child and forced labour has a positive effect on market capitalisation.

H3: The commitment to respect gender and cultural diversity within the company has a positive impact on market capitalisation.

4. Sample and methodology

To test the hypotheses just described, this study is based on the European companies that belong to the STOXX 600 index. Excluding the companies for which data was missing, the final sample for the study consists of a total of 550 companies for the year 2021. All data was extracted from the Refinitiv database. The analysis was carried out using a regression model with the following equation:

$$MCAP_i = \beta_0 + \beta_1 HRsc_i + \beta_2 PHRsc_i + \beta_3 DIVsc_i + \beta_4 FSIZE_i + \beta_5 ROA_i + \beta_6 FAGE_i + \beta_7 ESGsc_i + \varepsilon_i$$

The dependent variable of the model is MCAP, which measures the market capitalisation of a company at the end of 2021 (Dias, 2013). This variable was converted to a logarithm to normalise it and avoid biased estimates. The independent variables are instead represented by: Human rights score (HRsc), which measures on a scale of 0 to 100 a company's effectiveness in complying with core human rights conventions; Policy human rights score (PHRsc), which measures on a scale of 0to 100 the degree to which a company adopts a policy to exclude child, forced or compulsory labour or to guarantee freedom of association that is generally applied regardless of local laws; Diversity Score (DIVsc), which measures, always on a scale 0 to 100, a company's commitment to and effectiveness in maintaining a

gender diverse workforce and cultural diversity of board members. We also add the following four control variables to increase the goodness of the regression model: Firm size (FSIZE), calculated as the natural logarithm of total assets; a profitability index as return on assets (ROA), calculated by dividing a firm's net profit by the average of its total assets; Firm age (FAGE), which indicates the age of a firm since its inception; and finally, ESG score (ESGsc), which is an overall score of an ESG firm's performance. All variables were taken from the Refinitiv database.

5. Sample and methodology

Table 1 illustrates the descriptive statistics and correlation analysis. In addition, the variance inflation factor (VIF) test shows that there is no multicollinearity as all coefficients are less than 2.19. Table 2 shows the results of the regression analysis. The adjusted R2 is 0.4862, indicating that 48.62% of the variance in the dependent variable is explained by the independent variables.

Variables	Mean	Median	MCAP	HRsc	PHRsc	DIVsc	FSIZE	ROA	FAGE	ESGsc
MCAP	10.18	10.12	1							
HRsc	72.29	81.03	0.270***	1						
PHRsc	68.14	71.36	0.182***	0.518***	1					
DIVsc	45.24	46.00	0.264***	0.297***	0.152***	1				
FSIZE	10.34	10.23	0.603***	0.266***	0.213***	0.277***	1			
ROA	5.79	4.68	0.053	-0.072*	-0.009	-0.046	-0.325***	1		
FAGE	45.53	31.00	0.165***	0.141**	0.087**	0.107**	0.145***	-0.009	1	
ESGsc	71.57	74.25	0.232***	0.626***	0.356***	0.529***	0.367***	-0.061	0.099**	1

Notes: N. 550; *** – significant at the 1% level; ** – significant at the 5% level; * – significant at the 10% level

Table 1 - Descriptive statistics and correlation matrix

The results show that only hypotheses 1 and 3 are confirmed. Compliance with the main international conventions and gender and cultural diversity in the company have a positive impact on the market capitalisation, with a significance level of 1%. This confirms what is highlighted in the prevailing literature in CSR and sustainability and shows that investors reward companies that comply with international human rights conventions. This makes it possible to reduce the risks related to the violation or abuse of these rights and, consequently, to increase the performance and the degree of achievement of corporate objectives. A company that enjoys a good reputation will be better able to meet its customers' expectations by in-

creasing its turnover and profits. At the same time, the issue of respecting cultural and gender diversity in the company is perceived positively by investors as an element that can ensure a more balanced and inclusive management. A diverse team provides differentiated perspectives and approaches to solving various problems by encouraging innovation and creativity. Cultural differences can help you adapt to global markets by better understanding the needs of customers from different parts of the world. All these elements are therefore considered very important by investors. They carefully read the non-financial reports produced and published by companies and base their analyses on ESG performance or on certain human rights ratings produced by the main rating agencies such as Refinitiv.

The lack of verification of hypothesis 2 is surprising, as the issue of introducing policies against forced and child labour should be of concern to all large companies operating in international markets and at risk of such violations, as repeatedly denounced by current events. However, sometimes the review of employment policies is not immediately considered by financial investors. They probably rely much more on compliance with conventions that do not necessarily involve labour. As we have seen, there are many international conventions and companies may only adhere to a few. Another reason why hypothesis 2 was not tested could be that little information on human rights is disclosed in sustainability reports, which is confirmed by recent studies (Lopatta et al., 2022). This therefore makes it more difficult for investors to obtain certain information.

As for the control variables, the results show that all identified variables are verified with a high level of significance, except for the age of the company. It should be noted, however, that the ESG variable has a negative coefficient, albeit a very small one, which illustrates that an increase in ESG score is associated with a decrease, albeit a small one, in market capitalisation. This is not surprising, however, as ESG impacts should generally be assessed over the medium to long term.

Variables	Coeff.	Std. Err.	p-value
HRsc	0.0052	0.0010	0.000 ***
PHRsc	-0.0095	0.0101	0.385
DIVsc	0.0046	0.0018	0.008 ***
FSIZE	0.5207	0.0267	0.000 ***
ROA	0.0168	0.0019	0.000 ***
FAGE	0.0006	0.0045	0.210
ESGsc	-0.0063	0.0018	0.001 ***
Cons	4.5983	0.2586	0.000 ***
Number of obs.	550		
Adj R-squared	0.4862		

*** = significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level

Table 2 - Regression results

6. Conclusion

This study has provided a first empirical approach to how respect for human rights can influence investors' decisions and consequently market capitalisation. The analysis was conducted by examining three different aspects related to the broad topic of human rights, i.e. compliance with international conventions, adoption of policies against forced and child labour, and adherence to the principles of cultural and gender diversity in companies. The results partially confirmed the hypotheses formulated. As highlighted in the previous section, the adoption of labour policies does not seem to have an impact on market capitalisation. In this regard, investors are advised to pay more attention to the issue by trying to find more appropriate information on the subject in sustainability reports or non-financial statements. Alternatively, it is possible to consult some data or ratings produced by the main rating agencies. An excessive focus only on compliance with conventions can mislead investors.

The results of this study suggest that managers should continue to invest in respect of human rights and in particular in measures against forced and child labour, although this variable does not seem to influence investors' decisions at present. European policymakers should continue the path taken to both strengthen respect

for these rights and increase the level of disclosure by companies in order to protect financial markets and investors.

This study is not without limitations as it is based on cross-sectional analysis that could be extended with longitudinal data. At the same time, the analysis could be enriched with further elements of investigation or by expanding the sample of observed companies.

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Participatory landscape

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Abstract: The landscape is the expression, perceived in an aesthetic sense, of the system of relationships that is determined in the biophysical and anthropic envinronment which characterizes the relationship of societies and individuals with the environment and with the territory, with its sites and places, and where they in which they have developed, inhabit and operate. It falls into the category of common goods, to be protected and maintained as a cultural and natural heritage, thus suitable for guaranteeing the well-being of the community through the strengthening of an inclusive, participatory and sustainable urbanization. Then the concept of landscape today also includes the presence of the individual as subject intent on anthropizing nature, as well as the observer and preserver of collective memories and personal experiences, of actions and relationships, values and utility expressions of the past and present, or of traditional and contemporary land use. Landscape can be considered as a cultural element, a manifestation of reality which is not only visually perceptible, but which offers the possibility to those who observe it, to develop their own personality by improving the quality their life. It is therefore appropriate to listen to the will of those who inhabit the places, and to guarantee them an effective participation in the implementation of landscape governance, looking for concerted solutions and innovative proposals on issues such as sustainable urban agriculture, relationships between city and countryside, and the fight against land consumption. This is a transition from the "transformation for a new use", to the "new use without transformation" of the existing, through the safeguarding of immaterial knowledge (traditions, habits) and

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materials (architectures, tools of use). In this sense visiting and observing a place has the same meaning of living to enhance the place itself.

Keywords: Environment and territory, participation, landscape protection.

The landscape is the expression, perceived in an aesthetic sense, of the system of relationships that is determined in the biophysical and anthropic envinronment and that characterizes the relationship of societies and individuals with the environment and with the territory, with sites and place, and where they in which they have developed, inhabit and operate. Today it falls into the category of common goods, to be protected and maintained as a cultural and natural heritage, thus suitable for guaranteeing the well-being of the community through the strengthening of an inclusive, participatory and sustainable urbanization.

The protection of the landscape today is guaranteed at the constitutional level (ex art.9 Constitution). “But in the period prior to the constitutional charter, as well as in the first interpretations of art. 9, the landscape was understood as the natural beauty of a specific place, characterized by elements of particular suggestion and amenity", but in a largely subjective perspective [1].

The placement of the notion of landscape among the fundamental principles of our Constitution has led to important consequential legal implications [2,3,4,5,6].

The content of art. 9 of the Constitution, as amended, has indeed allowed an updating of the constitutional content, to extend the protection not only to the landscape, as an original and eminent creation of nature, "butto the product of the historical interaction between the individual and nature" [7].

Starting from a reconstruction of the juridical notion of the landscape as a form of the country in its entirety, given by its naturalistic as well as expressive value of the environment in which man lives and acts, the protection outlined by the Constitution assumes a dynamic value consisting in the control and direction of community interventions in the territory [7]

.Having said that, its governance - as a common good - necessarily implies the direct involvement of the communities of reference in the strict consideration of the necessary interaction with the individual [8]; the protection of the landscape is characterized by the double aspect of integrity and globality of its essence, in the structure and physiognomy of the places, which have come to be formed in nature and have been qualified by history and human intervention.

As a common good, a primary and absolute asset of the Republic, the landscape takes on an unavailable value, not exposed to the changeability of political guidelines and to be preferred in administrative choices, to free economic initiative and

the right to property (cfr.: Corte Cost.29.11.2017, n.246).

Then the concept of landscape today also includes the presence of the individual as subject intent on anthropizing nature, as well as observer and preserver of collective memories and personal experiences, of actions and relationships, values and utility expressions of the past and present, or traditional and contemporary land use. The landscape is not a simple indefinite space or better defined only by its naturalness, but includes collective memories and personal experiences, actions, relationships, and complex values. The landscape can be considered as a cultural element, a manifestation of reality which is not only visually perceptible, but which offers the possibility to those who observe it, to develop their own personality by improving the quality of life.

But in order to do this it is appropriate to listen to the will of those who live in the places, to guarantee them an effective participation in the implementation of landscape governance.

In this way the landscape becomes the expression of the past and the present or of the use of the traditional land, but also contemporary land use [9].

The European Landscape Convention of 2000 (ex art.1 affirming the concept whereby the landscape designates a certain part of the territory, as it is perceived by the populations, whose character derives from the action of natural and/or human factors and their interrelationships), it initiated the idea of the ordinary urban, peri-urban or rural landscapes in which the life of the majority of the population takes place. And this starting from the assumption that it is necessary to bring the attention back to the quality of the places and also to the wishes of those who live there.

"The Convention takes into consideration the protection of all types of landscape: the final objective is not so much the protection of nature itself, but rather the protection of human beings and their environmental context which has value not only as an aesthetic datum, but above all for the quality of life and for the feeling of belonging that human beings feel towards everything that surrounds them"[8].

Indeed, the attention to the participatory dimension in the definition of the implementation of landscape policies emerges in the European Landscape Convention; the reference is to the provision contained in letter

c) of article 5 of the Convention - dedicated to general Provisions - which expresses, among the requests for commitment by the signatory countries, the provision of the launch of public participation procedures or of the regional local authorities and also of the other subjects involved in the definition of such landscape policies aimed at the protection, management and planning of landscapes.

And the subjects involved in these processes certainly include national as well as regional and local authorities, the populations concerned and then the associations, economic actors, scholars and even experts.

What tools have been introduced by the Convention to achieve this participatory involvement?

Raising awareness on the theme of collective consciousness, thus starting a process of disseminating knowledge which is exercised whenever... "Each party undertakes to increase the awareness of civil society, private organizations and public authorities of the value of landscapes, their role and their transformation" (art. 6 C.E.P.).

At a national level, for example in the Legislative Decree no. 22 January 2004, n. 42 (cultural heritage and landscape code), participatory guarantees emerge on this issue: we refer to the content referred to in article 139 and 140 paragraph 1 which provide for the possibility (albeit optional) to hold a public inquiry in the case of a procedure of significant public interest of areas or properties in consideration of the relationship with the territory.

Or Article 144 (as amended by Article 14 of Legislative Decree No. 157 of 2006 then by Article 2 of Legislative Decree No. 63 of 2008), which with reference to landscape planning expressly imposes that institutional concertation, the participation of interested parties and associations with widespread interests are ensured in the plan approval procedures, identified in accordance with the current provisions on the environment and environmental damage, the broad forms of publicity referring to the regions the task of regulating landscape planning procedures by law, also with reference to further forms of participation, information and communication.

The Regions immediately understood the link between the dynamic-organizational profiles of the p.a. and the participatory needs of the population in the governance policies of the territory and therefore of the landscape (in general); proof of this is inherent in the attempt to multiply the opportunities for participation also in the drafting procedures of the landscape plans [10].

However a participatory governance of the landscape can also take place with a low intensity of active people, or in a context in which it is not necessary for the activity of the cives to transform into "activism".

Often places don't have to be distorted to be used, but it is enough to look at them in a different way, thus identifying new values of use for them. So, the interpretative model of this participatory landscape could also pass from the transformation for a new use, to the new use without transformation from an economic-value point of view. This is the low-entropy economy model which entails low initial costs and

risks that can be recovered in a short time, even if with revenues that are even less large but which compensate for the low costs [11].

And then participation can also express the need to reduce the material dimension of the transformation, enhancing the management of the existing. This is the transition from the "transformation for a new use", to the "new use without transformation" of the existing, through the safeguard of immaterial knowledge (traditions, habits) and materials (architectures, tools of use).

In this sense visiting and observing a place has the same meaning of living to enhance the place itself.

The participatory landscape can lead to the vision of the lived landscape to be understood as something to be contemplated, which is transformed into a scenario to be experienced as a composition of opposites, as a weave of correlations.

Therefore, tools with which the inhabitants of a place can represent the heritage, the landscape, the knowledge with which they identify and which they wish to transmit and preserve for future generations, consolidating the sense of belonging [9,13], are the maps values represented by community maps [9,13]; as a means to appreciate the origins of the territory, traditions and customs with a view to protecting the existing identity.

Finally, considering the dominant capitalist economy based on progress and indiscriminate growth, the experiences centered on the enhancement of the territory and the landscape oriented towards models of sustainability, initiate a reflection on the relationship between the margin and the center in an attempt to redesign the very idea of development and sustainability also paying attention to the rural and peripheral areas that make up the landscape. This is to allow the promotion of education and culture of the landscape and the regeneration of the territory, seeking concerted solutions and innovative proposals on issues such as sustainable urban agriculture, relationships between city and countryside, and the fight against land consumption.

The new needs of societies such as the opportunities of the green economy, together with the changed post-pandemic context of COVID-19, and the increase in teleworking, have brought renewed attention to rural areas as places of well-being, safety, ecological life and new possibilities for social and economic renewal.

In summary up, rural landscapes are fundamental assets for the definition of a sustainable future; in addition, rural areas represent places where the involvement of local communities in the decision-making process is still effective. It is precisely the possibility of active participation in public and social life, including artistic and cultural activities, which have strengthened the attractiveness of the same areas in

the eyes of the "citizen fleeing the city".

The concept of "rural world" today assumes a very important role in cities, including socio-educational [14]. Also in this context, respect for a participatory method is essential, because the general interest in the creation of a new vision of "rural areas" must be combined with concerted territorial government policies and no longer of a merely authoritative nature [15].

The quality of the agricultural landscape also represents an asset for rural areas; In fact, the agricultural use of an area also has the conservation role of naturalistic values, assuming the decongestant and containment function of the expansion of the urban aggregate, being able to justify itself with the needs of an orderly government of the territory. All this in order to maintain the balanced quantitative relationship between free and built-up or industrial areas and to realize the collective needs of greater livability of the urban space, if necessary, through the contraction of unlimited building expansion.

The new rural economy based on an enhancement of the landscape and rural spaces combined with the strong local involvement in creative experiments of social innovations also in the agricultural world, appears as an opportunity to redesign new spaces and areas of land management, abandoning the urban paradigm - centre to favor instead the promotion of peripheral areas [16].

Starting from this conception, investing in rural contexts - in peripheral areas -so that they can be tinged with new life through forms of socio-cultural cohesion and participatory processes, facilitates a path of profound redefinition and remodelling of the boundaries between these two territorial areas. In the new model of agriculture, the economic aspects are associated with those relating to the protection and safeguarding of the environment and the territory, the social development of rural areas and the enhancement of local resources.

These are the challenges and opportunities that are the object of attention in the planning of European policies to 2040 and which the national legislator is also called to confront.

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Sustainable Tourism Indicators and Sustainable Development Goals of 2030 Agenda: A Mapping

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Abstract: The 2030 Agenda by United Nations (United Nations, 2015) aims at extinguishing poverty, fighting inequality, facing climate change, and promoting human rights, local culture, and employment opportunities. Accordingly, it fosters three dimensions of sustainable development: economic, social, and environmental. The core of the 2030 Agenda is the achievement of 17 Sustainable Development Goals (SDGs) to be measured and monitored by means of specific, reliable, and valid indicators.

Tourism sustainability is a component part of the 2030 Agenda (UNWTO & UNDP, 2017). In accordance with the SDG 12.b Develop and implement tools to monitor sustainable development impacts for sustainable tourism, which creates jobs, promotes local culture and products, in the present paper tourism sustainability indicators are organized in the frame of the 17 SDGs.

A set of tourism sustainability indicators is identified in the literature and in specific datasets (e.g., Eurostat). Then, each indicator is related to one or more SDGs. The mapping is drawn along the social, economic, political, and environmental dimensions, according to specific sustainability issues (Rasoolimanesh et al., 2020). This could be a sound base to build composite

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indicators as measures of the different facets of tourism sustainability and actionable tools for the different stakeholders: decision-makers, tourists, host communities, entrepreneurs, etc. (UNWTO, 2015).

Keywords: 2030 Agenda SDGs, Tourism Sustainability, Indicators.

1. Sustainable tourism: a measurement approach

Our Common future, also known as the Brundtland report, offers the first definition of sustainable development and puts sustainability at the centre of the international agenda as an imperative prerequisite for development (WCED, 1987). The report stresses the need of endorsing the perspectives of both present and future generations and provides the stage for Agenda 21, the outcome of the United Nations Conference on Environment and Development, held at Rio de Janeiro in 1992 (UNCED, 1992). Agenda 21 sets out the objectives of sustainable development and the actions needed to achieve it. Since then, sustainability remains at the core of the United Nations agenda, and in September 2015, a high-level plenary meeting of the General Assembly produces the United Nations 2030 Agenda for Sustainable Development (UN, 2015). Along three dimensions of sustainable development - economic, social, and environmental - Agenda 2030 states 17 Sustainable Development Goals (SDG) and 169 targets, the attainment of which must be measured and monitored by means of specific, reliable, and valid indicators.

Since the Brundtland report, the growing relevance of the sustainable development paradigm for tourism is witnessed by UNWTO's documents, What Tourism Managers Need to Know (UNWTO, 1997) and Making Tourism More Sustainable: A Guide for Policy Makers (UNEP/UNWTO, 2005), and by the several reports, issued by the Secretariat of the World Tourism Organization for the General Assembly of the United Nations on the application of UN resolutions, on policies and programs to foster sustainable tourism development (https://www.unwto.org/sustainable-development/unga).

The attention given to tourism sustainability by the United Nations and by the World Tourism Organization stems from the acknowledgment of the pivotal role that tourism development has for local, national and global development: "Tourism is now a major sector of the world economy, especially as it refers to the international trade in services. The management of tourism affects the conditions of destinations and host communities, and more broadly, the futures of ecosystems, re-

gions and nations. Informed decisions at all scales are needed so that tourism can be a positive contributor to sustainable development in keeping with its role as a significant source of both benefits and potential stresses" (WTO, 2004, 7). Tourism not only affects but also depends on economic, social, and environmental conditions. Therefore, for tourism to thrive, it is necessary to preserve and ameliorate such assets defining firstly the concept of sustainable tourism as the practices of the tourism activities aimed to preserve and develop environmental, socio-cultural, and economic resources, providing benefits in all the destinations both for mass and niche tourism segments (UNEP, 2004).

As well as for the sustainability concept, sustainable tourism is a multi-faceted construct. It involves various stakeholders and can be approached according with manifold perspectives: tourism companies (supply side), visitors (demand side), host communities, and policy-makers. Achieving sustainable tourism is a continuous process with multiple tasks. More specifically, the tourism is sustainable if allows at:

monitoring the impacts of tourism and promoting the aware use of environmental and natural resources, key elements in tourism development to maintain ecological biodiversity (eco-tourism as defined by The International Ecotourism Society)

caring and preserving the socio-cultural heritage and the traditional values of host communities for inter-cultural knowledge and exchange

providing economic benefits to all stakeholders and overall, sustaining the welfare with stable employment and income-earning opportunities, infrastructures, and social services for the host communities and so, to contribute to the growth of well-being and the decrease of the population poverty (UNWTO, 2022)

reaching a high level of tourist satisfaction in new knowledge and visiting experiences.

Since decades, the flowering of national and supranational policies and programs to back sustainable tourism development has been matched by the quest for specific, reliable, and valid measures of performance, in order to monitor the progress toward sustainability. A cornerstone in such a process is represented by the 2004 report of the WTO (2004). A recent document draft of UNWTO (2022) proposes a unifying statistical framework for measuring tourism sustainability.

As suggested by Rasoolimanesh et al. (2023), the relevant contributions dealing with sustainable tourism development, after 2016, have treated SDGs only at large, as they have considered Agenda 2030 Goals and targets only in an indirect manner.

In order to fill this gap, we propose a frame of reference to indicators of sustainable tourism within the perspective of the 17 SDGs. Our aim is to offer a tool to em-

pirically measure the tourism contribution to the achievement of each of the 17 SDGs and so, to allow policy makers to better promote sustainable tourism policies.

2. Dimensions and impacts of sustainable tourism: why indicators?

By tourism the countries can gain international credit and appreciation and can, therefore, attract foreign investment flows, on which economic development may depend on (UNWTO, 2022). To achieve a sustainable tourism development as a continuous process of impact monitoring, all relevant stakeholders and political leaders have to be informed through specific assessments by measurement tools in order to establish data-driven or issue-driven policies.

The indicators are information sets specifically able to measure relevant time changes of the relevant variables and effects of the impacts of current issues and risk factors on such variables. They allow to assess the results of policies and behaviours for tourism development and management. Furthermore, they are useful to monitor through time series information both the changes in structures, the endogenous and exogenous factors affecting tourism and the environmental, social, and economic impacts due to tourism.

According with the Russian dolls model of sustainability (Levett, 1998), the primary dimensions of sustainability are nested along the following scheme (Fig. 1):

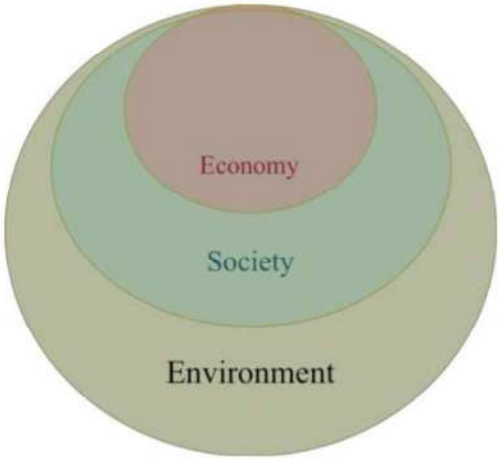

Figure 1 – Model of sustainability (UNWTO, 2022).

The environment is the more inclusive dimension, backing the economic and social-cultural ones: sustainability calls for a society respectful of the environment

and an economic system endorsing social well-being.

Specifically, the environmental dimension often is referred to as natural capital supporting or being affected by tourism activities through ecosystem services, a stable climate, and biodiversity. As well, the environmental dimension measures the flows of natural inputs (water, energy, etc.) and residuals (GHG emissions, solid waste, food waste and plastics, wastewater and other pollutants) generated by tourism production and consumption processes. In this sense, the tourism is sustainable if preserves the quality of natural elements (air, water, sea, and landscape) in rural and urban areas, minimizing the use of non-renewable resources and the production of waste related to tourism activities.

The social-cultural dimension includes the local and traditional aspects that can support or be impacted by tourism: the protection of local cultural heritage, individual and community welfare, including health and well-being, the development of social capital of the community networks able to plan and manage tourism, and, last but not least, the fulfilment of visitors' expectations.

The economic dimension refers both to investments in produced capital of goods and services by tourism industries (and other typologies of stakeholders) and to the consumption by visitors of the food and services, too. So, tourism is sustainable if is able to ensure economic profitability for business actors, to improve the quantity and quality of employment of local population, the development of infrastructure networks and financial and non-financial income of the territory directly and indirectly related to tourism, to provide fair and equal distribution of social and economic benefits and to make sustainable the expenditure of tourists, too

Nevertheless, all the dimensions are mutually linked and overlapped. So, different issues or a same issue could be part of more than one dimension. A balance must be established between the dimensions to guarantee long-term sustainability for tourism.

In this conceptual framework, the sustainable tourism indicators are useful to assess the impact of the tourism on the above dimensions.

The environmental impact generated by tourism, like every other business, and by tourists themselves can cause negative effects in terms of landscape degradation and biodiversity loss through the damage to coastal areas, forests, coral reefs, freshwater and other ecosystems and as global effect on human-induced climate change, the carbon dioxide emissions of transportation systems. Nevertheless, as positive effects, the revenues generated from the tourism sector can be a source of benefits for the environment if employed to preserve protected areas.

On the hand of socio-cultural impact, the lack of information and awareness of

the tourists about the local culture and the tourists' inappropriate behaviours can disturb way of life and social and cultural identity generating social conflicts in the local population (UNEP, 2005). This tourist-oriented perspective implies that residents' support for tourism is affected by the perceived personal benefits and the positive impacts of tourism. However, in the measure of socio-cultural impact, the residents' perspective - their perception of tourists or "the cultural distance" - is also important (Kim et. Al. 2020).

For the economic impact, both the extent of direct benefits derived from the expenditure by tourists at the destination for food, souvenirs, excursions, and tips, and the amount of money paid by tour operators to local suppliers (hotels and local transport companies) have to be measured. Indirect benefits include income from jobs and revenues for inside farmers or factories, generated by goods and services purchased by tourists. If the use of local products can increase the indirect impacts, the measurement of these effects can reveal that a destination needs fewer tourists to generate the same economic benefit for tourism enterprises, a stronger market position and less vulnerability to short-term economic changes. Moreover, the need of tourism-qualified employees will increase the level of human capital (Niedziółka, 2014). On the contrary, negative effects are generated by revenue 'leakages' of goods and services for tourists produced and purchased outside the country or area; by the diversion of funds, that could be otherwise used for providing local services, to address air and water pollution and related diseases, generated by tourist activities, and an increased cost of living for local population, due to an inflation of prices of goods and services in high-season.

Therefore, from a range of possible data sources, sustainability indicators are chosen if they are meaningful measures of tourism impact, useful to anticipate and prevent unsustainable emerging key issues related to tourism activities. In the context of sustainable development for tourism, indicators are strategic to monitor the impacts and, then, to measure the level of sustainable development, and the assets of the tourism destinations in a long-term reducing risk or costs perspective, for information-based decision making in all levels of tourism planning and management. Specifically, different levels of spatial areas are distinctive to produce sustainable tourism indicators (UNWTO, 2022):

- global, referring to all countries and marine areas
- supra-national areas, referring to sets or organizations of countries (EU, subcontinental areas, etc)
- national, country level, regional, referring to administrative units under the national level (NUTS 1, as aggregate of NUTS 2, and NUTS 2, in the EU ter-

ritorial classification scheme) municipal or city-region, administrative local units with relatively large populations locations or tourism destinations, areas within a given municipality where tourism activities and businesses are concentrated.

3. SDGs and sustainable tourism: what indicators?

The SDGs provide a comprehensive framework for promoting and developing sustainable tourism. They address a range of issues, including poverty, hunger, disease prevention, and gender equality, with a particular focus on income inequality, climate change, and biodiversity loss.

Leveraging the SDGs can be an effective way to explore the sustainability of tourism activities, as measured by a Tourism Sustainable Index (STI). This requires creating a scientifically and operationally sustainable tourism indicators' system that decision makers can adopt and implement for making management decisions. We can achieve this goal constructing a framework that considers the fundamental principles of sustainable tourism in the perspective of SDGs.

The first step is to understand the implications of each SDG for the tourism sector. Therefore, we propose to map various tourism-related indicators, identified by the relevant literature, to one or more SDS goal.

Table 1 proposes our first step toward this classification as it suggests a method, rather than exhaustive picture, that is out of the scope of the present contribution, being its future development.

SDG Goal(G) & Sust. Dim.(SD)	Sustainability issue	Indicator(s)	Data features (time and spatial (N)uts level)	Reference
G1: No poverty **SD:** Economic	Tourism demand	-Total number of tourist arrivals/overnigh.	Monthly data (1990.1-2023.5) N2	Blancas F. J. et al. (2015)
	Tourism revenue	-Tourism expenditure -Hotels and restaur. sector (% GDP) -IT expenditure (% GDP)	Yearly data (1975-2022) N1	
	Tourism Employement	-Employees in the service sector -Full-time employees (% service sector) -Av. length of serv. with same employer	Yearly data (2008-2023) N1 Quart. data (2008.Q1-2023.Q1) N1	
G2: Zero hungry **SD**: Econ.	Agriculture and farm	-Implementation and use of permaculture principles	Yearly data (2000-2021) N1	Schianetz. and Kavanagh 2008
G3: Good health & well-being **SD:** Social	Capacity of health services	-Hospital beds *per* inhabitant (#) -Staff employed in hospitals *per* inhabitant -Number of pharmacies *per* inhabitant	Yearly data (1980-2023) N1 Yearly data (1993-2022) N2	Blancas et al. (2015, 2023)
G4: Quality educat. **SD:**Social	Educ. levels of residents	-% of population enrolled in non-compulsory education	Quart. data (2008.Q1-2023.Q1) N1 Yearly data (2008-2022) N1	Blancas F. J. et al. (2015)
G 5: Gender equality **SD:** Social	Integration and reduction of gender inequal.	-% of employed women (tourism sector) -% of women employed with low-wages	Quart. data (2008.Q1-2023.Q1) N1 Yearly data (2008-2023) N1	Blancas F. J. et al. (2015)
G6: Clean water & sanitation **SD:** Environment	Water and wastewater	-Ann. water withdrawals on renew. ones -Wastewater treatment rate -% of tour. enterpr. reducing water cons.	Yearly data (1975-2020) N1	Dias J. G. (2017); Ivars-Baidal J. A.et al (2023)
	Coastal tourism	-% of coastal overnight -Trawling catch per EEZ (Tonn.per SKm)	Yearly data (2013-2022) N1	
G7: Affordable & clean energy **SD:** Environment	Energy consumption	-Use of renewable energy resources -Energy consumption of renewable resources per person and day	Yearly data (2004-2021) N1	Tanguay G. A. et al (2013); Blancas F. J. et al. (2015); Ivars-Baidal J. A. et al (2023)
	Energy management	-Energy intensity attribute. to tour. -Ratio of waste managed by energy recovery on waste managed	Yearly data (1990-2021) N1	
G8: Decent work & economic growth **SD:** Economic	Tourism employment	-Employed people (tour. sect. #) -% of employees hired full-time	Yearly data (1990-2021) N1	Blancas F. J. et al. (2015)
	Tourism seasonality	-% low-seas to peak-seas (empl. & tour.) - tourist events held in mid-low season	Monthly data (1990.1-2023.5) N1 Quart. (2008Q1-2023Q1) N1	
	Tourism quality	- % of high-quality accommodation establ. with respect to the total offer	Monthly data (1990.1-2023.5) N1 Yearly data (2012-2022) N2	
G9: Industry, innovation & infrastructure **SD:** Economic	Enterprises, innovation and Infrastr. for passenger trans.	-% of enterpr. using a voluntary certific. -innovating enterpr. supported by gover. -Density of the network (roads or railw.) -Number of public use airports	Yearly data (1970-2021) N1	Blancas F. J. et al. (2015); Ivars-Baidal J. A.et al (2023)
G10: Reduced inequality **SD:** Social	Inequality in gender, social communities, education and seasonality	-% of employed women (tour. sect.) -% of pop at-risk-of-poverty or social exclusion after social transfers -Gini coef. of equiv. dispos. income -Seasonality (nights spent per month)	Monthly data (1990.1-2023.5) N1 Quart. data (2008Q1-2023Q1) N1 Yearly data (2005-2021) N1 Month. data (1990.1-2023.5) N1	Blancas F. J. et al. (2015)
G11: Sustainable cities & communities **SD:** Social and economic	Safety, urbanization and transport	-Traffic accidents per 1000 locals -Destination safety (tourists' evaluat.) -Number of cultural assets -Urbanization and tourism - Capacity of transp. serv (air, road, rail)	Monthly data (1993.1-2023.4) N1 Yearly data (2012-2022) N2	Blancas F. J. et al. (2015) Blancas F. J. et al. (2025)
G12: Responsible cons. and prod. **SD**: Soc/Ec	Tourist offers providing a variety of exp..	-HQ offer in tourism accom. establ. -Catering and rest. services establ. -Tourist inform. offices	Monthly data (2022.7-2023.6) N1	Blancas F. J. et al. (2015)
G13: Climate action **SD:** Envir.	Atmospheric pollution	-Air pollutant emissions -Environmental protection investments	Quart. d (2010Q1-2022Q1) N1 Yearly data (1995-2022) N1	Blancas F. J. et al. (2023)
G14: Life below water **SD:** Environment	Population and water	-Air and water pollution, waste prod. -Quality of swim water -Ecological state of fresh water -Wastewater treatment plants	Yearly data (1970-2020) N1	Torres-Delgado A. and Saarinen J. (2014); Blancas. et al. 2015)
G15: Life on land **SD:** Environment	Terrestrial ecosystems	-Degree of naturalness of a tourist area -Biodiversity conservation -% of forest cover	Yearly data (2011-2020) N1	Rasoolimanesh S. M. et al (2023); Blancas F. J. et al. (2023)
	Management of solid urban waste	-Vol. of waste collected -Vol. of waste generated per person/day -Construction density per unit area	Monthly data (1980.1-2023.6) N1 Quart. data (1980Q1-2023Q2) N1 Yearly data (2011-2020) N1	
G16: Peace & justice **SD:** Soc.	Justice system	-Personnel in the criminal justice system	Yearly data (2008-2021) N1	not in surveyed papers
G17: Partners for goals **SD**: Social	Collaboration	-Tourism flows among countries	Yearly data (1990-2021) N1	not in surveyed papers

Table 1 - Sustainability tourism indicators related to SGDs

4. Conclusion

As tourism is one of the largest and fastest growing economic sectors in the world, there is a close scrutiny of its sustainability and the natural limitations of its growth. The Sustainable Development Goals (SDGs) are the outcome of a political process and their implementation is inherently political as well (Hall et al., 2022). They have become a major focus for studying tourism's contribution to sustainable development, aligning the idea of profitability with conservation for future generations. In this work, we provide a basis for future research that aims to formulate appropriate indicators and monitoring strategies based on the SDGs. In line with UNWTO & UNDP (2017), we consider composite indicators an essential method for the sustainable management of destinations and tourist products.

Our original approach leverages a rich literature on the construction of composite indicators and their use to evaluate the progress in tourism sustainability. As preliminary analysis, we have linked measures and indicators to the 17 SDGs, discovering that not all SDGs have received the same attention in the tourism and hospitality literature analysed so far and, indeed, the number of proposed indicators linked to each SDG is very different. Furthermore, highlighting the possible relevance of drawing from the Eurostat databases, we identify some indicators for important SDGs such as Peace & Justice and Partnerships for the Goals.

We show the possibility of measuring all dimensions of sustainability (economic, social, and environmental) and, therefore, of building composite indicators that can fully inform policy makers on the progress towards the achievement of each SDG. However, our preliminary research has also highlighted a potential problem of relevance of the indicators for those contexts, such as the Italian one, where fund management and policies for the tourism industry are implemented at the regional level. In fact, there are few available measures with NUTS2 territorial detail, and their number decreases even further when timeliness becomes important (for example, when using the indicators for real-time monitoring). Nevertheless, economic digital platforms represent a promising solution, although their reliability and coherence must always be investigated to ensure the comparability over time and space of the statistical measures made available to decision-makers.

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Acknowledgements
The present work has been inspired by the project GRINS - Growing Resilient Inclusive and Sustainable of the National Recovery and Resilience Plan PNRR – Next GenerationEU"- CUP E63C22002120006.

LifeScience hub and the impacts on the well-being of people. A case study from the region of Apulia

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Abstract: The purpose of this paper is to carry out an impact assessment of a LifeScience pole on the well-being of people in the Apulia region using statistical methodologies.

After an initial overview of the LifeScience Hub Foundation in Apulia, which outlines the main objectives and characteristics, the importance of the hub in promoting innovation, research and collaboration in the life sciences sector is underlined.

Using statistical methodology, this article outlines the impact assessment metrics of the LifeScience Hub both in economic terms, analysing the main economic indicators (employment, GDP and investment flows in the life sciences sector) and the impact on the social context, investigating factors such as access to health services, the availability of innovative treatments and the improvement of health outcomes. The study also examines the educational and research

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opportunities provided by the hub, evaluating their effects on human capital development and knowledge transfer in the region.

In addition, the paper addresses the potential spillover effects of the LifeScience Hub on other sectors of the economy. Consider how the hub's presence has spurred the growth of supporting industries, such as biotechnology, pharmaceuticals, and medical device manufacturing. The study examines how this diversification and expansion of the regional economy has contributed to the general well-being of people in Apulia.

This work has been structured as follows: Felice Ungaro and Alessandra Ricciardelli are the authors of the first paragraph (Introduction), of the second paragraph (LifeScience Hub Foundation) and wrote the last paragraph (Conclusions). Instead, Margaret Antonicelli is the author of paragraphs 3 and 4.

Keywords: well-being, health service, statistical methods, impact assessment.

1. Introduction

In the pursuit of fostering societal well-being through the convergence of scientific innovation and regional development, the establishment of the LifeScience Hub Foundation in Apulia, Italy, stands as a noteworthy endeavor. This paper embarks on a comprehensive exploration of the impact assessment of the LifeScience hub on the well-being of individuals residing in the Apulia region. Employing statistical methodologies as its compass, this study navigates the intricate landscape of evaluating the hub's influence on various dimensions of well-being, encompassing economic, social, and health aspects.

The LifeScience Hub Foundation emerges as a beacon of advancement in scientific exploration and industrial progression. This dynamic ecosystem, marked by the presence of renowned multinational corporations, alongside local enterprises and research institutions, epitomizes a collaborative approach to nurturing innovation, research, and development within the life sciences sector. In this introduction, we provide an overview of the LifeScience Hub Foundation and its pivotal role in catalyzing progress across diverse domains. The ensuing journey delves into the intricacies of impact assessment methodology, revealing the interplay between policies, interventions, and outcomes. Through a lens of effectiveness, efficiency, and sustainability, the paper examines the influence of the LifeScience Hub Foundation on both economic and social terrains. We unveil the statistical methodology under-

pinning the evaluation process, including techniques such as instrumental variables, propensity score matching, and difference in difference.

This study ventures further to define a comprehensive system of indicators that captures the multifaceted dimensions of well-being impacted by the LifeScience Hub. Drawing from objective and subjective data, the system of indicators encompasses economic growth, health outcomes, societal factors, and overall health well-being. The synthesized indices are structured to offer a comprehensive understanding of the broader impact of the hub's activities on the lives of Apulian citizens.

As the authors traverse this exploration, they aim to contribute to the discourse surrounding well-being assessment and its relationship to the establishment of innovative hubs in regions such as Apulia. By delving into the intricacies of impact assessment and the statistical techniques underpinning it, this paper sets out to unravel the nuanced narrative of progress, transformation, and well-being catalyzed by the LifeScience Hub Foundation's presence in Apulia.

2. The LifeScience Hub Foundation

- Apulia plays a leading role in the field of sciences in Italy and is one of the main regions for exports (amounting to a total of 912 million euros in 2019), thanks to the presence of multinational companies, including Sanofi and Merck, which have established production facilities here, along with regional research institutions. The region also boasts a strong manufacturing base, with nearly 1,200 companies (multinationals, SMEs, startups) active in the chemical and pharmaceutical sector, employing about 2,940 individuals. The support from the regional government and a highly specialized network of research and development institutions have led to a growing number of companies with engineering and ICT expertise in areas such as medical devices, bioinformatics, and telemedicine. This is due to the ample availability of quality local raw materials, which has resulted in the creation of niches such as natural cosmetics, with over 50 companies active in the sector.
- The Life Science Hub Foundation aligns with the strategy of the Apulia Region aimed at creating a transversal and multidisciplinary regional ecosystem in the context of Life Sciences. This encompasses molecular and nanotechnological aspects, bioinformatics, pharmaceutical development, nutraceuticals, and biomedicine. Innovative sectors such as Advanced Therapy Medicinal Products (ATMPs: Microbiome, stem cells, CAR-T) are involved,

with the goal of making the Apulia Region a center of excellence in the Life Sciences and Biomedicine sector. The implementation of this strategy involves establishing three hubs in the Capitanata area (Nutrimed sector), the Bari area (Biotech-Bioinformatics/Precision Medicine-Biomedical sectors), and the Salento area (Med-Tech/Nanotech sectors). This strategy builds upon a well-established regional expertise in the field of life sciences and health.

- The Foundation will serve as an entity supporting innovative projects in precision medicine, aiming to develop not only new diagnostic and therapeutic approaches but also new materials and devices for cellular and genetic therapies, non-invasive early diagnostics, as well as research and development activities in the field of life sciences within European and Italian projects.
- The Foundation's responsibilities will include creating an environment conducive to the growth of a new generation of nanotechnologist-medics who are nurtured at the interface of basic research and clinical practice. It will promote the development of existing local businesses and foster the emergence of new enterprises in the sector. Furthermore, the Foundation will attract financial and investment opportunities on a national and international scale, support the transfer of research results, safeguard intellectual property, promote new entrepreneurship, and participate in or initiate collaborations with companies, consortia, public entities, associations that share the goals of the "Puglia Life Science Foundation" as well as research, advanced training, and technology transfer structures in Italy and abroad.
- The Foundation will be a fundamental support for managerial and administrative activities, scientific and specialized training, and high-tech entrepreneurial activities (startups, spin-offs, etc.) rooted in the Apulian territory. These endeavors can industrialize research outcomes, translating them into market-accessible products for clinicians and patients, with significant employment impacts. This aspect, aligned with the objectives of the National Recovery and Resilience Plan (PNRR), will benefit and integrate with the coordinated regional program for incubating and accelerating innovative entrepreneurial initiatives, aimed at creating an ecosystem of expertise in scientific, managerial, economic, and legal domains capable of capitalizing on acquired know-how through marketable end products.

3. Impact assessment

Evaluating impacts means verifying the effects – both unforeseen and foreseen – of a policy/public intervention in reference to programs or projects, identifying the factors of success and failure.

The effects are evaluated in relation to the results that the policy has set itself to verify achievement and the factors that contributed to its success or failure, including at the end of any corrective actions and/or the launch of new policies, contributing to the action that the public decision maker leads (Burdge and Vanclay, 1995; Becker, 2001).

More specifically, the impact assessment provides information about:

effectiveness, in terms of achieving objectives;

efficiency, i.e., the dimension of the relationship between results achieved and resources employed;

sustainability, seen as the capability of the policy, program or project evaluated to produce lasting effects over time.

In terms of public policies, evaluation means the identification and measurement of the effect generated by the policy being analysed. The aim is therefore to investigate the presence of a causal relationship between a result variable and the intervention introduced by the legislation. The effect of the policy is calculated as the difference between the result obtained in the presence of the incentives envisaged and that measured in the absence of them.

The statistical field that deals with the estimation of causal effects goes by the name of "counterfactual technique". This methodology originates from biomedical statistics and adopts its terminology, distinguishing "treated" subjects from "non-treated" subjects, where the former are the companies that have benefited from the public incentive. However, the comparison between the two subsets is not informative of the causal effect and it is necessary to introduce appropriate estimators, instrumental variables, propensity score matching, difference in difference, capable of considering the self-selection process of the units treated under certain conditions.

In more technical terms, the effect of a policy is identified in the change obtained (result) due to a treatment (policy): that is, a causal link is established between intervention and result.

To evaluate a policy, therefore, it is necessary to define what type of treatment it was administered, according to what logic that treatment must induce a certain type of change, who among the potential beneficiaries/recipients received it and possi-

bly with what intensity.

The effect of a policy will be given by the difference between an actual result/value observable among the addressees of the policy following the implementation of the policy itself and the existing state in the absence of interventions attributable to politics (Becker, 1988; Becker, 2001).

The definition of effect, as outlined, brings out an important element to keep into consideration: the observed effects may not be due to the implementation of the public policy. Indeed, many other phenomena, independent of the activities referred to a given public policy, can influence behaviour more or less directly and the conditions that the policy in question wants to change. It is therefore possible to overestimate, o conversely, underestimating the contribution given by the policy itself and the causal relationship between outcome and intervention (policy).

To avoid the possible distortion of the evaluation conclusions due to the presence of further elements that act on the context, in addition to the public policy object of the evaluation, it is possible to resort to counterfactual analyses. That is, it is about evaluating the contribution net of other intervening elements: the counterfactual analysis concentrates, in fact, on the difference between what was achieved with the intervention and what it would be happened (in a hypothetical situation) without the intervention (Becker, 1991; Becker, 2001).

Evaluating the effects of a policy, conducted with a counterfactual approach is one type of particular evaluation, at least for two reasons:

places the attribution of causality at the centre of attention, i.e., the identification with observed changes given only by public action. With this type of analysis, this contribution is isolated from the influence of other factors that insist on the same phenomenon;

wants to calculate this net contribution of the policy through empirical data obtainable from existing sources or ad hoc collections.

Then, a control group is defined, and the results are verified achieved in the absence of the policy to compare them with those obtained in the presence of the politics.

Depending on how we define the control group in counterfactual analysis, one is in presence of two types of approaches:

1. Experimental approach. It is considered the method capable of producing the most valid estimates and credibility of the effects of a public policy. To obtain this result, however, it is necessary that the evaluator has the possibility to manipulate

the group selection process subject to the policy and the control group, and thus to determine who is subject to the policy (treatment) and who vice versa is excluded, through randomization. The latter is a random attribution of the components to the two groups guaranteeing to the components of the two universes of reference the same possibility of being part of the two samples. The starting differences between the components of the two groups must be zero: only in this case is the change attributable to politics. The ability to do so manipulation is however necessarily limited for practical, legal, or even reasons policies. When it is not possible to operate in this sense, there is an approach non-experimental.

2. Non-experimental approach. Even in a non-experimental situation, the effect of a politics is defined as the difference between a factual and a counterfactual situation, but in this case the counterfactual situation is no longer approximated by a group of control chosen by a randomization procedure. That is, the evaluator cannot manipulate the group selection process, but only observe what happens: the counterfactual will be approximated by observing what happens to other subjects and/or in other periods of time. In this case it is more difficult to determine whether to change observed is due to politics, as it could be due to other factors attributable precisely to the different characteristics of the members of the two groups. Six members of the group subjected to the policy and those of the control group are self-selected or have been assigned to treatment (policy) in a way however not random, the starting differences are generally not zero; the non-homogeneity of two groups causes the observed difference between treated and untreated to be a biased estimate of the effect of the policy. This distortion is also called "by selection" because the starting differences are due to the way in which the subjects are selected or yes self-select to receive or not to receive treatment. However, there are some statistical methods such as regression analysis − which allow you to estimate the effect of the treatment on the result other conditions being equal, that is, observable characteristics being equal. Such methods can be thought of as ways to smooth out the observed difference between treated and untreated of the component attributable to starting differences in characteristics observable. In this case the observed effect will be attributable to the treatment.

4. Definition of a system of indicators

To evaluate the impact of the LifeScience Hub on the economic, social and health

well-being of Apulian citizens, this work aims to define a system of indicators.

The concept of well-being cannot be defined unequivocally, and we find different conceptualizations in the literature. It is a concept that varies over time, according to places and cultures, and its definition must take into consideration the complexity of the phenomenon and its multidimensional nature (Alkire, 2002). Well-being should be considered as a system in which the components interact and are interconnected (Alaimo et al., 2020) and its definition must take into consideration both the individual and the social level, including objective and subjective aspects (Maggino, 2016).

The complexity of the phenomenon requires an overall vision for its understanding, which cannot be achieved by considering the single elements separately and must be faced through an effort of synthesis, in the awareness that a similar approach must not aim at reducing the complexity but at a stylization of reality (Alaimo et al., 2020). It is not a simple task, and the steps necessary for the construction of a composite indicator of well-being are subject to numerous critical issues, starting from the selection of indicators up to the aggregation and weighting procedure.

In this study, the parameters under study will have a twofold source:

objective and therefore directly observed data;

subjective data deriving from the questionnaire.

Through random sampling, a sample of subjects will be selected to whom, in a totally anonymous manner, the questionnaire will be administered before the start of the hub's activities and after 12 months and subsequently after 24 months. Since these processes manifest their effects in the medium-long term, it was not possible to define and program post-startup activity surveys of the hub with smaller time intervals.

In detail, to make comparisons before the activity of the hub and in the two successive time intervals, but also to carry out a comparative territorial analysis between the 6 Apulian provinces, the system of indicators will allow to put back an assessment index of the well-being deriving from the activity of the LifeScience Hub before and after allowing the evaluation of the impact.

The resulting index will be composed of 4 domains:

- Economy
- Health
- Society

- Health well-being.

In turn, each of these domains will be established and evaluated through a series of elementary indicators.

The system will be made up as follows (Figure 1).

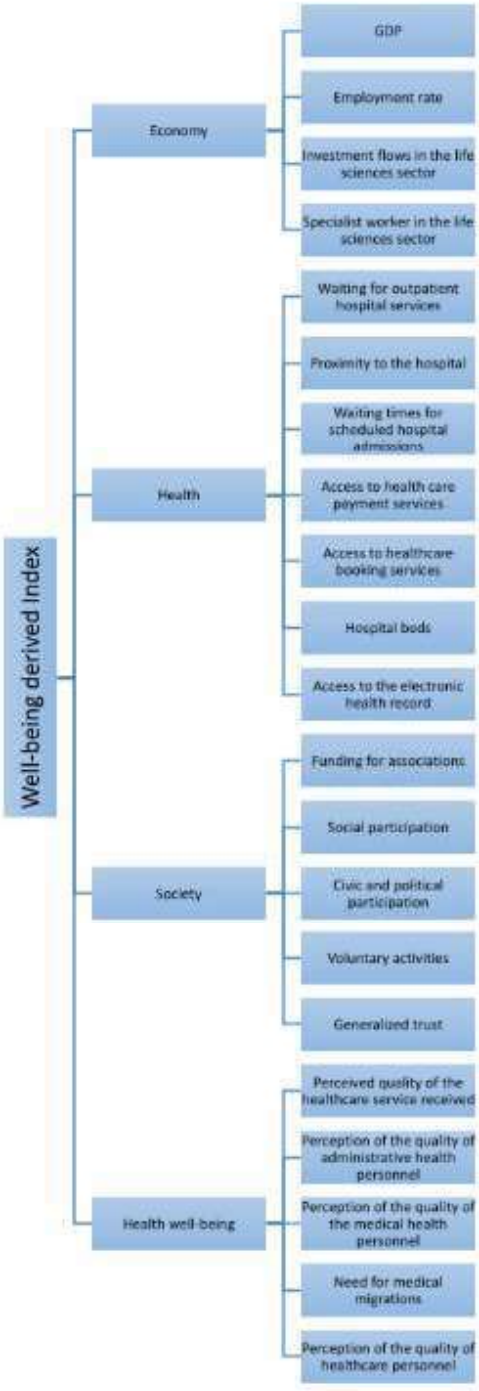

Figure 1 – Structure of Well-being derived Index

Since all the elementary indicators, pertaining to the 4 domains, are calculated on an ordinal basis, we want to summarize the information collected without losing the peculiarities of the complexity of the phenomenon studied.

Consequently, the synthesis methodology used will be based on a non-aggregating method, the POSET.

One of the basic structures upon which mathematical disciplines are built is order. A set is said to be (partially) ordered when an order relation is defined between its elements, making them comparable.

Let P be a set. A partial order on P is a binary relation $\leq$ on P such that, for every $x, y, z \in P$:

$x \leq x$ (reflexive)
if $x \leq y$ and $y \leq x$, then $x = y$ (antisymmetric)
if $x \leq y$ and $y \leq z$, then $x \leq z$ (transitive)

A set P with a reflexive, antisymmetric and transitive relation (order relation) $\leq$ is called a partially ordered set (or poset). For every partially ordered set P we can find a new poset, the dual of P , by defining that $x \leq y$ is the dual if and only if $y \leq x$ in P . Any statement about a partially ordered set can be turned into a statement of its dual by replacing $\leq$ with $\geq$, and vice versa.

A diagram, also called the Hasse diagram, can represent each (finite) poset graphically. The construction of a diagram is based on the concept of a covering relation. " A covers B " (or " B is covered by A ") in a poset P means that $B \leq A$ and there exists no $x \in P$ that $B < x < A$, i.e., A is greater than B and there is no other element in between. The set of all elements that covers an element X is called the cover of X, denoted by X^- .

Conversely, the set of all elements that are covered by X is called the cocover of X , written as X^- .

A diagram of a poset P is drawn as a configuration of circles—representing the elements of P — and connecting lines—indicating the covering relation. If A covers B, the circle for element A is drawn above the circle for element B , and both are connected with a straight line (Figure 2).

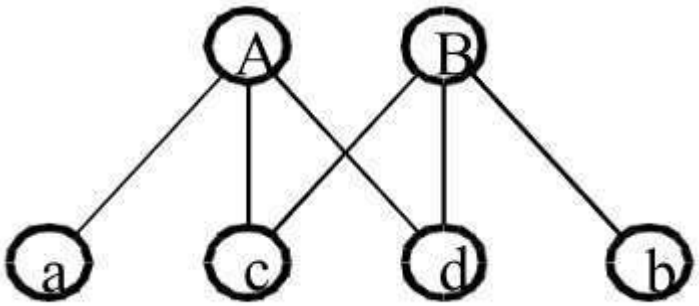

Figure 2 – Structure af Poset

For posets and subsets of ordered sets it is often desirable to have elements that are greater or less than all other elements. Let P be a poset and $S \subseteq P$. An element $a \in S$ is the greatest (or maximum) element of S if $a \geq x$ for every $x \in S$, denoted by $a = \max S$. The greatest element of P, if it exists, is called the top element of P. The least (or minimum) element of S, written as min S, and the bottom element of P are defined by duality. Whereas subsets of the poset in Figure 2 have greatest and least elements, the poset itself has neither a top nor a bottom element.

5. Definition of a system of indicators

This paper focuses on conducting an impact assessment of the LifeScience Hub Foundation in the Apulia region, Italy, on the well-being of its residents using statistical methodologies. The paper follows a structured approach, covering various aspects of the LifeScience Hub's impact and its implications for economic, social, and health-related well-being.

The introduction sets the stage by highlighting the importance of the LifeScience Hub Foundation in fostering well-being through scientific innovation and regional development. The hub's role in promoting collaboration, innovation, and research within the life sciences sector is emphasized. The paper's aim is to comprehensively evaluate the hub's impact on various dimensions of well-being, utilizing statistical methodologies and considering economic, social, and health aspects.

The overview of the LifeScience Hub's presence in the Apulia region underscores Apulia's significance in the field of sciences and its role as a hub for multinational companies, research institutions, and a strong manufacturing base. The hub aligns with Apulia's strategy to create a multidisciplinary ecosystem in life sciences. Its

establishment in different areas within the region reflects a commitment to excellence in various sectors. The Foundation's responsibilities include supporting innovative projects, promoting growth, attracting investment opportunities, and contributing to human capital development.

The paper discusses the evaluation of impacts and the factors contributing to policy success or failure. It defines effectiveness, efficiency, and sustainability as dimensions of impact assessment and introduces statistical techniques such as instrumental variables, propensity score matching, and difference in difference for causal inference. The need to isolate policy effects from other influencing factors is emphasized. The concept of counterfactual analysis is introduced as a method to evaluate policy contributions net of other intervening elements.

To assess the impact of the LifeScience Hub on various aspects of well-being, the paper proposes a system of indicators. Well-being's multidimensional nature is acknowledged, and the system aims to capture economic, health, societal, and health well-being domains. Both objective and subjective data are collected through surveys conducted before the hub's activities commence and at different intervals afterward. The resulting composite index will be organized into these four domains. The synthesis methodology used for the composite index is non-aggregating and relies on a partial order set (POSET) approach. This approach allows for a comprehensive understanding of the relationships between the various indicators and their components. The paper's system of indicators is represented visually using a Hasse diagram, showing how elements are related based on the partial order relation.

In conclusion, the paper takes a comprehensive approach to assess the impact of the LifeScience Hub Foundation on the well-being of the Apulia region's residents. It combines economic, social, and health-related dimensions of well-being using statistical methodologies. The paper's structured approach and focus on the multifaceted impact provide insights into the complex relationship between innovative hubs and regional well-being.

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Perceptions of well-being through food: construction of an indicator through data collected by questionnaire

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Abstract: In recent years, issues concerning well-being have been increasingly at the centre of political debate. Since well-being is a multidimensional concept, there are difficulties in its definition and the selection of indicators necessary for its measurement. In this paper, the role that nutrition has on well-being was analysed as it contributes to the maintenance of physical health and to the prevention of certain diseases. A questionnaire was constructed and administered in which the respondents' perception of subjective well-being and eating habits is investigated. The sample analysed is non- probabilistic and the technique used is an online survey. The data obtained were cleaned by manual data cleaning techniques, directly examining individual units in which error was detected. In measuring a multidimensional concept, such as well-being, several basic indicators are defined. The non-aggregative approach was used to summarize the complexity of the indicators because it can respect the ordinal nature of the data. Specifically, the Poset (Partially Ordered Set) approach was used: partially ordered sets arise from any attribute system when conflicting scores exist in the profiles of statistical units and thus some of the alternatives remain unordered and incomparable. Methods for constructing synthetic indicators through this approach are based on the existence of linear extensions that allow the elements of the Poset to be completely ordered, respecting the constraints imposed by the partial order relation. Before applying this methodology, a descriptive analysis of the data, obtained through the questionnaire, was carried out on a sample of 155 individuals. The partially ordered sets are represented by a Hasse diagram: having obtained 128 profiles we are

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dealing with an extremely heterogeneous sample. This heterogeneity reveals a strong discrepancy between the two main domains: satisfaction with different aspects of life and perception of eating habits. The width of the middle part confirms that most of the individuals involved in this analysis showed average fairness in eating habits and average propensity to improve these habits.

Keywords: well-being, indicators, nutrition, Poset

1. Introduction

Topics concerning well-being and its determinants have increasingly become the focus of global, national, and regional political debates. The most widely used tool worldwide to determine a nation's economic growth is the Gross Domestic Product (GDP), which has, however, become insufficient in interpreting the measure of a society's well-being. Social progress consists of improving the well-being of individuals and families. To assess this progress, it is necessary to look not only at the functioning of the economic system, but also at the different experiences and living conditions of people.

There are difficulties in the definition of well-being and in the subsequent selection of indicators necessary for its measurement. The complexity also arises from the fact that the choice of indicators, as well as their representation and interpretation, involve a subjective component.

Well-being is a multidimensional concept that encompasses various aspects of life, including health, social relationships and personal fulfilment. In general, well-being is a state of comfort, health, and happiness, both mental and physical, which includes several interconnected factors. While there is some agreement on the essential parameters of well-being in all countries, the identification of specific areas or components may vary from one culture to another.

Related to the concept of well-being in the literature are two adjectives: "subjective" and "objective". The term "subjective" refers to people's attitudes, opinions, values and all the various types of evaluations, both positive and negative, that people make of their lives. "Objective" well-being, on the other hand, in the context of quality of life, refers to aspects of reality that are defined and recognized by experts.

This study analysed the role that nutrition plays in well-being, as it significantly contributes to maintaining physical health and preventing certain diseases.

The connection between well-being and health is emphasized by the World Health Organization's definition of health as "a state of complete physical, mental, and social well-being," not merely the "absence of diseases or infirmity." Over time, medical studies have unequivocally highlighted how poor eating habits are correlated with specific pathologies: proper nutrition is an integral part of a healthy lifestyle. Therefore, nutrition and health are essential elements in defining the quality of life in any context, not just at an individual level.

In summary, the recommended dietary practices include: balancing calories; limiting the intake of fats, sugars, and salt; consuming fruits, vegetables, legumes,

nuts, and whole grains daily.

Like any other survey-based measure, subjective well-being data can be influenced by the adopted measurement methods. In particular, these measures need to be collected through sample surveys, as administrative databases do not contain this information.

2. Methodology

In this paper, a questionnaire was administered to investigate the perception of subjective well-being and dietary habits of the respondents. The questionnaire administered is divided into 4 sections, with a total of 29 questions. The questions formulated in the first section investigate demographic aspects. This section is crucial in the subsequent analysis of the results because it allows the population to be subdivided based on certain characteristics and comparisons to be made. The second section contains questions regarding perceptions of subjective well-being. In particular, satisfaction with one's life and perception of one's health are investigated. The next section concerns the perception of eating habits, and one is asked in the different questions whether one's diet is considered adequate or not. In the last section, eating habits are analysed in detail. Taking into consideration different foods, or categories of foods, it is investigated what the frequency of consumption is. These questions are particularly important because they provide insight into whether habitual consumption is compatible with the Healthy Eating Guidelines provided by the Ministry of Health.

The methodology used for constructing the questionnaire ensures that the questions are easily understandable and that there is no overlap in the meanings of response categories. The structure of the responses guarantees that all respondents can express themselves with enough options. The optimal number of categories should capture significant variations but should not increase the response burden, leading to biases or errors.

The analysed sample is of a non-probabilistic type; non-probabilistic samples are selected based on convenience criteria. This sampling technique offers the advantage of being simple, fast, and cost-effective; however, it does not allow for generalization of the results. Nevertheless, in practice, such samples are often the most used because they are straightforward and economical to construct. The survey technique used is self-administered (self-reported): a web questionnaire was utilized, and each subject received the questionnaire through a link. The obtained

data were cleaned through manual data cleaning techniques, directly examining individual units where errors were identified.

In measuring a multidimensional concept like well-being, various basic indicators are defined. An indicator in statistics represents a term indicating indirect measures of economic or social phenomena that are not directly measurable. The adoption of different indicators for each conceptual variable leads to the definition of a system: a coherent set of interconnected elements from a perspective. To summarize the complexity of the system, two approaches can be used: aggregative-compensatory and non-aggregative. In this analysis, the non-aggregative approach is used because the aggregative-compensatory approach faces difficulties in converging all the relevant information on complex, dynamic, multidimensional phenomena full of ambiguity and nuances into unidimensional measures. Additionally, assuming that synthesis implies aggregation, ordinal data must be scaled to numerical values for effective aggregation and processing, which often proves to be inconsistent with the nature of the phenomena. Non-aggregative approaches can respect the ordinal nature of the data.

In this perspective, one of the most useful references is Partial Order Theory, a branch of discrete mathematics that provides concepts and tools that naturally fit the needs of ordinal data analysis. Non-aggregative approaches focus not on dimensions but on profiles, which are combinations of ordinal scores that describe the "status" of an individual. Profiles can be described and mathematically analysed through tools that refer to this theory. Specifically, Partially Ordered Sets (Poset) allow for information extraction directly from the relational structure of the data and provide robust results without requiring restrictive assumptions. Partially ordered sets arise from any attribute system when there are contrasting scores in the profiles of statistical units, making some of the alternatives unordered and incomparable. A formal definition of Poset is as follows: let X be a dataset and let "$\leq$" be a binary relation on it. The binary relation "$\leq$" is called a partial order if it satisfies the properties of reflexivity ($x \leq x$, for every x in X), antisymmetry (if $x \leq y$ and $y \leq x$, then $x = y$), and transitivity (if $x \leq y$ and $y \leq z$, then $x \leq z$). Then the dataset X with the relation "$\leq$" is called a partially ordered set, in short Poset. Partially ordered sets can be represented using Hasse diagrams, which are a kind of directed graph. The diagram is read from top to bottom; if a downward path connects two elements, they are comparable; otherwise, they are incomparable. Finite Posets always have maximal and minimal elements. A subset of elements of the Poset that are mutually comparable is called a chain, and a subset of elements of the Poset that are mutually incomparable is called an antichain. A Poset that is a chain is also

called a linear order. Most Posets in the social sciences derive from multi-indicator systems (MIS): a set of indicators or attributes defined on a set of statistical units. Each unit is then assigned a profile on the MIS, which is a sequence of scores on the set of indicators. In general, the resulting set of profiles may be only partially ordered because contrasting scores can arise in two profiles, leading to incomparability. There are nuances and ambiguities that, in Posets, are reflected in the different "relational position" of the elements within the network of comparability and incomparability defining the partial order (and which is made visible in the Hasse diagram).

Methods for constructing synthetic indicators using Posets rely on the existence of certain naturally associated linear orders, linear extensions. Consider a Poset Q. Suppose that the elements of Q are linearly ordered in a linear order L, such that if $p \leq q$ in Q, then $p \leq q$ in L. In other words, the elements are completely ordered, respecting the constraints imposed by the partial order relation of Q. The resulting complete order L is called a linear extension of Q. L is "linear" because it is a chain; it is also an "extension" of Q because it transforms the incomparabilities of Q into comparabilities. In the case of ordinal data, often "comparisons" (with benchmarks or inter-unit) are more meaningful than "absolute" measurements. This theory is particularly suitable for evaluating well-being: partially ordered sets are the natural context for making multidimensional comparisons.

3. Results

Before applying the Poset approach, a descriptive analysis of the data obtained through the questionnaire was conducted on a sample of 155 individuals. There is a high presence of individuals aged 19 to 27, with 37% of the participants belonging to the 19-30 age group. Looking at the distribution of marital status, there is a high percentage of singles, consistent with the prevalence of young people in the survey. Through the two concluding questions in the demographic section (weight in Kg and height in cm), the Body Mass Index (BMI) was calculated.

To assess the subjective well-being of individuals, the central part of the questionnaire is based on life satisfaction. 51% of the responses indicate a high rating given to the overall level of satisfaction. The level of life satisfaction was subsequently divided into five domains: economic situation, health, family relationships, friendships, and leisure time. The highest scores were assigned to health and rela-

tionships with friends.

The last part of the questionnaire provides data related to dietary habits. 54% of individuals gave a rating of 4 or 5 to their eating habits. Only 61% of the respondents believe they consume an adequate amount of fruits and vegetables; this percentage increases to 77% among individuals who rated their eating habits as 4 or 5.

As previously highlighted, the results obtained through the questionnaire do not allow for the use of an aggregative approach to define the synthetic indicator. Given the availability of ordinal values, the Poset analysis is the most appropriate.

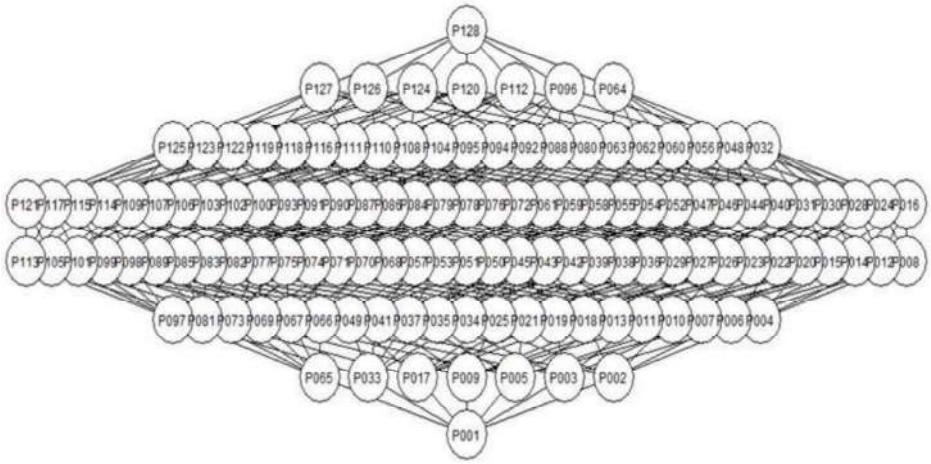

Figure 1 – Hasse Diagram

From the elaborated Hasse diagram, it is evident that with 128 profiles obtained, the sample is extremely heterogeneous. This result is determined by the fact that despite individuals stating they were fully aware or moderately aware of adopting incorrect dietary practices, they still chose to stick to their eating habits. This heterogeneity reveals a strong discrepancy between the two main domains: satisfaction with different aspects of life and perception of dietary habits.

The graph shows that position p128 was occupied by the person who achieved the best results: they have a proper diet and are fully aware of how to maintain these high standards. On the other end of the spectrum is profile p1. The width of the central part confirms that the majority of individuals involved in this analysis demonstrated average correctness in their dietary habits and a moderate inclination to improve these habits.

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5. Conclusion

In this paper, it was possible to address the complex theme of food well-being, analysing the impact of nutrition on the perception of well-being.

As evidenced in the paper, an analysis was conducted with the collected data, showing a medium/high perception of well-being, particularly in the domains of health and relationships with friends.

There are few simple dietary practices recommended by the WHO; nevertheless, individual habits often struggle to adhere to these guidelines. The application of the Poset model reveals that among the interviewees, there is a full awareness of following an incorrect and/or improvable diet, despite knowing how one could eat in a healthier and more balanced way, both in terms of food and beverages. Dietary habits are transmitted across generations, they vary among regions, and they are part of individual experience.

During the examination of various questionnaire formulation methodologies, particularly in terms of questions, it is noted how the unconscious and automatic aspects of individuals influence responses, and how biases, heuristics, and personal characteristics interfere with reality. These and other cognitive processes, combined with the inherent ease of habits, evidently make changing dietary patterns challenging, even though there is an awareness of the path towards greater well-being.

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Territorial inequalities in health: a review of main theoretical framework applied in social statistic

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Abstract: The universal welfare systems, present in most industrialized countries, have had to manage the complexity of areas such as the economy, society, health and education, starting from the analysis of the inequalities between citizens unfortunately present in these areas. The health sector is one of the areas in which the presence of inequalities and different access to health services is most present. The full awareness of the presence of these territorial imbalances emerged above all during the Covid-19 syndemic which affected all continents starting from the end of 2019. The syndemic has highlighted in Italy the very serious limits of the Essential Levels of Assistance, a score that represents the level that must be guaranteed in all territories on the basis of the Constitution, and for which the State must ensure full funding. The purpose of this article is to carry out an analysis of the main and most applied frameworks related to territorial health inequalities, highlighting their valuable aspects, but also the related criticalities. Future developments of this article will lead to the empirical evaluation of the different frameworks, first carrying out a comparative analysis at the Italian regional level; subsequently, comparative analyzes will be carried out at the European and Mediterranean area level.

Keywords: health system; health theoretical frameworks; statistical approaches; socio-economic determinants.

1. Introduction

Analyse the issue of social inequalities and the effects they cause in access to health services today increasingly involves the need to adopt an approach and tools capable of challenging its complexity.

It is now known in the scientific literature related to the studies epidemiological studies that the variability of "health" in the population is strongly influenced and determined from the differences genetics, of different socio-economic conditions or the result of the individual choice of own lifestyle. The inequalities are observed on all dimensions of the structure demographic and social: at the same age, the risk of dying is higher in the more social classes disadvantaged, among the unemployed, among those who live in deprived houses and in degraded neighbour-hoods, among whom lives alone or in less protected family situations. Education level is another factor fundamental since it is the bearer of knowledge, skills and the possibility of self-management, ability of choice and sense of responsibility for oneself and for others.

The detection of inequalities involves the identification of groups of subjects otherwise benefited. That is, there are subjects belonging to certain categories social groups that have an advantage in using a service or in having a quality of a better life, and subjects belonging to other social categories who, on the contrary, go encounter more difficulties in accessing or using the same service or treatment.

It should be noted that the most recent literature has brought to light that the structure itself of inequality has changed leading to the need for a profound renewal of analytical tools with which inequality-ties are observed and become the object of public policies.

Among the "new poverties" and the "new social fragilities" there are undoubtedly aspects common, just as common are the factors that determine them. The two terms however identify different positions: the first characterized by the loss almost of rights and guarantees, from the lack of primary resources, from the absence of relationships social networks that act as support and emotional and social referonce; the second marked by uncertainty of status, by the only theoretical availability of resources and opportunities, by the presence of a network of still vital relationships even if worn and not very resistant over time.

Inequality today assumes a multidimensional character or rather it is built based not on one factor on which others are added disadvantage factors of decreasing importance, but from the interweaving of diversified factors difficult to arrange hierarchically.

Starting from the reflections made here, the main theoretical frameworks used in statistics to conduct analyses at a territorial level that can study the peculiarities of health inequalities, also from a comparative perspective, will be dealt with in the following paragraphs.

2. The determinants of health assessment.

Health determinants are the factors that influence the health of an individual and, more broadly, of a community or population. Above all, in recent years there has been discussion on the incidence of individual behaviour or of the political, socio-economic and cultural context. The discussion in this regard is not only theoretical and conceptual; its findings have to do with a nation's prevention strategies and health policies (Betti, De Tommaso, Maino, 2023).

These factors make it possible to evaluate health as the community, together with the attitudes, beliefs and behaviours that cannot be avoided by the population, interprets it. They have a direct impact on the health of individuals and on the community by facilitating the modelling of lifestyles and behaviours, which, by interacting with each other, produce health or disease (Renzi, Franci, 2023).

As defined by recent literature (Renzi, Franci, 2021), there are 9 domains identified as social determinants of health:

1. level of education, understood as accessibility or lack of opportunity to access learning processes and to have a better ability to read services at any age, proves to be useful for any type of user;
2. wealth, understood as the availability of financial resources possessed, capable of allowing users to be able to meet health, public and/or derived expenses;
3. working activity, understood as safety in working environments since work could negatively influence health by exposing the worker to unhealthy working conditions but could also stimulate health-related behaviours and activities (An et al., 2011);
4. health system and related services, understood in terms of ease of access to services from a physical, cultural and linguistic point of view;
5. housing policies, a fundamental aspect which provides for the availability or lack of housing (and related essential services) of good quality, at affordable prices and structurally safe;
6. physical environment, seen as the place where individuals usually reside and carry out most of their activities;

7. transport system, understood as the network, services and infrastructures that facilitate the movement of residents from one place to another. Access, or lack thereof, to quality transport affects job opportunities and vital services such as health care, education and social services;
8. social environment, understood as the social capital of a population and is made up of the set of laws and rules that facilitate relationships between individuals;
9. public safety, which refers to the safety and security of public property; it is characterized by the absence of violence in public environments.

3. The main theoretical models on the determinants of health

Reading health inequalities in an articulated way, respecting its complexity, linked to the influence of social, individual, economic, cultural factors and so on, is certainly a job that epidemiologists, statisticians, sociologists, and others, have been carrying out for some time, and which must concern all care and help professions, in order to build and implement targeted and universal interventions. Doing this means placing the gaze with which the determinants of health and disease are faced in a broader dimension, within a general theoretical framework to which a reference model can be traced in relation to the occurrence of health and disease.

Below we will report 2 of the most recent and equally complete and articulated reference models for the analysis object of this study.

3.1 The King's Fund framework

According to this model, elaborated in 2018, the health of the population must be rooted in what drives our health and in what can improve and maintain it over time. Accordingly, the four domains we consider crucial to this are the broader determinants of health, our health behaviours and lifestyles, an integrated health and care system, and the places and communities in which and with which we live (Fig. 1) (Buck et al, 2018). A comprehensive approach to population health must be able to work across all four domains.

This framework specifies how health is determined by four interconnected domains: social determinants of health, lifestyles and behaviours that influence

health, health system strongly integrated on the needs of the individual, role assumed by the community and the environment in which you live.

The determinants of health are the most important levers for achieving good health. Health behaviours and lifestyles fall within individual responsibilities and represent the second levers that affect health. Furthermore, there is now full awareness of the importance of the place where one lives and where most of the individual's activities are carried out.

Finally, the framework underlines how the integration of social and health services is an essential aspect. Consequently, the health system must maximize and recognize the activities pof the four domains, developing the activities in each of them and providing for a balance of their functions.

Figure 1. The four domains of a population health system.

3.2 Social Isolation and Loneliness in Older Adults framework

Clinical contexts offer important opportunities to identify problems related to social isolation and loneliness and to promote interventions aimed at alleviating these problems both within the clinical setting itself and by mobilizing wider social and policy resources that can be necessary for effective intervention.

To this end, the National Academies of Sciences, Engineering and Medicine, in 2020, developed a conceptual framework to better understand the relationships between different aspects of social connections and how they are integrated into general public health attention to the social determinants of Health. The framework (Fig. 2) has an assumed causal flow (indicated by thicker one-way arrows) from

risk factors (for social connections and other variables in the framework) through social connections (e.g., social isolation and loneliness and other aspects connectedness such as social support, considered both independently and in relation to each other) to mediators (e.g., medical, biological, behavioural, social, and psychological pathways) through which social isolation or loneliness influence health outcomes and potentially mortality.

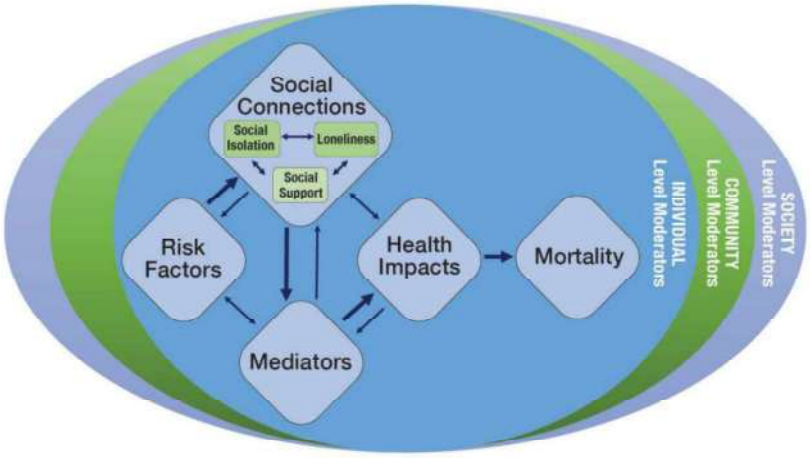

Figure 2. Guiding framework.

Variables or boxes that intervene between a presumed causal factor and any subsequent variables or boxes that the cause is presumed to affect are termed mediators of that causal effect. Mediators are the factors that help explain how social isolation or loneliness affects health outcomes.

Most notably, variables in the box labelled pathways are hypothesized to mediate the effect of risk factors or social connections on health impacts, which in turn usually mediate these effects on mortality. Any of the variables in Figure 1-1, as well as other variables not specified there, may also act as moderators of any of the relationships between variables in the framework. Moderators are the factors that can influence the magnitude or direction of the effect of social isolation or loneliness on health.

Many of the relationships in the model are potentially bi-directional, as indicated by the thinner arrows. For example, social isolation and loneliness do causally affect health, but they, in turn, may also be affected by health status. Similarly, factors that mediate the relationship between social isolation/loneliness and health can also serve as moderators of those relationships.

Finally, all of these relationships fit within a typical ecological model of health wherein factors contributing to social isolation and loneliness at the individual level are also potentially affected by the broader contextual factors at the levels of the community and society. Factors that influence social isolation and loneliness at the community level may include factors such as availability of transportation, broadband access, natural disasters, gentrification, and housing displacement. Factors that influence social isolation and loneliness at the society level may, for example, include racism, ageism, changes in family structure (e.g., lower rates of intergenerational living, higher rates of divorce and childlessness), trends in use of technology, and broader laws and policies that may affect social isolation and loneliness.

4. Conclusion

The complex issue of health inequalities treated here through the analysis of the main scientific frameworks used in the applied study of social statistics offers the basis for many reflections. First, as stated by Renzi and Franci (2021), the health of our communities has a very broad significance; moreover, it is extremely fundamental to expose all the domains and the determinants that it includes in a common vision. The empirical evidence, the basis of future work that will derive from this article, has already demonstrated from the first analyses that the progress of the state of health of our populations does not pass only through health care; appear to be important proactive actions on the social, institutional and economic determinants of health to improve health. With a view to control and guidance, it is necessary to refer to conceptual models, the basis of our statistical analysis design, which are coherent and as broad as possible, in order to represent the complexity of the health phenomenon as much as possible.

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From the Anthropocene to the Digitocene

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Abstract: the digital revolution represents the 4th major turning point in human history, after cognitive, agricultural and scientific. This permeates every aspect of daily, business and social life. It has changed the way we work, learn, communicate and interact. The digital age has abolished the barriers of time and space. We can connect with anyone, anywhere, anytime. We are able to access a huge amount of information instantly, creating opportunities for learning and collaboration that were unthinkable before. Thanks to the digital revolution, we have gained the ability to create objects and services with far fewer constraints and more opportunities than analog ones. With serious consequences for humans. It has lost its identity and goals and its raison d'être.

1. Introduction

We human animals of the 21st century are fortunate to be living through the 4th great anthropological revolution.

Cognitive Revolution:
it was the first, which occurred about 50,000 years ago. It was the crucial turning point in the evolution of Homo Sapiens. This transition led to the development of unique skills such as abstract thinking, language use and metacognition, distinguishing us from other species. These skills enabled the emergence of complex cul-

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tures, advanced technologies and the understanding of realities from both objective and subjective perspectives. In addition, the ability to reflect on one's emotions and actions has given humanity an evolutionary advantage, giving it the creative ability to imagine social constructs such as religions, law, and money. The prerogative to develop areas such as technology and social cooperation has been fundamental for anthropological evolution.

Agricultural Revolution:
it occurred about 10,000 years ago, marked a decisive moment in human history. It transformed sapiens from hunter-gatherers to settled farmers. It brought a series of changes, including population increase, development of cities. It brought as a gift the concept of collectivity and sociality. It initiated the Anthropocene.
Sedentariness introduced the concept of ownership, prompting humanity to claim, cultivate and protect land. With growing populations, complex social structures, hierarchies and the need for shared norms emerged. This transition laid the foundation for modern civilizations.
The emergence of writing and the constant development of new technologies profoundly influenced the structure, organization and culture of human societies, shaping the world as we know it today. It has had a profound impact on the human community. It led to the development of new technologies, the birth of new ideas and the spread of education.

Scientific Revolution:
the stage for the birth of modernity, which is characterized by a rational and methodical attitude toward the world, has been set through approximately 5 centuries. During this period, scholars abandoned interpretations based on faith, superstition, and dogmas and began to use the scientific method to study the natural world.
This represents one of the most transformative periods in the history of human thinking. It laid the foundation for modern science and the scientific criterion. A systematic approach to investigating natural phenomena through observation, hypothesis, experiment and verification. This method promotes critical thinking, repeatability and falsifiability, standing in sharp contrast to the uncritical acceptance of traditional authorities.
The Scientific Revolution marked the dawn of a new way of thinking, based on empirical evidence and logical reasoning. It laid the foundation for the scientific and technological developments of the following centuries, profoundly shaping the modern world in which we live.

Digital Revolution:
it originated more or less in the middle of the last century. It has redefined the very nature of our reality.
From a world fundamentally anchored to the physical, tangible universe, we are heading toward an existence increasingly shaped by digital information. This transformation, which goes beyond mere technological change, has profound implications for the very essence of human experience. The Digital Revolution, more than a mere technological evolution, represents a turning point in the anthropological history of humanity. We can claim to be in the Digitocene.
With our imagination, our creativity, we have given birth to a new substratum of reality. We realized a new ontology of existing. For millennia, human reality had been intimately linked to the analog world, composed of atoms. With the advent of digital technology, we are witnessing and compliciting a progressive dematerialization of experience. Byte-based reality has created virtual environments, global networks and a myriad of experiences that exist independently of physicality.
The increasing digitization, the interface between the individual and the reality becomes increasingly mediated by digital devices and platforms. This does not only alters the way we interact with the world, but also disrupts the way we perceive it. The new intrinsic essence of reality results in an epistemic transformation of the world. Augmented and virtual realities extend and alter our sensory perception, overlaying or replacing digital information with the physical universe.

Algorithms:
increasingly powerful and inscrutable, they filter and process immense amounts of data and display reality through analyses that produce information from which we taking decisions critical to our future. Even more often, the algorithms themselves are making decisions for us. We are entrusting them with substantial choices for our lives. We have created these tools to which we have also transferred many of our fallacious approaches, and now we are victims of the automation bias. Dangerous cognitive shortcuts make us passively accept information, evidence, and analysis provided by machines as free of potential errors or flaws and thus having the characteristic of objectivity. They are tools capable of decisively influencing our knowledge of events and realities around us.
This is leading toward a troubled, painful and alienating reconsideration of the self in the digital age. We have great difficulties understanding who we are, the reality around us, and what our role is within it. Identity, traditionally rooted in physicality and socio-cultural context, is now fluid and multifaceted.

Digital presence, from social media profiles to avatars in virtual worlds, has equipped us with a digital twin or worse yet, multi-identities. Anyone can have different versions of themselves in different digital contexts. We are in the midst of an irreversible process of delegating memory and many stages of the cognitive process.
Our ability to record and remember is amplified and externalized, shaping our self-perception. This leads inexorably to devolving, or worse yet, abdicating, many of our precipitous faculties to engineered artifacts devoid of any human qualities and sensibility.

Neuroplasticity:
these changes are significant and lasting. They represent a turning point in humanity's evolutionary and cultural journey. This house we are building is profoundly transforming us and changing our perception of reality. And it changes how we perceive ourselves. We are in the presence of a real anthropological crossroad.
Our constant interaction with technology is affecting the structure and functions of our brains. We are special entities, capable of very high adaptability since we are endowed with great neuroplasticity. This characteristic of our high resilience and adaptation to change has allowed us to be who we are and to build everything around us. But the pace of these transformations is unsustainable compared to our physiological processes of adaptation. The danger in our new digital habitat is insidious because it is almost always initially intangible and therefore imperceptible as such. This has as its first consequence that we react to events and interface with the world as if it were still analog. Human beings need to directly experience events and phenomena in order to have awareness and consciousness of whether the nature of an entity carries negative, harmful, painful, etc. consequences. By the time the digital danger manifests itself, however, it is already too late. This puts us in a position of extreme weakness and risk. We are naked and defenseless but mostly unaware of the threats caused by the unprecedented nature of the entities around us.
These are transformations that alter the very essence of who we are and determine a trajectory that is not very prescient or dignified for our future as a species. We are at an inflection point in our existential curve.

Digital in action:
digital technology has among its most important and significant features the one of breaking down constraints and increasing opportunities to create and shape new re-

alities out of nothing and forge new ontologies. This power is given to it by the possibility of uniting different entities that were thought to be irreconcilable or splitting realities that were thought to be discrete and indivisible. The digital has succeeded in separating the concept of presence and location. It has amply demonstrated that one can act to accomplish a goal without the need for the presence of intelligence.

The digital insinuated itself between the logic of law and the physical space in which it operates. It is from this union that law derives its legitimacy and authority. The digital separated them. It has unhinged law's effects, the ways in which it is perceived and the areas in which it is applied, effectively undermining its effectiveness. The implications are obvious in terms of regulatory effectiveness and functional inadequacy in relation to the governance needed.

This is very dangerous and has caused a regulatory deficit. It has severely limited the regulatory power and efficiency aimed at directing and regulating the use of digital and containing its distorting effects.

Digital and Law:

the pace of technological development is much faster and more effective than the liturgies of law formation. The production of instances of law is inadequate to keep pace with technological development. The legislative process is slow and complex, often unable to adapt quickly enough to technological changes. This creates a situation in which new technologies are used without adequate checks and balances. Legal action is now mainly determined by analogy. But the distance in terms of legal relevance between the old facts and the new realities is enormous to be able to resolve, judge and intervene on facts that are in their essence characterized by novelty. Objective situations yet to be defined by the lawmaker are interpreted creatively when, instead, it is necessary to put in place rules that are relevant and pertinent to these new realities.

This creates legislative loopholes where existing norms are inapplicable to regulate cases where the extension of principles regulating other legally relevant situations are inappropriate to cover entirely new contexts. The creative and flexible approach which lawyers, judges, attorneys and legal scholars try to interpret reality by tracing it back to existing, often dated and decontextualized norms is doomed to the generation of jurisprudential monsters with disastrous consequences for the credibility and even the authority with which the law has to fulfill its functions. Digital technology has not only inflicted serious wounds on Law, it has also brought to its intrinsic involution.

Further more, digital technologies act in a global Sphere while the regulation of the uses and consequences of its actions are always addressed locally and often in contrast and opposition to each other. A method in which the cultural and technological backwardness of those who must in advance discipline, regulate and limit the possibilities of action of these tools is evident. Regulating a phenomenon in order to avoid its effects only after the consequences have been experienced is a losing approach.

Digital Habitat:
social norms and values are being renegotiated in the digital context. We are in a phase where we are bargaining principles, morals, and even ethics with the new inhabitants we have created and who are occupying an increasingly prominent place in our everyday physical and relational reality.
We have built an interconnected global environment made up of information. This information is generated by humans, other biological agents, and especially by engineering and communicative artifacts. The human citizens of this habitat consist of about 8 billion people. But mostly about 35 billion IoTs. These are digital entities whose sensors detect values of reality and send them to huge processors.
This data is stored and then processed by very powerful Artificial Intelligence algorithms. It is estimated that by 2025 there will be more than 50 billion.
IoT is an approximately $1.5 trillion-a-year market that is steadily growing. There are now about 3 trillion transistors created to enable the generation, processing, sending and storage of information. These numbers are destined to grow in the coming years with a pace that is difficult to predict, partly because humans have been almost completely excluded from so many vital production cycles. Automations we have made are now also capable of giving machines the ability to determine the production modes and capacities of these informational entities.
In 2022, 64.2 zettabytes of data were produced. This is a 23% increase from 2021 and a 460% increase from 2010. Data production is expected to continue growing at a rapid pace, reaching 175 zettabytes by 2025. One zbyte is equal to 1021 bytes.
We are now in the age of Hyperhistory where time is fluid and nonlinear. This is due to the ability to access information at any time and from any place. One of the pressing problems is the inability to store data compared to its continuous and incessant production. We are getting to the point where it is necessary to decide what data we need to sacrifice and delete. This is most dangerous because we can create situations of inconsistent or contradictory information given that different queries access the data at different times. The output could be significantly different and

generate confusion and uncertainty at a time in history when everything is changing at unbearable speeds for human cognitive capabilities. This is Especially true if the massive elimination of historical data is delegated to machines that do not have cognitive capabilities to be able to discern the even historical, artistic, sentimental value of data that infer from our nature. We are deliberately entrusting History to machines.

Data and the future:
decisions about what choices to make for the future are based on the data collected and recorded in the past. But who generates and collects this information flow with which we are constituting the new reality? Our biological capabilities are inadequate to store and analyze in continuity massive amounts of data.
To make up for this inability, we have created powerful processors to cope with the management of all the data collected. Humans have become a marginal part of production. Almost all data originates and is exchanged directly and exclusively between IoT devices. Other data arise from interactions between humans and machines. Even when humans need to exchange information there is almost always a mediation by machines. Unfortunately, even if they are interested as a recipient of information, they are often totally excluded from the information flow.
Today, processing and transforming data into information from which to make the best decisions for a future is the sole responsibility of machines. Much data is synthetic; they are artificially generated rather than produced from real-world events. They can be originated using statistical models that are based on real data or by simulating real-world events. Synthetic data are unfinished, may contain errors, and lack completeness and accuracy compared to real data. Above all, it is obscure which transformative processes they undergo, for what goals and purposes. Artificial intelligence algorithms have the characteristic of being nondeterministic. Generated outputs depend to a very large extent on the quantity and the quality of the data with which they are fed. Today, we are unable to trace the reason of certain AI statements or evidence. And this takes humans dangerously back to a time when we had no knowledge of the relationship between cause and effect to understand the natural world, its events and its laws. The justifications were divine or magical. We are again losing control over determining why a condition causes a specific result or effect. We are losing control of these processes. We are no longer the masters of the world. Given what we have done in the past millennia, the future will determine whether this is good or bad; for us and for our planet.
Our ultimate goal must be solely and exclusively the well-being of humans, to

safeguard immense social capital created over millennia and the home that hosts them and enables them to perpetuate the species. Are we sure that by delegating this to algorithms powered by IoT-generated or, even worse, self-generated data we achieve our well-being? Are we sure that a very few individuals, driven only by self-interest, pursue the good of all sapiens? Who does really have this power today? Who is the master of the fire?

Research, resources and power:
new technologies require substantial resources (capital and human), extreme agility, adaptability to sudden changes in the environment, and the ability to update the focus in real time with respect to new requirements. These dynamics are typical of private enterprises, which are profit-driven and have a strong incentive to innovate and adapt quickly to change. States and public organizations, on the other hand, are slower and more bureaucratic, and may have difficulty keeping up with the rapid changes in the technological world. Institutions face limits and constraints that private companies can deviate from. States and public organizations often have to comply with strict rules and regulations, which can limit their ability to experiment. Even the ability to spend, agility and freedom to direct large sums of their revenues to experiment and innovate is now only the preserve of private corporations. The 6 largest hi-tech in the Western world have a capitalization of about $10 trillion. Their revenues for 2023 will be approximately $1.5 trillion. A large percentage of this revenue, about 10 percent, is devoted to research. The best scientific minds on the planet provide their expertise to develop digital technologies for these companies.
Italy's 2022 GDP was about 1.9 trillion euros. Of which just a small part, 0.74 percent, is allocated to research. From these numbers, the scientific and technological backwardness and subalternity of a state to these large companies is clear.
Knowledge is power, but it is power only when it can develop technological tools that create utility for individuals and society. Today only large private corporations are able to develop advanced technologies in all areas. For the past few decades, real power has shifted from states to corporations. But while a state basically studies and implements technologies for the welfare of its citizens, a private corporation only and exclusively looks after its own interests. This leads to conflicts between states and private corporations. The latter have technological conditions that allow them decisive influence over people.
In the social channels of Meta Inc. lives a population of about 3 billion individuals. They are constantly listened to, intercepted, and followed in their daily lives in or-

der to seize every aspect of them, even confidential ones. Most exclusively, it has the ability to continuously dialogue with us and to convey, in a targeted and selective manner, messages of any content. Through its AI algorithms it has a very detailed profile of all those who use its tools.
This is an enormous, boundless power given by the intimate knowledge of about 37 percent of the world's human population. Meta has obtained this power by accumulating immense amount of data, carving them out of us, and having them turned into information from which it has deduced our characteristics in order to exploit our weaknesses. This information is stably available to anyone who wants to buy it, in a continuous and perpetual auction in which our future behaviors are sold, admirably induced by knowingly manipulating our needs and desires. They have succeeded through this boundless collection of data and increasingly powerful algorithms to hack our brains and sell them to the marketplace of future desires.
It is clear that a private company that legitimately pursues its interest and has the availability of large sums of financial capital, technological knowledge, quantities of data of the highest accuracy and value with the ability to interact with an endless audience has a power that is difficult to contain. Meta inc. is just one of many Companies that have this boundless power to have all the information in order to better direct our choices, to our detriment.

Technology and social capital:
we are in the presence of a very real threat to democracy, to our privacy, to our freedom, to our ability to self-determine our future and our lives. We are plunging into a new and murky digital Dark Ages in which a few very powerful feudal lords have created the conditions to subjugate all of humanity. We are sinking into a new kind of poverty: social poverty.
Having defeated biological poverty is one of the most important victories that humans can claim to have achieved in recent decades. The reference is to the lack of access to essential natural resources such as food, water, shelter, clean air and water, and fertile land. We are very close to achieving this extraordinary result. In fact, more people die today from overeating than from food shortages.
Social poverty refers to lack of access to essential resources such as education, health care, employment opportunities, and racial and gender discrimination. Poverty and social deprivation have worsened significantly. Both in absolute terms and in the way people perceive themselves within the global village. With an increasingly rapid and disruptive pace, through the digital, we are building the new habitat in which human inhabitants are minorities. Under these assumptions, the social

condition for most sapiens is destined to be subordinate to digital entities. We are condemning ourselves to a situation of irrelevance and marginality.
To limit this tremendous power and, above all, to give a virtuous direction to the knowledge gained and the technologies developed, a new approach is indispensable.

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Climate change, sustainability and socio-economic impacts in the EU

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Abstract: In recent years, the progressive increase in exceptional climatic events, which are also the result of climate change and of territorial organisations not very respectful of local characteristics, is one of the major problems and objectives addressed at international level (UN, 2015; Banca d'Italia, 2021; Copernicus, 2021; ECB, 2021; WMO, 2021). The frequency and growing intensity of the phenomena directly affect the financial situation of the territories and of particular economic activities, such as agriculture, most exposed to such extreme events. All this endangers the entire regional economic and social system to serious problems of stability and sustainability which require reflections on possible targeted interventions (Aspinall, 2012; Espon, 2021). In Europe, current debates focus on the creation of networks to support the transition to a low-carbon economy, as well as to manage the risks of climate change (Prezioso, 2020; Espon, 2021). Therefore, this research, by combining various data and sources at Community level, such as the data of the European Copernicus program and the Espon Observatory, made it possible to observe changes over time and to map the risks of socio-economic vulnerability in order to better evaluate them.

Keywords: climate change, socio-economic impacts; Europe.

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1. Introduction

Extreme weather events can cause significant financial damage around the world. Credit institutions, Insurance companies, often, have to deal with these circumstances, bearing a large part of the related costs. As expressly indicated in the major international agendas (UN, 2015; EC, 2021) and in the context of the European Green Deal, the next challenges will concern climate change and territorial impacts to be addressed in an integrated and strategic perspective in all sectors and policy areas (Espon, 2011; EC, 2019; Prezioso, 2020).

In fact, the impacts generated by the climate depend on the complex interactions between climate, territorial vulnerability, exposure and adaptability of human and natural systems. These events put the marginal areas at risk above all. The impacts deriving from these extreme events such as drought, fires in forest areas and desertification, concern different aspects relating to human security and livelihoods, economic and financial systems, infrastructures, biodiversity and soil degradation (WMO, 2021). On a European scale, the anthropogenic emissions that derive from the territorial organization produce significant climate changes and at the same time generate different impacts in terms of extent and intensity. As discussed in the Climate Report elaborated by the Espon Observatory 2011, these changes and impacts vary considerably between the regions, due to a specific capacity to deal with them related with different physical, environmental, social, cultural and economic factors, which influence local reactions to climate change. The Report has been updated in 2022 (Espon Observatory, 2022) in consideration of the most recent international climate agendas including the Green Deal, the EU Biodiversity Strategy for 2030, the Common Agricultural Policy, generating substantial and relevant data and results to inform the European cohesion policy in the period 2021-2027 to promote sustainable and integrated development.

Exposure to risk and regional sensitivity, together with the capacity of human groups to adapt and planning, are therefore useful indicators to measure the impact that climate change can generate on territories. In a complex systemic approach where physical and anthropic variables intervene in different ways, depending on the action scales of each socio-environmental system, the greater or lesser vulnerability to the global trends in progress derives. This fact has significant consequences for the regional economic and social stability and the territorial system should face emerging risks related to climate change, with potentially asymmetric impacts in several European sectors and regions that depend not only on the degree of concentration of exposures but also on ongoing mitigation measures by Institutions.

The impacts concern not only the socio-economic conditions of the population, but also the various economic activities and this very often occurs in circumscribed territories. Therefore, this requires a robust and cooperative financial system able to maintain the flow of credit even if asymmetric shocks occur, in these cases sustainable intensification of finance is desirable, although it is very likely to be limited by the very same structural critical issues that hinder integration into EU financial markets (ECB, 2021).

2. Introduction

Based on data from the International Copernicus Observatory, which considers temperature anomalies as one of the most significant indicators (Copernicus, 2021), figure 1 shows the trend of the monthly global-mean and European-mean surface air temperature historical series recorded at global and European level.
In particular, while global temperature anomalies show an alternating and continuous trend particularly significant after 2015, in Europe the trend is less pronounced and discontinuous, thus highlighting an increase in the risks to which European territories will be progressively exposed in the coming years.

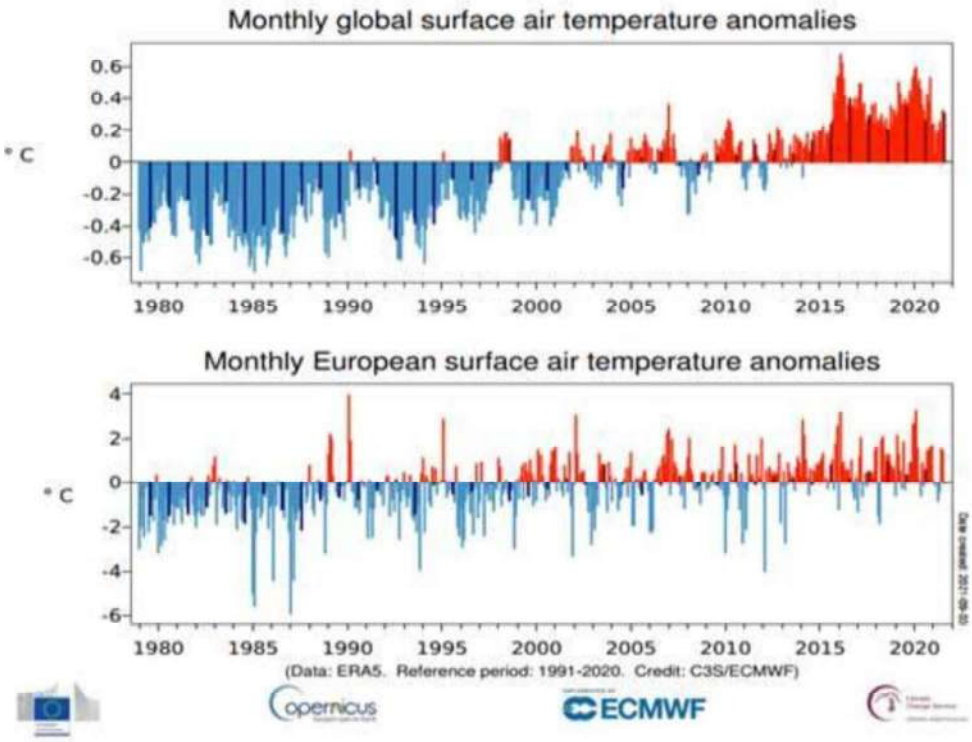

Fig. 1 – Indicator on the total number of anomalies recorded in the World (top chart) and in Europe (bottom chart) between 1980 and 2020.
Source: Copernicus, 2021.

Obviously, these risks are not distributed uniformly throughout the World and in Europe, in fact as can be seen from the Copernicus data on climate risks in the EU and by examining together the data from the Espon Observatory at NUTS 3 level, are concentrated in different regions. Specifically, the North and Central Europe will be more exposed to the risk of flooding, while excessive heat waves, drought and the risks of desertification and fires will be the main risks in southern Europe.

The different impacts of climate change in Europe are represented in the map (figure 2). It was built considering the exposure to climate change, obtaining a potential scenario at NUTS 3 level for the period 2071-2100, as a combination of data: the regional exposure to climate change, where the indicator uses the baseline period between 1961 and 1990; flood ones and most recent on the weighted dimension of physical, economic, social, environmental and cultural sensivity to climate change. The synthesis scenario shows the potential vulnerability of regions to climate change, considering the potential impacts and regional adaptation capacity.

The results show, as since 2011, a clear disparity emerges between North and South in Europe. In particular, the highest values can be observed in the Mediterranean regions and in south-eastern Europe, especially the more marginal ones and this will be due to the drier and warmer climate which will favour, as is known, the greater probability of forest fires, while the northern regions show low or only marginal vulnerability to climate change. The map also reveals transformations that may occur in various regions, such as those of north-eastern Europe where the environmental conditions for agriculture will allow access to new crops.

Taking into account these regional evidences, it is necessary to think about sustainable strategies that contribute to studying these dynamics in order to face and make them less catastrophic (Yohe and Schlesinger, 2002; Aspinall, 2012; Kythreotis et al., 2020; Weckroth, and Mantila, 2022).

Therefore, interest is very strong especially from government and financial institutions, as confirmed by the most recent research reports proposed by various Observatories and Institutions (ECB, 2021; Banca d'Italia, 2021; Espon, 2011; WMO, 2021) and on the assumption that the territorial impacts to climate change are quite different and depend, as already noted, on a multiplicity of factors linked to the environmental contexts (economic, social, cultural, institutional, morphological, etc.). It is evident that the socio-economics risks in the territories will differ in consideration of the exposure degree and the relative regional sensitivity, as well as the territorial capacity and resilience of human groups.

Therefore, for this study, we started from a synthetic indicator called "Territorial vulnerability to natural hazards", developed during a project of international research by the Espon Observatory entitled "TITAN - Territorial Impacts of Natural Disasters" (Espon, 2021) which expresses the complexity of the factors that affect the vulnerability of the territories to exposure to natural events. In addition to this indicator, for European countries, we selected variables and indicators at NUTS 3 level for the latest available year to highlight both regional socio-economic and financial susceptibility for specific economic sectors. This has made it possible to map the geography of climatic risks and the related socio-economic exposure of the examined territories, also to observe their evolution over time. The results on a European scale, represented cartographically subject to further analysis for the in-depth study of the observed phenomena, provide both indications on the different regional exposure to risks and policy recommendations. The greater regional exposure to these risks is considered in this contribution as an indicator capable of attributing an economic weight to the consequences of these events, providing the tools to assess the exposure of the territories also from a regulatory perspective.

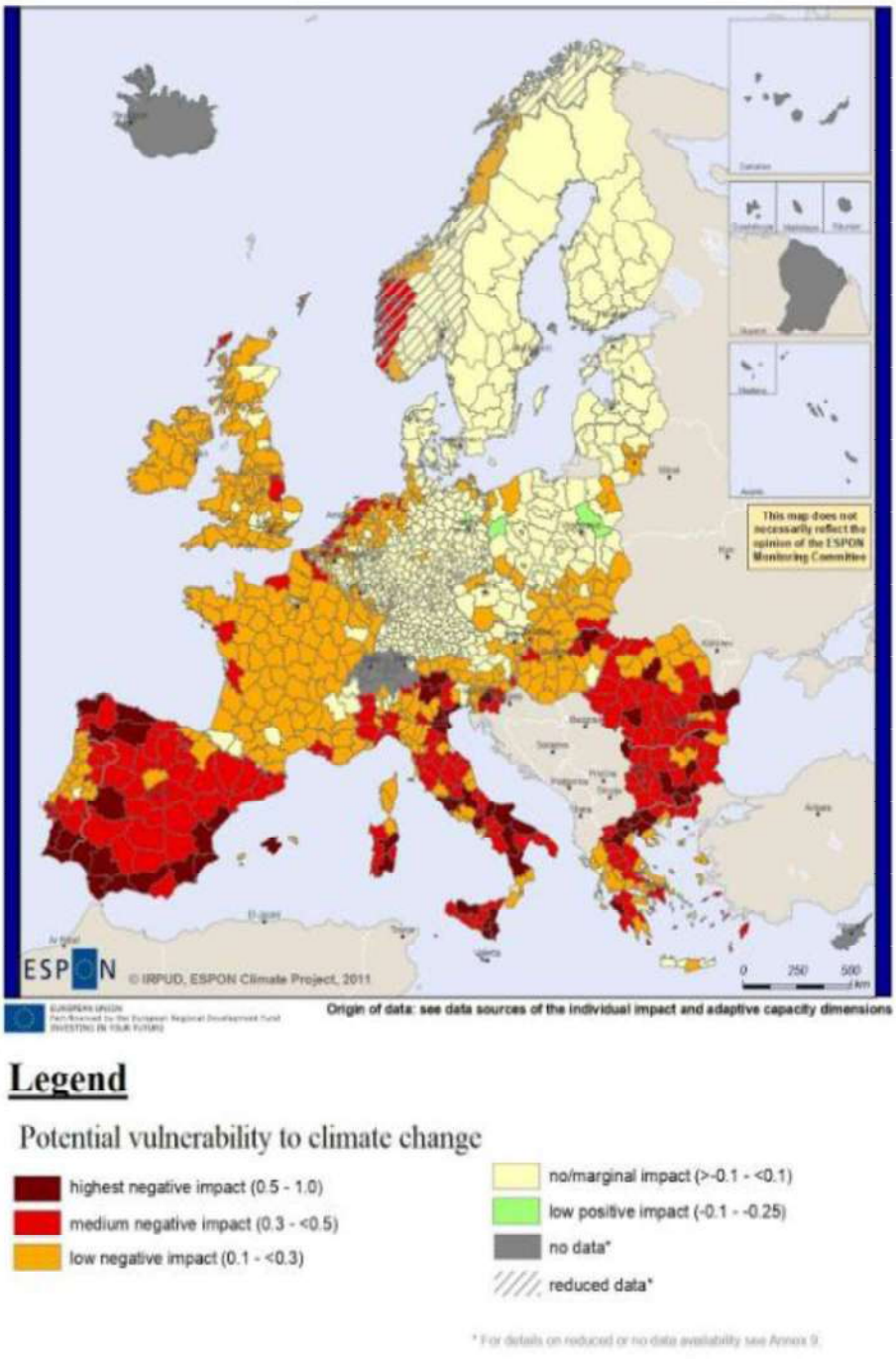

Fig. 2 – Indicator of potential vulnerability to climate change at NUTS 3 level in Europe: scenario for 2071-2100 period, on baseline 1961- 1990 period.

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Promoting Equality and Inclusion: A MIMIC Model for Assessing Sustainable Tourism and Cultural Experiences for People with Disabilities in Italian Museums

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Abstract: Addressing tourism for all and cultural tourism for people with disabilities is crucial for promoting equality, strengthening the tourism industry, improving the quality of life for people with disabilities, and meeting legal requirements. Around 1.3 billion individuals worldwide experience significant disability, with 5.8% being children and adolescents aged 0-14. Ensuring access to travel and tourism is a fundamental right for all individuals, regardless of their abilities. Promoting more inclusive and accessible tourism experiences can achieve equality and social inclusion for people with disabilities. Cultural tourism, a vital sector of the global tourism market, can improve the quality of life for people with disabilities by facilitating social interaction, community engagement, and personal growth. Cultural tourism can also promote intercultural understanding by providing opportunities for people from different backgrounds to learn about each other's cultures and traditions.
Research on children and their families with disabilities is particularly neglected in tourism. The demands and perspectives of this audience and its families still need to be explored at all levels. Significant challenges such as access to travel and tourism opportunities, such as physical barriers, limited access to

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information, insufficient training of tourism service providers, and negative attitudes towards disability characterize this sustainable tourism line.
This exploratory study focuses on a systematic sample of 300 Italian museums. It proposes a MIMIC model for measuring the impact of sustainable tourism based on the analysis of the links between the satisfaction of visitors and their accessibility to the museum.

Keywords: Mimic, sustainable tourism, accessibility, missing values.

1. Background and literature review

The scholarly literature on disability and tourism has significantly expanded recently, delving into multiple facets of this subject. Some studies have looked at the issue from a commercial angle, viewing individuals with disabilities as consumers and exploring their underutilized potential as an untapped market segment [12; 17]. However, numerous investigations have adopted a different stance, exploring the hurdles that individuals with disabilities encounter while touring, such as physical, sensory, cognitive, attitudinal, and social obstacles [3;4;5;18]. These studies have deeply examined the experiences of people with disabilities looking at different tourist services like transportation [2] hospitality [13; 22], and experiences [6] while distinguishing among different types of disabilities. Subsequent research has looked at potential solutions to these obstacles, such as creating accessible tourist infra-structure, accessible information and communication technologies [8; 19] and training tourism professionals about disability awareness and accessibility [16; 1] .

For instance, [29] analyzed the issues arising from how information is delivered to these travelers. Increasing emphasis has been placed on the direct participation of disabled individuals in designing and implementing accessible tourism initiatives. This couples with the need for collaboration amongst the tourism industry, disability groups, and government agencies to foster accessible and inclusive tourism [10] and to ensure full participation and enjoyment of travel experiences by individuals with disabilities. Several studies have recognized the importance of policies and regulations in promoting accessible tourism [25].Government bodies and national tourism organizations can play a critical role in setting accessibility standards and guidelines, providing funding for accessible infrastructure and services, and enforcing accessibility requirements, including information [7; 28]. By focus-

ing specifically on cultural tourism, the literature has emphasized making cultural sites and destinations more inclusive and accessible for people with disabilities [21; 9].

This includes addressing physical barriers and ensuring digital content is accessible through subtitles, audio descriptions, and strategic use of the latest technology and applications [24]. The literature further underscores the importance of directly involving people with disabilities in designing and developing cultural tourism experiences. This can range from co-creating museum exhibits to their involvement in planning and implementing cultural festivals. However, a significant challenge is the need for more awareness and training among tourism and culture professionals [16]. Children with disabilities are particularly vulnerable in tourism, especially cultural tourism [31; 29]. They face substantial barriers to accessing cultural sites and experiences, including physical and social obstacles. These children's and their families' needs have been largely under-studied [31; 29]. From a practical perspective, existing literature has explored two main approaches to creating more inclusive and accessible cultural experiences.

The first involves multisensory exhibits [26], while the second involves participatory museum practices. However, many of these studies primarily concern adults, leaving children with disabilities largely ignored. In the context of Italy, a world-renowned cultural tourism destination, this research aims to understand how museums cater to visitors with disabilities, considering their unique characteristics.

Specifically, since the propensity of a museum towards inclusion is a dimension that is difficult to measure directly and has been little explored in the literature, the paper intends to propose a new model (Fig.1) to evaluate the propensity towards inclusion and sustainability of museums (SIM, in the circle) as results both accessibility, adequacy (causes in the squared boxes) and satisfaction (indicators, squared boxes).

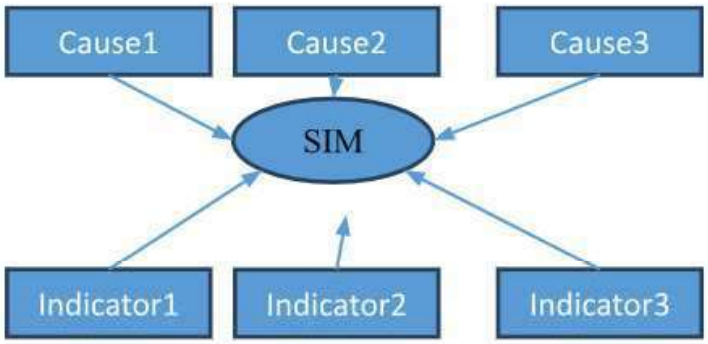

Figure 1 – Theoretical model

2. Data and methodology

To address our research questions, a systematic sample of 300 museums was planned with a sampling interval equal 2 involving a population of 600 Italian museums from large cities and small towns. The survey was conducted through the CAWI method during the 2022 F@Mu National Day of Families, a one-day event held annually in Italy. The event aims to provide activities for families with preschool or primary school children. The questionnaire comprises 36 closed and semi-structured questions about the preparation of museums to welcome visitors with disabilities and families with children with disabilities, including information on the museum's name, ownership, geographic location, accessibility, and staff skills.

More specifically, the list of questions was selected to gather information on:

Name, ownership, and geographical location of the museum.

Preparation of spaces and presence of specific services for welcoming people with disabilities and self-assessment of the accessibility of the museum.

Staff skills on disability issues and willingness to undertake/organize specific training courses.

Table 1 displays the descriptive statistics on overall sample for the selected items after handling the missing values with R package mice [33], enabling the imputation of missing values with plausible data values. The reasonable values are sampled from a distribution that is precisely tailored for each missing data item. The first 13 items compose the test battery (Cronbach's ‘alpha equals 0.84) related to the satisfaction of the experience at the museum. All the battery’ items were measured on an anchored five-point scale. The ordinal item dis describes the presence of

support facilities for disabled persons from 5 not present to 1 available for all types of disabilities. Last two items reflect the overall accessibility and personnel preparedness levels of adequacy. The tactile paths (item G) reflect a heterogeneous evaluation demonstrating that this type of accessible infrastructure dedicated to visually impaired people is seen as relevant by a still limited number of museum operators. On the contrary, items F and N received a good evaluation characterised by low variabilities, such as item ADT6.

Items	Median	Mean	Std.dev
A. Signage	3.00	3.36	1.04
B. Captions	4.00	3.64	1.10
C. Paper Informative Material	4.00	3.54	1.17
D. Sensorial-based Informative Material	3.00	2.88	1.42
E. Settings	4.00	3.89	1.02
F. Visit Itinerary	4.00	3.99	0.98
G. Tactile Paths	3.00	2.97	1.45
H. Lightings	4.00	3.49	1.20
I. Resting Areas	3.00	3.21	1.28
L. Staff Preparedness	4.00	3.91	1.15
M. Restaurant/Cafeteria Service	3.00	3.05	1.45
N. Reception and Ticketing Services	4.00	4.11	1.04
O. Bookshop	4.00	3.63	1.22
dis	*4.00*	*Not adm.*	*Not adm.*
ADS16 – Adequacy of Staff in welcoming disabled people	4.00	3.43	1.05
ADT6 – Adequacy of Accessibility	3.00	3.34	0.96

Table 1 – Main descriptive statistics for the selected items

The propensity towards inclusion in a museum is a dimension that is difficult to measure directly, and little explored in the literature. This condition allows the application of a well-known class of model the field covariance structures. The covariance structures [14] enable the estimation of correlations between observed and latent variables and between latent variables using an equations' system. In the first case, we speak of a measurement model; in the second, we refer to a structural model. The Multiple Indicators and Multiple Causes (MIMIC) is a variant of the covariance structures. It enables the specification of statistical relationships between observed causal variables and unobserved latent variables, subsequently in-

directly influencing a group of observed indicators. The MIMIC model, first proposed by [15] and further developed by [20], incorporates latent variable(s) that are measured by multiple indicators while simultaneously being influenced by observed variables. Model fit was assessed for the measurement and MIMIC models using several criteria. The comparative fit index (CFI), Tucker-Lewis Index (TLI), and root mean square error of approximation (RMSEA) are fitting measures that are not influenced by sample size. According to [11], values over 0.95 for both CFI and TLI imply a high level of fit, and a Root Mean Square Error of Approximation (RMSEA) score below 0.05 indicates a satisfactory model fit. The construction of the MIMIC model is a consequence of the identification of the factor structure on the set of indicators; therefore, before applying the model, it will be necessary to carry out in order the explorative factor analysis (EFA), the confirmative one (CFA) and finally test the hypothesized model.The data administration and preliminary descriptive analysis were conducted using R (Version 3.6.2; R Core Team, 2019) and other R-packages, such as psych [23] and lavaan [25].

3. Results

To evaluate the MIMIC model, we employed a split-half sampling strategy in a random manner. The initial subsample, K (nK=150), was utilised to explore the factor structure. The subsequent subsample, J (nJ=150), validated the confirmatory factor analysis (CFA) and MIMIC model. The correlation matrix for subsample K is characterized by a lack of discordant values and the lowest correlation value is equal to 0.29 between M and N items whilst the highest correlation values with H item. Figure 2a shows the path diagram for EFA only on the items belonging to the battery because the items represent the reflective parts of the MIMIC model. EFA results have been characterized by the standardized factor loadings higher than 0.5, as [31] suggest for a small sample size. The proportion of explained variance equals 0.59, and the correlation of (regression) scores with factors equals 0.95; these values denote the latent character of a sustainable, inclusive museum (SIM). This exploratory factorial structure has been tested in the subsample J, but two variables have been dropped in the final model. The CFA fit indices: CFI=0.996, RMSEA= 0.038, and SRMR=0.048 highlight a good model (Figure 2b). Even on J, we tested the MIMIC model using three new variables as causes: the former two related adequacy levels (ADS16 and ADS6) and the latter one to the presence of support facilities for disabled people (dis). The MIMIC model has been obtained

with the weighted least squares mean (WLSM) estimator because the nature of dis is ordinal. Finally, Figure 2c shows that the MIMIC model path diagram is characterized by three cause variables and three indicator variables with satisfactory fit indices: CFI=1.000, RMSEA= 0.000 and SRMR=0.041. The overall adequacy related to accessibility and the presence of facilities for people with disabilities makes up the propensity to the sustainability and inclusiveness of museums that reflect (or impacts or conditions) the three aspects F-I-H.

4. Results

The theme of accessibility and inclusion of all visitors is a central aspect for museums to pursue their mission adequately. Being accessible to all audiences can also be considered an element of sustainability of museums which, by improving their inclusiveness directly and indirectly, also contribute to SDGs and to goals 4, 10 and 11. Therefore, our work proposes a model to assess the propensity toward inclusion.

The results initially obtained show that six items explain the presence of the latent variable of the propensity toward inclusion and sustainability of museums (SIM) and that the items in which the latter is most reflected are E and F, i.e. Settings and Visit Itinerary; of these six items, the confirmatory factor analysis (CFA) confirms four, i.e. the Settings, the Visit Itinerary, Lightings, and the Resting Areas.

Finally, the MIMIC model reveals that the overall adequacy related to accessibility and the presence of facilities for people with disabilities makes up the propensity to the sustainability and inclusiveness of museums that reflects the three aspects of Visit Itinerary, Lightings, Resting Areas. These results seem to indicate that museums that have well-prepared staff to welcome and manage visitors with disabilities and that have good physical accessibility to spaces prefer to invest in three aspects that are particularly important for museums and their usability, such as the visit, lighting, and stopping points, all elements considered by the sector literature as important for full accessibility to a vast public. The absence of the item linked to personnel preparation - another factor recognized as strategic - must be read since this aspect is already given in the model (ADS16), as well as the absence of architectural barriers and the presence of services dedicated to people with disabilities.

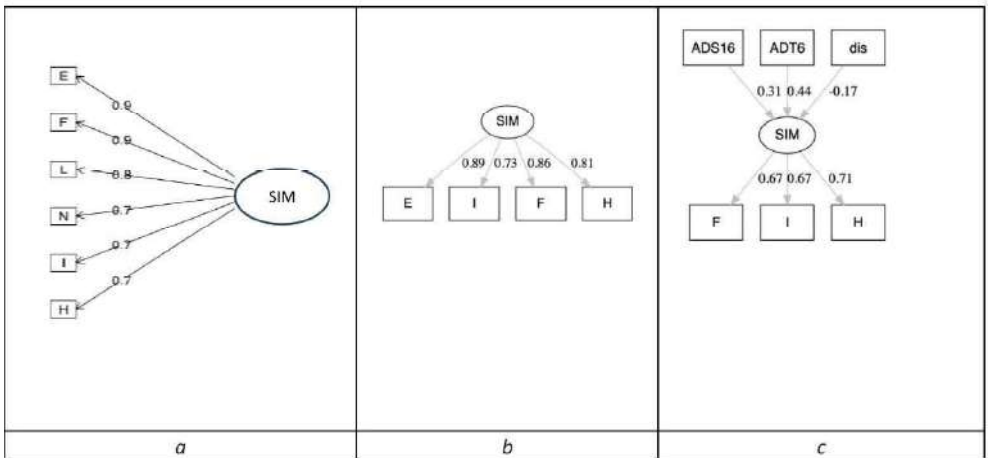

Figure 2– Path diagrams for EFA(a), CFA(b) and MIMIC(c)

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PDF finito di comporre il 31agosto 2024

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