

The relationship between innovation and value creation by artificial intelligence: The case of the tourism industry in the Covid-19 pandemic[★]

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Abstract. Nowadays, even if the Covid-19 pandemic has not left a significant impact, the market of the tourism industry has relentlessly become competitive. At the same time, the interests of tourists have also continuously changed rapidly in industry 4.0. Facing such unpredictable challenges, firms must constantly have different innovations to bring new and other values to the tourism industry. With the ability to create appropriate new values, Artificial Intelligence (AI) can force firms to redesign products and services, and at the same time to restructure the entire innovation method. However, AI may also appear as a preferred option when the advantages of conventional innovation methods are challenging to realize. This paper aims to explore how AI will help the innovation of tourism and hospitality enterprises create new values that match new and safe experiences for customers during the Covid-19 pandemic and beyond.

Keywords: Value creation, Artificial Intelligence, Innovation.

1 Introduction

Tourism is an important source of foreign currency revenue, accounting for a significant proportion of Vietnam's GDP. There will be the participation of many stakeholders in the tourism industry, such as hotels, restaurants, event organizers, amusement parks, shopping malls, souvenir shops, small local leisure & service establishments for tourists, airports, rental company cars, travel agencies, and tourist information centers, museums and art galleries, etc. This means that tourism has many other related industries, including agriculture, food, beverage, real estate, construction, transportation, creative sectors, and other services.

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Although, tourists are often the ones who actively participate in their own experiences when choosing a types of tourism with a particular tourist destination. But, tourists often feel anxious about the unknown when traveling to unfamiliar destinations [4]. Thus, this process needs solutions to help them achieve correlation to get close to cultural norms, bypass security checkpoints, or even use payment methods in currencies. In addition, support methods are also considered, in times of disasters such as natural disasters or terrorist attacks, because tourists are generally not prepared to react [5;7].

Now that the COVID-19 pandemic has spread around the world, the fear factor affecting human psychology will continue. As a result, service industries that depend on direct human interaction have been greatly affected. Many experts believe that it will take nearly 18-30 months to stimulate demand again of the restaurant, hotel, airlines, etc. Domestic tourism may return slowly due to the willingness to spend of the tourists. Even tourism for international visitors needs a more detailed plan and depends on the immigration policy of each country. Thus, with tourist destinations, Vietnam is also one of the tourist destinations that are affected, affecting Vietnam's GDP [14].

Because of health concerns and risks, tourists will also raise skepticism about the safety of services in their minds. Therefore, the tourism industry will have to find business innovations to be able to survive. Solving this problem requires a lot of digital transformation of services in the tourism industry. Then, the entire tourism industry ecosystem can create trust and safety in the minds of tourists. This strategy will make the entire ecosystem of smart tourism sustainable and innovative [14]. This study aims to understand innovation in the fourth industrial revolution with artificial intelligence. And its contribution to innovation by creating value in line with constraints during and after the Covid-19 pandemic.

2 Innovation in the fourth industry revolution

Nowadays, the concept of innovation is not only for specific products but also for firms that provide services to customers, such as restaurant or hotel management in the tourism industry [13]. According to the OSLO manual 2018, business innovation change the firm's products (product innovation), Innovations change the firm's business processes (business process innovation). Managers can combine different types of innovation (bundled innovations) according to appropriate objectives to create business efficiency [9]. Therefore, firms choose the types of innovation according to the purpose of development.

In addition, research on innovation across various industries has shown that being user-centric to create products/services that delight customers are the right choice. Different methods of product innovation or business process innovation, or combine them to bring customers the new value created by the enterprise's comprehensive innovation process. Then, the perception of the value that customers feel satisfied with will guide the company's innovation [8].

Several countries are prioritizing innovations with emerging technologies such as Artificial Intelligence (AI), Internet of Things (IoT), and Blockchain, and these are

becoming areas of focus in both research and development of business [11]. Besides, AI is still being advocated for growth, and it has a lot of potentials to apply to many types of innovative business activities. AI has put technology at the heart of organizations, and AI is being embedded in every device and innovation program across different industries. *“The global artificial intelligence market size was valued at USD 62.35 billion in 2020 and is expected to expand at a compound annual growth rate (CAGR) of 40.2% from 2021 to 2028.”* [1].

In fact, technology can free workers from some unsafe tasks during the Covid-19 pandemic while also helping them improve services and assist in creating a sense of security for tourists. We can see many new applications & devices being used in practice in many parts of the world, such as online check-in kiosks, automatic control gates with Biometric Card Readers/passports, fully automated hotels, or self-driving cars are being announced by manufacturers to become ubiquitous on the streets in the next few years. In Vietnam, many innovative applications or devices are being used; even self-driving has the first version introduced by a Vietnamese company designed and manufactured.

However, some studies show that AI technology is only being developed in a few regions of the world. This creates an "AI divide," reinforcing inequalities in social, economic, and cultural sectors. Meanwhile, the participants in the tourism industry are globally connected because the number of international visitors brought to the locality is creating a tourism ecosystem with a significant source of revenue. Many countries support the development of AI in the field of smart tourism. Its direction for Vietnamese businesses also needs innovative thinking (with new methods) to connect. It is also something that needs to be done quickly.

Table 1. Information Communication Technology and Smart Tourism [12].

| Technology | Function | Smart tourism scenario |
|------------------------|---|--|
| Mobile Device/Wearable | Mobile Phone for Web, Multimedia, eMail, Apps | Smart Tourism App, Location base App, Target Marketing Device |
| Cloud | Cloud for IaaS, PaaS, SaaS, IoTaaS, AaaS | Smart Tourism cloud infrastructure services for XaaS |
| Social Media | Online Social engage platform | Smart Tourism social media for smart destination |
| Big Data | Collect online data for exchange and process | Big Data for Smart Tourism analytic, prediction |
| AR/VR | Augmented Reality/Virtual Reality | AR/VR for smart destination promotion |
| Robotic | Robotic for human interaction assistance | Robotic for helpdesk, customer service in destination |
| IoT | Internet of Thing | Location based service for tourism, transportation |
| Block Chain | Open distributed ledger technology | Smart contract for tourism, food quality record tracking |
| Artificial Intelligent | AI/ML provide analytics algorithm | Cognitive engagement, process automation, insights |
| 3D Printer | Transferring image onto a 3D surface | Destination 3D landscape demonstration, Customize souvenir product |
| Cyber Security | Internet, IoT security | Provide all tourism big data security such as GDPR compliance |
| 5G/NB-IoT, Wifi | 5G next generation transmitting technology | Smart Tourism data transmitting backbone |

The growth of Information Communication Technology (ICT) such as artificial intelligence, cloud computing, mobile devices, extensive data mining, and social media

makes software and hardware related to computing, storage, and communication become ubiquitous; it is a key component of innovations in the field of smart tourism [12]. AI has an important task to jointly create the context of smart tourism, which is to participate in awareness, process automation, and insights. The participation of AI in the relationship of ICT & smart tourism can be seen in Table 1[12].

3 Value creation by Artificial Intelligence

3.1 Value co-creation - Safe, hygienic service experience

The local culture and language differences will not be a barrier to tourism but an attraction for exploration. So during travel, technology will help tourists with the unknown with the local cultural environment, along with language exchange applications that will reduce anxiety and fear. Furthermore, technology will allow customers to receive the best services [3].

In the COVID-19 period and beyond, automation technology and immense AI capabilities have enabled Human-Machine Interoperable Devices (HMIs) to deliver differentiated experiences that help tourism establishments create sustainable value in the tourism industry. HMIs influences the tourism industry by providing a service where travelers have to serve themselves more with the help of HMIs to co-create a safe, hygienic service experience. In addition, tourists use HMIs from the point of view of accepting technology and services to enhance the value of quality and reliable information-sharing mechanisms [14].

3.2 Diverse User Experience

There has been a lot of research on tourism initiatives to enhance the richness of the user experience for applications serving the tourism industry. In which, Virtual Reality (VR) has a leading role among AI-related technologies. VR is most likely used as a virtual imaging tool to create human travel experiences during and even after the pandemic [11]. In addition, mobile technology has contributed to enhancing the user experience with "Augmented Reality" (AR), which is used in many cases. VR & AR applications for the tourism industry will increase tourists' interest in tourist destinations or help them make choices regarding future travel plans.

The tourism can apply AI in location-based interactive services and the customization ability of Robotic and Chatbot to provide information about tourist attractions and promoting tourist attractions by analyzing GPS and shopping data. In addition, providing instant language translation to assist tourists in obtaining tourist information or image recognition can enhance the rich content information of a tourist destination. This shows that AI creates new value to enhance the on-site experience of tourists through the rich & relevant information development of inquiry personalization [12].

AI can enhance the travel experience by automatically marking photos with location information and automatically creating photo books. In addition, travelers can upload and share photos to group social networks to promote travel experiences with family and friends. Therefore, AI has created value, as excursionists can share their travel

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experiences to help other tourists get more information while making their decisions. Besides, AI can also recall memories, enhance tourists' travel experiences, and help them build their image and status on social networks [12]. Figure 1 is an illustrative example.



Fig. 1. An example of a travel experience with photos & location maps.

3.3 Willingness to pay for personalization capabilities and requirements

From the customer's point of view, AI will facilitate and enable travelers to prepare for their travel experiences more quickly. AI will also generate intelligent predictions and make appropriate recommendations following individual requirements, but the transaction costs are more reasonable. As a result, the travel experiences are personalized to be tailored entirely to the needs and preferences of tourists [3].

Moreover, firms using AI can better understand their customers' financial capabilities and requirements from the point of view. From there, they can design products, services, and experiences that are more tailored to the needs of their customers. At the same time, thanks to the help of technology, firms will significantly reduce overall operating costs. Thus, it will help firms provide services at a more reasonable price, translate into profits, and transfer as part of the cost reduction to customers [3].

4 Innovation and Value creation by Artificial Intelligence

Vietnam has been taking health measures for people, such as vaccination and requiring masks in public spaces. And as soon as hotels reopen, they must also implement hygiene, health, and safety procedures to keep guests and staff safe. Technologies that use AI by automating processes and services will serve as a potential platform for users to increase the rate of information application in decision-making in real-time and in current contexts. Smart tourism has been presented as a clear concept, not just relying

on capturing massive data. But to be able to inform business innovation also needs to store, process, combine, analyze and use “big data” intelligently [13].

Expectations for AI adoption to impact the services provided and supported business processes are substantial in service industries. AI applications impact information processing and operations management, research and development, finance and accounting, supply chain management, strategy, sales, marketing, and customer service. They also always expect AI to contribute to innovative business models with efficient user-centric services [2]. Artificial Intelligence (AI) will help firms and organizations transform innovation. To respond to rapid technological advances and realign human resources, AI can force firms to restructure the entire innovation approach [13].

In addition, innovation will provide new initiatives and innovative changes in products and services in the tourism industry. However, these innovations must also make it possible to promote tourism with something new. At the same time, intelligent technologies also attract and engage tourists in creating tourism experiences as a co-creating component of that experience value [13]. As the novelties of digitalization became the norm, more automated service was provided, by Human-Machine Interoperable Devices (HMIs), with personalized service delivery capabilities. Humanization and regular updating will increase the participation of tourists as co-creators of value in tourism services. At this time, the self-service activities of tourists also become service providers; this is seen as a change in process innovation of products/services [14].

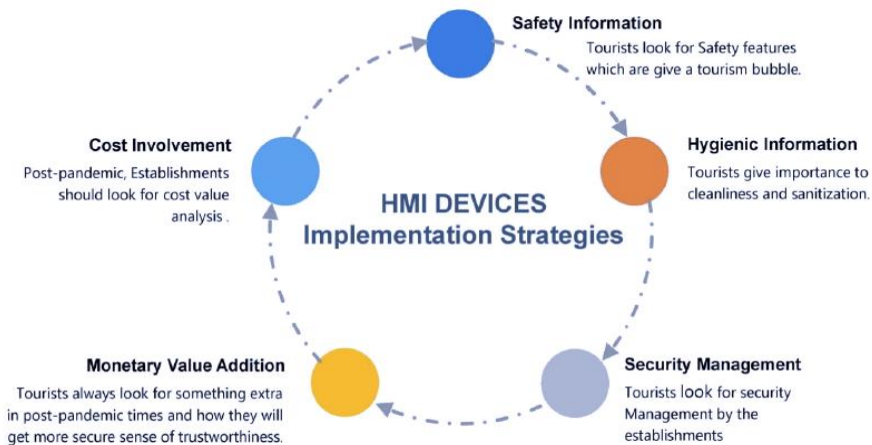


Fig. 2. HMI devices and strategy implementation vantage points [14].

However, it is acceptable to use AI devices to provide functional services, and the willingness of tourists to use AI devices to provide hospitality services is lower than that of airline services [6]. But facing the risk of coexisting with Covid-19 has become clearer than ever; what services can provide tourists as before will take a long time to return to the way they were before. Therefore, it is imperative to create a new direction with distinct innovations that create safety for visitors' health. The socio-economic

condition of Vietnam's dwindling tourism system can be renewed by following strategies for the safety information, hygiene addition knowledge, security management, value and cost involvement for HMI devices, as shown in Fig 2 [14].

From the above points of view, AI forces firms to restructure and innovate their businesses towards creating value using AI and, most recently, HMI devices in the tourism industry. At the same time, they consider the use of AI as a priority option when turning AI into solutions and tourism initiatives to contribute to creating innovations for the smart tourism sector. Their relationship has implications for business innovation that will bring innovative tourism products, services, and processes to customer-centric business functions that serve the people and worldwide after the Covid-19 pandemic.

5 Conclusion

Although recovering the economy during the Covid-19 period and restoring the tourism industry is a challenge. Innovative solutions for sectors of the tourism industry to attract a new influx of tourists. Based on this research, we believe that adapting to new conditions during and after the Covid-19 pandemic is necessary for innovation. In which, AI can create new values that enhance a safe customer experience and is worth the move for firms in the travel industry. Furthermore, there are reasons to believe that the innovative approach with AI is radically different from the human-skill-intensive innovation approach many firms have adopted in the past.

The development of the tourism industry will rapidly utilize new initiatives that are also important for the future of this industry because the technology and intelligence of AI will make business more accessible by shortening the time of work & human resources. However, we also need to pay attention to human labor needs in the tourism industry, a labor-intensive industry, by creating more favorable conditions for employees to work in this industry. In addition, AI also has challenges as many other researchers have pointed out that need to be considered, which are: Computing Power, Trust Deficit, Limited Knowledge, Human-level, Data Privacy and Security, The Bias Problem, Data Scarcity, etc.

In general, AI can appear as a preferred option. This is because it has a positive role in situations where the advantages of conventional digital innovation methods are difficult to realize value creation with a new experience for customers. Incorporating AI into applications & innovation tools of firms seeking innovation is also a smart choice in the tourism industry during the Covid-19 pandemic (if all obstacles of AI for users & related sectors of the tourism industry are solved). Thus, it can be seen that the application of AI will help tourists to use a lot of information in the context of tourism, and at the same time, creating value by AI will help tourists get more personalized value, bringing trust & usefulness in the time of Covid-19 pandemic and beyond.

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