DOS ALGARVES
TOURISM, HOSPITALITY & MANAGEMENT JOURNAL

Movie-Induced Tourism: New Zealand and the UK, an EEG case study

Turismo Cinematográfico: Nova Zelândia e Reino Unido, um caso de estudo de EEG

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Abstract

This study on film tourism aims to evaluate the impact of films on the attractiveness of tourist destinations, namely on the intention of spectators to visit, leading to the following research question: Which film/country arises the greatest interest in visitors, and which could subsequently be presented as an example to be used in project design? To that end, two destinations represented in three fantasy genre sagas were selected: The United Kingdom and the *Harry Potter* films, and New Zealand and *The Lord of the Rings* and *The Hobbit* films. The instruments used for data collection were an EEG study where six variables were analysed (involvement, stress, interest, focus, excitement, and relaxation), a questionnaire and a survey. The results showed a strong relationship between all variables, and the chosen destination for a remote tourist experience was New Zealand with the Lord of the Rings and The Hobbit sagas.

Keywords: Movie-induced tourism; *Harry Potter*; UK; *Lord of the Rings*; New Zealand; EEG.

Resumo

Este estudo sobre turismo cinematográfico tem como objetivo avaliar o impacto dos filmes na atratividade dos destinos turísticos, nomeadamente na intenção de visita dos espectadores, levando à questão de partida: Que filme/país desperta maior interesse nos visitantes, e qual poderá posteriormente ser apresentado como um exemplo a ser usado na conceção do projeto? Deste modo, foram selecionados dois destinos representados em três sagas do gênero fantasia: Reino Unido e os filmes do *Harry Potter*, e Nova Zelândia e as trilogias *O Senhor dos Anéis* e *O Hobbit*. Os instrumentos utilizados para a recolha de dados foram um estudo EEG onde foram analisadas seis variáveis (*envolvimento, estresse, interesse, foco, excitação* e *relaxamento*), um questionário e um inquérito. Os resultados mostraram que existe uma forte relação entre todas as variáveis, sendo que o destino escolhido para uma experiência turística remota foi a Nova Zelândia com as sagas *O Senhor dos Anéis* e *O Hobbit*.

Palavras-chave: Turismo cinematográfico; *Harry Potter*; Reino Unido; *O Senhor dos Anéis*; Nova Zelândia; EEG.

Dos Algarves: Tourism, Hospitality and Management Journal, 42-2022.
ISBN 2182-5580 © ESGHT - University of the Algarve, Portugal.

To cite this article: Neves, I. & Almeida, N. (2022). Movie-induced tourism: New Zealand and UK, an EEG case study. *Dos Algarves: Tourism, Hospitality and Management Journal*, *42*, 99-120. https://doi.org/10.18089/DAMeJ.2022.42.6

1. Introduction

Several destinations promote their image through film, and many studies in recent decades have been dedicated to analysing the impacts of cinematographic tourism in a particular shooting location (Beeton, 2006; Croy & Heitmann, 2011; Fu, 2014; Macionis, 2004; Riley, Baker, & S.Van Doren, 1998).

Based on an end-of-course research project report, this study continues the work started by these authors. Using the Electroencephalography method (a neuromarketing technique that measures people's brain activity) and crossing its results with a survey, this investigation aims to assess the impact of films on the attractiveness of tourist destinations, namely on the visit intention raised through the measurement of viewers' level of emotion while viewing two short clips of videos promoting filming locations for different films: Harry Potter (UK) and The Lord of the Rings/The Hobbit (New Zealand). Thus, it is intended to identify the film/country that fosters the greatest interest in visitors and can later be presented as an example to use in a remote film tourism experience.

In this context, the methodological approach is a pioneer; therefore, this investigation fills a gap in this research field.

2. Literature review

2.1 Movie-Induced Tourism

One of the biggest concerns related to tourism is to understand what leads tourists to travel, what motivates them the most, and what socio-psychological factors lead them to choose to leave their comfort zone, whether recreational, personal satisfaction (Chon, 1989), professional, sports (Kurtzman & Zauhar, 2005), among others. Crompton (1979), Dann (1977) and Maslow (1954) were some of the first scholars to analyse the personalities and motivations of tourists.

Cohen (1986) explored the influences of film production on tourist destinations, stating that film productions could promote the demands of tourism and that film marketing should serve as a strategy for the tourism marketing of destinations. The identification of locations that have served as the stage for filming movies or series has thus become a contemporary leisure activity, assisted by promotional material and the marketing efforts of local authorities (Macaskill, 1999). From this new trend the concept of Movie Induced Tourism was born, coined by Riley, Baker & Van Doren (1998).

Over the years, different definitions have emerged for this form of tourism, including Movie-induced Tourism (Riley et al., 1998), Media-related Tourism (Busby & Klug, 2001), Film Tourism (Beeton, 2005), Film-Induced Tourism (Hudson & Ritchie, 2006), Cinematic Tourism (Tzanelli, 2007), Set-jetting Tourism (Grihault, 2007), Screen-tourism (Connell & Meyer, 2009) and Popular Media-induced Tourism (Yen & Teng, 2015), to transport the tourist from viewing a film to the filming location. The tourist started to reveal close connections between what is seen on TV and the decisions made when travelling.

At the end of the 20th century, the academic literature began to devote more attention to this form of tourism (Beeton, 2006), since in this industry, more and more tourists seek to visit destinations that were part of some cinematographic work and that are not directly related to the tourism promotion of Destination Management Organisations (DMOs). This is

a new form of cultural tourism called film-induced tourism that, due to the lack of knowledge and understanding of the benefits of cinema in tourism, still receives little attention from academia and professionals (Rewtrakunphaiboon, 2009).

2.1.1 Impacts of Movie-Induced Tourism

Movie Induced Tourism is increasingly used as a tool capable of captivating and attracting tourists to destinations causing socio-cultural, economic and environmental impacts both on localities and residents (Hudson & Ritchie, 2006; Riley et al., 1998; Tooke & Baker, 1996). Films such as *Gone with the Wind* (1939), *The Quiet Man* (1952), *Crocodile Dundee* (1986) and *Braveheart* (1995) were the first to be highlighted as highly successful films capable of influencing destination brand awareness and tourism flows (Carvalho, 2013).

The tourism impacts created by the films are varied. While some locations have benefited from economic windfalls, others point out safety concerns and overcrowding (Riley et al., 1998). Busby & Klug (2001) mention economy, environment, property values, visitor flow, multiplier effect, infrastructure, and destination image as some potential positive impacts of this type of tourism, but also potential negative impacts on environment, traffic, infrastructure, heritage, culture, privacy, economy, property values, visitor experience and host community.

2.1.1.1 Benefits

As in most tourist destinations, the destinations searched and visited with film-related motivations may incur a set of impacts resulting from the increasing demand.

Figure 1. Lord of the Rings Movie Set

Source: Active Adventures (n.d.)

Figure 2. Mount Ngauruhoe: Mount Doom

Source: Orme (n.d.)

The filming location of a particular film is inevitably associated with cinema, becoming a marketable product by attracting fans from around the world. Several benefits arise from this flow of tourists, such as the increase of tourism in the place in question and, consequently, the development of the economy and the support of tourism infrastructures (Nunes & Carvalho, 2015), as it is the case with the *Lord of the Rings* trilogy. This trilogy not

only exposed New Zealand to a global audience of potential tourists but also made it an icon of the landscapes of the films (Figures 1 and 2) by being promoted as the "Home of Middle-Earth", which gave rise to the development of the national airline that called itself the Company for Middle Earth (Carl, Kindon, & Smith, 2007).

One of the most significant advantages of film tourism is its ability to combat seasonality since it is a type of tourism that occurs all year round and regardless of the weather. An example of this is the attention drawn to Forks (Washington, USA) after the release of the vampire film *Twilight* (2008). With a population of just over three thousand inhabitants, the small town saw a 1000% increase in visitors despite being known for its long cloudy and rainy periods (Farnham, 2013).

The TV series *Outlander* (2014 - present), based on the books by Diana Gabaldon, has become a phenomenon in recent years for its plot, characters and landscapes from the Highlands in Scotland. The 200-member *Outlander* team obtained permission to build their studio in the region, and during the weeks of filming the first season of the series, between 2013 and 2014, they contributed £20 million to the country's economy (Garavelli, 2014). According to VisitScotland (2019), the 2017 summer season also increased visits to sites used as filming locations in the series. For example, Blackness Castle recorded a 72% increase between June and September, as well as Doune Castle, which registered a 50% increase over the same period in 2016 (Potočnik-Topler & Špenko, 2019).

Figure 3. Game of Thrones | Dubrovnik

Source: King's Landing Dubrovnik (n.d).

Another example is the TV series *Game of Thrones*, which was particularly popular in the UK (Figure 3). The increasing number of British tourists in Dubrovnik (one of the famous filming locations in Croatia) was felt quickly, rising from 87000 tourists in 2011 to 123000 in 2012 (the release year of the series' second season). According to the findings, this also had an impact on other cities in Croatia, since tourism increased by about 2.6% between 2007 and 2011 (the period before the series) and 25.2% between 2011 and 2015 (the period of filming of the series in Croatia), as well as the number of overnight stays that increased from 7.8% to 18.6%. Assessing the cumulative effect of tourism in Dubrovnik and on the economy, the tourism motivated by the series proved to be a stabilising factor for the country's economy, which

contributed positively to an increase in jobs and proved to be the only sector where investment did not decrease (Tkalec, Zilic, & Recher, 2017).

Table 1. Impact of a film/TV series on the number of visitors

Film	Location	Impact of visitor number
Braveheart	Wallace Monument, Scotland	300% increase a year after the release
Captain Corelli's Mandolin	Cephalonia, Greece	50% increase
Field of dreams	Iowa	35.000 visits in 1991 and a steady increase every year
Four Weddings and a Funeral	The Crown Hotel, Amersham, England	Fully booked for at least three years
Harry Potter	Various locations in the UK	Increase of 50% or more in all filmed locations
Mission Impossible 2	National Park, Sydney	200% increase in 2000
Notting Hill	Kenwood House, England	10% increase in one month
Pride and Prejudice	Lyme Park, England	150% increase
Sense and Sensibility	Saltram House, England	39% increase
The Beach	Thailand	22% increase in youth market in 2000
Troy	Canakkale, Turkey	73% increase

Source: Hudson & Ritchie (2006).

Table 1 shows some of the impacts of the films in their respective filming locations. In the UK, *Pride and Prejudice* increased visitor numbers at Lyme Park by 150%, and the Wallace Monument in Scotland, after the release of *Braveheart,* registered a 300% increase in visitors. The famous *Harry Potter* franchise yielded a 50% or more increase in tourist numbers at all filming locations for the films, and The Crown Hotel in Amersham was fully booked for at least three consecutive years after the release of *Four Weddings and a Funeral*.

2.1.1.2. Challenges

However, there are challenges in the increased flow of tourists. The rapid success of a destination associated with a film and the tourists increase can overload the daily lives of those who live there already since communities are not always prepared to live with this increase in visitors and the changes associated with this new context (Connell, 2012).

Mordue (1999, 2001) analysed the early impacts of the *Heartbeat* TV series on the small UK village of Goathland, where it was mostly filmed, and concluded that many residents were negatively affected by the increased number of tourists and the high exposure of the small village, giving rise to symbolic conflicts between the traditional community identity of Goathland and the virtual identity created in the television series.

In addition to social impacts, physical and environmental impacts may also occur due to a high and constant flow of visitors to a film destination. One of the most frequent examples is the film *The Beach* (2000), starring Leonardo DiCaprio and set in the Phi Phi islands in Thailand. After the film's release, the number of tourists increased by 22% in the first

year (Hudson & Ritchie, 2006), leading to adverse environmental and social impacts, which required the development and implementation of a sustainability plan. So, to overcome problems of "over-tourism" and degradation of the marine ecosystems, Maya Bay has been temporarily closed (Koh & Fakfare, 2020).

2.1.2 Authenticity and reality

Authenticity is conceived as a negotiable rather than primitive concept, the rigour of its definition by subjects depending on the mode of their aspired touristic experience (E. Cohen, 1988). Dean (1973) found a significant positive impact between the authenticity of intangible cultural heritage (ICH) and the satisfaction of ICH tourism.

Cinetourists judge real landscapes in conformity with those in films, and, typically, the greater the similarity between real and hyper-real landscapes in films, the more expectations are met or exceeded and the greater the satisfaction of visitors (Carl et al., 2007). Real landscapes are those which effectively correspond to the idea previously created when watching a film (Buchmann, Moore, & Fisher, 2010). In contrast, hyper-real landscapes correspond to hyperbolised landscapes, related to exaggeration and transport to images of grandeur and spectacularity and endowed with few real images (Eco, 1983).

Table 2. Displacement film tourism (examples)

Film title	**Film location**	**Film setting**
Braveheart (1995)	Ireland	Scotland
The Last Samurai (2003)	New Zealand	Japan
Cold Mountain (2003)	Romania	USA
Saving Private Ryan (1998)	Ireland	France
A Fistful of Dollars (1964)	Spain	USA
Gangs of New York (2002)	Italy	USA
King Arthur (2004)	Ireland	England
Seven Years in Tibet (1997)	Argentina	Tibet
The Count of Monte Cristo (2002)	Ireland	France/ Italy
Waking Ned (1994)	Isle of Man	Ireland
Batman Begins (2005)	England	USA
Excalibur (1981)	Ireland	England
Memoirs of a Geisha (2005)	USA	Japan
The Spy Who Carne in From the Cold (1965)	Ireland	East Germany

Source: Bolan *et al.* (2011).

There are various antecedents and consequences of customer satisfaction/dissatisfaction in tourism and hospitality businesses (Dean, 1973). Riley et al. (1998) mention that when films take place in a different location from the destination portrayed on the big screen, problems may arise because visitors do not find what they saw, generating dissatisfaction. Table 2 presents some examples where the filming location does not correspond to the location of the film action, such as *Gangs of New York* (2002) shot in Italy, but portraying places in the USA, or even Ireland that often ends up being the stage of several film scenarios around the

world: *Braveheart* (1995), *Saving Private Ryan* (1998), *King Arthur* (2004), *The Count of Monte Cristo* (2002), *Excalibur* (1981) and *The Spy Who Came Out of the Cold* (1965).

To Bolan et al. (2011) the issues of displacement (filming location vs action location) and authenticity are something important for film tourists, which often results in three types of tourists: (a) the ones who ideally visit both the filming location and the action location, (b) the ones who prefer to visit only the action location and (c) the tourists who prefer to visit only the filming location.

The effects of post-production and the lack of some sets also present challenges in the perception of the place, creating difficulties for some tourists in terms of how they experience the landscapes; therefore, tour guides play a crucial role in understanding them by integrating stories about the challenges of filming, thus facilitating the authenticity of the experience (Carl et al., 2007).

2.2 Neuromarketing

Neuromarketing is an interdisciplinary field where marketing, neurology, sociology and psychology can work together (Yücel et al., 2015). It employs brain imaging and measurement technologies to record consumers' (or the brains') responses to marketing stimuli and circumvents the problem of relying on consumers' self-reports (Brenninkmeijer, Schneider, & Woolgar, 2019).

When contrasting classic tourism market research methods with neuromarketing, the focus of the latter is primarily on the tourist's subconsciousness (Šerić, Jurišić & Petričević, 2015). Neuromarketing contributes to revealing tourists' implicit emotional responses that affect subsequent decision-making process. Therefore, neuromarketing research can increase tourism competitiveness by providing data to conduct more efficient campaigns (De-Frutos-Arranz & López, 2022). According to Ali Gaafar & Al-Romeedy (2021: 20), this field is an important method to explain and understand tourists' behaviour, having the ability to imaging tourists' subconscious minds, which allows DMOs to identify tourists' needs and factors that trigger their purchasing decision behaviour, and in consequence, create more satisfying products/services, and design more efficient marketing strategies that improve destination competitiveness.

Depending on the research questions raised by the parties, the studies are designed to measure, using the instruments most suited to the needs, considering their advantages and disadvantages (Guedes, 2020). The five most prevalent instruments/techniques in Neuromarketing studies are: (1) PET - positron emission tomography, (2) MEG - magneto encephalography, (3) FMRI - functional magnetic resonance imaging, (4) EEG electroencephalography and (5) ET - Eye Tracking (Rabiul *et al.*, 2015).

2.2.1 EEG technique

EEG (electroencephalography) is one of the techniques drawn from cognitive neuroscience used in neuromarketing to measure brain activity and record consumers' responses to marketing stimuli. This EEG is a great tool for studying the neurocognitive processes underlying human behaviour (Cohen, 2011), as it directly measures neural activity, monitors cognitive-affective processing without behavioural responses, while being inexpensive,

lightweight and portable (iMotions, 2019). EEG systems use sensors (electrodes) attached to the scalp to capture the electrical potentials generated by the brain (iMotions, 2019).

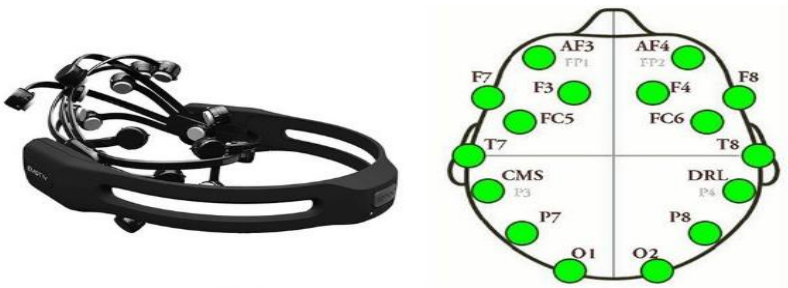
Neuromarketing, in particular EEG, is a valuable tool for evaluating the effectiveness of destination marketing, and according to Bastiaansen *et al.* (2018) popular movies can positively influence affective destination image. Boksem & Smidts (2015) presented one of the first studies to use the EEG technique to analyse people's brain response to different trailers to provide insight into participants' individual preferences and movie sales in general population. Zhu & Wu (2021) were the first to undertake an EEG study to study movie casts, and their findings show that the willingness of audiences to watch a movie is deeply affected by actor types in patriotic films.

Among the successes of neuroscientific studies is the case study of Christoforou, Papadopoulos, Constantinidou & Theodorou (2017). They demonstrate that neuroscience metrics obtained while people watch movie trailers can predict the commercial success of a given film and explain a significant percentage of the variability in box office sales.

2.2.2 EMOTIV-EPOC+

The EMOTIV-EPOC+ (Figure 4) is a portable EEG device (Lang, 2012; Osama & Aslam, 2020) which takes advantage of the particular characteristics of each electrical signal produced in the brain to process the information coming from them in order to identify some processes, such as emotions, cognitive analysis and some facial expressions (Moreno, Peña, & Gualdrón, 2014). Two reference channels, plus 14 EEG channels, are positioned according to the 10-20 system in CMS (Common Mode Sense) and DRL (Driven Right Leg) and AF3, AF4, F7, F3, F4, F8, FC5, FC6, T7, T8, P7, P8, O1, O2. The device also includes gyroscopes to monitor head movement (X and Y axis) (Hazrati & Hofmann, 2013).

Figure 4 - EMOTIV-EPOC+ device and location of its electrodes



Source: EMOTIV (n.d.)

The EEG signals are transferred from the Bluetooth to a computer and then decoded by the EmoEngine software, which processes the data, consisting of three brainwave processing suites: Expressiv (detects facial expressions), Affectiv (detects emotions) and Cognitiv

(recognises thoughts directly related to motor image formation) (Lang, 2012; Osama & Aslam, 2020).

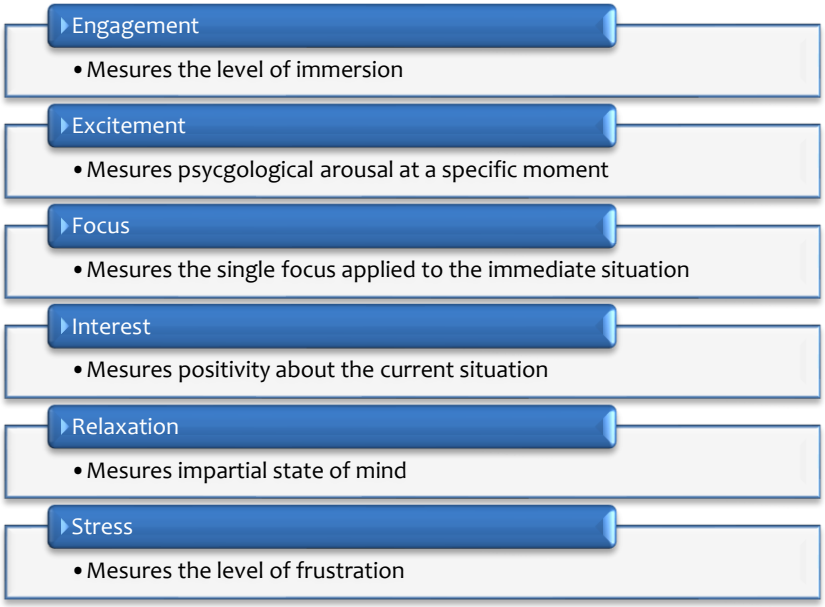
EMOTIV-EPOC+ measures six different cognitive states in real-time: Engagement, Excitement, Interest, Focus, Relaxation and Stress (iMotions, 2019).

3.Methodology

This study is hypothesis-testing research, and the EEG research is used to evaluate the effectiveness of tourist destination marketing in coupling a positive emotion to a destination.

In the digital age, technological innovation in visualisation is key to successful destination marketing (Choi, Hickerson, & Lee, 2018). Following this thought, a study was conducted using EEG to analyse participants' emotions towards two videos promoting tourism in the United Kingdom and New Zealand, through landscapes and tourist attractions that served as a backdrop to the *Harry Potter* films and the *Lord of the Rings*/*Hobbit* trilogies, respectively.

Figure 5. EEG study metrics



Source: Adapted from National Geographic (n.d.)

In the end, this EEG study was cross-checked with the answers to a survey, where the subjects were asked which of these two countries they would choose to visit if they had the opportunity to embark on a remote cinema tourism experience, among other aspects.

3.1 Hypothesis

Movie-induced tourism is a segment of the tourism market in which tourists travel to a place after seeing it in film production (Duarte & Fonseca Filho, 2016). In this way, and considering the six variables measured by the EMOTIV-EPOC+ device, the first hypotheses emerge:

H1: People who have often seen the movies of a given saga have higher levels of engagement (H1a); excitement (H1b); interest (h1c) about the video that represents that saga.

Shestyuk et al. (2019) examined whether TV audience and Twitter activity can be predicted using EEG measures. Their results revealed that the performance of TV programming depends on the audience's overall cognitive and emotional engagement with the programme content. Attention is necessary for the audience to be aware of the content, but emotional motivation is what will stimulate proactive engagement with the content. In this sense, hypothesis 2 arises:

H2: People who have already visited a particular country show higher levels of interest in the promotional video of that same place.

Tourists' emotional experiences are distinct from connection with nature and attachment to place (Qiu, Zhang, & Zheng, 2018). Film productions such as The Lord of the Rings and The Hobbit trilogies have renewed the sense of New Zealand as a fantasy realm and rekindled the romanticism fostered by 19th-century tourists, artists and writers. The films showed the spectacular scenery of New Zealand (Shih, 2018), and today, this sparsely populated mountainous country offers a range of mountain recreation opportunities, including skiing, alpine climbing, fishing, hiking and hunting (Booth & Cullen, 2001), giving origin to hypothesis 3:

H3: Of all the aspects inherent in the Lord of the Rings and Hobbit sagas, natural landscapes are the attributes that most people would most like to visit.

Heitmann (2010) suggests that film tourism overlaps with various other segments of tourism and that films can act as triggers for a particular genre and hence the type of tourism they represent, by pondering whether *Braveheart* (1995) and *The Lord of the Rings* (2001, 2002, 2003) induced nature tourists to visit the natural settings of Scotland and New Zealand respectively. In this sense, hypothesis 4 arises:

H4: People who choose New Zealand for a remote tourism experience consider themselves nature tourists.

Urban tourism can be defined as short-term visits to cities for spending holidays, learning more about the history and culture of the place, attending sporting or artistic events and taking advantage of shopping opportunities (Konakoglu & Kurdoglu, 2019). On the other hand, cultural tourism is defined as people travelling to cultural attractions outside their residence to gain new information and experiences to satisfy their cultural needs. Given that many of the filming locations of the *Harry Potter* saga took place in various historical monuments a bit throughout the UK, hypothesis 5 arises:

H5: People who choose the UK for a remote tourist experience consider themselves urban tourists.

3.2 Procedure

Firstly, two YouTube videos representing different landscapes from the United Kingdom and New Zealand selected as suitable to induce a good level of attention in the participants were previously downloaded and then edited and adapted to a duration of about one minute and a half with the addition of some subtitles.

The data collection process was carried out at CiTUR, a research centre unit at the Escola Superior de Turismo e Tecnologia do Mar (ESTM), Polytechnic of Leiria (Portugal). Fifteen individuals, students, and employees from this school participated in this study (twelve men and three women, mean age of 23 years).

Figure 6. Proposed algorithm

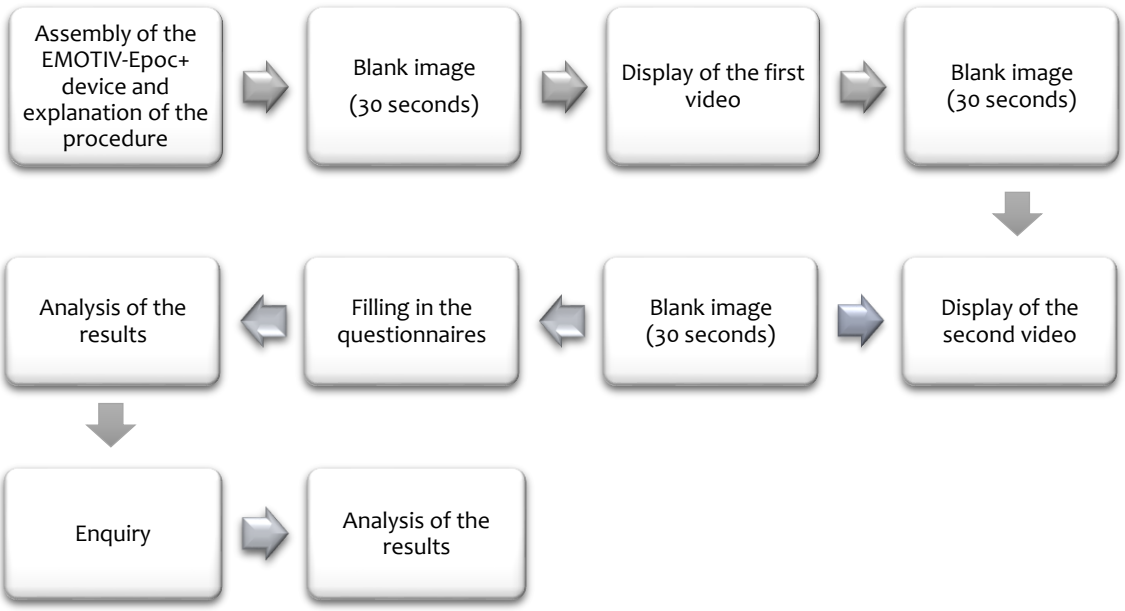


Figure 6 represents the ten steps of the proposed neuromarketing procedure. First, as soon as the participants arrived in the room, the EMOTIV-EPOC+ sensors were moistened, and the device was installed on the participants' heads while the whole study process was explained to them. After setting up the equipment, the participants were given a few minutes to settle and ensure that they felt as relaxed as possible before starting so as not to affect the study. Then a blank image was played for 30 seconds to neutralise the participants' emotional state before starting, between each video and at the end of the experiment. The first video concerned the *Harry Potter* films and was set against the backdrop of some locations in the United Kingdom. The second video compiled some of the most beautiful New Zealand

landscapes present in *The Lord of the Rings* and *The Hobbit* films, and it was commented on by the production team and some of the actors involved in the shootings. In the end, the participants were asked to complete a questionnaire where their answers were cross-checked with the EEG study.

Later a survey was applied to some participants to justify some EMOTIV-EPOC+ records. The fact that there were several subjects with higher averages in all variables corresponding to the first promotional video (United Kingdom) and electing New Zealand as the country they would like to visit in a remote tourist experience raised the first question: "(1) Do you consider yourself a nature tourist or do you prefer cities?"

During the EEG study, the onset of recording of some variables or even the highest peak of recording occurred in multiple subjects at three specific moments in the first promotional video, giving rise to the final three questions, "From the promotional video to the UK (about the *Harry Potter* saga) that you watched last week, what is your connection: (2) to Oxford University? (3) to Glenfinnan Viaduct? (4) to King's Cross Station?"

4. Results

The choice of non-probability convenience sampling resulted in a sample that was not very heterogeneous.

During the analysis of the EEG study and the individual responses to the questionnaire, several patterns were identified in some participants. The lack of justification regarding some peaks of the stress variable of some subjects concerning three moments of the United Kingdom promotional video (*Harry Potter*) and the annoyance with the country chosen in the questionnaire and the EEG results led to the need to carry out an a posteriori inquiry.

4.1 EEG Study

Firstly, to analyse the results of the EEG study, recordings were made every 10 seconds from each of the 6 variables during the total 270 seconds of the experiment for each of the 15 subjects. The values of every 10 seconds (in percentage) were transcribed to Excel, where the averages of each variable were calculated for each film. Interest was the only variable whose values were recorded from the first second to the last one by all subjects. Subjects 5, 6, 13 and 15 were the only ones to record all the variables from the beginning to the end of the test (Table 3).

Table 3. Average of each variable for each subject

	HP	HOB	HP	HOB	HP	HOB	HP	HOB	HP	HOB	HP	HOB
	Engagement		Excitement		Focus		Interest		Relaxation		Stress	
Subject 1	87	70	91	79			52	53	42			
Subject 2							78	75				
Subject 3	48	56	37	63			55	56	22	25		
Subject 4							71	60				
Subject 5	75	73	11	28	36	37	50	50	32	31	63	32
Subject 6	66	70	31	23	33	33	48	48	39	26	23	24
Subject 7							99	99				
Subject 8	65	64	10	16	25	27	49	51	28	29	22	21
Subject 9	54	50	80	64		47	53	60		49	82	16
Subject 10							92	51				
Subject 11	12	32	69	78			50	46			100	89
Subject 12	61	62	61	31		47	47	55		11	64	21
Subject 13	67	65	63	31	76	54	70	65	29	31	84	75
Subject 14			90	78			48	52		68		
Subject 15	52	48	30	19	50	45	62	61	17	14	44	41
Total	59	59	52	46	44	41	62	59	30	32	60	40

For the involvement variable, the average of both promotional videos was the same (59%). The excitement, focus, interest, and stress variables presented higher values in the UK promotional video (52%, 44%, 62% and 60%, respectively, compared to 46%, 41%, 59% and 40% in the New Zealand promotional video). Only the relaxation variable had a higher average for the New Zealand video (32% compared to 30% for the UK).

4.2 Questionnaire

The analysis procedure adopted in the quantitative phase of the research translated into a questionnaire that was divided into three parts: (I) The UK promotional video, (II) New Zealand promotional video and (III) remote film tourism experience. The questions were the same in parts I and II, although adapted to the films/countries in question. To analyse the questionnaire responses, when possible, these were converted into percentages for each film to facilitate comparison between them. Finally, the third part of the questionnaire was analysed.

The *Hobbit* and *The Lord of the Rings* have fewer views (40% of the subjects have never seen them) than *Harry Potter* (20% have never seen them).

None of the subjects who visited the United Kingdom (40%) and New Zealand (6.7%) had the films as inspiration for these trips. Those who have visited the UK mainly chose castles and fortresses (33%) as well as mountains, lakes and parks (33%) as the attractions they wanted to visit the most during their trips, with filming locations for films and museums

being chosen by 17% of respondents (each). In New Zealand, mountains, lakes and parks were the ones elected by the only subject who visited the place.

To analyse some variables included in this questionnaire, a Likert-type scale was used, as it allows respondents to express their degree of agreement or disagreement (Churchill, 1999), the features capable of motivating them to visit the locations addressed in these films, which is appropriate to the objective of the quantitative research.

To this question, the subjects highlighted the natural landscapes in New Zealand, however regarding the UK, they were very linear in their answers and highlighted both aspects inherent to the films (theme and plot) and the natural landscapes, cultural aspects (religion, customs, among others) and cultural heritage.

In the third part of the questionnaire, when faced with the possibility of a remote tourism experience, 67% of the subjects elected New Zealand as the place they would like to visit, 27% chose the United Kingdom and 6% Japan.

4.3 Hypothesis Testing

Considering that the sample of this research consisted of 15 subjects and, for small samples, the most usual is the confidence interval for the mean (Ferreira, 1999), a confidence level of 90% was defined.

Table 4. Involvement, excitement and interest vs number of views for each saga

	HP	HOB	HP	HOB	HP	HOB	HP	HOB
	Engagement		Excitement		Interest		Number of views	
Subject1	87	70	91	79	52	53	≤11	1
Subject2					78	75	0	0
Subject3	48	56	37	63	55	56	6 to 10	≤11
Subject4					71	60	1 to 5	1 to 5
Subject5	75	73	11	28	50	50	1 to 5	0
Subject6	66	70	31	23	48	48	6 to 10	6 to 10
Subject7					99	99	6 to 10	≤11
Subject8	65	64	10	16	49	51	≤11	1 to 5
Subject9	54	50	80	64	53	60	1 to 5	1 to 5
Subject10					92	51	0	0
Subject11	12	32	69	78	50	46	1 to 5	1 to 5
Subject12	61	62	61	31	47	55	6 to 10	1 to 5
Subject13	67	65	63	31	70	65	6 to 10	0
Subject14			90	78	48	52	1 to 5	0
Subject15	52	48	30	19	62	61	0	0

Table 4 presents the averages of each subject for the variables "engagement", "excitement" and "interest" in each promotional video as well as the number of times each subject watched each of the sagas. Of the eight subjects who saw one saga more times than another (subjects 1, 3, 5, 8, 11, 12, 13 e 14), there was one (subject 7) who did not show a discrepancy in the values recorded for each of the variables, which is why it was not considered for the hypotheses H1a, H1b and H1c.

From the records of the seven subjects that present discrepancies in values, only one (subject 7) did not record the engagement variable and therefore was not considered for counting this variable either. Once only six subjects were considered and only 83% of whom presented higher levels of involvement for the saga they watched more times, hypothesis 1a is not verified.

For hypothesis 1b, only six subjects were also considered (one of the subjects did not present any record for this variable either) where only 83% agree with the hypothesis, so it is not verified.

In hypothesis 1c, seven subjects were considered, where only 29% presented higher values for the saga they saw more times, so this hypothesis is not verified.

Table 5. Subjects who visited the UK and/or New Zealand vs. level of interest

	United Kingdom video	**New Zealand video**	
	(Interest)		
Subject1	52	53	
Subject2	78	75	✓
Subject3	55	56	
Subject4	71	60	✓
Subject5	50	50	✗
Subject6	48	48	
Subject7	99	99	
Subject8	49	51	✓
Subject9	53	60	
Subject10	92	51	✓
Subject11	50	46	✓
Subject12	47	55	✗
Subject13	70	65	
Subject14	48	52	
Subject15	62	61	

Table 5 presents the average interest level of each subject for each promotional video. In green are the values of those who visited a particular country, and in red are the values of those who did not visit it. As it is possible to see in the table, of the seven subjects who visited

at least one of the countries (subjects 2, 4, 5, 8, 10, 11 and 12) related to the promotional videos, five show higher levels of interest in the promotional video of that same place (subjects 2, 4, 8, 10 and 11), one shows the same average for both videos (subject 5) and one of them shows higher levels of interest in the promotional video of the country he has not visited yet (subject 12). Thus, considering only 71% of the subjects agree with hypothesis 2, the same is not valid.

When the subjects had to rate the aspects capable of motivating them to visit the places covered in *The Lord of the Rings*/*The Hobbit* sagas on a scale from 1 to 5 (1 being very weak and 5 being very strong), ten of the subjects rated the natural landscapes in New Zealand as 5 and two of them as 4, so hypothesis 3 is verified.

Table 6. Type of tourism vs Country of choice

	Type of tourism		Country of choice	
	Nature	Urban	New Zealand	United Kingdom
Subject1		✓		✓
Subject2	✓		✓	
Subject3	✓		✓	
Subject4	✓		✓	
Subject5	✓		✓	
Subject6		✓	✓	
Subject7	✓			✓
Subject8		✓	Japan	
Subject9	✓		✓	
Subject10		✓	✓	
Subject11		✓	✓	
Subject12	✓			✓
Subject13	✓			✓
Subject14	✓			✓
Subject15		✓	✓	

As shown in Table 6, of all 15 involved in this test, 60% prefer nature tourism, while the remaining 40% prefer to do urban tourism. Out of the nine subjects who elected New Zealand for a remote tourism experience, only five (56%) of them consider themselves nature tourists, while the other four prefer to do urban tourism. Thus hypothesis 4 is not verified.

Out of the total number of subjects involved in this study, only five elected the United Kingdom for a remote tourism experience, and only one (20%) considers himself an urban tourist, so hypothesis 5 is not verified.

5. Findings and recommendations

Both scenarios shown in the videos have served as a backdrop for blockbuster films and within the same genre (adventure/fantasy), resulting from film adaptations of a series of

books by J. K. Rowling (Harry Potter) and J. R. R. Tolkien (Lord of the Rings and Hobbit). Thus, in the future, it would be appropriate to:

Assess the extent to which films in the adventure/fantasy genre stand out more from the rest and are potentially a better choice in terms of tourism.

A qualitative analysis of the EEG study allowed to verify that most of the subjects presented higher values in all the variables as soon as they viewed a specific scene of one of the videos to which they had an emotional connection: either because they remembered their childhood or they saw a place they would like to visit in the future, or even because they had already visited the place and it had been a disappointment. The subjects with no relation to the films always presented constant values for all the variables.

In the survey of the 15 participants, most subjects elected New Zealand for a remote tourist experience (67%). In contrast, only 27% of the subjects elected the United Kingdom and 6% Japan even though the EEG results showed higher values in almost all variables while watching the video related to the *Harry Potter* movies. The average level of involvement is the same for both promotional videos and, although the average psychological excitement, focus and interest decrease, the relaxation increases leading to the following recommendation: in a future study, different subjects to different videos lasting up to one minute to analyse how long their state of cognitive concentration lasts and whether it decreases over time, increasing the levels of relaxation.

The beginning of the recording of the variables "involvement", "excitement" and/or "relaxation", in some subjects, corresponds to the explanation about the Glenfinnan Viaduct and respective relation with the film. When asked about their relationship with this specific scene, only subject 11 said he had no connection with it, subject 1 said he had no relation and that he only remembered this scene because he had seen the films several times, while subject 12 showed interest in visiting this place and crossing this bridge by train (this moment also coincided with a peak of the stress variable).

Subject 9 also reached a peak in the excitement variable at this moment of the Glenfinnan Viaduct and promptly explained that when he was a child, he had a blue car where he could see Harry Potter and Ron Weasley (characters from the films) inside. Also, at this moment, the stress variable starts to be registered, reaching its highest peak in the next 10 seconds, which still coincides with the explanation of this scene. Again, in the same promotional video, when the King's Cross Station appears, this same subject reached a high value of the excitement variable, explaining that his attachment to this place is due to several people playing with crossing through the wall and making videos going against a wall in the hope of crossing it through towards "another world".

Subject 13 claimed to have a particularly special attachment to the Hogwarts library represented in the films through Oxford University due to its aesthetic beauty, corresponding to the second 50. At this moment, excitement and interest began to be recorded, as well as the highest peak of the stress variable.

Subject 11 also had a stress peak during the explanation about King's Cross Station, lasting for the next 30 seconds on a blank screen. When asked about his connection to King's Cross Station, the subject replied that "I visited the place when I was studying in England, and at the time, I had very high expectations because there was all that mystique of the film

which already has immense magic and brilliance, and when I got there, I came across the obvious, a normal train station". He also added that during the next seconds he could not concentrate on the video because he recalled his tourist experience, which justifies the prolongation of the maximum levels of the stress variable during the blank screen. Since the stress variable measures the level of frustration, and several subjects show high values of it when viewing a particular scene with which they feel emotionally involved, it is essential to:

Repeat this study, to a controlled sample, firstly to people who have already visited the filming locations of the sagas to understand if a high level of stress always translates this condition, and secondly to people who have never visited but are fans of one of the sagas and would like to make this trip.

Although the sample is not significant, there is a pattern that leads one to believe that when the subject has a special attachment to a particular scene in a film or location, there is a relationship between the variables engagement, excitement, interest and stress. To corroborate this assumption comes the last recommendation:

Repeat this study in a larger sample and with more people who have visited the filming location of the different sagas, especially in New Zealand, as only one of the fifteen subjects has visited the location.

6. Conclusion and Limitations

The main objective of this investigation was to understand which film/country is most suitable for a remote film tourism experience, and throughout this research, several topics related to film tourism were addressed, as well as EEG, a neuromarketing technique used in this study.

To understand the brain activity of the fifteen people involved, seven hypotheses (h1a, h1b, h1c, h2, h3, h4 and h5) were created, whose answers resulted from a cross-reference of data between the EEG technique and a questionnaire. Regarding the hypothesis, apart from hypothesis 3, none of the others is verified.

Even though the EEG showed higher levels of engagement, excitement, and interest in the UK (Harry Potter) promotional video, the difference is not significant. Analysing the questionnaire, most respondents elected New Zealand (Hobbit/LOTR); therefore, New Zealand is the answer to the main research question "Which film/country arises more interest in visitors, and which could subsequently be presented as an example in project design?"

Concerning the EEG study, the reduced sample and the convenience sampling have generated a strong bias in gender (masculine), which is one of the most significant limitations of this research. Also, some missing data led to the exclusion of a part of the already limited sample, compromising the results' veracity.

Despite that, there were no ethical issues involved in this study. The present research represents a unique approach to researching film tourism motivation so that it can be a good starting point for future research involving this field and neuromarketing techniques.

DMOs to integrate neuromarketing into their strategies to create smart promotional content and thus optimise their resources. The EEG technique can be a great tool to study a film's potential to promote a specific territory and understand the best marketing strategies to be applied, but it can also be applied in other fields of tourism or sciences.

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Este trabalho é financiado por fundos nacionais através da FCT – Fundação para a Ciência e a Tecnologia, I.P., no âmbito do projeto referência n.º UIDB/04470/2020.

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Submitted 22 March 2022
Accepted 1 August 2022