

SMART TOURISM DESTINATION COMPETITIVENESS: THE EXPLOITATION OF THE BIG DATA IN MOROCCO

Badri Hiba¹, Hmioui Aziz²

¹USMBA - Sidi Mohamed Ben Abdellah University-The National School of Business and Management (ENCG Fès) –
(badri.hibaa@gmail.com)

²Laboratory for Research and Studies in Management, Entrepreneurship and Finance (LAREMEF) – (hamioui.aziz@yahoo.fr)

KEY WORDS: Tourism, Big Data, Social space, GIS technology, Human spatiality.

ABSTRACT:

Over the past decade, the introduction of new technologies in different markets has led to the emergence of smart destinations by providing stakeholders with effective and efficient technological solutions. The objective of smart destinations is to improve spatial competitiveness.

Tourism with its focus on travel and the transfer of people, goods, and services across time and space is essentially a geographic phenomenon. The central themes of the research field of traditional geography focus on three related topics: place, space, and environment.

The trend toward big data has had a significant impact on all sectors from which geographic information science has had a major impact on how organizations acquire and leverage spatial information. Looking at how organizations are using geographic information science and technology, one of the clearest themes is that usage is expanding rapidly; while traditionally the largest adopters of geospatial data have been government agencies, it is now easy to see widespread adoption of GIS across all industries. On the one hand, to act on the country's income through a wider and more targeted geographic attractiveness and on the other hand, to improve the investment fields in the most visited areas and to create a favorable tourism environment in areas whose attractiveness remains low.

1. INTRODUCTION

The idea of smart tourism destination derived from the concept of smart city, as technology has become an enabler of development of tourism destinations (Boes et al. 2015). Smart tourism destination is focused on e-tourism, where the consumers are very familiar with new technologies, and use them permanently. It contains multiple components, like reservations systems, social media, various communication and connection applications etc. (Gretzel et al. 2015). The exploitation of Big-data, which has become the main link for efficiency and reactivity in a constantly changing global tourism market. There is a great deal of work being done on Big Data, and the "3V" formula proposed by Laney in 2001 has long been used to describe Big Data:

Volume (referring to their imposing mass); Speed (they are created without interruption); Variety (they come in many forms).

For Kitchin (2014), four criteria emerge from the recent scientific literature: Big data is considered (1) exhaustive (n=all); (2) hyper-detailed; (3) relational (cross-referenced with other data); (4) flexible (i.e., easily modified) More generally, the Big data phenomenon is a set of discourses, practices, and beliefs centered on data, people, and their behaviors. Therefore, we can talk about 7V.

GIS technologies can be used to assess and monitor the potential of tourism resources, which is an essential element for the tourism destination.

The use and application of GIS technologies in the tourism sector can be divided into three major application areas: tourism development and research, tourism planning, and tourism marketing (Sureshkumar et al. 2017).

For this reason we will try through this work to show how tourism can take advantage of technological advances in terms of BIG DATA to ensure the performance and therefore the offer of tourist units in Morocco. In such a spatial competitive industry, data literacy becomes fundamental. Know the profiles of consumers,

flows, expectations; be able to anticipate behaviour and adapt the tourism offer accordingly: these are the challenges faced by the various private actors and public authorities.

Now, obviously, the tourism sector is digitized. On the one hand, a growing number of purchases of tourist products (hotel nights, site visits, etc.) are made via the Internet. On the other hand, tourists have a natural tendency to share their opinions and describe their experiences and behaviors on the web.

Consumers are making available to all a growing number of digital traces they also become prescribers.

New trends emerge as well, and people's imaginations evolve in function not only of their own experience but of the overall experience of the others.

In this context, the tourism industry must adapt to understand, better and faster, changing behavior of tourists. It is necessary to integrate a new type of analysis, exploiting big data.

One of the challenges of tourism policies is to understand the attitude of consumers and the motivations for visiting a site. An in-depth analysis of these points allows for in-depth work on aspects such as marketing segmentation and targeting. It also helps to refine the tourism offer and guide public policies.

Social networks hold a considerable place in the Big Data sphere. In fact, the social web is often confused with these platforms. However, these are two distinct realities. More precisely, the social web is above all a component of Web 2.0 (Proulx and Millerand, 2010). It therefore inherits the same characteristics as the latter: creating, sharing and updating digital content quickly is the common denominator of all social web tools, including social networks. The social web thus encompasses the latter, but also other tools such as blogs, exchange and sharing platforms, and collaborative websites. Big Data has therefore become involved in the tourism sector, and even relatively early compared to other areas. Current tools for the exploitation of mass data serve two types of actions:

- Allow tourists to better prepare their stay or trip;

- Allow tourism professionals to better understand the profiles; expectations and appreciations of tourists in order to prepare the following seasons.

2. LITERATURE REVIEW

The exponential development of new information and communication technologies has facilitated the transition from the ordinary city to the smart city by generating massive amounts of data. As a result, the arrival of new entrants whose business model is based on intensive use of new technologies is encouraging all the economic actors to integrate big data into their strategies to gain a spatial competitive advantage. The first things that organizations have to deal with when dealing with big data is where and how that data will be stored once it has been acquired. After the storage phase, it becomes necessary to exploit all of the recorded data in order to implement actions that promote the sector. The smart destination is considered as a business ecosystem that exploits technology and adapts in real time the supply to the demand by a very advanced digital control tools. A primordial question seems to us primordial to ask is how the evolution of new technologies has impacted the competitive placement of Morocco?

Indeed, the application of the term smart in the tourism sector has its origins in the concept of smart city and smart destination. The smart tourism destination focuses on the needs of tourists through the combination of ICT and tourism innovation, the development of the sector, improving service quality and tourism management (Huang, X, K. Yuan, J, Z. & Shi, M. Y, 2012). Impact assessment and simulation are increasingly important in tourism development and GIS can play a role in auditing environmental conditions, examining the suitability of locations for proposed developments site, identifying conflicting interests and modeling relationships (Bahaire & White, 1999). In tourism management, it has been used to determine the best routes to tourism destinations and points of interests (Lau and McKercher 2006) as well as to determine optimal information flows within tourism destinations (Baggio 2014; Baggio and Del Chiappa 2014; Del Chiappa and Baggio 2015; Éber et al. 2018).

The objective of this study: First of all is to position Morocco's geography as a smart destination through the collection and exploitation of data, secondly to analyze the impact of this new transition on revenues and on its place as an attractive / intelligent destination.

3. METHODOLOGY

The methodology consists first of all in defining the dimensions of the smart tourism destination namely: ICT, innovation, accessibility and sustainability.

A qualitative study will be carried out to determine how the good collection of BIG DATA impacts the spatial competitiveness of the smart tourism destinations.

The technique that we are going to follow relates to the documentary collection and the analysis of public policies.

The question of this study concerns the way in which the use of BIG DATA determines the organizational strategies of tourist destinations.

3.1 The challenges of BIG DATA in Morocco

Digital is a strategic lever for promoting the sector, particularly through digital communication "in line with the evolution of the global tourism sector" and the use of Big Data, which has become the main link in the efficiency and responsiveness of a global tourism market in perpetual evolution.

This is followed by the 2nd axis dealing with the modernization and implementation of tools for monitoring the behavior of travelers from the emitting markets, first of all traditional (French, English, German and Spanish) but also those emerging, including the Chinese market which shows a particularly high growth, increased from 15,000 in 2015 to 180,000 in 2017. As a result, the Moroccan state emphasized the need for an exchange between the mystery of tourism and the General Directorate of Information Systems Security under the National Defense Administration is responsible for piloting the strategy of the State in matters of cyber security and to coordinate the interministerial work relating to its implementation. It is responsible, among other things, for monitoring all new technologies to define the main innovations in information system security and for setting up, with other ministerial departments, a monitoring and alert system relating to events that may occur and which are likely to affect state security systems.

3.2 Competitiveness and BIG DATA

The actual behaviors of tourists are not necessarily those desired by tourist operators. Being able to analyze massively the data taken from the Internet and social networks makes it possible to override the received ideas, to build a customer-oriented tourist approach and thus to improve the competitiveness of this sector. According to the World Tourism Organization (UNWTO). In 2017, the kingdom received more than 11 million tourists, a 10% jump from the year before. In terms of tourism revenue, this increase translated into an income of more than 70 Billion Dirhams.

Elements of BIG DATA requirements:

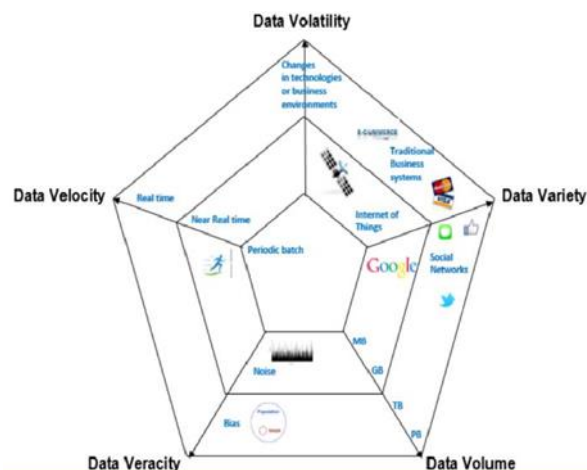


Figure 1: Elements of BIG-DATA. Source: Cornelia L. Hammer, Diane C. Kostroch, Gabriel and STA Internal Group, "Big Data: Potential, Challenges, and Statistical Implications". IMF, September 217.

Data volatility: relative to the rate of change of stored data values over a period of time.

Data velocity: refers to the speed at which data is generated, distributed and collected.

Data variety: refers to the multiplicity of available data types

Data veracity: It refers to the reliability of the data which is essential to be able to take advantage of it and transform it into usable information

Data volume: refers to the huge amounts of data generated at any given time.

Table 1: Evolution of internet users in the world (% of population)

Years	% of Population
2010	28,7
2011	31,2
2012	34,2
2013	36,6
2014	39,7
2015	41,6
2016	44,6
2017	49,6
2018	50,8
2019	51,1

Source: Compiled by us based on figures provided by world-statistics.org

KEY FIGURES : SOCIAL MEDIA USE AROUND THE WORLD	
Number of active social media users	3.96 BILLION
Social media penetration (Users VS Total Population)	51%
Annual Growth in the Total number of social media users	10.5%
Total number of social media users accessing via mobile phone	3.1 BILLION
% Of total social media users accessing via mobile	99%

Figure 2: Social Media use around the world. Source: Compiled by us based on figures provided by world-statistics.org

Big data in the Moroccan territory

Following the information presented by the website world-statistics.org we can concretize the behavior of the Moroccan consumer at the following points: (Figures for the year 2020).

Internet users in Morocco

- ✓ 25.32 million internet users ;
- ✓ The number of internet users in Morocco increased by 2.9 million (+13%) between 2019 and 2020 ;
- ✓ Internet penetration : 69%

Social media users in Morocco

- ✓ 18.00 million social media users ;
- ✓ The number of social media users in Morocco increased by 1.7 million (+11%) between April 2019 and January 2020.
- ✓ Social media penetration : 49%

Mobile connections in Morocco

- ✓ 43.35 million mobile connections ;

- ✓ The number of mobile connections in Morocco increased by 1.2 million (+2.9%) between 2019 and 2020 ;
- ✓ The number of mobile : 118% of the total population.

Table 2: The Travel & Tourism Competitiveness Index (TTCI) of Morocco: 2009-2019

YEAR	2009	2011	2013	2015	2017	2019
SCORE	4.08	4.08	4.03	3.8	3.8	3.9
RANK	73/134	75/139	71/140	62/141	65/136	66/140

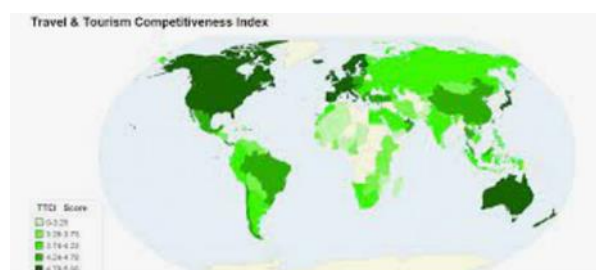


Figure 2: Travel tourism and competitiveness index. Source: Compiled by us based on figures provided by the reports of the World Economic Forum.

4. DATA ANALYSYS

National tourism information is divided into several local databases. The fact of not being able to bring them together in one and the same receptacle miss the opportunity to base the promotional, commercial strategies, decisions and action plans on rational insights.

Therefore, with reference to the tourism geographic information database, on the model of computer hardware and software and using the methods of systems engineering and information science, the TGIS collects, stores, manages, reviews and implements multimedia tourism geographic information systems.

The GIS of the exploitation of the big data in the Moroccan geography allows to have an inventory of the tourist resources, to evaluate the degree of degradation of the various patrimonial resources, to facilitate the development of the tourist territory through an overall view of the organization of a sector, to develop the natural and cultural heritage by a better knowledge of the territory, to help in the decision-making, to define orientations of management, to the realization of great projects, to analyze tourist routes, to provide the evolution of the agricultural and urban space of the oases and to manage well the tourist offer and to diffuse and communicate information.

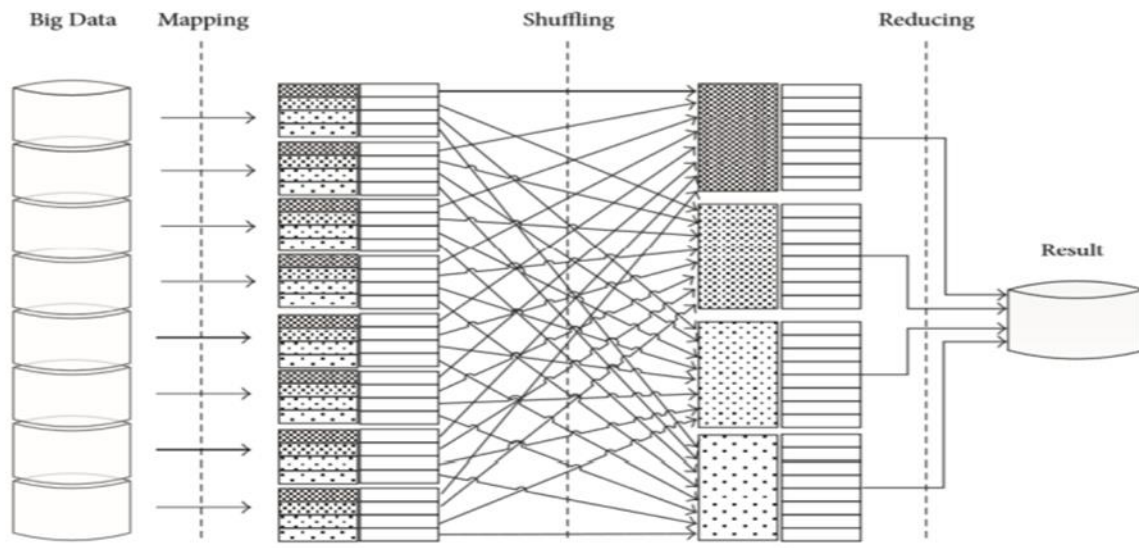


Figure 3: Map reduce functioning

Source: Nawsher Khan and al., Big Data: Survey, Technologies, opportunities, and Challenges. The Scientific World journal, 2014

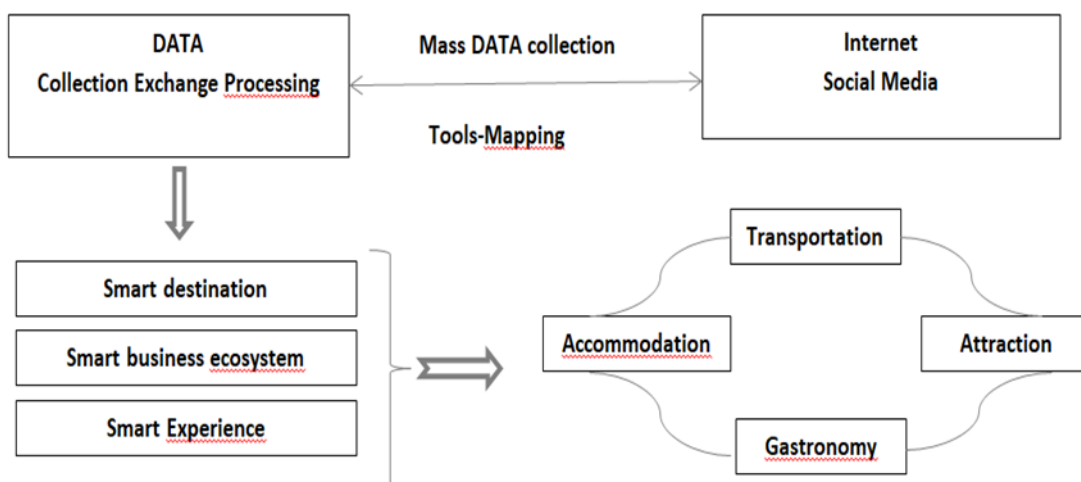


Figure 4: Spatial tourism/ Big Data-Map

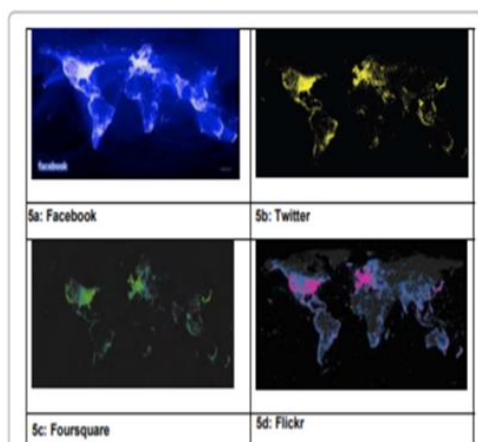


Figure 5: Penetration level of the different social media sources. Note: All pictures represent the penetration level for 2010. Source: Tourism Geography: Emerging Trends and

Initiatives to Support Tourism in Morocco- Steenbruggen, J Tourism Hospit 2016, 5-3.

Concerning the social media data, this figure presents a global overview of the penetration of different social media sources. We can conclude that the different social media maps show great geographical similarity, in terms of their global penetration level. The African continent has 1.32 billion people, 34% of this population has access to the internet, or 453.2 million people. 16% of the African population is active on social networks. On its side, Morocco is well above the continental and even global average. Indeed, 69% of Moroccans have access to the internet at the end of 2019.

The digital in Morocco has started to take a performance since the year 2010, the thing that is justified by the growth of figures in terms of access first of global users to technological networks and in parallel the increase of internal flows in terms of foreign tourists.

In the same way, the integration of the various technologies having for object first to make Morocco an accessible

destination also facilitate the evaluation of the opportunities and the risks of the tourist sector.

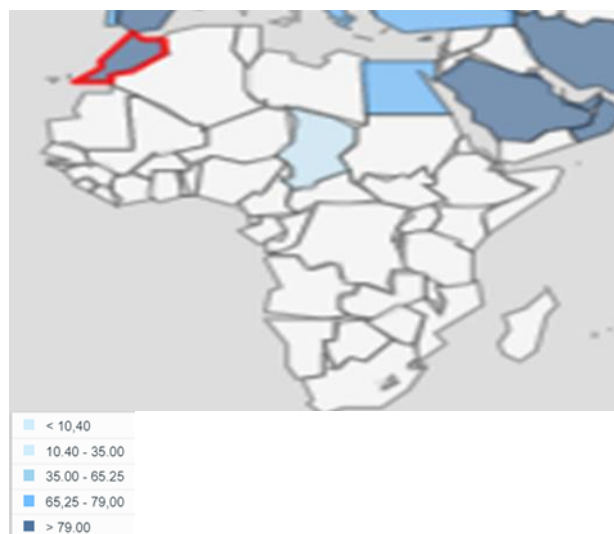


Figure 6: Individuals using the Internet (% population)

The positive results of the degree of impact of the use of BIG DATA in competitive performance were well presented by the empirical analysis to present how today's new technologies in space with the different forms taken, can only push a country such as MOROCCO which is recognized as a tourist destination to transit to a phase of a smart destination that exploits all the BIG DATA in terms of information related to the requirements of the tourism sector as well as need of the tourists.

The discriminant analysis model is given by equation (1) (Spircu et al., 1994): $D = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + \dots + b_nX_n$ (1) where D – value of the determinant b_k – discriminant coefficients, X_k – independent variables. The motivation for using this method of data analysis is based on the fact that it is the only one to be approached from two methodological perspectives, both as explanatory method and descriptive method, basically having two purposes (Spircu et al., 1994): Descriptive purpose (to look for as few explanatory variables as possible in order to express "as well as possible" the separation of individuals into classes) and an explanatory, predictive purpose (consisting of verifying to what extent a certain individual, not yet grouped, is similar to the individuals of a certain class, and if this similarity exists, to decide on its distribution in the class concerned).

5. RESULTS

The objective of this study is to verify the following hypotheses:

H0: The use of new technologies has no impact on competitiveness;

H1: The exploitation of Big Data allows the increase of the tourist activity;

H2: Big Data influences the strategic positioning of Morocco in the sector on a global scale.

	Statistique	Erreur std	Bootstrap ^a			
			Biais	Erreur std	Intervalle de confiance à 95%	
					Inférieur	Supérieur
% of internet users (World)	N	5	0	0	5	5
	Minimum	28,70				
	Maximum	39,70				
	Moyenne	33,6000	,0000	,0000	33,6000	33,6000
	Ecart type	4,11400	,00000	,00000	4,11400	4,11400
	Asymétrie	,574	,913	,000	,574	,574
	Kurtosis	,703	2,000	,000	,703	,703
Nbr.tourists	N	5	0	0	5	5
	Minimum	9288000				
	Maximum	10282944				
	Moyenne	9666788,80	,00	,00	9666788,80	9666788,80
	Ecart type	463022,080	,000	,000	463022,080	463022,080
	Asymétrie	,735	,913	,000	,735	,735
	Kurtosis	-2,458	2,000	,000	-2,458	-2,458
Travel revenues	N	5	0	0	5	5
	Minimum	57614				
	Maximum	64226				
	Moyenne	60571,80	,00	,00	60571,80	60571,80
	Ecart type	2831,262	,000	,000	2831,262	2831,262
	Asymétrie	,105	,913	,000	,105	,105
	Kurtosis	-1,860	2,000	,000	-1,860	-1,860
TTCI	N	5	0	0	5	5
	Minimum	3,80				
	Maximum	4,08				
	Moyenne	3,9220	,0000	,0000	3,9220	3,9220
	Ecart type	,12931	,00000	,00000	,12931	,12931
	Asymétrie	,301	,913	,000	,301	,301
	Kurtosis	-2,623	2,000	,000	-2,623	-2,623
N valide (listwise)	N	5	0	0	5	5

a. Sauf avis contraire, les résultats du bootstrap sont basés sur 1000 échantillons de bootstrap stratifié

		Years	% Population	Nbr Tourists	Travel Revenues	TTCI
Years	Corrélation de Pearson	1	,993**	,933**	,957**	-,795
	Sig. (bilatérale)		,000	,000	,000	,059
	N	10	10	10	8	6
% Population	Corrélation de Pearson	,993**	1	,917**	,962**	-,809
	Sig. (bilatérale)	,000		,000	,000	,051
	N	10	10	10	8	6
Nbr Tourists	Corrélation de Pearson	,933**	,917**	1	,887**	-,941**
	Sig. (bilatérale)	,000	,000		,003	,005
	N	10	10	10	8	6
Travel Revenues	Corrélation de Pearson	,957**	,962**	,887**	1	-,512
	Sig. (bilatérale)	,000	,000	,003		,299
	N	8	8	8	8	6
TTCI	Corrélation de Pearson	-,795	-,809	-,941**	-,512	1
	Sig. (bilatérale)	,059	,051	,005	,299	
	N	6	6	6	6	6

** La corrélation est significative au niveau 0.01 (bilatérale).

5.1 Analysis

The methodology followed to obtain the results mentioned above "DATA ANALYSIS TABLE" is based on a study of quantitative variables with SPSS software.

. First, the consumption of the Internet in the world presents an average of 33.6%.

$$x'' - 2\sigma = 33,6 - 2 * 4,11 = 25,38\%$$

$$x'' + 2\sigma = 33,6 + 2 * 4,11 = 41,82\%$$

95% of the countries on the world have a population that varies between 25.38% and 41.82% using the internet.

Since we have a skewness >0 so the distribution spreads to the right of the mean.

The asymmetric analysis of the set of variables following the coefficient results shows that it is superior than 0, so the first hypothesis is rejected.

However, the Kurtosis coefficient is negative for all the three variables: number of tourists, total revenues, the TTCI, which shows that the distribution is less flat except for the total percentage of internet users in the world.

For the correlation we can see that the variables are well correlated except for the values of TTCI that we will explain in the following points:

-The variables are well correlated with each other following the results of the correlation table where all the variables analyzed determine the competitiveness of Morocco as a tourist destination. For example, the increasing index of the use of the internet in the world explains perfectly the increase in the flow of tourists to Morocco as well as the total income. These three variables are perfectly correlated with each other where $r > 90\%$. In addition, the Travel & Tourism Competitiveness Report 2019 stated that Morocco has the highest TTCI scores in the MENA region on natural resources, best enabling environment, infrastructure, and tourism services infrastructure in North Africa. Although Morocco dropped one rank from 2017, the report called it an improved country in terms of the "pillars" of business environment and air transport.

The positive results of the degree of impact of the use of big data in competitive performance were well presented by the empirical analysis (Part 3) to present how today's new technologies with the different forms taken, can only push a country such as Morocco which is recognized as a tourist destination to transit to a phase of a smart destination that exploits all the big data in terms of information related to the requirements of the tourism sector as well as need of the tourists.

6. CONCLUSION

The objective of this study is to examine how the digital traces of tourists are tracked in order to know to what extent the data presented on the internet modify and orient the perception of tourists and influence their behavior. GIS can facilitate the planning of tourism activities. More and more Internet sites allow access to databases of attractions and geolocalized tourist packages and promote a more sustainable tourism development by allowing the evaluation of the environmental impacts potentially generated. In particular, they allow the identification of high-risk areas with a high ecological value as well as the identification of cultural heritages to be preserved. Geographic information systems can also be used to measure the impacts of tourism by allowing a comparison of the pre-development state with the resulting state. It is thus possible to avoid reproducing development errors that may have been made.

REFERENCES

Boes, K., Buhalis, D. and Inversini A., 2015, Conceptualising Smart Tourism Destination Dimensions. in *Information and Communication Technologies in Tourism*, Springer. pp 391-403.

https://www.researchgate.net/publication/272576525_Conceptualising_Smart_Tourism_Destination_Dimensions
Ulrike Gretzel; Marianna Sigala; Zheng Xiang; Chulmo Koo.; 2015, smart tourism : foundations and evolution, Researchgate, pp 3-5.

https://www.researchgate.net/publication/280719315_Smart_tourism_foundations_and_developments

Aguiar A. B., Szekut A., 2015, Big data and tourism: Opportunities and application in tourism destination management, *Applied tourism*, pp 36-42.

Guilarte Y. P., Quintans D.B., 2019, Using Big Data to measure tourist sustainability : Myth or Reality, *MDPI* (2019), pp 1-19.

M.Sajid Khan, Mina Woo Kichan Nam, and Prakash K. Chathoth., 2017 Smart City and Smart Tourism: A Case of Dubai, *MDPI*, pp 1-24.

Koo, C.; Park, J.; Lee, J., 2017 Smart tourism: Traveler, business, and organizational perspectives, *Inf. Manag.*, pp54, 683–686.

The Travel & Tourism Competitiveness Report (200-2019), *WORLD ECONOMIC FORUM*.

Activity Report 2020-Ministry of the Economy, Finance and Administration Reform/Financial Studies and Forecasting Directorate.

Cornelia L. Hammer, Diane C. Kostroch, Gabriel and STA Internal Group., September 2017, Big Data: Potential, Challenges, and Statistical Implications". *IMF*.

[https://databank.worldbank.org/metadataglossary/sustainable-development-goals-\(sdgs\)/series/TT.NET.USER.ZSBakshi](https://databank.worldbank.org/metadataglossary/sustainable-development-goals-(sdgs)/series/TT.NET.USER.ZSBakshi),

K., 2012, Considerations for Big Data: Architecture and Approaches. In: *Proceedings of the IEEE Aerospace Conference*, pp. 1–7

BUHALIS, D. & AMARANGGANA, A., 2014 ,Smart tourism destinations. In XIANG, Z., TUSSYADIAH, L. (Eds.), *Information and communication technologies in tourism*, pp 553-564. New York : Springer.

HUANG, X, K. YUAN, J, Z., SHI, M. Y., 2012, Condition and key issues analysis on the smarter tourism construction in China, - WANG F.L. LEI, J. LAU, R.W.H. & ZHANG J. (eds) *Multimedia and Signal Processing. CMSP 2012. Communications in Computer and Information Science*, 346. Berlin : Springer, 444-450.

CHIAPPA, G. D., BAGGIO, R. (2015). Knowledge transfer in smart tourism destinations: Analyzing the effects of a network structure, *Journal of Destination Marketing & Management*, 4(3), 145-150.

GRETZEL, U. ZHONG, L., KOO, C. 2016,

Application of smart tourism to cities, *International Journal of Tourism Cities*, pp 1-4.

World Bank (Citing: International Telecommunication Union, *World Telecommunication/ICT Development*, 2012-2019

National dashboards ,Number of tourists arriving in Morocco (2010-2019).

<http://www.observatoiredu tourisme.ma/tableaux-de-bord-nationaux/>

Social Media use around the world : <http://world-statistics.org/> (Accessed on : 15 Mai 2021)

<https://mtataes.gov.ma/fr/tourisme> (Accessed on : 21 Mai 2021)

<https://data.worldbank.org/indicator/IT.NET.USER.ZS?locations=MA>

(Accessed on : 21 Mai 2021)

Nawsher Khan and al., Big Data: Survey, Technologies, opportunities, and Challenges. The Scientific World journal, 2014

Tourism Geography: Emerging Trends and Initiatives to Support Tourism in Morocco- Steenbruggen, J Tourism Hospit 2016, 5-3

Hall CM (2005) Reconsidering the geography of tourism and contemporary mobility. *Geographical Research*, 43(2), 125-139.

Minca C (2006) Re-inventing the Square: Postcolonial geographies and tourist narrative in Jamaa el Fna, Marrakech, in: *Travels in paradox: remapping tourism*, Claudio Minca and Tim Oakes pp: 155–184.

Butler RW (2004) Geographical research on tourism, recreation and leisure: origins, eras and directions. *Tourism Geographies* 6: 143-62.

Mitchell LS, Murphy PE (1991) Geography and tourism. *Annals of Tourism Research* 18: 57-70.