

Neurotourism: A paradigm shift in travel on the intersection of e-tourism and neuroscience

EMESE PANYIK * [epanyik@braga.ucp.pt]

JOSÉ GONÇALVES ** [josevalegoncalves@ua.pt]

Keywords | Neurotourism, neuroscience, artificial intelligence, brain, memories, tourism experience

Abstract | This paper aims to reflect on and reinterpret a recently coined concept, namely *neurotourism*, by applying the actual and future convergence of Information and Communications Technology and neuroscience to the area of tourism. Current interpretation of the concept suggests that neurotourism explores the neural mechanism underlying tourists' behaviors and emotions in order to measure tourist satisfaction and revisiting intention. As opposed to this conceptualisation we offer a different approach drawing on current advancements in the key underlying areas. In particular, we argue that neurotourism goes beyond being merely an applied neuroscience tool in tourism management. This is because Augmented Reality and Virtual Reality technologies, using wearables, are likely to be only transitional in the delivery of the tourist experience. Actual developments reveal the advent of implemented technology by merging Artificial Intelligence and the human mind (See: Neuralink). Thus, the convergence of neuroscience and e-tourism will potentially lead to the creation of the tourist experience through the implementation of sensations and emotions directly to the neural system. Neurotourism in this sense will be a new form of tourism understood as implemented neural experience. Today, evidence shows for the first time ever that new memories can be created by direct cortical manipulation. Telepathy, the direct and non-invasive brain-to-brain communication in humans, is viable. The understanding of virtual reality, on the other hand, is drifting from a merely technological dimension towards the human experience, interpreted as the perception of the physical environment mediated by both automatic and controlled mental processes. Experiences are essential to the tourism industry and the current trends of intense technology implementation coupled with co-creation have led to the transformation of conventional experiences and paved the way towards artificial experience enhancement, in which technology can function either as a mediator or as the core experience itself. Within this context, the present paper considers the latter scenario in which implanted neural experience becomes the core experience. As such, it identifies a new paradigm of travel and tourism on the intersection of key scientific trends. Though admittedly long time off, the paper aims to outline the path towards the development of neurotourism by analysing these trends and identifying the relevant scientific advancements that point to this direction.

* Catholic University of Portugal (UCP), Braga Regional Centre, Faculdade de Ciências Sociais, Portugal.

** Department of Economics, Management, Industrial Engineering and Tourism, University of Aveiro, Portugal

It further contemplates the validity of implemented experiences which bypass the basic component of the definition of tourism: the physical displacement of the tourist.

References |

- Bieszczad, K., M.; Miasnikov, A. A. & Weinberger, N. M..(2013). Remodeling sensory cortical maps implants specific behavioral memory, *Neuroscience*, 246 (2), pp. 40-51
- Grau, C. et al. (2014). Conscious Brain-to-Brain Communication in Humans Using Non-Invasive Technologies. *PLoS ONE* 9(8): e105225. doi:10.1371/journal.pone.0105225
- Ma, Q. G., L. F. Hu, et al. (2014). "Applying Neuroscience to Tourism Management: A Primary Exploration of Neurotourism "Applied Mechanics and Materials 670-671: 1637-1640.
- Ramirez, S. et al. (2013). Creating a false memory in the hippocampus. *Science*, 341. Pp.387-391

Bibliography |

- Boulaire, C., Hervet, G. (2012). "New Itinerancy: the Potential of Geocaching for Tourism". *International Journal of Management Cases*, 9(Special Issue: Papers from the 9th International CIRCLE Conference): 210-218.
- Carmena, J. M., Lebedev, M.A., Crist, R.E., O'Doherty, J.E., Santucci, D.M. et al. (2003). "Learning to Control a Brain-Machine Interface for Reaching and Grasping by Primates." *PLoS Biol* 1(2): e42).
- Hasson, U., A. A. Ghazanfar, et al. (2012). "Brain-to-brain coupling: a mechanism for creating and sharing a social world." *Trends in Cognitive Sciences* 16(2): 114-121.
- Hawking, S. (2014). The science of the future. *National Geographic Channel*: T1E5.
- Ifft, P. J., S. Shokur, et al. (2013). "A Brain-Machine Interface Enables Bimanual Arm Movements in Monkeys." *Science Translational Medicine* 5(210): 210ra154.
- Ma, Q. G., L. F. Hu, et al. (2014). "Applying Neuroscience to Tourism Management: A Primary Exploration of Neurotourism". *Applied Mechanics and Materials* 670-671: 1637-1640
- Pirita, I. (2012). "Geocachers: the creative tourism experience." *Journal of Hospitality and Tourism Technology* 3(4): 152-175.
- Saalfeld, P. (2014). "Fusing Faculties of Mind " *Harvard Magazine* March-April: Downloaded June, 2014 from: <http://harvardmagazine.com/2014/2003/fusing-faculties-of-mind>
- Stephens, G. J., L. J. Silbert, et al. (2010). "Speaker-listener neural coupling underlies successful communication." *Proceedings of the National Academy of Sciences* 107(32): 14425-14430.
- TechCrunch (13/07/2016). Pokémon Go tops Twitter's daily users, sees more engagement than Facebook. Downloaded from: <https://techcrunch.com/2016/07/13/pokemon-go-tops-twiters-daily-users-sees-more-engagement-than-facebook/> on 28/07/2016.
- The Wall Street Journal (13/07/2016). 'Pokémon Go': Why You Should Play. Downloaded from: <http://www.wsj.com/articles/pokemon-go-why-you-should-play-1468430960> on 28/07/2016.
- Thomson, E. E., R. Carra, et al. (2013). "Perceiving invisible light through a somatosensory cortical prosthesis." *Nat Commun* 4: 1482.
- U.S. Food and Drug Administration (June 26, 2014). FDA allows marketing of first wearable, motorized device that helps people with certain spinal cord injuries to walk (News release). Downloaded June 2014 from: <http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm402970.html>

USA Today (16/06/2016). *Mark Zuckerberg breaks arm, talks telepathy*. Downloaded from: <http://www.usatoday.com/story/tech/news/2016/06/14/mark-zuckerberg-breaks-arm-talks-telepathy-facebook-live-qa/85891528/>

Xu, F., F. Tian, et al. (2016). "Tourists as Mobile Gamers: Gamification for Tourism Marketing." *Journal of Travel & Tourism Marketing* 33(8):1124-1142.

Yoo S-S., Kim H., et al. (2013). "Non-Invasive Brain-to-Brain Interface (BBI): Establishing Functional Links between Two Brains." *PLoS ONE* 8(4:e60410).