

## *Technological Opportunities for the Travel and Tourism Sector Emerging from the 2020 Global Health Crisis*

**Carlos Mora**

Associate Professor, Department of Information and Communication Technologies,  
Tomar Polytechnic Institute;  
carlos.mora@ipt.pt

### **Abstract**

It is unclear, at the time this article is being written, the extent of the impact that the crisis imposed by the virus COVID-19 pandemic outbreak may have on society and economy, although it is already very certain that among the most affected sectors, Travel and Tourism will be at the top of the list. Throughout the text, this impact and its precursors and consequences are briefly analyzed, both from the point of view of the individual as an integral element of society, as from the point of view of the individual as an aggregating matrix, analyzing in continuity the extraordinary and singular opportunity that this crisis represents for Information and Communication Technologies in general, and for some emerging technologies such as Artificial Intelligence and Virtual and Augmented Realities, in a context of intermittent social isolation and deep economic crisis, with application to the Travel and Tourism sector.

### **Keywords**

Tourism, Technology, Artificial Intelligence, Virtual and Augmented Reality.

### **Resumo**

No momento em que este artigo está a ser escrito é ainda pouco clara a dimensão do impacto que a crise imposta pela pandemia do vírus COVID-19 poderá ter na sociedade e na economia, sendo, contudo, já muito claro que entre os setores mais afetados, o das Viagens e Turismo estará nas primeiras posições da lista. Ao longo do texto, analisa-se brevemente este impacto e os seus percussores e consequências, quer do ponto de vista do indivíduo enquanto elemento integrante da sociedade, quer do ponto de vista desta enquanto matriz agregadora, analisando-se em continuidade a extraordinária e singular oportunidade que esta crise representa para as Tecnologias de Informação e Comunicação em geral, e para algumas tecnologias

emergentes como a Inteligência Artificial e as Realidades Virtual e Aumentada, num contexto de isolamento social intermitente e de profunda crise económica, com aplicação ao setor das Viagens e Turismo.

### **Palavras-chave**

Turismo, Tecnologia, Inteligência Artificial, Realidade Virtual e Aumentada.

### **Contextualization**

In the recent past, few events have affected so many countries and populations of the world as the virus COVID-19 pandemic outbreak, declared by OMS earlier this year. The health, social and economical impacts are profound and, at this point, unclear. What is already clear is that the Travel and Tourism (T&T) sector will be one of the most affected. This is a particularly important consequence in an economic structure where the T&T sector represent in percentage of the national GDP 8.7% exports and 1.9% imports (INE et.al., 2020a), or nearly 18.500 million euros and a little over 4.000 million euros, respectively (INE et.al., 2020b).

Takin in account that the company size structure, in Portugal, is massively composed of SME, 99.9% to be more exact (INE et.al., 2020c), and assuming that the T&T company size structure follows the national one, the impact on this sector will be profound and lasting. This impact will have to be addressed from three perspectives.

First from the point of view of the individual as an integral element of society and consumer of T&T products and services.

Second from the point of view of society, perceived as an aggregating matrix of individuals that control demand and supply of market goods and services and as a social actor who's wellbeing and general health depends on the behavior of others.

Third from the point of view of companies as an aggregating matrix of individuals – here focused on the managers, directors, owners, in short, the leaders - of companies active in the T&T sector.

### **The Individual Perspective**

Since the turn of the millennium, that social isolation, especially amongst the oldest population, as its numbers increases and more live alone is a growing concern.

In 2017 the global population aged 60 years or over numbered 962 million, but by 2050 is estimated to reach nearly 2.1 billion. Of these the percentage that lives independently - alone or with a spouse only - varies widely, ranging from as low as 2.3% in Afghanistan to a high of 93.4% in the Netherlands (United Nations, 2017).

Social and political actors are addressing numerous solutions to this problem, but technology is, amongst all, the most promising path to solution (Findlay, 2003; Swindell, 2001), decreasing the loneliness and associated illnesses. Researchers have found eight different technologies that have been applied to alleviate social isolation, namely, general ICT, video game, robotics, personal reminder information and social management system, asynchronous peer support chat room, social network sites, Telecare and 3D virtual environment (Khosravi et. al., 2016).

With the COVID-19 pandemic outbreak, the consequent imposed social isolation, expands the above stated problem to all demographic groups, and if loneliness is not the main concern for younger demographic groups, the general feeling of confinement extended for long periods of time, the feeling of impotence to find an immediate solution and the fear for the resulting economic consequences are of paramount importance and present in everyday discussions.

Composed on this, there is a growing perception that the virus outbreak, transposed frontiers, cultures and huge distances, overnight, due to the ever-growing facility of international traveling. Italy one of the most affected countries in Europe, if not in the world, had an unforeseen contagious speed after the carnival festivities that took place mostly in the north, the most affected region.

This growing perception will constitute a fear factor to block international traveling, both on the individuals will to engage in traveling as in the easiness to accept living in a region with much incoming travelers. This block factor will be as absolute as each individual experience in two dimensions:

- i) the duration and roughness of the social isolation imposed to control the outbreak;
- ii) the proximity of the death occurrences, for it is quite different to cope with the death toll of distant populations to cope with the death of familiars, acquaintances, work colleagues, etc.

## The Society Perspective

There have been many studies about the relationship between social interactions and health (Cohen, 2004; Umberson, D., & Karas Montez, J. (2010)) but never as before the relation between these two aspects has been so important<sup>1</sup>.

As the majority of the population is under self or government imposed social isolation, especially in the most advanced countries, for it is rather difficult to impose this measures in third world countries with unstructured housing or over-populated regions, the toxic effects of this perceived social isolation (Cacioppo & Cacioppo, 2014) are diluted, for all age groups are involved, but the psychological conditions and perceptions outgrow the individual dimension and compose themselves in a social pattern that is more than the sum of the individual contributions.

This social pattern generates six trends:

- i) there will be an ever growing need to substitute physical relations, existing before the social isolation, with digital substitutes. This trend will pressure social networks, like Facebook, Instagram and Twitter, to enhance their functionalities shifting the focus of the user interface from instant messaging or active posting and passive post reading to more interactive functionalities like group video conferencing, rather than one-to-one video calls, and rich visual and audio role playing;
- ii) telework had exponential demand. The critics of such type of work focus on the lack of human interaction that are present in physical working environments. In the present context, where telework was unavoidable, these critics dry out and large numbers of workers word wide search for tools and tactics to achieve higher levels of interaction, again depending on group video conferencing, permanent video connections between colleagues and enhanced audio experiences;
- iii) digital entertainment will have the highest growth of the last few years. Entertainment platforms, both audio and video, like iTunes and Netflix, will have to cope with massively client base growth, but the gaming industry will be on the forefront of the growth rate, as increasing number of individuals will prefer to engage in in-door, virus risk free, entertainment activities;

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<sup>1</sup> On a light note I would say that the present context contradicts all previous articles, for it is social isolation that currently enhances one's health.

- iv) to cope with the previous three trends, communication operators and communication infrastructure owners will have to enhance the capacities of their assets, both on simultaneous number of users as in performance and quality;
- v) the previously described fear factor related with international traveling, acting at the individual level as a discouragement to engage in traveling or accept incoming travelers, will compound itself in large social groups assuming the outlines of a “bad social behavior” similar to what we have seen in recent times with people who engage in environmental damaging practices, further discouraging travelling practices;
- vi) as environmental awareness grew to ever high peaks before the COVID-19 pandemic outbreak, and the environmental consequences of the reduction in human activity and consequent pollution are plainly seen, with manifestations of fauna and flora having previously unseen behaviours, consequences that will grow as long as the social isolation measures are kept, this environmental awareness will continue to increase again further discouraging travelling practices.

### The Leader and Company Perspective

On 2002, a Harvard Business Review seminal article (Bennis & Thomas, 2002) was presented and discussed the idea that, under the point of view of leaders, extreme traumatic experiences, that the authors called crucibles, would represent important, if not fundamental, turning points in any individual’s life. These crucibles could have two outcomes depending on the innate psychological characteristics of the individual. Either they would crush him, render him un-useful for leading and, in the limit for social interaction, or they would represent an opportunity for reinvention, and he would emerge stronger, more engaged, and more committed than ever.

Form the point of view of the company a time proven Punctuated Equilibrium theory depicts organizations as evolving through relatively long periods of stability (equilibrium periods) in their patterns of activity that are punctuated by relatively short bursts of fundamental change (revolutionary periods). Revolutionary periods substantively disrupt activity patterns and install the basis for new

equilibrium periods. One of the triggers for such revolutionary periods, states that “Major changes in environmental conditions will significantly increase the likelihood of revolutionary transformation” (Romanelli & Tushman, 1994)<sup>2</sup>. The present COVID-19 pandemic outbreak, the consequent imposed social isolation and its look down on T&T sector activity can most certainly be considered a “major change in environmental conditions”, thus triggering an almost certain period of revolutionary transformation.

So, both on the leaders of T&T companies as in the tissues and culture of the companies themselves are created conditions for major changes.

Whether the psychological characteristics, and cultural context, of the typical T&T company leader in Portugal will break them or constitute an opportunity for re-invention is out of the scope of this article but one possible path for revolutionary transformation of the T&T companies is presented in the following section.

## The Revolution Path

In the previous sections I have addressed several aspects of the current context we are living and working, describing the authors view on the individual perspective where the extended confinement, the impotence to reach an immediate solution and the fear of the near future results, among other things, in a growing aversion to traveling, either incoming or outgoing. I have also described my view of the social perspective where the need to relate, telework, growing demand for rich entertainment, the pressure on communications infrastructure, the social perception of traveling as a “bad social behavior” and the growing environmental perception are

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<sup>2</sup> In fact, the time span covered by the study is quite small – three years. Having in mind that revolutionary transformation was defined as when occurred in a two-year period, one can conclude that most of the transformations when incremental and cumulative occurring in a greater than three years period were left out, which would bias the study towards the validity of the punctuated equilibrium theory.

The geographic coverage of the study was, national restricted and though absent from the text, probably region restricted too, since in the end of the '60 decade most minicomputer manufactures were clustered in the southern region of US, namely around Silicon Valley in California.

Californians are defined as temperamental, and their environment is a quite permissive one, from where one can easily conclude that major transformations and disruptions from previous established order are probably dear. This would once again bias the study towards the desired results.

Finally, the restriction of the study to the minicomputer industry, in a time frame where this industry was suffering major advances and breakthroughs would once again bias the conclusions.

Nevertheless, I consider this article adequate to the point in view.

changing agents. And finally, was also described the authors view on the threats and opportunities presented for both managers and companies, steaming from the crucibles due to the economic forecast and the punctuated equilibrium theory.

All these aspects compound for unique and extraordinary opportunities presented for the T&T companies and actors, that can grasp the situation and seize the necessary technological and human skills. A non-exhaustive list is present next, and their outlines described.

- i) Artificial Intelligence (AI) has been used in the T&T sector for many years, from marketing decision support (Stalidis et. al., 2014) to b2c e-commerce (Werthner, 2003) to crisis management (Jia et al., 2012) but never as before its application has had such broad opportunities. The huge number of new technological supported T&T users and activities will boost the AI applicability mainly on digital marketing and consumer profiling integrating all platforms – web, mobile, game consoles, smart tvs - in a big data set that can only be explored by advanced AI algorithms;
- ii) Virtual Reality (VR) and Augmented Reality (AR) are, from the authors point of view, the most promising areas for application to the T&T sector, as its inherent ability to replace reality either by creating a full artificial environment (VR) that enables the user to experience T&T without bounds (Katkuri et. al., 2019) or by creating an environment where digitally generated assets are overlapping real world pre-collect, or real-time collect images of the travel or touristic site being visited (Chung et. al., 2015), thus constituting the perfect substitute for the actual physical travel or visit;
- iii) Gamification is another thematic that will suffer enormous developments and that has a history of application to the T&T sector. In fact, the story telling inherent to all good games is key for any touristic application, whatever type of tourism we are talking but specially for heritage and general history sites, where the gamification of the visitor experience can reach from an extended immersion (Xu, 2017) to a mean to collect crowdsourced metadata (Paraschakis, 2013);
- iv) Internet of Things (IoT) represents the last area with important applications for the T&T sector, as an enabler of intelligent interactive systems that by making them “aware” of the things around it can expand and enrich any T&T experience;

Finally, and as a second level of opportunities presented by the above list of possibilities the author believes that two main areas will have extraordinary developments and any action designed and proposed for the T&T sector should have both in account.

- i) The role of embodiment in cognition as a necessary aspect for real AI systems has been under discussion for decades with many advocators for its need (Searle, 1980; Johnson, 1987; Agre & Chapman, 1987; Brooks, 1989), who defend essentially that the requisites for an intelligent action require the physical embodiment of the agent for it to be fully integrated in the world. The author believes that such requisite is necessary and that the previously stated demands on a new evolved AI, VR and AR will result in an explosion in sensorial hardware to be used in AR and VR, that will enable any T&T system to deliver a full body extended sensorial experience to the user;
- ii) Today, VR and AR systems are basically of two kinds. Drawing on specific devices (with or without computation autonomy) that are clumsy and expensive or drawing on smart phones or other top end mobile devices that are expensive and still have limited capabilities, regardless of the enormous leaps in computing and storing capacities. As huge numbers of new users request more systems, for gaming, T&T experiences or any other applications, its expectable that the entry level price will sharply decrease and the technical capabilities sharply increase, thus enabling the build of an enormous potential user base for said T&T VR and AR experiences.

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