

# Sonic Immersion in Mixed Reality Environment

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An emotional environmental element such as enjoyable music arouse desire which leads to loyalty, willingness to buy and recommendation (Baker et al., 2002; Kotler, 1974; Sherman et al., 1997; Wakefield and Brodgett, 1996). This abstract explains and builds a literature driven conceptual model for sonic immersion in a multi-sensory, mixed reality environment. Multi-sensory, mixed reality environments allow the control of multiple sensory stimuli, hence the scents, temperature, moisture level, sounds and the sights of the environment can be adjusted according to customer wishes or pre-programmed scenarios. (Tuominen and Heikkinen, 2014.)

Already in 1992, Cruz-Neira et al. stated that virtual environment (VE) can be an effective medium. Recently, many hotels, restaurants, travel agents and attractions have added a virtual tour of their locations and offerings (Guerra, Pinto and Beato 2015; Pakanen and Arhippainen, 2014), and combined Visual Sales Systems into their operations. However, the pioneers in the industry already experience the future ways of stimulating quest senses. For instance, #geteleported mixed reality trip by the international hotel chain Marriot incorporates multiple sensory stimuli. However, in order to fully utilize Virtual Reality (VR) technology, Virtual Environments (VE), and Mixed Reality Environments (MRE) in the tourism sector, the operators must first understand users and their expectations of virtual and mixed reality environments. Each tourist has their own ideas of an ideal tourism experience, and the motivations behind the decisions vary greatly (Buhalis and Law 2008). Therefore, all environments, whether real or digitally enhanced, has to provide enough challenge, inspiration and aesthetic appeal to attract consumers (Huang et al., 2010).

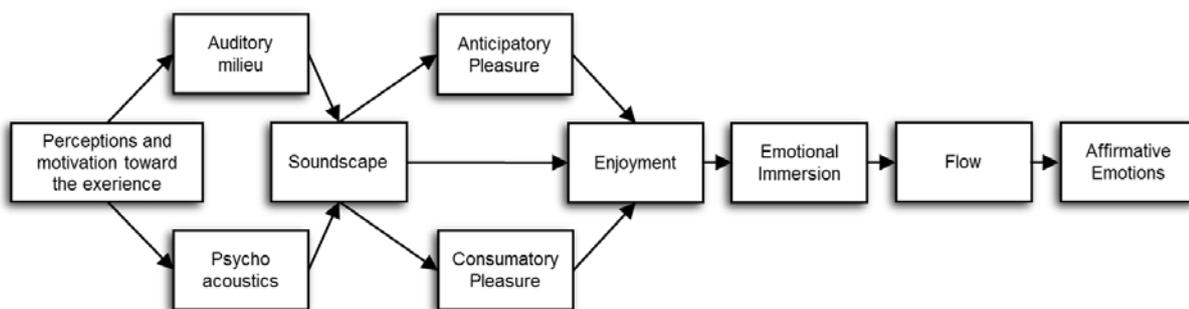
Pine and Gilmore (1999) approach immersion and absorption as a dimension which designates the relation of a user to the surrounding environment. An immersive experience, in which a person feels detached from the real world can happen in both films and games (Patrick et al. 2000). Dovey and Kennedy (2006, p.146) describe the immersion as 'the experience of losing a sense of embodiment in the present whilst concentrating on a mediated environment', and accentuate the state of mind 'where a person is completely absorbed in what he is doing'.

There seems to be little consensus on the definitions of immersion (Brown and Cairns, 2004; Adams, 2004b), and the role of sound in the formation of immersion. For example, Rollings and Morris (2000) describe that sound is important for immersion because it is hardly noticed by the user. Van Leeuwen (1999) emphasise the role of ambient sound and postulates that the immersion occurs when sound is experienced and heard from all directions. In these circumstances, the listener becomes immersed and loses the ability observe the sound source and the auditory milieu.

Immersion has been used often to describe the level of involvement in games, especially in virtual reality environments (Adams, 2003, p.58). Designers, and researchers also investigate the phenomenon of immersion as an important element of interaction (Brown & Cairns, 2004). Concurrently, also the studies of electronic dance music festivals postulate the importance of musical immersion (Ferreira, 2008; Rietveld, 2013; Yadati et al., 2014). Also, in a recent study concerning mixed reality and virtual reality environments, Lorenz et al. (2015) stated that the feeling of being in a mediated environment, hence the overall level of the experience is strongly influenced by the auditory milieu and the psychoacoustics.

The sensory appeal of scenery and beautiful sounds of nature indulge the traditional traveller. Learning from game industry, and reproducing this 'audiovisual quality and style' (Ermi and Mäyrä 2004, pp. 7-8), could make virtual travel experience become a new reality for the traveller as well. Ermi and Mäyrä (2004) further suggest the importance of 'audiovisually impressive, three-dimensional and stereophonic worlds that surround players in a very comprehensive manner' in the formation of total immersion. Botteldooren et al. (2011), combine both the sound sources and the milieu, and incorporates the sensory stimuli with e.g. the functionalities of the milieu, the motivations and expectations of people present and the individual cultural background of each participant into a concept of 'soundscape'. In their concept, 'soundscape' designers can regulate when a sound should be heard and through analysis, and the management of the elements within the soundscape, new and innovative components can be created to augment the existing ones (Botteldooren et al., 2011). Consequently, with these tools, the management can influence the perceived experience.

The sensation of sound is linked to emotions and feelings (Lindström, 2005; Hultén, 2011) and these sensations impact brand experiences, interpretations, and that companies have great opportunities to create signature sound that symbolises the brand, creates sensory experiences and enhances recall. (Botteldooren et al., 2011; Pawaskar and Goel, 2014.) Signature sounds, according to Botteldooren (2011) and Pawaskar (2014) evoke the sensations and influences the emotive feelings influencing the brand experience. These sensory experiences enhance recall while symbolises the brand. Similarly to Van Leeuwen (1999), Henriques (2011) stated that 'sonic dominance', is the total immersion of the participants present in the experience. Therefore the vibration frequencies connect to the physiology of the participant, thus creating a deep level of immersion. Despite the earlier findings of the importance of the 'sonic environment', or the sonic immersion, there is no research involving virtual or mixed reality environment, especially in the context of hospitality and tourism. Therefore, besides classifying immersion in MREs, this project aims to measure, and finally define a model for sonic immersion (fig 1.) in a mixed reality environment, within tourism context.



**Figure 1 Proposed model of sonic immersion in tourism related mixed reality environment.**

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