

Findings of the ESPON HERIWELL project

Improving statistical data collection on cultural heritage

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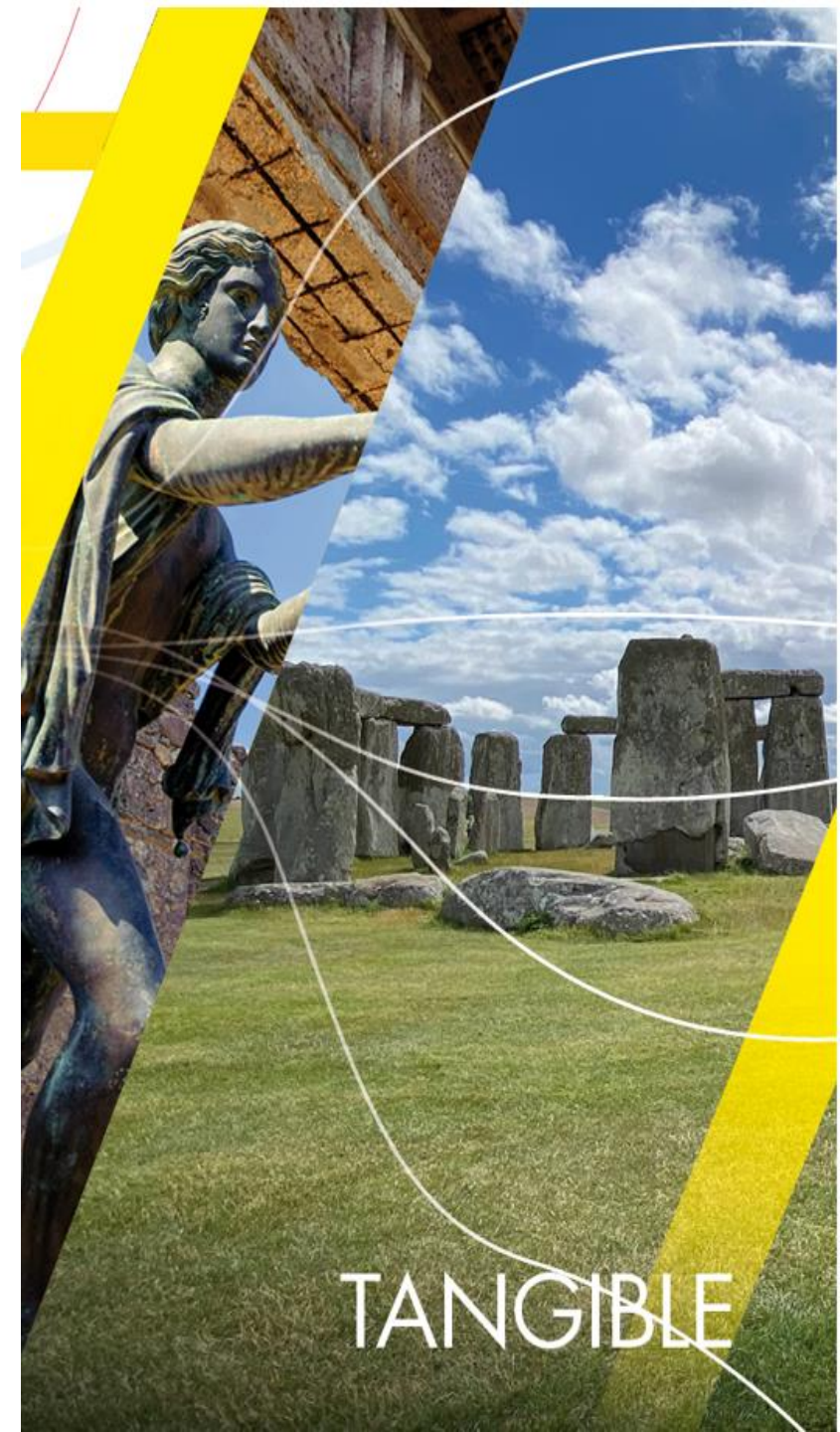
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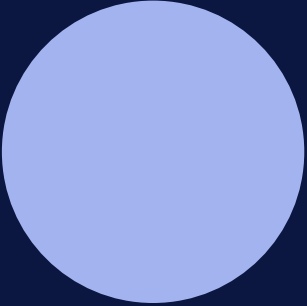
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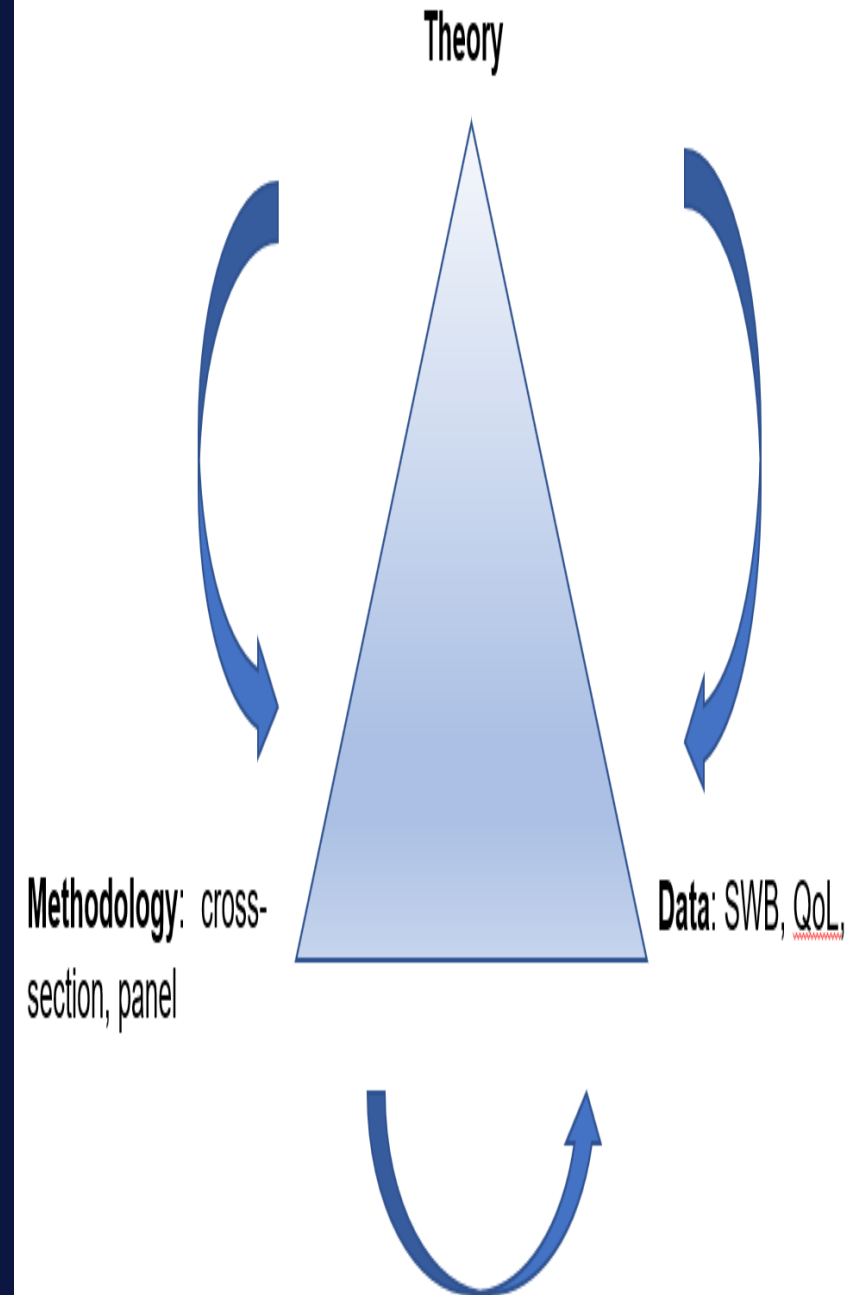
Introduction

- Exploring the relationship among Culture (Cultural heritage) and well-being (sustainable development)
- Big data at works: Tripadvisor and Wikipedia
- Agenda for the future





HERIWELL: Cultural heritage and well-being (sustainable development)



How to measure the impact of TCH on SWB?

- **two main constraints need for exploring the impact of TCH on SWB**
 - the majority of the definitions of SWB adopted so far do not consider cultural heritage among the determinants of well-being while the cultural sector is only partially considered among the determinants of well-being, especially as a "relational good"
 - difficulty of defining quantitative indicators of TCH endowments comparable across countries and over time
- **... the relationship between TCH and SWB is not direct** because TCH produces its effects on the different dimensions of SWB often intermediated by and jointly with other factors that affect the cultural heritage sector: for instance, investments in heritage preservation, valorization and enhancement policies, accessibility, participation, etc..

What data?

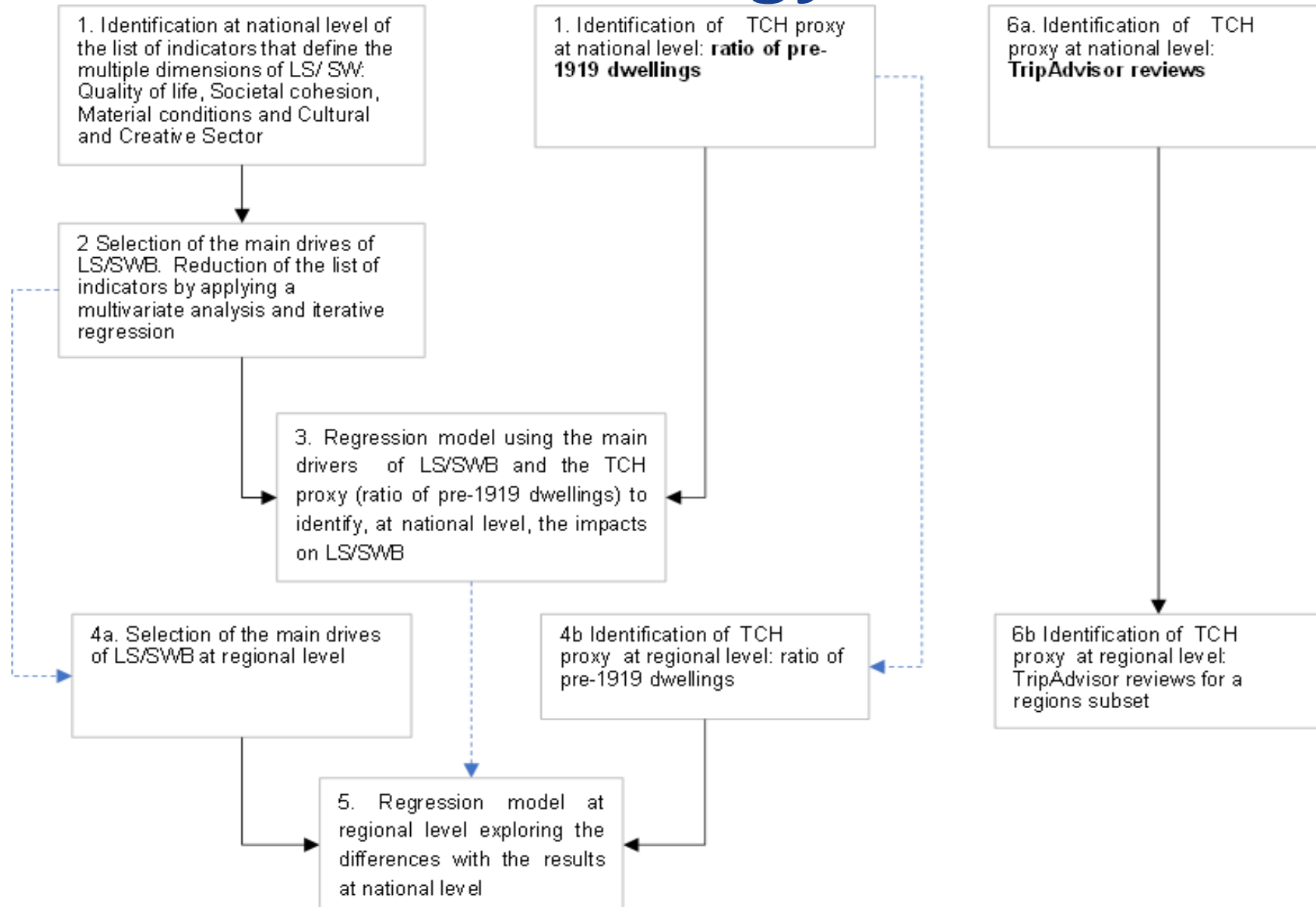
- **An indicator of Life satisfaction has considered as a proxy for SWB (Source Eu-silc)**
 - A set of 18 indicators are drawn from Eu-silc and SDG framework
 - A set of 11 indicators are drawn from Cultural Statistics
 - 3 indicators are defined to measure TCH:
 - the "Historical building stock" approximated by the ratio between the number of dwellings built before 1919 and the total number of dwellings. This indicator has already been used as as a proxy for tangible cultural heritage (TCH) in the ESPON HERITAGE project (ESPON 2019).
 - the share of European Regional Development Fund (ERDF) allocated to cultural heritage that, even with some limits, approximate an indicator of expenditure on TCH;
 - a new indicator based on TripAdvisor
- This approach has some issues when moving at regional level

SDGs?



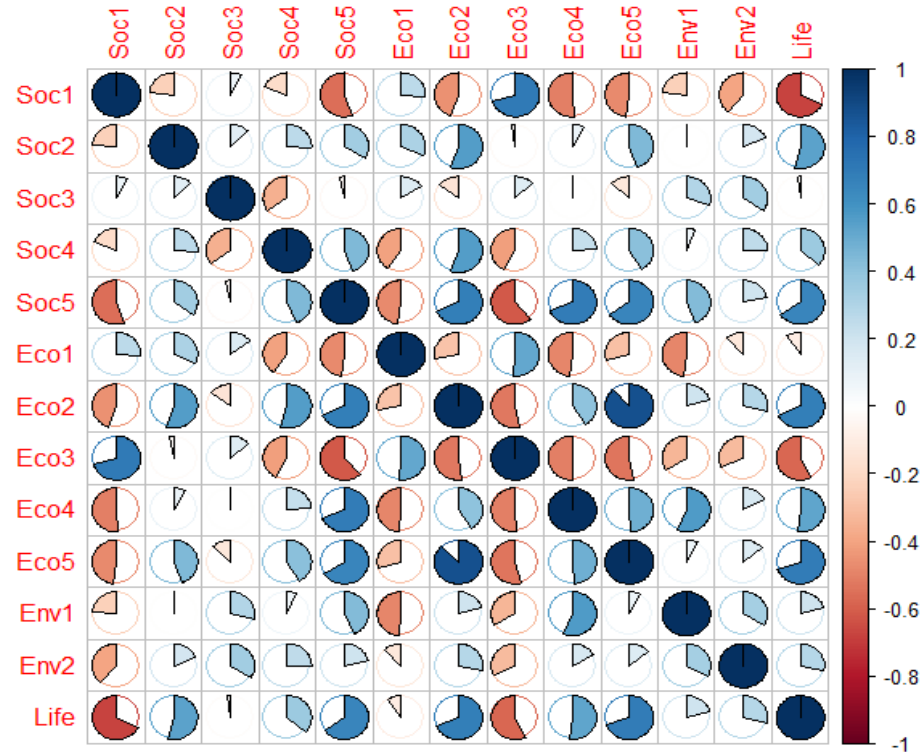
Goal	Abbr	Denomination
Goal 1	Soc1	Poverty risk
Goal 3	Soc2	Good health
Goal 4	Soc3	Early school leaving
Goal 4	Soc4	Tertiary education
Goal 4	Soc5	Adult participation in learning
Goal 7	Eco1	Employment gap
Goal 8	Eco2	GDP per capita
Goal 8	Eco3	NEET
Goal 9	Eco4	Public investment

Methodology



SDGs and Life satisfaction

Correlation of the SDGs and Quality of Life indicators
(national level)

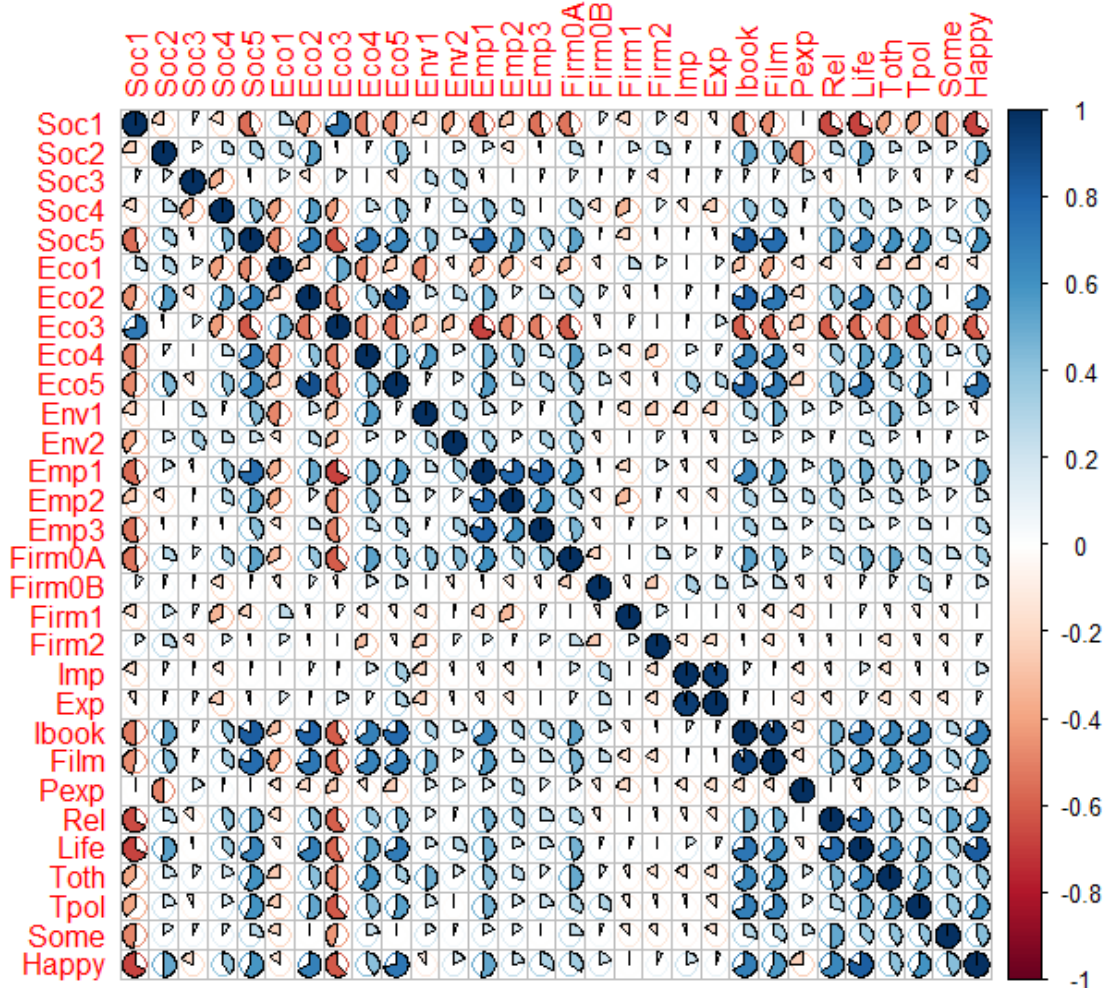


Legend:

- Soc1: Poverty risk; Soc2: Good health; Soc3: Early school leaving; Soc4: Tertiary education; Soc5: Adult participation in learning;
- Eco1: Employment gap; Eco2: GDP per capita; Eco3: NEET rate; Eco4: Public investment in R&D; Eco5: Adjusted gross disposable income of households per capita;
- Env1: Share of renewable energy in gross final energy consumption by sector; Env2: Greenhouse gas emissions by source sector; Life: Overall life satisfaction;

SDGs, culture and Life satisfaction

Correlation of the all indicators and Quality of Life indicators
(national level)



Legend:

- Emp1: Total employment on CCS (%);Emp2: Share of young employment on CCS;Emp3: High level of education employment in CCS (%);Firm0A: Enterprise on CCS (%);Firm0B: Persons employed per enterprise (number);Firm1: Survival rate in 2 years of enterprises operating in libraries, archives, museums;Firm2: Survival rate in 2 years of enter-prises operating in specialised design activities;Exp: Export of cultural activity;Imp: Import of cultural activity;Book: Online purchases, download or acceded from websites or apps: e-book, e-magazines/e-newspapers;Film: Online pur-chases: film/music, delivered or upgraded on line;Pexp: Public expenditure on culture;
- Life: Overall life satisfaction;Rel: Satisfaction with personal relationships ;Life: Overall life satisfaction; Toth: Trust in others ; Tpol: Trust in political system ; Some: Persons having someone to rely on in case of need ;Hap: Be satisfy most of time.

Equations: iterative approach

SDGs

FUNCTIONAL FORM: BETA REGRESSION	
LS/SWB	
Const ant	0. 496* (0. 292)
Eco5	0. 00002*** (0. 00001)
Soc1	- 0. 024*** (0. 006)
Soc2	0. 008** (0. 003)
N	31
R2	0. 701
Log Li kel i hood	61. 516
=====	
Notes:	***Si gni fi cant at the 1 per cent level . **Si gni fi cant at the 5 per cent level . *Si gni fi cant at the 10 per cent level .
where:	
ECO5 is Adjusted gross disposable income of households per capita;	
SOC1 is poverty risk;	
SOC2 Good health	

SDGs + Culture

FUNCTIONAL FORM: BETA REGRESSION	
LS/SWB	
Const ant	0. 823*** (0. 266)
I book	0. 018*** (0. 006)
Soc1	- 0. 023*** (0. 006)
Soc2	0. 007** (0. 004)
N	31
R2	0. 707
Log Li kel i hood	61. 703
where:	
Ibook is Online purchases, download or accessed from websites or apps: e-book, e-magazines/e-newspapers;	
SOC1 poverty risk.	
SOC2 Good health	

Equations: iterative approach

SDGs + culture + CH (proxies)

FUNCTIONAL FORM: BETA REGRESSION

	LS/SWB
Bui l d	0. 010** (0. 005)
Soc2	0. 017*** (0. 002)
Eco3	- 0. 031*** (0. 006)
Pexp	0. 052* (0. 026)
N	26
R2	0. 745
Log Li kel i hood	56. 966

where:

Build is the ratio between the number of dwellings built before 1919 and the total number of dwellings,

SOC2 is Good health,

ECO3 is NEET rate

Pexp is Public expenditure on culture

Regional level

National level

FUNCTIONAL FORM: LINEAR REGRESSION	
LS/SWB	

pc_part	0.016*** (0.004)
Emp1_n	0.067*** (0.018)
Build_n	0.010*** (0.004)
N	41
R2	0.952
Adjusted R2	0.948
Residual Std. Error	0.149 (df = 38)
F Statistic	249.262*** (df = 3; 38)
Where:	
pc_part is Participation rate in education and training,	
Emp1_n is Total employment on CCS (%)	
Build_n is the ratio between the number of dwellings built before 1919 and the total number of dwellings	

Main results

National level

- cultural online accessibility and Good health are the main positive drivers of Life Satisfaction, while Poverty risk is the main negative driver
- The main SWB and cultural drivers are stable in the two cross-sections analyses for year 2013 and year 2018
- TCH shows a positive effect on LS/SWB in the interaction with Public expenditure on culture and Good health (Quality of life).

Regional level

- a positive impact of Participation rate in education (Social cohesion dimension) and a positive impact on SWB of both the Historical building stock as a proxy of TCH and of employment in CCS.

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New sources: Tripadvisor, Wikipedia



1. Pantheon

79,028

Tripadvisor as a new source for TCH

National level

- TripAdvisor is a promising source to detect the cultural consumption of CH, and is positively correlated with TCH endowments

Regional level

- the use of the TripAdvisor indicator at NUTS2 level confirms the usefulness of this big data source to monitor the contribution of TCH to SWB at regional level

Tripadvisor as a new source for TCH

- **TripAdvisor user reviews** are used as a measure of the appreciation that cultural consumers assign to the sites they have visited.
- For each geographical entity, nation or region, the list of "things to do" proposed by TripAdvisor users was surveyed.
- Then, the TripAdvisor web page of each attraction has been loaded in order to obtain: the number of reviews, the ranking in the list of the other things to do in the same area, and the type of attraction classified according to the TripAdvisor classification (e.g Amusement & Theme Parks, Ancient Ruins, Architectural Buildings, Churches & Cathedrals, Religious Sites, Castles, Points of Interest & Landmarks, Museums, Scenic Walking Areas, etc.).
- A new indicator of TCH has been defined, on an experimental basis, starting from the distribution of the number of reviews for each geographical entity

Tripadvisor as a new source for TCH

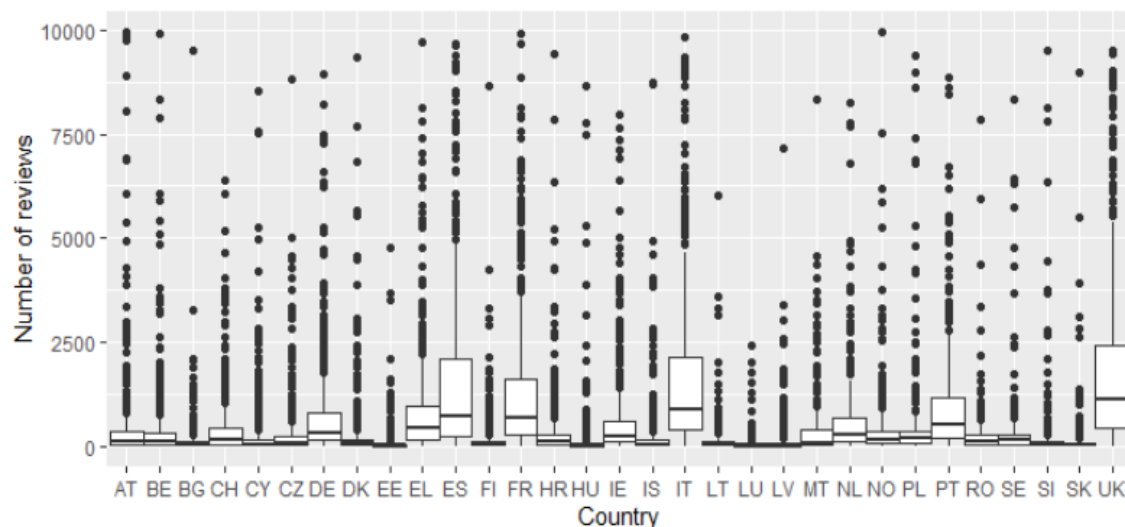
Top 20				
Nuts_nome	Site	Reviews	Order	Classification
Wien	Schönbrunn Palace	42,529	#2 of 857 things to do in Vienna	Architectural Buildings • Castles
Wien	St. Stephen's Cathedral	23,706	#5 of 857 things to do in Vienna	Points of Interest & Landmarks • Churches & Cathedrals
Wien	Historic Center of Vienna	19,008	#1 of 857 things to do in Vienna	Historic Sites • Neighborhoods • Points of Interest & Landmarks • Hist
Wien	Belvedere Museum	17,499	#4 of 857 things to do in Vienna	Historic Sites • Architectural Buildings • Art Museums
Wien	The Hofburg	12,522	#3 of 857 things to do in Vienna	Speciality Museums
Salzburg	Fortress Hohensalzburg Castle	11,701	#1 of 210 things to do in Salzburg	Architectural Buildings • Lookouts • Castles • History Museums
Wien	Schonbrunner Gardens	10,249	#11 of 857 things to do in Vienna	Historic Walking Areas • Parks • Gardens
Wien	Tiergarten Schoenbrunn - Zoo Vienna	9,896	#17 of 857 things to do in Vienna	Zoos
Wien	Prater	9,836	#85 of 857 things to do in Vienna	Amusement & Theme Parks • Parks
Wien	Kunsthistorisches Museum Vienna	9,707	#7 of 857 things to do in Vienna	Speciality Museums • Art Museums
Salzburg	Salzburger Altstadt	8,862	#3 of 210 things to do in Salzburg	Historic Sites • Points of Interest & Landmarks
Wien	Wiener Staatsoper	8,014	#30 of 857 things to do in Vienna	Theaters
Salzburg	Mirabell Palace and Gardens	6,906	#16 of 210 things to do in Salzburg	Points of Interest & Landmarks • Architectural Buildings • Gardens
Wien	Albertina	6,821	#19 of 857 things to do in Vienna	Art Museums
Wien	Stephansplatz	6,068	#39 of 857 things to do in Vienna	Points of Interest & Landmarks
Wien	Natural History Museum (Naturhistori	4,923	#12 of 857 things to do in Vienna	Natural History Museums
Salzburg	Salzburg Cathedral	4,259	#6 of 210 things to do in Salzburg	Architectural Buildings • Churches & Cathedrals
Wien	Peterskirche	4,088	#15 of 857 things to do in Vienna	Points of Interest & Landmarks • Churches & Cathedrals
Wien	MuseumsQuartier Wien	3,868	#33 of 857 things to do in Vienna	Speciality Museums
Wien	Spanish Riding School	3,603	#24 of 113 Theater & Concerts in Vienn	Theatre & Performances

Tripadvisor as a new source for TCH

NUTS2 -name	N. sites	N. reviews
Burgenland	227	4,286
Karnten	533	18,305
Niederosterreich	833	12,953
Oberosterreich	563	22,180
Salzburg	546	91,675
Steiermark	779	20,026
Tirol	806	62,247
Vorarlberg	200	6,928
Wien	873	298,839

Tripadvisor data

Box-plot of the number of reviews for country



To test the usefulness of this new indicator as a proxy of the TCH use, we derived 4 different measures of the distribution of TCH across countries. These measures are related to the different quartiles of the distribution (q25, q50, q75 and max, i.e. the point that divides the observations into four defined intervals based on the values of the data).

Due to the different importance of countries related to their TCH sites, we have found that the impact of these new indicators on SWB is more important when we use q25, that basically implies a sort of cut-off of the most important TCH sites for each country

Tripadvisor data

FUNCTIONAL FORM: BETA REGRESSION

LS/SWB

Const ant	1. 786*** (0. 152)
Soc1	- 0. 028*** (0. 010)
Eco3	- 0. 021 (0. 014)
q25	0. 001* (0. 0003)
N	31
R2	0. 515
Log Li kel i hood	54. 376

where SOC1 is poverty risk, ECO3 is NEET rate, q_25 is the first quartile of the distribution of the number of revisions in country.

Wikipedia data: an example

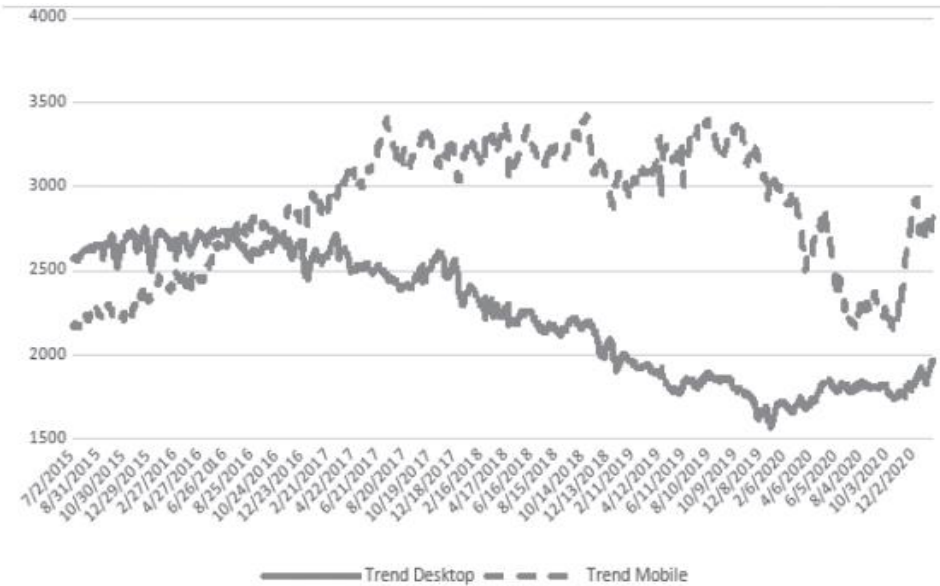


FIG. 2 – Daily visit for Colosseum: mobile and desktop on Wikipedia – Trend component, English vocabulary

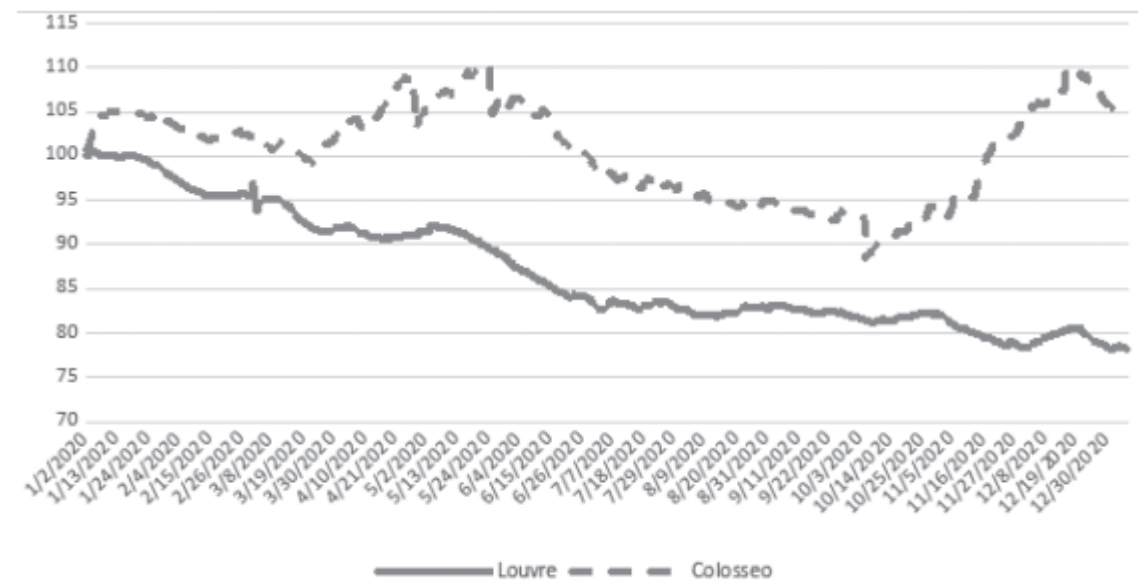


FIG. 3 – Daily visit for Colosseum and Louvre on Wikipedia: mobile – Trend component, English vocabulary

3

Agenda for the future: some points



Today: eurostat example

HIGHLIGHTS



Read about cultural participation

This Statistics Explained article explores the extent to which Europeans attend or actively take part in cultural activities and outlines the main reasons for not participating.



UNESCO World heritage sites

Eurostat publishes some experimental statistics on the online visits on Wikipedia of these sites which measure their popularity.

Culture (cult)

- ⊕ Cultural employment (cult_emp)
- ⊕ Enterprises in cultural sectors (cult_ent)
- ⊕ International trade in cultural goods (cult_trd_go)
- ⊕ International trade in cultural services (cult_trd_ser)
- ⊕ Cultural participation (cult_pcs)
- ⊕ Private households expenditure on culture (cult_exp)
- ⊕ Public expenditure on culture, recreation and religion (cult_gov)

Tripadvisor: extensions

Total reviews for Colosseum and Pantheon for class of rating

	Colosseum	Pantheon
Excellent	72.3	72.8
Very good	21.2	22.1
Average	5.1	4.5
Poor	0.8	0.4
Terrible	0.6	0.2
	100	100

Source: www.tripadvisor.it

Latent topic and recurrent words characterizing the non-positive reviews

Latent topic Recurrent words	1 - Waiting time and crowd	2 - Street Hawkers	3 - Tour and ticket information-suggestions
First word	Queue	People sell	Audio guide
Second word	Line	Selfie stick	Tour guide
Third word	Wait	Harass	Book online
Fourth word	Hours	Ruin	Roma pass
% of negative sentences that includes one of these words	56.0	12.2	13.6

ii) save money and wait in the line as long as the people wait for the skip line tour.

Main points

- Effort on territorial level, preserving homogeneity across the data available for each country
- Extend the study on the relationship among culture (cultural heritage) and well-being (sustainability)
- Exploring the new sources to derive new consolidated indicators – may be tenders a new sources?
- Improving the quantitative approach by means of panel analysis



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// Thank you

Fabio Bacchini