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Imagining the Future of Travel: Technology and Sustainability Transitions

Employing narrative futuring through "letters from the future" technique, this study captures travelers' imagination of how travel will be in 20 years as they position themselves to pre-experience it. Key themes extracted from the letters include the (desired) future states of technology, reflecting expectation of technical feasibility of artificial intelligence (AI), and the world around them, echoing concerns towards environmental and social sustainability. Especially critical is the link between advancements in technology and sustainability, provoking relevant stakeholders to start taking responsibilities to prepare for what might come and steer the development of AI to benefit society at large.

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Introduction

It is without doubt that artificial intelligence (AI) and its related technologies will have a substantial impact on every aspect of life. By whom, how, where, and when this impact will be felt is still the focus of an on-going debate (Floridi et al., 2018). Inherent to this debate is the considerable uncertainty with how and to what extent AI will revolutionize society, firms, employment, and life in general (Makridakis, 2017a; 2017b). Attempts to anticipate the forthcoming changes brought by AI manifest in numerous predictions, projections, and forecasts of its transformational effects in various domains (e.g., productivity, income inequality, job creation, job loss), including those that see AI as a threat to the environment and human civilization (e.g. Makridakis, 2017a; 2017b; PwC, 2019; Sarkar-Basu, 2019).

In the rapidly growing travel and tourism sector, accelerated technological progress in AI leads to innovative breakthroughs in ways companies process and transform customer (big) data (e.g. biographic, biometric, and behavioral data) into business intelligence to develop more personalized offerings, tailor recommendations, and provide high quality customer service (Chen et al., 2016; Fuchs, Höpken, & Lexhagen, 2014; Huang & Rust, 2018). Moreover, novel applications of AI are consistently introduced to the sector (Kendrick, 2019; Lineberger et al., 2018), some of which are radically new innovations (e.g., service robots, autonomous vehicles, passenger drones, automated border control systems). It is suggested that AI advancements will contribute to operational efficiency of travel companies, transform experiences of travelers, and sustain growth of the travel and tourism industry (Infosys, 2018). However, the constant introduction of novel technologies may also create societal perceptions that the future is coming at us at a faster pace (Makridakis, 2017a), prompting anxiety of how the future states of travel and tourism will look like. Therefore, exploring public visions of and attitudes toward the future will be useful to better understand the social production of expectations of technological development in travel and tourism.

Envisioning the future is highly related to the common concept of sustainability (Kocsis, 2018) and the sociotechnical transitions needed to build a sustainable society. As suggested by Hajer and Pelzer (2018), shaping sustainability transitions requires a shift from exploring *expected futures* (i.e. an explanation of what might happen) to identifying *desirable futures* and ways to get there. This is the fundamental of *futuring*, which is "systematically thinking about the future in order to frame reasonable expectations," "to identify emerging opportunities and threats," and "to anticipate actions that will promote desirable outcomes" (Millett, 2006). This study recognizes the need to engage in futuring in order to stimulate further theoretical developments in future oriented tourism research and to build resilience in the travel and tourism industry in light of technological changes and AI revolution.

Using the method of narrative futuring (i.e., engaging in the future through storytelling), this study aims to explore consumers' visions of the future of travel, specifically targeting imaginaries and fictional expectations of how advanced travel technologies will be (i.e. technological feasibility) and how they will cast an impact on travel behaviors and experiences (i.e. technological affordance). Exploring multiple narratives about the future will help scholars, managers, and policymakers to focus on identifying desirable futures in travel and tourism and preparing ways to achieve them through research, business strategies, policies, and action plans.

On Futuring

The role of technology in sustainability oriented innovation has been suggested in the literature on sustainability transitions, a fundamental transformation towards more sustainable modes of production and consumption (Kemp, 1994; Markard, Raven, & Truffer, 2012). As the pace of technological advancements continues to accelerate, futureproofing society needs more than raising awareness about future changes, including those brought by AI, but taking

actions to consciously influence the future and shape sustainability transitions (Hajer & Pelzer, 2018). The concept (and techniques) of futuring can contribute to this direction. Social futuring characterizes social entities (e.g. a nation, an industry sector, an organization) recognizing their capability to interpret, envisage, influence, and generate future changes, and prepare for their strategic treatment (Szántó, 2018). It is akin to what Cornish (2004) terms as *productive dreaming*, where people explore future possibilities in their imagination to be able to realistically anticipate their future needs and prepare for them. Szántó (2018) further categorizes social futuring into *proactive* (i.e. interpreting, generating, and elaborating expectable future changes and preparing to influence them), *active* (i.e. preparing to neutralize the limitations of future changes and/or harness advantageous opportunities), and *reactive* (i.e. addressing the threats inherent in certain changes). For any social entity, engaging in futuring means affording a chance to create a future that will be beneficial to them (Monda, 2018).

Literature has highlighted the importance of imaginaries in the process of futuring (Hajer & Pelzer, 2018) and in sustainability transitions (Olson, 1995). As images of the future can influence behavior (Olson, 1995), it is suggested that imaginaries can have a double function: as an achievable aim and a way to achieve this aim (Hajer & Pelzer, 2018). For companies and business organizations, identifying the emerging but unarticulated "voice of the customer" is an important aspect of futuring (Millett, 2006), especially to capture trends in emerging technology, market, and customer behavior. Thus, it can be suggested that capturing collective imaginaries from customers (travelers) will be useful to set the groundwork for identifying "desired futures" in the travel and tourism field. In terms of timeline, futuring tends to take a long-term perspective in order to stimulate creativity and to avoid the risk inherent in short-term planning horizon of inviting presumptions that the future will be largely a continuation of the past, hence only requiring short-term strategies (Millett, 2006; Walton, 2008). Millett (2006) suggested at least 10 years to the future, while Walton (2008) recognizes

that forecasters and planners (in the context of scenario planning) typically use a time scale of 10 to 50 years ahead.

Methodology

This study utilizes narrative futuring, a narrative psychological approach to imagining the future in order to anticipate change (Sools & Mooren, 2012). According to Wahle (2012), narrative futuring can be defined as "the creative process by which one uses imagination and draws upon the knowledge and experience from the past and present, in order to construct a narrative about how the future could possibly be like" (p.9). Specifically, we asked participants to write a letter (containing a minimum of 2500 characters) from a future perspective to share an imagined travel experience in the Year 2039 (20 years into the future). The timeline of 20 years to the future was selected to allow for more creative imaginaries, which should inform more flexible industry strategies (Millett, 2006). Sools, Tromp, and Mooren (2015) suggested that letters from the future are "indicative of a variety of forms through which human beings construct and understand their future selves and worlds" (p. 350). Imagining the future, by way of writing a letter, helps stimulate a reflection on own life (Wahle, 2012). By adopting this method, we thus take advantage of people's imaginative capacity to untangle the complex interplay between technological advancements and their transformative consequences on the travel and tourism industry and on travelers.

In an attempt to stimulate without limiting the imagination process, a minimal guideline was given by suggesting them to think about where they would go, how they would get there, etc. Although, it was mentioned that a special consideration may be given to how advanced technologies would have become. Participants were allowed to address the letter to anyone (e.g. a friend, unborn children, current self, the government). This paper reports findings from a random selection of 30 letters written by travelers residing in the UK and the US. In analyzing

the letters, imaginaries of travel and tourism future, technological innovations, and sustainability were extracted.

Findings

The letters largely follow a similar storyline with travelers describing where they are (destination), how they got there (transportation), what they see/do (attraction), how services are delivered (hospitality), and plan for the rest of the trip or other details. While technology was the main theme discussed in all letters, many travelers gave a detailed explanation about societal and environmental settings as a backdrop for their travel experience. The divide between utopian and dystopian futures, although it is not as clear-cut in many instances, provides an angle to better understand how travelers see the roles of travel (as a socioeconomic activity) and technological changes in sustainability transitions.

Destination. Many travelers envisioned a trip to outer space, mainly to the moon and Mars. Some described having a long-distance trip (e.g., from London to Australia) as a precursor to travel to the moon. Others described traveling to other countries; domestic travel was rarely mentioned. Specifically interesting were the underlying motives behind the destination choice. While fascination of being in a radically new environment (e.g., another planet) dominated the narratives (Excerpt 1), many also stated to escape from home (i.e., country, earth) due to deteriorating environmental conditions.

Excerpt 1: "*Having seen most places on earth because travelling is so easy these days with pods. It only takes 30 minutes in one of the new travel pods to travel to Australia which is 10,000 miles away. I decided I'd try a trip to the moon which is something I have always wanted to do.*" (Traveler, UK)

Transportation. The vision for destination choice was enabled by the expectations that travel will be faster and more comfortable (Excerpts 1-2). Travelers' ideas for modes of transportation

range from pods to sonic jets to teleportation. Some travelers envisaged the use of alternative sources of energy for a more sustainable transportation, including the use of odorless bio, hydrogen, and solar cell fuel. Many highlighted how traveling has become more comfortable, stating changes in the design of transport facilities and infrastructure (e.g., seats that dynamically mold to fit human bodies), and other mechanisms to remove the hassle of traveling (e.g., being put in the "stasis" mental state or on "animation mode" for the duration of travel). Dominating the discussion around local transportation within a destination was the widespread adoption of autonomous vehicles powered by AI. Very few mentioned alternative ways to travel via virtual reality to eliminate the need for physical travel, either overall (e.g., virtual tours to Mars) or for portions of travel (e.g., parts of a tour; Excerpt 3).

Excerpt 2: "*I* […] *was able to book a sonic jet flight. The flight was so fast, it only took 2 hours to arrive in Argentina, from London, and it was so comfortable! The seats were luxurious and there was food and drink available on tap during the flight from an extensive in-flight menu presented on a screen, you just pressed what you wanted and it was delivered to your seat through a tube*." (Traveler, UK)

Excerpt 3: "*A highlight of our stay has been the virtual tours of places lower down on our itinerary that we would have been able to fit in and they were almost like the real thing only from the comfort of our hotel room or relaxing by the pool.*" (Traveler, UK)

Attraction and activities. With many travelers seemingly selected novel destinations to travel to, most letters described sightseeing (e.g., a "*subterranean bot tour*", "*a special trip in the old fashioned moon rover type vehicle that Aldrin and Armstrong used backs in 1969*") and dining as dominant activities. Some travelers mentioned participation in events and/or being part of specific missions (e.g., research, volunteering), with references to enabling technologies and environmental settings (e.g., "*as most of the world is now under water*").

Hospitality. Automation dominated the discussion around how services are delivered in the future. References to robots, bots, and AI assistants were found in almost all letters (e.g. Excerpt 4). Some travelers went on details in describing service touchpoints that are automated,

such as ordering and payment system. Especially important was the different enabling technologies envisioned by the travelers, all of which are powered by AI: DNA login system, biometric recognition (face, voice, earlobe, iris/retina), etc. The benefits of automation in service identified by travelers included safety and security (i.e., less risk of identity theft) and convenience (e.g., less time queueing).

Excerpt 4: "*The Mars-tel Comfort Suites are a stroke of genius. Not one human employee to pay or provide healthcare to. All the travel-bots fully service the customers. They cook, clean, provide medical help and assistance in various forms. They even fix themselves!*" (Traveler, US)

AI Revolution. The visions for what might come in terms of technological change pointed towards AI revolution; automated AI systems become ubiquitous and underpin the mechanism of almost all aspects of travel and tourism. As expected, since these imaginaries came from travelers, customer-facing AI systems were referred to in most letters, especially AI assistants. While most travelers described AI systems specifically designed for travel facilitation (Excerpt 5), some suggested having smart systems as "life" assistants. Excerpt 6 presents the darker side of the future (i.e., simulated life experiences), reflecting negative outcomes of technological progress in AI.

Excerpt 5: "*I found out that I'd be assigned an AI companion to serve as my personal assistant and answer all my questions on the trip. That was wonderful! I was also given a data connection to talk to the AI meal planner to describe my dietary do's, don'ts, and desires. The meal planner assured me that the meals on board the cruiser would be spectacular, and they were.*" (Traveler, US)

Excerpt 6: "*It is easy to holiday abroad now because all reality has disappeared and artificial intelligence and artificial reality is there for us at the press of a button. I sit here getting fatter and fatter because I don't have to walk anywhere anymore and getting all my food and drink delivered. You just sit here in a darkened room where one whole wall is a giant screen so it gives the impression of being in vast surroundings. There are air vents which produce various smells to go along with the sights you are viewing. Your temperature is adjusted to give you an idea of the weather conditions you are looking at. You can even have rain in your room courtesy of overhead sprinklers which you can control with a blue button.*" (Traveler, UK)

Environment. While the descriptions of destination, transportation, and attraction could be triggered the guidelines given in the instruction, key findings from the narratives are travelers' imagination of the future states of the world around them, reflecting the hopes and fears associated with such issues as climate change, global warming, overpopulation, and social disintegration. These discussions went beyond imagining temporary travel (i.e., visiting new places), to envisioning life after possible severe degradation of living conditions on earth (Excerpts 7-8). Traces of hopes were also found as travelers imagined the development of technological solutions to solve issues in areas lacking vital resources to sustain human life (Excerpt 9).

Excerpt 7: "*The Airbnb is run by a Chinese family who were sent here when China was overpopulated in the 2020s and they moved to the moon…*" (Traveler, UK)

Excerpt 8: "*I was talking to some people who were on an expedition to Mars to try and colonise it. They say it can be done but people will have to stay indoors all the time, but that won't matter because in a few years it will be the same on earth.*" (Traveler, UK)

Excerpt 9: "*Drip irrigation has worked a miracle, the technology which takes water vapour from space and* turns *into droplets has made sure there is abundance of food on the moon.*" (Traveler, UK)

Conclusion and Implications

The findings from this preliminary analysis demonstrated some extreme states of the future of travel: utopian and dystopian futures. Travelers' imagination was seemingly shaped by expectations of technological progress and innovation as well as relevant environmental and social forces pertaining to sustainability. For example, travelers envisioned being able to travel to the moon in 20 years not only because the technology would have made this possible, but also because other societal and environmental problems on earth would have created a pressure for us to find new opportunities for work, business, and leisure, and, even further, to find alternative places to sustain life and human civilization. Somewhere in between those utopian and dystopian futures lies the desired state of travel and tourism, enabled by advancements in AI, that is beneficial to travelers, firms, organizations, and society at large.

While further research will be needed to paint a more realistic image of a desired future of travel and tourism, some of the characteristics of this future can be extracted from the letters. These include expectation to remove frictions while traveling (e.g., faster, more comfortable travel, automated processing of services), to introduce novel tourism experiences (both through physical travel and virtual/augmented experiences), and to encourage living in harmony with the environments. These are areas where innovations in AI and related technologies can contribute most.

The findings from this study contribute to provoke relevant stakeholders in travel and tourism field to rethink their strategies to prepare for possible implications of technological innovations and to find ways to design sociotechnical systems supporting sustainability transitions. Further research is necessary to identify collective imagination of the future, adding to the travelers' perspectives. Action research in collaboration with industry players and policymakers will be important to perform futuring by formulating action plans and strategies to ensure the industry will play a positive role in fostering sustainability. As highlighted in Excerpt 10, the reality where automation fully replaces seemingly mundane (authentic) experiences, such as taking a shower, does not seem so far away. It is recognized that both technological innovations and pressure on resources (i.e., lack of water) can contribute to this reality. The question becomes whether we head towards it or steer away from it and how.

Excerpt 10: "*We are on the 100th floor with a sea view. But get this, there is no food auto serve or auto clothes wash and best of all no sonic shower. Would you believe it, we have to shower with real water, that sounds like fun.*" (Traveler, UK)

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