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Using *Google Trends* to Evaluate Cultural Events

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October 2019

ECARES working paper 2019-24

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ULB - CP 114/04
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Abstract

The paper discusses briefly the methods that are used to evaluate *ex ante* and/or *ex post* cultural events. We suggest that Google Trends, which is now quite common can also easily be used in this case.

Keywords: Festivals, European Capital of Culture, Subsidies, Tourism
JEL codes: H43, Z11, Z18, Z30

Introduction

In Europe, and to some extent, in many countries, cultural events, such as music or theatre festivals, European Capitals of Culture, and why not The Olympic Games or Wimbledon, benefit from public and private subsidies. The organizers have to show that what they have in mind will break even, or better, make profits. The costs and benefits from the event have usually to be reported to those who subsidized it, and from time to time, such reports are made public, which makes it possible to realize that the methods used to compute the benefits are flawed for two reasons.

First, they often take into account the expenses of visitors who live in the city or the region where the event is organized. There indeed exist three types of visitors, and not all of them should be counted as adding value:

(a) locals, who would probably have spent more or less the same locally if the special event had not taken place (going to a restaurant, sipping glasses of wine in local bars or at local terraces, visiting a museum or going to a local concert),
(b) visitors from the surrounding neighbourhood and the country who may indeed have contributed to the city where the event took place but not to the GDP of the country, and
(c) foreigners whose expenses (in fact only their local value added) contribute to the city, the region and the country.

Visitors of type (b) and (c) may increase the revenues of the local population, but not necessarily of the region and very rarely of the population in the rest of the country. One can even take a further step, and suggest that the expenses of visitors from the country itself should not be counted since they do not increase the country's GDP, because they would probably have spent their income otherwise, and often in the country itself. So the only receipts that are worth counting are those coming from other (neighbouring or distant) countries, since otherwise, the event is just a beg your neighbour, or even a steal your neighbour game. They should at least be accounted separately: Cheating on numbers does not help, and to paraphrase Diamond and Hausman (1994) "no number is better than a number that is wrong."

The second reason is that the number of visitors may be difficult to assess. This is of course not the case when attending a specific event where entry tickets are needed (concerts, theatres, and so on). But it is so with festivals or other comparable events (such as the Olympic Games, the European Capitals of Culture) that last for days or

even weeks during which guests go from one event to the other, and may stay for a couple of days or even weeks, and need to be lodged and fed.

We suggest relying on *Google Trends* which counts the *clicks* of people who look for information concerned with the cultural project to prepare their visit, though some may not come, but this does hardly bias the results. Google Trends also collects their geographical origin. Though Google Trends can hardly produce a full ex-post evaluation, it contributes to estimate whether the project attracted visitors and helps correcting blown-up receipts.

Of course, the view taken is also extremely narrow, because it does neither consider the 'cultural benefits' of those who visit the city nor of those who live in or close to the city where the event takes place. There are indeed three elements which contribute to the impact of a cultural project:

(a) the monetary contribution of visitors,
(b) the welfare gains (or losses, such as additional pollution and noise, traffic jams) of those who live close enough as well as those of visitors, and
(c) the possible local long-term effects (new or upgraded museums, concert halls, green areas, roads, newly painted or restored house fronts, and so on).

Both the short-term welfare gains and the long-term effects are very difficult to measure. We therefore restrict our discussion to the immediate monetary contributions of visitors, which is anyway what is usually considered in ex post evaluations.

Monetary effects are very often summarized by a so-called expense multiplier R/I, where R and I respectively represent monetary receipts from visitors and investments in the project. Investments are in principle easy to measure by the organizer, and consist in private or public subsidies. With the exception of additional entry tickets to museums or to special events, such as concerts, exhibitions, additional overnight stays in hotels which consist mainly of local wages and profits, most receipts are not measured in terms of value added. This is much more complicated for other commodities which may be imported from other regions of the country or even from foreign countries. Only the value added of the glass of wine sold in a bar during a festival in Dublin or Brussels should be accounted for, not the price paid by the visitor. Here also, the receipts are blown-up if R contains costs and value added borne elsewhere.

There is thus the danger of blowing up receipts in three ways: Overestimating the total number of visitors, including the expenses of locals, and accounting for the full price paid by the visitor instead of the value added only. *Ad hoc* methods used by experts without expertise often forget to do this, or do it only partially, since they have to convince donors that the event will be or has been successful.[1]

Usual evaluation methods

Several methods have been and are still used to evaluate the opportunity of creating cultural events, or to measure their fallouts: input-output analysis and computable general equilibrium models, time series analysis, natural and randomized experiments, contingent valuation, and surveys.

Input-output analysis and computable general equilibrium models

The oldest approach is input-output analysis using national or regional input-output tables in which one injects estimates of final demands, and recovers sector multiplier effects. This may work for events that have large national or even international effects, such as Olympic Games, but in smaller events such as music festivals, the effects are small, and even unnoticeable and country-wide or even regional input-output tables would not help much. Computable general equilibrium models suffer from similar problems.[2]

Time series econometrics

Time series econometrics is used only rarely, both because of lack of data, and of events that are again too small to make it possible to discern the *blip* produced by the event in aggregate time series, or to decide whether the blip is just noise. The idea is to collect time series before, during and after the event, and compare the three periods.[3]

Natural experiments

A natural experiment is the result of an unexpected event that makes it possible to compare the behaviour of agents in 'normal' times (the control situation) with the behaviour during or after the event considered to have changed the situation (the treatment). The 2003 Avignon theatre festival is one such case. Just before the festival

was poised to start, and though everything was ready to run the show, it got cancelled because actors went on strike. Comparing what happened during 2003 to other years provides estimates of what got lost in 2003, but also of what the festival generates in normal times.[4]

The Avignon case uses the control and the treatment at different moments in time, but one can also apply the technique to events that could have been organized in different locations A, B, C and D that were candidates, while only one is submitted to the treatment: The Olympic games took place in city B while A, C and D play the role of controls, since they (hopefully) had the same basic characteristics as B. This is an essential request. Indeed, locations and populations should be as close as possible to each other.[5]

Randomized experiments

Natural experiments are rare, or they may not exist when they are needed. Randomized experiments were invented long ago by psychologists and are mostly used in the pharmaceutical industry where individuals are randomly allocated between those who receive the new drug (treatment) and those who receive a placebo (control). The problem is again making sure that the control and treatment groups are endowed with identical characteristics, and have no contacts with each other.[6]

Contingent valuation, *willingness to pay and willingness to accept*

Contingent valuation (CV), willingness to pay (WTP) and willingness to accept (WTA) are without doubt the methods that cultural economists prefer. WTP roughly consist in asking consumers (or producers) how much they would be willing to pay to avoid a negative or to accept a positive outcome; WTA goes for compensation, and asks agents how much they would like to be paid to accept a negative outcome, or how much they would be likely to pay to enjoy a positive one. See the special issue of the *Journal of Cultural Economics* edited by Schuster (2003) as well as Carson's (2011) 7,500 entries on the subject.

Diamond and Hausman (1994, p. 45), and almost twenty year later Hausman (2012) are very critical of these approaches. The first paper asks whether "some number [is] better than no number" and the second suggests that contingent valuation is not only 'dubious,' it is 'hopeless' as well. The debate seems therefore far from being closed. Hausman's (2012, p. 54) conclusion is utterly pessimistic: "I do not expect that

proponents and opponents of CV will ever agree. Some bad ideas in economics and econometrics maintain a surprising viability."

Surveys

Surveys of future, current, or past participants in a cultural event invariably come up with very positive results. The reason is that in most cases the event cannot be organized without subsidies, and both private and public donors have to be convinced that the event will be, is, or was a profitable operation. Running surveys should not be criticized *per se*, but there is much to say against the way their results are used.

Collecting VAT receipts

In most European countries VAT is collected at least every month, but most events do not last during a full month, or take place between, say, July 20 and August 10. In addition, the data are often very difficult to obtain from the tax administration. Those who organize events should be in touch with tax collectors, long before the event takes place to make sure that the collection is organized in a way that can used to examine the results a couple of weeks before, during and after the event.

Summary

Natural experiments as well as well-designed random experiments and analysis of time series are superior to all other methods, and should be used whenever possible. All other methods are weak (input-output analysis since it can hardly capture small effects, say those of a music festival) or strongly biased by the questions and answers used in contingent valuation, willingness to pay or to accept, as well as in surveys: "I am willing to pay $100" is not the same as "Here are my $100".

Collecting and analyzing the receipts of the value added tax, especially if they can be distinguished by type of 'outlet' (hotels, restaurants, taxis, bars and coffee shops, tourist shops, other shops, and so on) would be extremely helpful. They could easily be adjusted by taking into account the origin of the visitor (city, region, foreign country) to assess the economic short-term monetary effects of the event, using Google Trends data.

Google Trends

Google Trends (GT) provides a simple method using the number of clicks by those who look for information on events or destinations and classify possible 'visitors' according to their origin since 2004. Though not every click will be followed by a visit, one can assume that this does not bias the final results. Note that repeated searches from the same person over a short period of time are eliminated.

Many papers have been published during the last years on the statistical possibilities offered by GT and the large correlation coefficients obtained by comparing observed numbers (when they exist, and Google clicks). In 2005 already 64 per cent of travelers were using research engines before, during and after their touristic visit (Zheng and Gretzel, 2010). This number is probably much larger nowadays. Choi and Varian (2012) were the first to use GT data to predict the number of tourist arrivals in Hong Kong.[7]

There are nevertheless two problems. The data are provided under the form of normalized indices which take the value 100 for the largest number of clicks searching for a given destination and introduced by the citizens of a specific country, region, or city.[8] This makes it difficult, although not impossible[9], to compare the number of 'visitors' between different events. The second problem is that one has to search using several keywords to make sure that one covers as much as possible (but nothing that is irrelevant). For the Bayreuth Wagner Festival, for example, on has to type 'Bayreuth Festival + Bayreuther Festspiele + Bayreuth Wagner + Wagner Festival + Wagner Festspiel – Richard Wagner', where the + sign adds and the – sign subtracts the information. Our experience suggests to try as many words as possible, using several languages, but also try to avoid duplications using the – sign.

The example of European Capitals of Culture, 2011-2016

In 1985, the European Union decided to nominate one European Capital of Culture (ECC) each year for a period of one year during which cultural events with a strong pan-European dimension should be organized. Since 2001, two cities are chosen. Only cities located in member states can be elected. Our results describe what happened in 11 European Capitals of Culture (ECC) during the period 2011-2016. These are located in Guimaraes (Portugal, 2012), Kosice (Slovakia, 2014), Maribor (Slovenia, 2013), Marseille (France, 2013), Plzen (Czech Republic, 2015), Riga (Latvia, 2014), San-Sebastian (Spain, 2016), Tallinn (Finland, 2011), Turku (Finland, 2011), Umea (Sweden, 2014) and Wroclaw (Poland, 2016). There are thus two cities

every year, with the exception of 2015 where we dropped Mons (Belgium) keeping only, Plzen, which was not easy either.[10] Our dataset contains GT scores for 11 different editions of the ECC program from 2011 to 2016.[11] We collected GT scores for each ECC over a period of eight years: Five years before the event, the year of the event and 2 years following the event. For instance, Guimaraes, an ECC in 2012 is followed between 2007 and 2014, while we observe clicks about Wroclaw (ECC 2016) between 2011 and 2018.

Normalized clicks for each ECC are accounted for by restricting our queries to the 'travel' category suggested by GT, using as keyword the name of the city, followed by the words 'city in ***' where *** is the name of the country, for instance, 'Košice – city in Slovakia'. By doing so, we could avoid dealing with too much unrelated information.

The clicks are summarized in Appendix for each destination. As can be checked in column 2, Guimaraes received clicks from 19 countries out of 72,[12] between 2007 and 2014, with a score of 100 in Portugal, four from Angola and two from Brazil. All others are ≤1. Clicks to Wroclaw during the years 2011-2018 come from ten countries, with a score of 100 from Poland (where Wroclaw is located) and a score of ≤1 from all other countries. The most 'visited' city is San Sebastian (column 8) which obtained at least a score of 2 from 29 countries, including a score of 25 from Puerto Rico, 93 from Spain and 100 from Andorra, which is not located in Spain, but in the Pyrenees, on the border between Spain and France. Marseille (column 5) comes second with 22 countries of origin, including Reunion Island (a French island in the Indian Ocean) with a score of 70 and France with 100.

The large number of small scores and 0s show that, though ECCs are largely subsidized by their own country as well as by European Union, other countries, including their European neighbours, are not very eager to show up. This clearly means that the GDP of the nominated country is hardly affected. Of course, there are local effects that come from other regions or cities within the country. This is illustrated in Table 1 for a small number of important French music festivals. Though some 'visits' are quite important, especially for the well-known festival in Aix-en-Provence, these can be considered as beggar thy neighbour effects: What visitors spend in Aix-en-Provence is not spent in Auvergne (26) or Burgundy (18).

[Table 1 approximately here]

The numbers in the table in Appendix are cumulated over eight years for each ECC and may therefore miss the peak year during which the event takes place, as well as the two years (before and after) that surround the event. To check for this issue, we ran two regressions, one for national clicks only (within the country in which the ECC takes place) and worldwide clicks (which unfortunately also include national clicks). The regressions are specified using eight dummy variables for years (five years before to two years after) and eleven dummies for the cities where the event was organized. The regression equation based on 88 observations (8 years x 11 cities) is specified as:

$$N_{ti} = \beta_t + \alpha_i + \gamma + \varepsilon_{ti},$$

where N_{ti} is the number of GT clicks in year t (t = -5, -4, ..., 0, 1, 2),[13] for ECC i (i = Guimaraes, ..., Wroclaw); ε_{ti} is the error term. The parameters β_t and α_i and pick up the differences between the reference year (year 5 before the event) and the excluded ECC (Guimaraes). The estimated coefficients represent thus the difference between the regression intercept γ which is common to all cities and years. The results of both regressions (national and worldwide clicks) are reproduced in Table 2.

[Table 2 approximately here]

The estimated parameters can be interpreted as follows. The intercepts give the average number of clicks, both national and worldwide. They are very significantly positive and different from 0 and, obviously, national clicks (some 40.0/100) are smaller than worldwide clicks (62.3/100). The time and ECC dummies provide the additional effects, which can be positive or negative. Very few are significantly different from 0, which means that there is very often no additional effect.

A couple of time dummies are positive (half left of Table 2): The national excitement starts one year before, increases during the event to some 9 additional points (40+8.9), and lasts for two more years reaching 40+10.9. We do not know whether this positive effect last for longer periods. No additional worldwide time effect is significantly different from 0.

The half right of Table 2 shows the ECC effects with respect to Guimaraes, the reference ECC in both regressions. At the national level, Riga (+9.4) and Wroclaw (+37.9) are the only ECCs that generated a strong positive surplus, but the opposite happened with Kosice (-9.9). Worldwide effects are usually negative or equal to zero,

with the exception of Wroclaw (though the effect contains the large increase of 37.9 in Poland itself).

Global effects on cities should include the sum of the time and the city dummy. Let us take Riga in its active year as an example. At the national level, the time effect is equal to 8.9 (time effect-ECC year) + 9.4 (ECC effect), that is 18.3 points. The worldwide effect on Wroclaw is 8.9+14.1 = 23 points. The joint national effect on Kosice is, however, negative (8.9 - 9.9).

Final remarks

As long as serious econometric methods such as natural or well-designed random experiments, or time series methods are not used on relevant data (VAT receipts, for example), Google Trends could play an important role. It is easy to use, costs some time, but no money, and the results are easy to understand. It is in no way sufficient to cover the various aspects of artistic events, but it can help tempering the enthusiasm of 'professional' experts who, for two neighbouring ECCs, Lille (France, 2004) and Mons (Belgium, 2015) discovered an expense multiplier of the order of 5 or even 6, even before the year of the event.[14]

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[1] See Crompton (2006) and Crompton and McKay (1994).
[2] See Humphreys and Plummer (1995) and Matheson (2008).
[3] See Skinner (2006), Plaza (2006), and Plaza et al. (2011).
[4] See Brodaty (2017).
[5] See Billings and Holliday (2012).
[6] See Greene et al. (2014) and Lattarulo et al. (2016).
[7] See also Robbins et al. (2018), Jun et al. (2018) for many other references.
[8] See https://support.google.com/trends/?hl=en#topic=6248052 (last visited on March 1, 2019) for more details and how to use the website.
[9] Indeed, it is impossible to run more than five different queries at the same time.
[10] Mons was problematic since it has two names in Belgium: Mons in French and Bergen in Flemish. Bergen also means 'mountains' in Dutch which would have collected millions of clics that have nothing to do with the city itself. Bergen is also the name of a city in Sweden. Note that even Plzen (Pilsen) was problematic, since there exists a beer that carries the same name.
[11] We dropped 2017 and 2018, since we wanted to also analyze the two years that followed the event.
[12] There are 72 countries which gave at least one click to one of the 11 ECCs considered during the eight year observation period.
[13] 0 represents the year during which the event takes place.
[14] For details, see Gergaud and Ginsburgh (2017) and Gergaud et al. (2017).

Table 1. Google Visitors of French Musical Festivals
(largest no. of vistors is 100, others are relative to 100)

	Aix-en-Provence	Beaune	La Roque d'Anthéron	Orange	Saintes	Strasbourg
Alsace						**100**
Acquitaine	9					
Auvergne	26					
Brittany	8					
Burgundy	18	**100**				
Ile de France	23	9	19	28	7	4
Languedoc-Roussillon	19			79		
Lorraine						11
Midi-Pyrénées	13					
Nord-Pas de Calais	8					
Picardie						5
Poitou-Charentes					**100**	
Provence C. d'Azur	**100**		**100**	**100**		2
Rhône-Alpes	38	10		43		3

Location of festivals and French region in which the festival takes place are in bold.

Table 2. Main determinants of GT clics in 11 ECCs (2011-2016)

Dummy variables	National	Worldwide	Dummy variables	National	Worldwide
Time dummies			ECC dummies		
Five years before ECC	0.000	0.000	Guimaraes	0.000	0.000
	-	-		-	-
Four years before ECC	-1.970	1.189	Kosice	-9.865**	-22.885***
	(3.098)	(3.621)		(3.864)	(3.400)
Thre years before ECC	3.341	1.500	Maribor	3.042	-11.156***
	(2.962)	3.451		(2.530)	(3.302)
Two years before ECC	3.061	0.826	Marseille	1.875	1.646
	(2.331)	(3.218)		(2.695)	(3.230)
One years before ECC	6.538**	1.136	Plzen	1.462	2.759
	(2.551)	(3.368)		(3.094)	(4.102)
ECC year	8.939***	2.841	Riga	9.448***	-1.031
	(2.481)	(3.487)		(2.883)	(3.463)
One year after ECC	8.331***	0.545	San Sebastian	2.552	-8.271**
	(2.693)	(3.884)		(2.757)	(3.923)
Two years after ECC	10.912***	-0.304	Talinn	-4.344	3.365
	(3.587)	(3.700)		(4.499)	(3.707)
			Turku	5.740*	-7.667*
				(2.926)	(3.885)
			Umea	1.760	-8.896
				(2.900)	(3.963)
			Wroclaw	37.927***	14.083***
				(3.492)	(4.191)
			Intercept	39.984***	62.262***
				(3.268)	(3.756)
			R-Squared	0.825	0.694
			No. of observations	88	88

Robust standard errors between brackets.

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

Appendix. Google Visitors of European Capitals of Culture, 2011-2016 (1)
(largest no. of visitors is 100, others are relative to 100)

	Guimaraes Portugal 2012	Kosice Slovakia 2013	Maribor Slovenia 2012	Marseille France 2013	Plzen Czech Rep. 2015	Riga Latvia 2014	S-Sebastian Spain 2016	Tallinn Estonia 2011	Turku Finland 2011	Umea Sweden 2014	Wroclaw Poland 2016
Google visits from											
Algeria				11							
Andorra							**100**				
Angola	4										
Argentina	<1		<1	1		<1	4	<1			
Australia			<1	1	<1	<1	3	<1	<1		
Austria	<1	<1	2	2	2	<1	3	<1	<1	1	
Belarus			<1			1		1			
Belgium	<1		<1	11	<1	<1	4	<1	<1	<1	
Bosnia&Herzegov.			2								
Brazil	2		<1	1	<1	<1	1	<1	<1	<1	
Bulgaria		<1	<1	2	1	<1				<1	
Canada	<1		<1	1	<1	<1	1	<1			
Chile	<1					<1	5				
China								<1			
Colombia				1		<1	3	<1			
Costa Rica							4				
Croatia			4		<1					1	
Cyprus						1		<1			
Czechia		1	<1	2	**100**	<1		<1	<1		1
Denmark			<1	1	<1	<1	2	<1	<1	1	
Ecuador							3				
Egypt				4							

Note: European Capitals of Culture (and countries in which the capitals are located) are in bold.

Appendix. Google visitors of European Capitals, 2011-2016 (2)
(largest no. of visitors is 100, others are relative to 100)

	Guimaraes Portugal 2012	Kosice Slovakia 2013	Maribor Slovenia 2012	Marseille France 2013	Plzen Czech Rep. 2015	Riga Latvia 2014	S-Sebastian Spain 2016	Tallinn Estonia 2011	Turku Finland 2011	Umea Sweden 2014	Wroclaw Poland 2016
Google visits from											
El Salvador							10				
Estonia						6		**100**	4		
Finland			<1	1	<1	1	3	3	**100**	4	
France	<1	<1	<1	**100**	<1	<1	14	<1	<1	<1	<1
Georgia								1			
Germany	<1	<1	<1	4	1	<1	3	<1	<1	<1	1
Greece			<1		<1	<1	1	<1	<1		
Guatemala							6				
Hungary		3	7	2	1	<1	1	<1	1		
India				<1		<1	<1				
Iraq										<1	
Ireland		<1		2		<1	7	<1			1
Israel			<1		<1	<1	15	<1			
Italy	<1	<1	<1	2	<1	<1	2	<1	<1	<1	<1
Japan	<1			4		<1	<1	<1			
Kazakhstan						<1					
Kenya										2	
Latvia						**100**		3			
Lithuania						8		3			
Luxembourg						1		<1			
Macedonia			2								
Mexico			<1	1		<1	3	<1			

Note: European Capitals of Culture (and countries in which the capitals are located) are in bold.

Appendix. Google visitors of European Capitals, 2011-2016 (3)
(largest no. of visitors is 100, others are relative to 100)

	Guimaraes Portugal 2012	Kosice Slovakia 2013	Maribor Slovenia 2012	Marseille France 2013	Plzen Czech Rep. 2015	Riga Latvia 2014	S-Sebastian Spain 2016	Tallinn Estonia 2011	Turku Finland 2011	Umea Sweden 2014	Wroclaw Poland 2016
Google visits from											
Morocco				4							
Netherlands	<1	<1	<1	4	<1	<1	4	<1	<1	<1	<1
Norway				1		1	4	1	<1	2	
Peru						<1	5				
Philippines							1	<1		<1	
Poland	<1	<1	<1	2	<1	<1	1	<1	<1	<1	**100**
Portugal	**100**		<1	11		1	6	<1			
Puerto Rico							25				
Romania		<1	<1	1	<1	<1	1	<1			
Russia	<1		<1	1	<1	1	1	1	<1	<1	
Reunion				70							
Serbia			1			<1					
Singapore										<1	
Slovakia		**100**	<1		4	<1		<1			
Slovenia			**100**		1						
South Korea					<1						
Spain	1	<1	<1	5	<1	1	93	<1	<1	<1	
Sweden			<1	2	<1	1	4	1	2	**100**	<1
Switzerland	1	<1	<1	9	<1	<1	5	<1	<1	<1	
Thailand						<1		<1			
Tunisia				8							
Turkey			<1	<1	<1	<1	<1	<1	<1	<1	

Note: European Capitals of Culture (and countries in which the capitals are located) are in bold.

Appendix. Google visitors of European Capitals, 2011-2016 (4)

(largest no. of visitors is 100, others are relative to 100)

	Guimaraes Portugal 2012	Kosice Slovakia 2013	Maribor Slovenia 2012	Marseille France 2013	Plzen Czech Rep. 2015	Riga Latvia 2014	S-Sebastian Spain 2016	Tallinn Estonia 2011	Turku Finland 2011	Umea Sweden 2014	Wroclaw Poland 2016
Google visits from											
Ukraine		<1	<1	1	<1	<1	1	<1			
United Kingdom	<1	<1	<1	2	<1	<1	3	<1	<1	<1	<1
United States	<1	<1	<1	1	<1	<1	1	<1	<1	<1	<1
Uruguay							4				
Venezuela						<1	1				
Vietnam					<1						

Note: European Capitals of Culture (and countries in which the capitals are located) are in bold.