

CAPSTONE-PROJECT

BETTER TRAVEL GUIDE



RETO BURCH



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VITALIJ LOWSKI



ANDREAS TREBS

TEAM



MSc Business
Administration,
Urban Development



Merchant in Wholesale
and Foreign Trade,
Sales and Data
Protection



Diplom-Kaufmann (FH),
Online Marketing
and E-Commerce



Diplom -
Wirtschaftsingenieur (FH),
Quality Management
and Certification

RETO BURCH



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IDEA

69% OF TRAVELLERS ACTIVELY SEEKING FOR SUSTAINABLE TRAVEL OPTIONS*

SUSTAINABLE TRAVEL FOCUSES ON MINIMIZING ENVIRONMENTAL IMPACT WHILE MAXIMIZING POSITIVE SOCIAL AND ECONOMIC OUTCOMES.

HOW CAN WE
MAKE IT
MEASURABLE?

HOW CAN WE
TRAVEL
RESPONSIBLY?

CAN WE AFFORD
IT?



* "A World in Motion: Shifting Consumer Travel Trends in 2022 and Beyond" from World Travel & Tourism Council (WTTC), Trip.com Group and Deloitte, January 2023



PROJECT GOALS

HOW CAN WE MAKE
IT MEASURABLE?

ESG SCORE
BASED ON: ENVIRONMENTAL, SOCIAL AND
GOVERNMENTAL INDICATORS

ANALYSIS:
TEST OF
HYPOTHESIS

HOW CAN WE
TRAVEL
RESPONSIBLY?

CARBON FOOTPRINT

TOOL:
BETTER TRAVEL
GUIDE

RESPONSIBILITY INDEX
BY PLANE, TRAIN & CAR

CAN WE AFFORD IT?

DAILY COSTS



PROJECT PLAN & TOOLS



Define idea & goals,
search for data

Project management,
hypothesis definition,
data search

Data cleaning & analysis

Cleaning & Manipulation,
EDA & Advanced Data
Analysis, Feature
engineering

Challenge & test
hypothesis

Statistical & logical
analysis, test hypothesis

Findings & Solutions,
Visualisation
& Presentation

Visualisation, Tool



DATA SOURCES

01	ESG DATA	<ul style="list-style-type: none">• worldbank.org & gu.se (University of Gothenburg, SE)• API, csv Dataset of 15 indicators for 2012-21 worldwide
02	LGBTQIA+ RIGHTS DATA	<ul style="list-style-type: none">• spartacus.gayguide.travel• csv Dataset of lgbtqia+ rights
03	TRAVEL DATA	<ul style="list-style-type: none">• destatis.de & unwto.org• csv Dataset of Germans outbound & worldwide inbound
04	CO2 TRAVEL FOOTPRINT	<ul style="list-style-type: none">• mein-klimaschutz.de• csv Dataset for CO2 footprint calculation
05	CITIES LIVING COSTS DATA	<ul style="list-style-type: none">• numbeo.com• API Dataset of living and apartment costs
06	APARTMENTS COSTS DATA	<ul style="list-style-type: none">• airbnb.com• API Dataset of entire apartment costs



KPI & FEATURE ENGINEERING

ENVIRONMENTAL
INDICATORS

SOCIAL
INDICATORS

GOVERNMENTAL
INDICATORS

SCALING AND COMBINING

ESG SCORE



KPI & FEATURE ENGINEERING

CO₂e PER
TRANSPORTATION
METHOD

DISTANCE FROM
FRANKFURT TO
DESTINATION

YEARLY BUDGET
OF 2.3t CO₂e PER
CAPITA

COMBINING

CARBON FOOTPRINT



KPI & FEATURE ENGINEERING

ESG SCORE

CARBON FOOTPRINT
BY PLANE

CARBON FOOTPRINT
BY TRAIN

CARBON FOOTPRINT
BY CAR

SCALING AND COMBINING

RESPONSIBILITY INDEX
PLANE, TRAIN & CAR



KPI & FEATURE ENGINEERING

80
AIRBNB PRICES

500
RENT PRICES

500
CITY
LIVING COSTS

500 AIRBNB PRICES

CREATE A DAILY VACATION COSTS BUCKET FOR 500 CITIES

DAILY COSTS



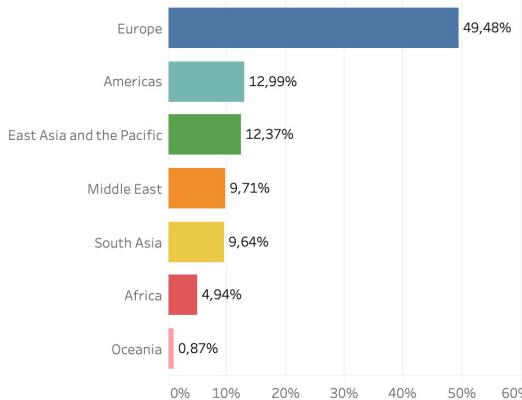
ANALYSIS: TEST OF HYPOTHESIS

01	COUNTRIES WITH HIGH ESG SCORE HAVE ALREADY MANY VISITORS (2012 - 2019)	 YES NO
02	COUNTRIES WITH IMPROVING ESG SCORE ARE INCREASING IN VISITORS (2012 - 2019)	 YES NO
03	COUNTRIES WITH HIGHER ESG SCORE HAVE HIGHER DAILY COSTS	 YES NO
04	GERMAN RESIDENTS TRAVEL MORE TO COUNTRIES WITH HIGHER ESG SCORE	 YES NO

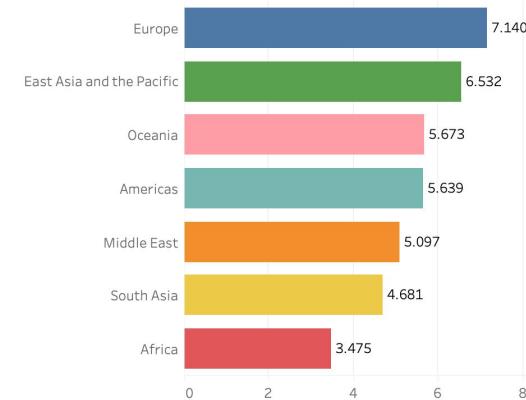


Origin, Destinations and ESG Score	Strong Relationship Score and Destinations	Moderate Relationship: ESG and Destination Europe	No Relationship by change over years (2012-2019)	Relationship ESG Score and Price Level	Hypothesis 1-3	Travel Behavior German Res..
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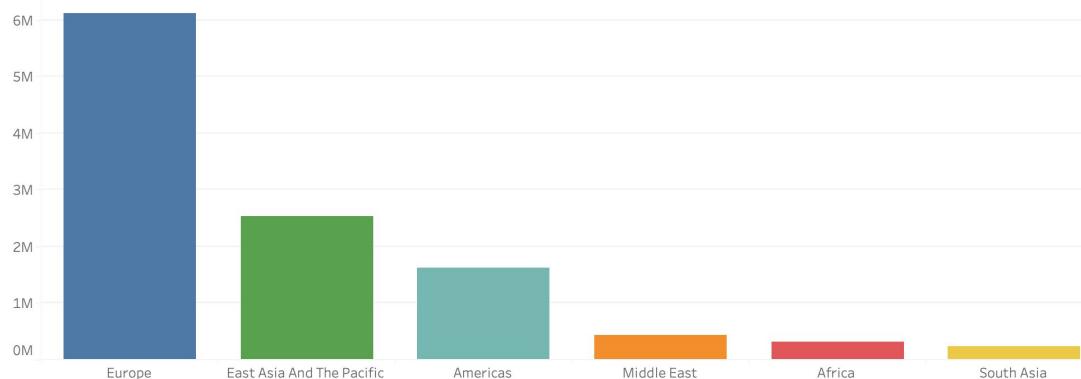
Most visit Regions



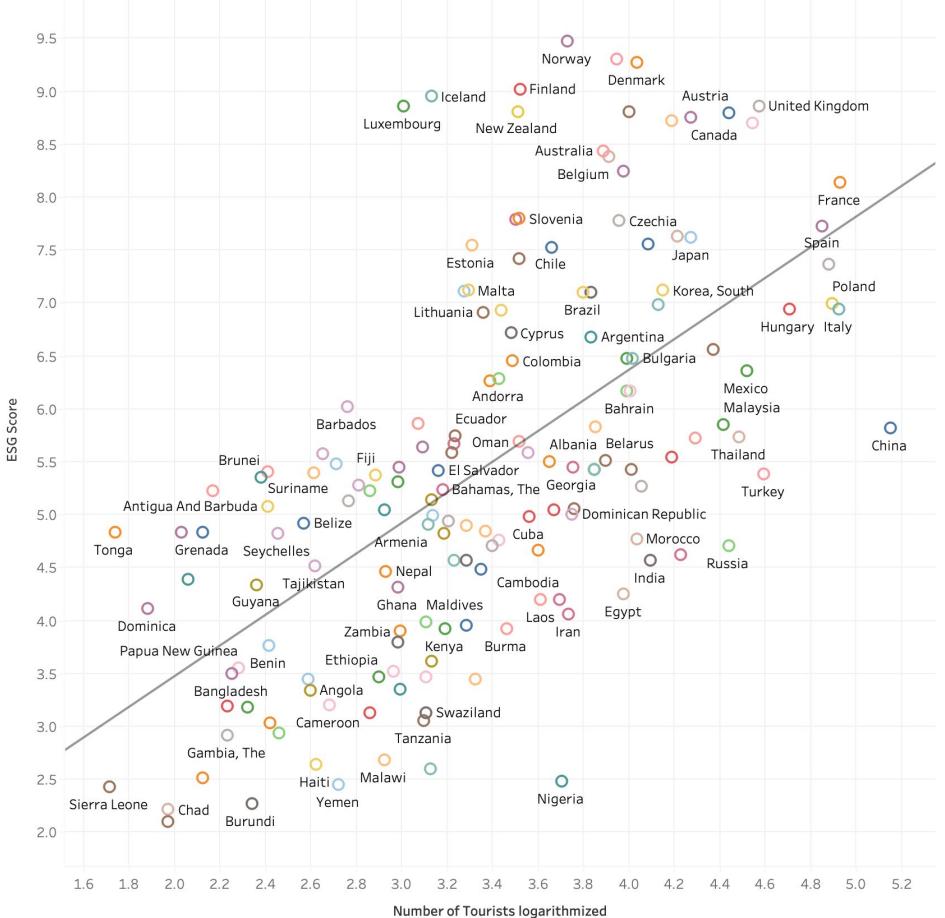
Average ESG Score Regions



Origin of the Tourists



Origin, Destinations and ESG Score	Strong Relationship Score and Destinations	Moderate Relationship: ESG and Destination Europe	No Relationship by change over years (2012-2019)	Strong Relationship ESG Score and Price Level	Hypothesis 1-3	Travel Behavior German Res..
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Relativ Strong Relationship between Number of Tourists and ESG Score by countries

Corr.: 0.6
R-Squared: 0,37151
Standard error: 1,43467
p-value (significance): < 0,0001

Origin, Destinations and ESG Score	Strong Relationship Score and Destinations	Moderate Relationship: ESG and Destination Europe	No Relationship by change over years (2012-2019)	Strong Relationship ESG Score and Price Level	Hypothesis 1-3	Travel Behavior German Res..
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Moderate Relationship between Number of Tourists and ESG Score within Europe

Corr.: 0.3

R-Squared: 0,0532213

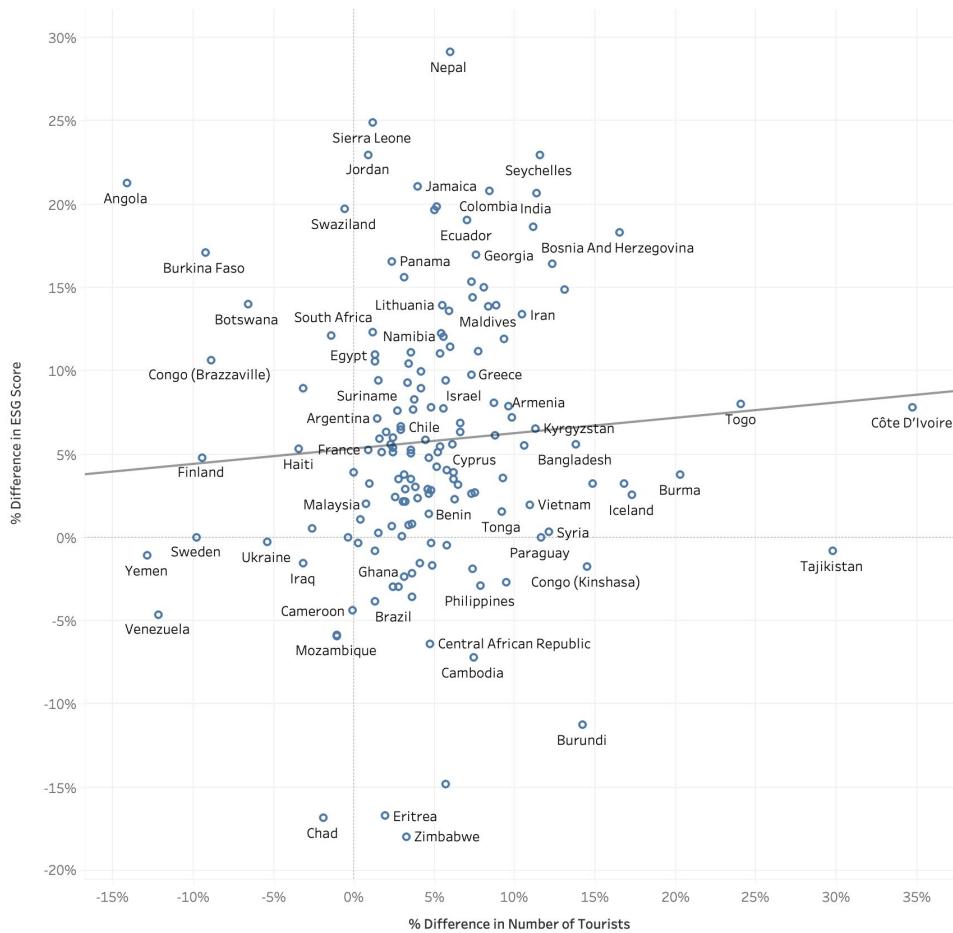
Standard error: 1,37507

p-value (significance): 0,152089

Origin, Destinations and ESG Score	Strong Relationship Score and Destinations	Moderate Relationship: ESG and Destination Europe	No Relationship by change over years (2012-2019)	Strong Relationship ESG Score and Price Level	Hypothesis 1-3	Travel Behavior German Residents
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**No Relationship
between %Diff in
Number of Tourists and
%Diff in ESG Score over
the years 2012-2019**

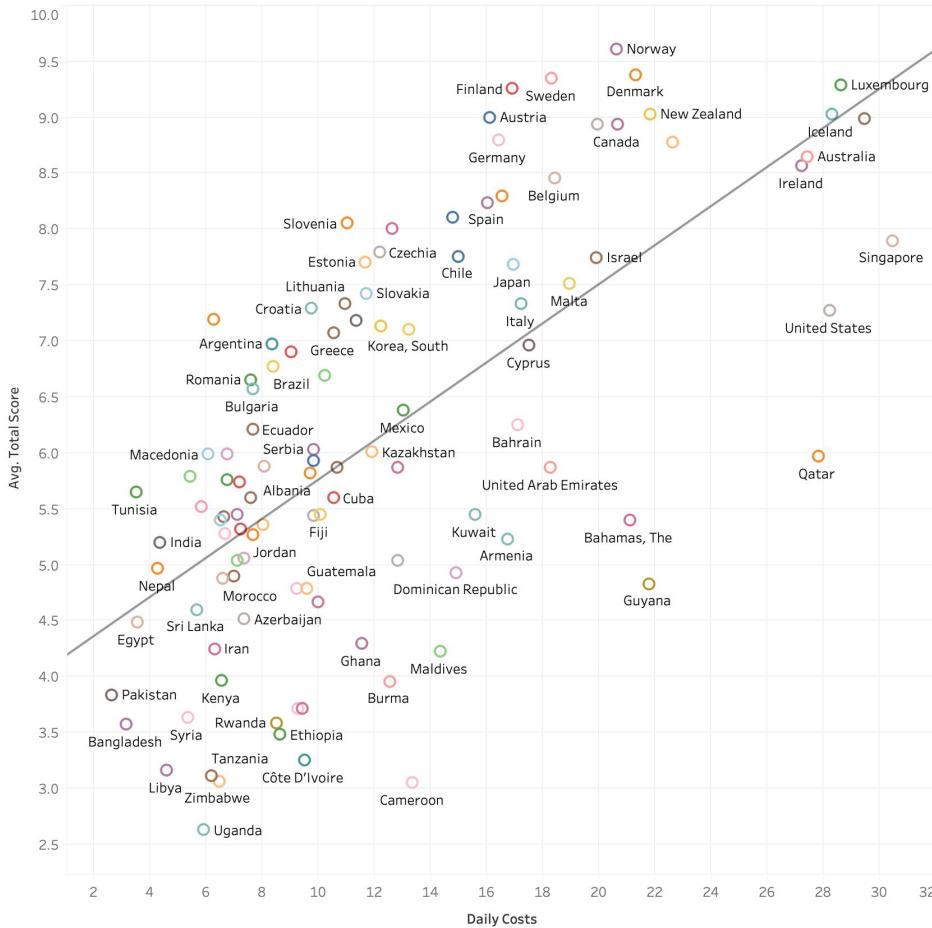
Corr.: 0.088
R-Squared: 0,0055058
Standard error: 0,0806765
p-value (significance): 0,354152



Strong Relationship Score and Desti..	Moderate Relationship: ESG and Destination Europe	No Relationship by change over years (2012-2019)	Strong Relationship ESG Score and Price Level	Hypothesis 1-3	Travel Behavior German Residents	No Relationship between ESG Score and Destination
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Relativ Strong Relationship between Daily Costs and ESG Score by countries

Corr.: 0,59
 R-Squared: 0,431584
 Standard error: 1,33598
 p-value (significance): < 0,0001



Relation Score and Destination Europe	Change over years (2012-2019)	Relation Score and Price Level	Hypothesis 1-3	Travel Behavior German Residents	Relation Score and Destination	Hypothesis 4
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01

COUNTRIES WITH HIGH ESG SCORE HAVE ALREADY MANY VISITORS (2012 - 2019)



YES

02

COUNTRIES WITH IMPROVING ESG SCORE ARE INCREASING IN VISITORS (2012 - 2019)



NO

03

COUNTRIES WITH HIGHER ESG SCORES HAVE HIGHER DAILY COSTS



YES

Relation
Score and
Destination ..

Change over years
(2012-2019)

Relation Score and
Price Level

Hypothesis 1-3

Travel Behavior
German Residents

Relation Score and
Destination

Hypothesis 4

04

GERMAN RESIDENTS TRAVEL MORE TO COUNTRIES WITH HIGHER ESG SCORES



Moderate
Relationship:
ESG and Des..

No Relationship by
change over years
(2012-2019)

Relationship ESG
Score and Price Level

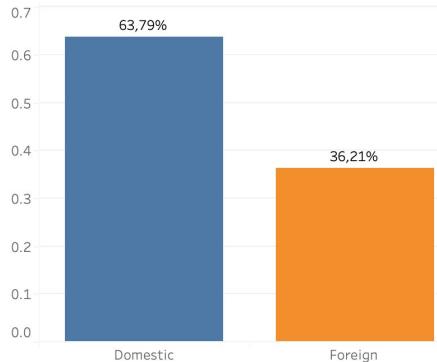
Hypothesis 1-3

Travel Behavior
German Residents

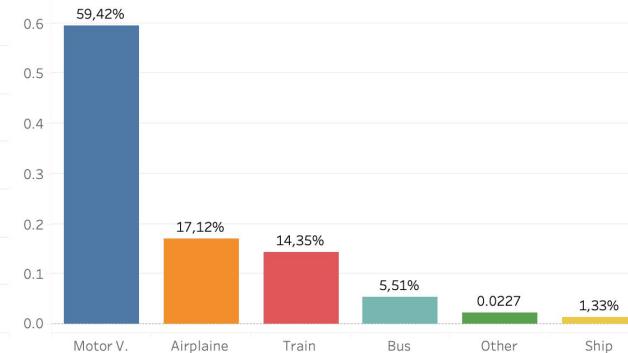
No Relationship
between ESG Score
and Destination

Hypothesis 4

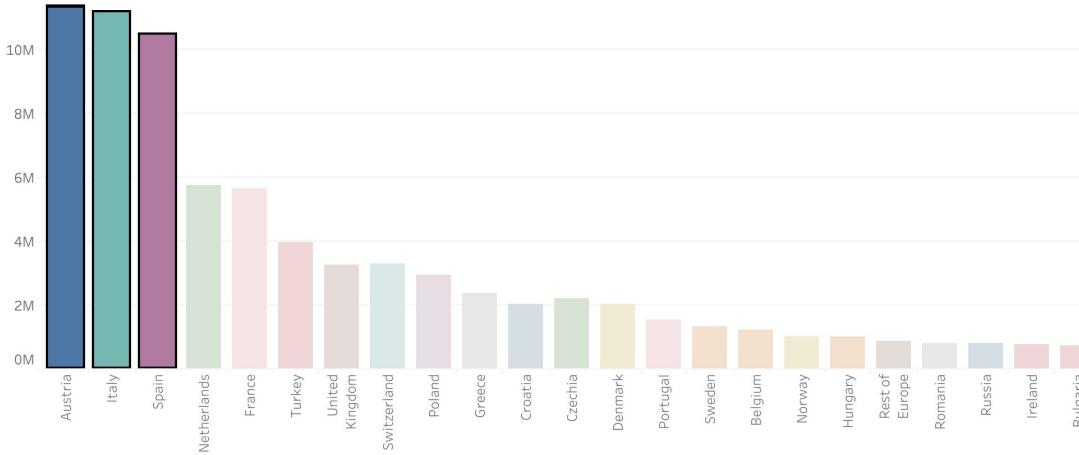
Vacation at home or abroad



Means Of Transportation



Top Destination



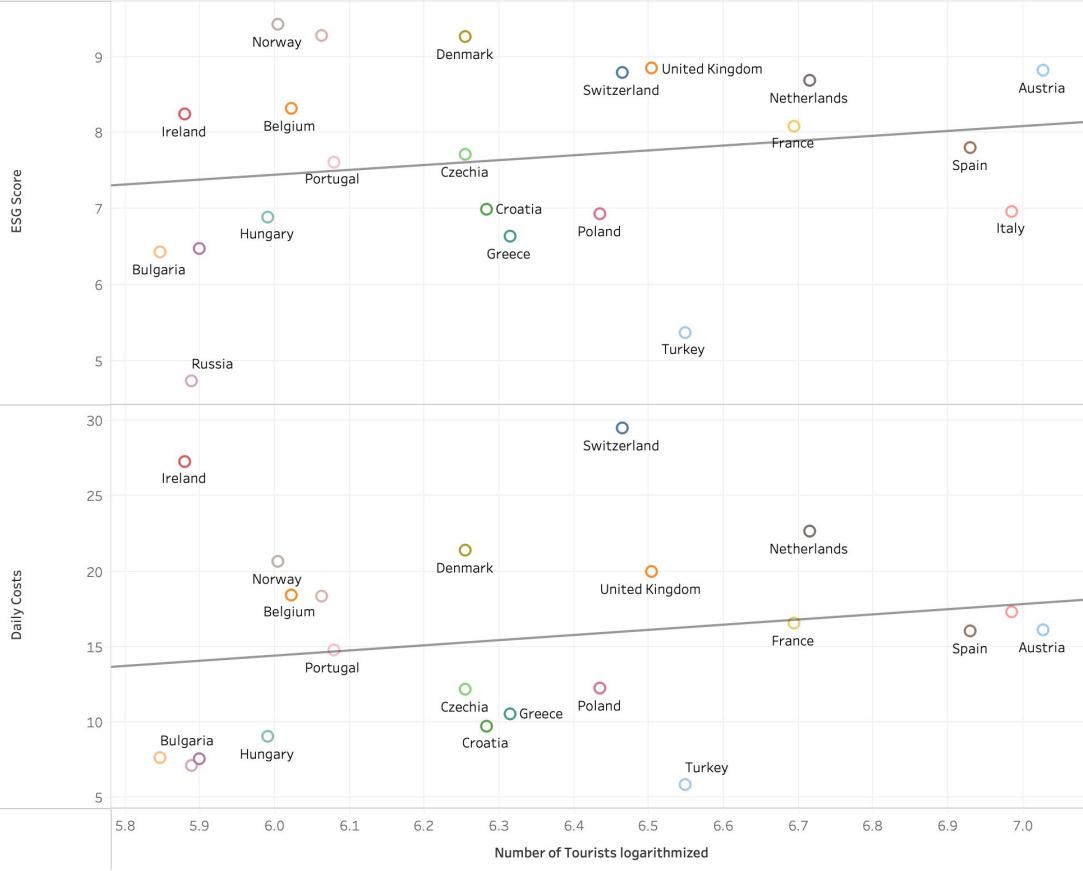
Moderate Relationship: ESG and Des..	No Relationship by change over years (2012-2019)	Strong Relationship ESG Score and Price Level	Hypothesis 1-3	Travel Behavior German Residents	Weak Relationship between ESG Score and Destination	Hypothesis 4
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Weak Relationship between Number of Tourists and ESG Score by countries

Corr.: 0.13
 R-Squared: 0,0382959
 Standard error: 6,56487
 p-value (significance): 0,382779

Weak Relationship between Number of Tourists and Daily Costs by countries

Corr.: 0,11
 R-Squared: 0,0352912
 Standard error: 1,28538
 p-value (significance): 0,402482



Relation Score and Destination ..	Change over years (2012-2019)	Relation Score and Price Level	Hypothesis 1-3	Travel Behavior German Residents	Relation Score and Destination	Hypothesis 4
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04

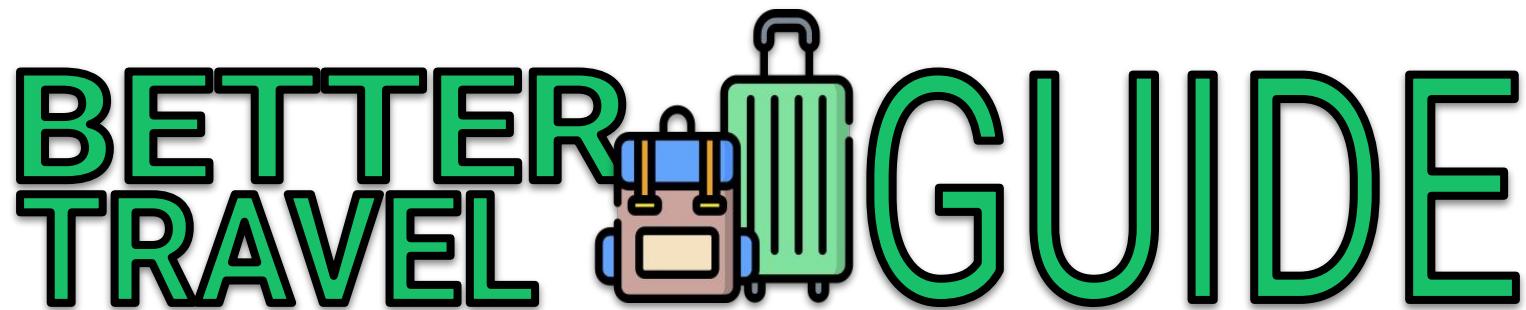
GERMAN RESIDENTS TRAVEL MORE TO COUNTRIES WITH HIGHER ESG SCORES



NO

OUR TOOL

BETTER TRAVEL GUIDE



OUR TOOL



Sandra from Frankfurt



...doesn't want to spend more than...

- 30% of her yearly total carbon footprint budget
- 200€ per day as travel expenses

... thought about going to Paris or Rome but wants to...

- compare those cities with the recommended ones
- look into the carbon footprint differences of plane, train and car



KEY INSIGHTS

- | | | |
|----|---|--|
| 01 | MORE AND MORE GERMANS WANT TO TRAVEL SUSTAINABLE | |
| 02 | HOWEVER THE TRAVEL DATA SHOWS THAT WE DON'T BEHAVE AS INTENDED | |
| 03 | IT'S NOT EASY TO FIND THE RIGHT INFORMATIONS | |
| 04 | OUR TRAVEL GUIDE TOOL SHOULD PROVIDE GUIDANCE AND INFORMATION | |
| 05 | THE DECISION AND THE CHANGE IN ACTIONS NEEDS TO BE DONE BY EACH OF US | |



NEXT STEPS

- INCLUDE ORIGIN CITY FOR MORE PRECISE FOOTPRINT CALCULATION
 - EXTEND CITY CATALOGUE TO > 500
 - BETTER WEIGHT OF THE INDICATORS
 - BICYCLE AS ANOTHER TRANSPORT TYPE
 - E-CAR AS SECOND CAR TYPE



THANK YOU VERY MUCH
FOR YOUR
PARTICIPATION AND INTEREST!



SPECIAL THANKS TO
OUR PHENOMENAL COHORT
&
OUR WONDERFUL COACHES
MATTHIAS, JUGNU, PARAM,
PHILIPP, ANNE, KONNI, SERGIO!

