Factors Affecting the Likelihood of Using Artificial Intelligence in Tourism Businesses: A Case of Egypt

Ahmad Muhammad Ragab and Mohamed Ezzat*

Faculty of Tourism and Hotels, Minia University, Egypt

KEYWORDS

ABSTRACT

Tourism is being shaped by new consumer demands known as "digital natives", who expect technology such as Artificial Intelligence (AI). However, AI in tourism is still in its infancy compared to other sectors such as banking, healthcare, etc. Thus, governments and businesses need to develop AI policies and strategies to keep tourism services competitive. The objective of this research is to understand the factors that determine the likelihood of using AI in tourism businesses in Egypt. A measurement model is developed by combining the technology, organization, and environment context model and the benefits, organizational readiness, and external pressure model. The findings reveal that perceived functional benefits, strategic benefits, technological competence, and perceived risks are significant predictors of the likelihood of using AI in tourism businesses. The paper concludes that the public and private tourism sectors should enhance awareness of AI technologies implementation for a more prosperous, productive, and competitive tourism sector in Egypt.

1. Introduction

The tourism sector has undergone radical transformations in recent decades due to information and communication technologies (ICTs). The growth of ICTs has led to fundamental changes not only at the macro-level, in terms of the structure of the sector itself and the appearance of new competitors, services, and destinations; but also at the micro-level, where tourism businesses have seen themselves affected in some way, forcing them to rethink their value chain to adapt to this new reality and not lose competitiveness (Bowen & Whalen, 2017). The latest trends in the tourism industry refer to a new era of technology based on complex information technologies such as robots, big data, virtual reality, and artificial intelligence (Ruiz et al., 2018). In this regard, the UNWTO (2021) stated that tourism is being shaped by new consumer demands known as "digital natives," who expect technology such as artificial intelligence. Tourism and travel Tech firms have shown various novel ways in the recent decade, including production and using new technologies to produce new value. The amount of money invested in travel technology by venture capitalists (VCs) has been increasing. From 2014 to 2019, almost USD 449 billion was invested in tourism Tech start-ups; the travel tech sector has a unicorn valuation of USD 61.6 billion (UNWTO, 2021).

The incorporation of artificial intelligence (AI) has been a common practice in the manufacturing industry in recent decades, more than in the

* Contact Hussein Abdel Wahab Abdel Rady at: mohamed.ezzat@mu.edu.eg

services sector, including tourism (Samara et al., 2020). However, the literature on the adoption of this type of technology in tourism suggests that AI applications may represent a revolution in the travel and tourism industry, both in terms of jobs and operations and service quality, which would cause transformation in destinations and across the industry sectors (Filieri et al., 2021; Huang et al., 2021; Buhalis, 2019). In addition, nowadays, tourists leave digital footprints on the internet before travelling, when they look for information about tourism services and destinations, during the travel planning, during the trip, and at the end of it. Tourists' digital footprints happen through their purchases and payments and by providing information, opinions, evaluations, photos, and other multimedia materials on social networks (Alonso & Ribeiro, 2018). Through the combination of all these digital footprints and information provided, AI tools can obtain personalized details for each tourist and, consequently, give them the travel information they need at all times (Zhang et al., 2019). Peric and Vitezic (2021) argued that the traditional image of tourism, as dependent on personal interaction and interconnection between a host and a guest, has been challenged by the emergence, growth, and influential role of AI applications. In the travel and tourism sector, AI applications are now widely developed and examined in various domains (Bulchand-Gidumal, 2020). This revolution presents meaningful opportunities in economic terms, efficiency, and competitiveness but also threats to tourism (Kazak et al., 2020). As a result, it is essential to study the adoption of AI in tourism and its consequences from several perspectives. The objective of the research at hand is to explore the factors that determine the likelihood of using AI among tourism businesses in Egypt. The main contribution of the present paper lies in the dearth of research on this topic in Egypt. Therefore, this research attempts to bridge this gap by studying the influential factors in adopting AI technologies in tourism businesses in Egypt based on the benefits, technological competence, and pressures and risks model.

2. Literature Review

2.1. What is AI?

AI has evolved into a notion at the intersection of reality and science fiction, utopia, and dystopia (Naude, 2021). As a result, AI is frequently misinterpreted regarding its capabilities, potential, and limitations (including ethical issues) (Brynjolfsson & Mcafee, 2017). There is no apparent agreement even on the definition of AI (Jackson, 2019). However, a realistic depiction of AI would be a computer system capable of doing tasks requiring human intelligence. Kılıçhan and Yilmaz (2020) referred to AI as the ability of a system to accurately understand external datasets, learn from them, and apply what it has learned to accomplish specific objectives and tasks via flexible adaptation. AI's primary goal is to enable technologies to execute activities and tasks without the assistance of humans. AI works in a similar way to the human brain in that it thinks, understands, makes judgments, and infers from data utilizing intelligent systems (Kirtil & Aşkun,2021.; Gaur et al., 2020). In this sense, many studies confirmed that AI holds the promise of bringing benefits across many industries and sectors, and governments are also implementing national AI strategies and investing in AI research and projects to stay ahead of the curve (Koehler, 2018; Brynjolfsson & Mcafee, 2017). For example, revenues generated from AI technologies are expected to reach $98.4 billion by 2023, with an annual growth of 28.5%, with software accounting for roughly half of that. Furthermore, investments in AI and machine learning firms have risen rapidly in recent years, with AI start-ups raising USD 26.6 billion in 2019 (Markiewicz & Zheng, 2020). AI cannot be narrowed down to a single technology but to a diverse group of technologies and tools (Kuo et al., 2017). Examples of the most popular AI technologies and tools include: 1) machine learning which can detect patterns in massive data sets and learn how to generate predictions and recommendations based on three kinds of analysis: descriptive, predictive, and prescriptive; 2) deep learning, which is a branch of machine learning that uses numerous processing layers or neural networks to simulate how the brain processes information and makes decisions in order to solve issues, 3) natural language processing that focuses on extracting value from the human language like text/content analysis and translations, and 4) natural language generation which enables text creation from data (Jackson, 2019). Figure 1 shows the different streams and work areas in AI.

Figure 1

Main streams and work areas in AI
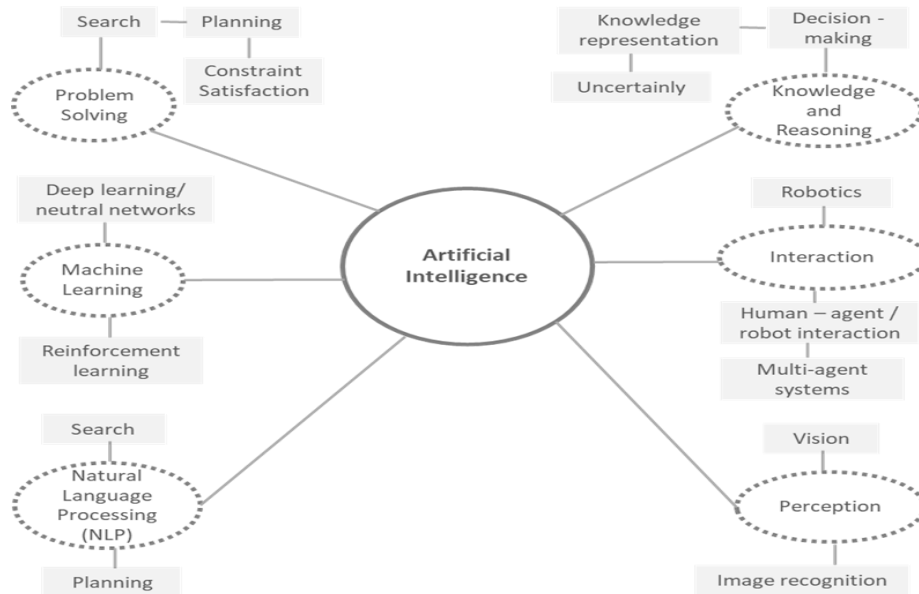
Source: Adopted from Dignum, V. (2019). Responsible artificial intelligence: how to develop and use AI in a responsible way. Springer Nature

2.2. AI in tourism

The tourism industry has been pushed to use innovation and technology as vital aspects to alter businesses and destinations due to the quick speed of digitization, new technological breakthroughs, and the changing preferences of tourists. The relevance of AI is vast and covers every sector, and tourism is not an exception (Gaur et al., 2020). Although AI in tourism is still in its infancy, compared to other sectors such as banking, healthcare, etc., it will continue to rise in tourism, and governments and businesses need to develop AI policies and strategies to keep tourism services competitive (Nam et al., 2020). Dignum (2019) argued that most AI applications in the tourism sector are focused on improving customer service and engagement. However, Kirtil and Aşkun (2021) mentioned that AI applications had been used in tourism to estimate hotel occupancy and tourism demand since the late 1990s. Moreover, the availability of hotel and travel information, modelling tourist decisions, assessing consumption statistics, data mining, and voice and image recognition are some ways AI has been applied in tourism (Nam et al., 2020). Specifically, Samala et al. (2020) looked at the most prevalent applications of AI in tourism as well as how these technologies are assisting the industry in improving its offerings for visitors. A list and descriptions of these AI applications are as follows:

− Virtual reality: it aids travellers in gaining access to natural resources, general infrastructure, tourism infrastructure, and destination attractions, all of which influence their purchasing behaviour and decision-making process.

− Chatbots: computer software machines that are pre-programmed to answer simple queries posed by clients, such as after going into a hotel and inquiring about the establishment's facilities, lunch and dinner timings, hotel services, and so on. Chatbots can also provide information on neighbouring pubs, discos, theme parks, zoos, casinos, adventure activities, retail malls, and other tourist attractions.

− Google Maps: the AI technology employed in Google Maps provides information about nearby tourist infrastructure, such as neighbouring hotels and accommodations, restaurants, bars, and discotheques, among other things. In addition, it offers information about traffic incidents and congestion an alternate route to avoid the traffic bottleneck.

− Facial recognition: it provides hassle-free check-ins at airports and other places, assures

data security and safety for visitors using blockchain technology, and streamlines the travel experience for visitors.

− Robots: it provides unexpected services to keep tourists engaged, resulting in a fresh and pleasurable experience in the tourists' imagination. Tourists are assisted by robots who take them to their hotel rooms, handle their bags, provide housekeeping services, and serve food and refreshments.

− Language translators: it allows visitors to communicate with locals in their own language. Local tour guides might be replaced by these language translators. For example, Google Translate has a "Conversation mode" option that allows travellers to translate their voice communications into the target language. The Camera integration option can interpret menus and signboards in foreign locations.

− Service optimization: using AI in conjunction with the Maximum Likelihood approach, services can be optimized. This algorithm predicts when prices will rise and fall and is employed in many aspects of travel, such as hotel, flight, and taxi bookings. Similarly, AI aids with cross-selling, which is a sales tactic in which a customer is sold related products

In this context, most of the research on AI applications in the tourism sector was focused on studying AI's acceptance and behavioural intention in the tourism field, aimed at tourists' perspectives rather than tourism businesses' perceptions (Grundner& Neuhofer, 2021). This, accordingly, implies the importance of this present study.

3. Methodology

3.1. Research model and hypotheses

There are three standard models for technology adoption at businesses (Alsheibani et al., 2018; Mokgohloa et al., 2020); the technology, organization, and environment context model (TOE), the diffusion of innovation model (DOI), and the benefits, organizational readiness, and external pressure model (BOE). While they share a similar base, these frameworks focus on distinct aspects of technology adoption issues. The TOE model focuses on external pressures (such as market forces and government regulation), organizational structures, and technology availability when describing the elements that influence technological adoption (Tornatzky et al., 1990). However, the DOI model

explains the spread of technology and the factors that impact it; as a result, DOI essentially describes the temporal component when technology adoption occurs (Rogers, 1995). On the other hand, the BOE model incorporates TOE's organizational and technological contexts into organizational readiness, as well as a perceived benefit factor for evaluating adoption (Iacovou et al., 1995). These three models have been further extended to study several aspects of the adoption of different technologies. For example, Kuan and Chau (2001) extended the TOE model to develop a perception-based model that comprised six perceptions: direct benefits, indirect benefits, financial cost, technical competence, industry pressures, and government pressures. More recently, Oliveira and Martins (2010) combined the TOE and BOE models, introducing a model for e-business adoption which includes three factors: technological and organizational readiness, perception of benefits and obstacles of e-business, and environmental and external pressures. The current study incorporated elements from the two previous models, the perception-based model and the e-business adoption model, to provide a framework to explore the likelihood of using AI in tourism businesses in Egypt, the context of this study. Three domains with five factors were proposed, as illustrated in figure 2.

3.1.1. Perceived benefits

AI has the potential to increase productivity and efficiency in business, resulting in better customer service, faster service delivery, and higher quality of service. According to previous research, organizations who use e-business can gain from increased sales, new markets presence, and cost savings. Iacovou et al. (1995), and Kuan and Chau (2001) defined two distinctive types of direct and indirect benefits. The direct benefits refer to the functional returns on using AI, for example, increasing productivity and profitability. At the same time, the indirect benefits relate to the strategic advantages of utilizing AI, such as improving the image and competitive advantages. Such AI benefits have been confirmed in tourism research. Geisler (2018) explained that AI technology could help tourism businesses gain a competitive edge. Similarly, Zhang and Sun (2019) said that it could help with tourist forecasting, scenic spot management quality, tourism administrative management efficiency, and tourism route planning intelligence. Furthermore, Gaur et al. (2021) concluded that AI is a powerful

analytic technology that provides scalable and accurate real-time analysis of massive data that reinforces tourism decisions. Consequently, the following hypotheses have been established:

H1. Perceived functional benefits positively influence the likelihood of using AI in tourism businesses.

H2. Perceived strategic benefits positively influence the likelihood of using AI in tourism businesses.

3.1.2. Perceived technological competence

Many studies found that businesses with solid and advanced technological and financial capabilities are more likely to adopt AI tools (Awa et al., 2016). In this, the way businesses approach AI adoption will be influenced by technological competencies such as access to AI technologies, availability of AI expertise, and financial resources (Horowitz et al., 2018). This is also supported in tourism research, where Lama et al. (2020) concluded that a lack of technological and financial resources negatively affected technology adoption in tourism, especially in developing countries. In this context, the open-source nature of cutting-edge technologies allows for quick diffusion and adoption of AI by businesses (Evangelista et al., 2020). Based on these arguments, the following hypothesis has been formed:

H3. Perceived technological competence positively influences the likelihood of using AI in tourism businesses.

3.1.3. Perceived pressures and risks

Competitive pressure is a term that relates to pressures that a business thinks from competitors within its industry (Kuan & Chau, 2001). It is argued that businesses that employ AI technologies early have a competitive advantage (Horowitz et al., 2018). In the case of tourism, AI can help every

business or actor to gain a competitive advantage, as found by Ivanov and Webster (2019). In this sense, Samara et al. (2020) argued that new AI technologies will disrupt and alter the supply chain, resulting in business model transformations and increased competitiveness in the long term. New markets include niche markets, recent locations, and expanded tourism activities. will open up and promote economic growth more sustainably and competitively. Empirical findings assured that competitive pressure appears to be a significant driver of IT adoption and diffusion. Hence, we proposed that:

H4. Perceived competition pressures positively influence the likelihood of using AI in tourism businesses.

On a related point, because the AI adoption process can be intense and costly, it is crucial to assess perceived risks (Oliveira & Martins, 2010). That is to say, the adoption of AI in tourism faces some hurdles and hazards. Samara (2017) defined some of the risks associated with the adoption of AI in the tourism industry into four categories: technical, financial, and business issues, as well as regulatory and socio-ethical issues. More specifically, Jacques (2020) determined three aspects of AI adoption challenges in the tourism industry, including 1) the tourist's view of AI; what these technologies mean to them in terms of thoughts, attitudes, and perceptions, 2) the replacement of humans by machines, and 3) AI's ethics, such as the loss of privacy and the fear of a society ruled totally by technology. Additionally, Bowen and Morosan (2018) confirmed that one of the tourism sector's major issues with AI adoption is losing its sense of hospitality, one of its most distinguishing characteristics. Thus, the following hypothesis has been defined:

H5. Perceived risks positively influence the likelihood of using AI in tourism businesses.

Figure 2

Research Model
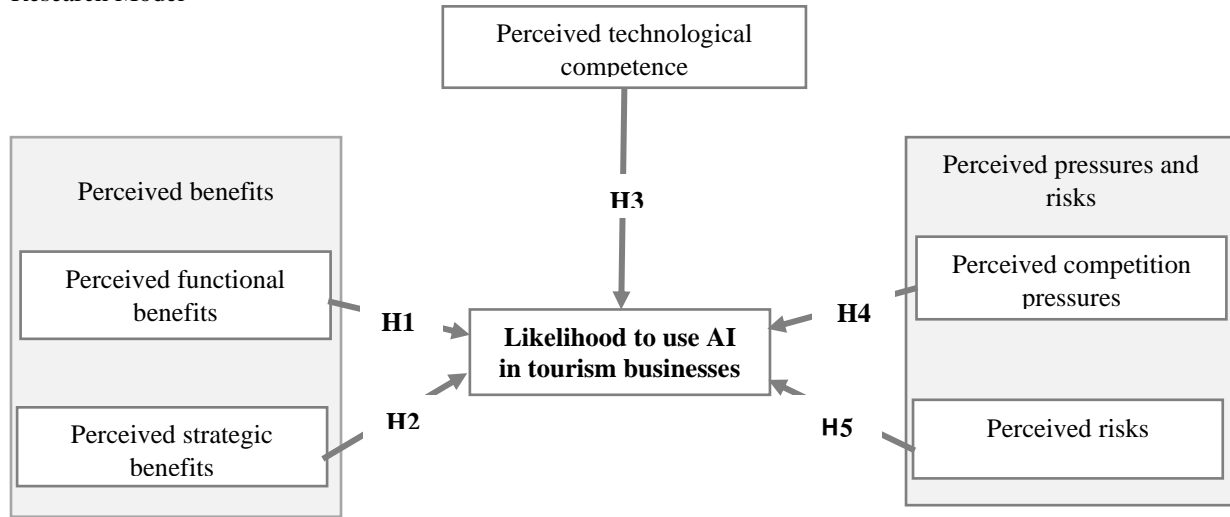
3.2. Data collection

A quantitative research design was used for this study, with questions and statements adapted from relevant previous studies (Iacovou et al., 1995; Kuan & Chau, 2001; Oliveira & Martins, 2010). The questionnaire statements were graded on a 7-point Likert Scale, with 1 indicating strong disagreement and 7 indicating strong agreement. A random sample of respondents was chosen from employees in travel agencies and hotels in Egypt. The received responses totalled 218 completes; 80 respondents were affiliated to travel agencies (36.7%), and 118 belonged to hotels (63.3%). Based on the rule of thumb for this type of research (ten times rule) (Hair et al., 2011), the sample size was sufficient in this current study.

4. Finding and results

4.1. Assessment of the measurement model

This research used a partial least square-structural equation modelling technique (PLS-SEM) to test the proposed associations. PLS-SEM is a multivariate statistical analysis approach that enables analysing relationships between a set of elements in a conceptual model, including measurement items and structural constructs, at the same time (Rasoolimanesh et al., 2015). Based on a thorough literature review, a pool of 21 items belonging to the five domains of the study model was initially defined. However, the analysis showed that the loadings of 4 items were less than 0.7; thus, we removed them to increase the validity of the scale (Hair et al., 2011). The final adopted scale included 18 items whose loadings were between 0.720 and 0.967 (Table 1). The reliability and validity results, presented in table 1, explained that the measures were reliable internal consistency, as calculated by the composite reliability. The study measure's composite reliability (CR) values ranged from 0.831 to 0.939, exceeding the 0.70 suggested threshold value (Nunnally, 1994). Furthermore, the average variance extracted (AVE) for each variable exceeded 0.50, following the standards of Fornell and Larcker (1981) verifying the convergent validity. Moreover, the discriminant validity of the scale was assessed, as shown in table 2. In this validity test, the off-diagonal items in their respective row and column are represented by the factors in the matrix diagonals, implying the extent to which the factors differ. The five components used in this study passed the discriminant validity test with a squared correlation coefficient less than AVE (Fornell & Larcker, 1981). Additionally, the variance inflation factor (VIF) that tests the multicollinearity confirmed that the values of the five scale constructs of this study model were less than 0.5, which is acceptable (Rasoolimanesh et al., 2015).

Table 1

Assessment of the measurement model

Factors		Loading	CR	AVE	VIF
Perceived functional benefits			**0.844**	**0.645**	**2.089**
PFB1	AI will significantly improve tourism businesses' performance and productivity	0.880			
PFB2	Using AI in tourism businesses will improve service quality	0.761			
PFB3	AI will increase the profitability of tourism businesses	0.762			
Perceived strategic benefits			**0.956**	**0.878**	**3.892**
PSB1	AI will help tourism businesses to enhance their own brand image	0.965			
PSB2	AI will assist tourism businesses in improving their destination image	0.876			
PSB3	AI will aid tourism businesses in improving relationships with partners	0.967			
Perceived technological competence			**0.904**	**0.760**	**2.584**
PTC1	It is easy to access AI technologies, especially open-source products	0.836			
PTC2	Tourism businesses will find the required expertise to support AI	0.894			
PTC3	I believe tourism businesses are willing to invest funds in AI adoption	0.884			
Perceived competition pressures			**0.939**	**0.793**	**4.110**
PCP1	Using AI technologies is expected from the majority of tourists	0.862			
PCP2	AI adoption is recommended/requested by the majority of business partners	0.930			
PCP3	I believe AI will help tourism businesses to get an edge over competitors	0.871			
PCP4	The majority of competitors are using or soon to be using AI technologies	0.897			
Perceived risks			**0.831**	**0.622**	**1.656**
PR1	I believe AI is a tool and not a threat to tourism human resources	0.720			
PR2	I am concerned about potential security risks and privacy issues	0.827			
PR3	I think there would be severe unsolved legal issues implicated in AI implementation	0.815			

Table 2

Discriminant validity test results (Fornell-Larcker criterion)

	Latent variables	1	2	3	4	5
1	Perceived direct benefits	**0.803**				
2	Perceived indirect benefits	0.852	**0.937**			
3	Perceived technological competence	0.693	0.625	**0.872**		
4	Perceived competition pressure	0.802	0.651	0.763	**0.890**	
5	Perceived Risk	0.537	0.516	0.525	0.603	**0.789**

4.2 Structural model assessment

Two indicators had been verified as per the SmartPLS outcomes to test the data fit to the model. The standardized root mean square residual (SRMR) was 0.073 (good if < 0.08), and the normed fit index (NFI) was estimated at 0.896 (acceptable if close to 0.90) (Henseler et al., 2016). In addition, the R2 value indicated that the model explained about 30% of the variation in the likelihood to use of AI in tourism businesses, which is deemed a high value in behavioural studies (Hair et al., 2011).

Path coefficients and associated P values were calculated to test the causal link of each proposed hypothesis in the study's structural model. For this, 5,000 sub-samples were used in a bootstrapping method as Hair et al. (2011). As shown in figure 3, path coefficients indicated direct effects in the predicted direction and were statistically significant (at p 0.05) for 4 causal relationships. In other words, 4 out of 5 study hypotheses were supported (Table 3). Perceived functional benefits had a positive effect (β = 0.223, p = 0.008) on the likelihood of using AI in tourism businesses. The influence of perceived strategic benefits on the likelihood of using AI in

tourism businesses was positive (β = 0.271, p = 0.048). Perceived technological competence positively influenced (β = 0.219, p = 0.005) the likelihood of using AI in tourism businesses. Also, perceived risks positively influenced (β = 0.200, p = 0.004) the likelihood of using AI in tourism businesses. In contrast, the influence of perceived competition pressures on the likelihood of using AI in tourism businesses was significant but with a different sign (negative) rather than hypothesized (β = -0.260, p = 0.038). Hence, this last study hypothesis cannot be supported.
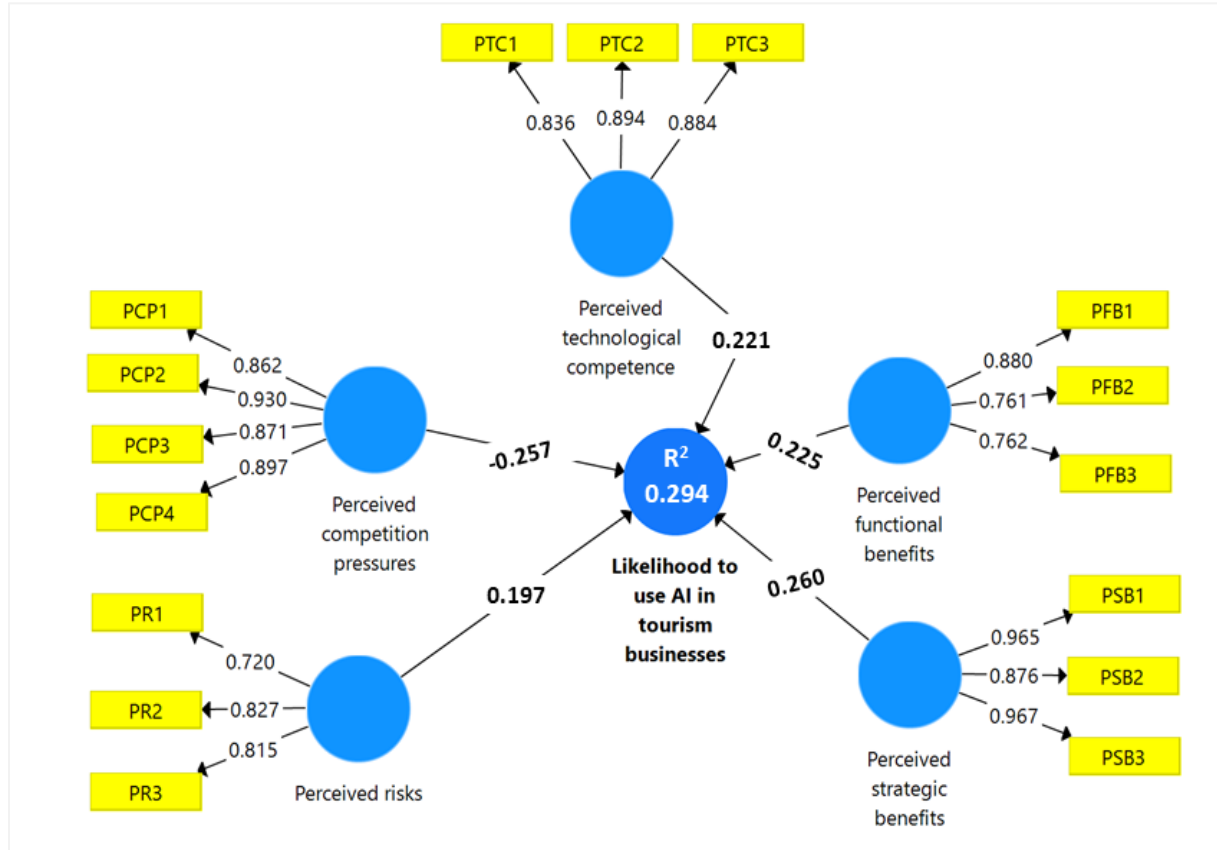
Figure 3

Structural model results.

Table 3

Results of hypothesis testing

	Hypothesis	Path coefficient	p-value	Supported
H1	Perceived functional benefits -> Likelihood to use AI in tourism businesses	0.223	0.008	Yes
H2	Perceived strategic benefits -> Likelihood to use AI in tourism businesses	0.271	0.048	Yes
H3	Perceived technological competence -> Likelihood to use AI in tourism businesses	0.219	0.005	Yes
H4	Perceived competition pressures -> Likelihood to use AI in tourism businesses	-0.260	0.038	No (Different sign)
H5	Perceived Risks -> Likelihood to use AI in tourism businesses	0.200	0.004	Yes

5. Discussion and conclusion

AI is a buzzword these days (as well as Big Data, the Internet of Things, Smart Cities, etc.). As a result, AI is seen as a way to innovate, process automation, performance optimization, data analytics augmentation, and so on by all types of

businesses, organizations, and governments around the world. However, a plan is more likely to encounter roadblocks than opportunities without a thorough knowledge of AI's complexities and factors influencing its adoption. AI applications are now being widely developed and examined in various domains in the travel and tourism sector. Many authors (Kazak et al., 2020; Koehler, 2018; Brynjolfsson & Mcafee, 2017; Kuo et al., 2017) argued that this AI revolution presents meaningful opportunities in economic terms, efficiency and competitiveness but also threats to the tourism sector. However, the mainstream of prior research on AI in tourism is still in the early stages of development, with only a few studies examining adoption and implementation. Moreover, many research papers focused on the behavioural intention of AI from the tourist perspective rather than the tourism businesses' perception. To address these concerns, the current research explored the factors that determine the likelihood of using AI in tourism businesses in Egypt. we adopted a model that was based on two previous models; the perception-based model (Kuan & Chau, 2001) and the e-business adoption model (Oliveira & Martins, 2010), to understand the likelihood to use AI in tourism businesses in Egypt. The study model contained three domains perceived benefits, perceived technological competence, and perceived pressures and risks. These three domains encompassed five specific factors: 1) perceived functional benefits, 2) perceived strategic benefits, 3) perceived technological competence, 4) perceived competition pressures, and 5) Perceived risks. This study hypothesized that there are direct positive effects between the five factors mentioned earlier and the likelihood of using AI in Egypt's tourism businesses.

A quantitative research design was used to collect data from employees in travel agencies and hotels in Egypt to test the proposed hypotheses. A partial least square-structural equation modelling technique (PLS-SEM) was used. The findings supported that perceived functional and strategic benefits, referred to as perceived benefits, had positive effects on the likelihood of using AI in tourism businesses, with the model's highest path coefficient. This result was in line with many previous studies concluding that new technology adoption is influenced by how enterprises perceive the benefits of adoption (Geisler, 2018; Zhang & Zhongli, 2019). In this context, Ezzaouia and Bulchand-Gidumal (2020) found empirically positive relationships between the perceived functional benefits of using IT in the hotel sector regarding marketing, managerial, and Competitive advantages. Likewise, in their study on the adoption of e-commerce in travel agents in Egypt, Abou-Shouk et al. (2016) determined that perceived benefits explain 32% of the adoption decision. Next, the results showed that perceived technological competence and perceived risks predict the likelihood of using AI in tourism businesses. These results were consistent with the findings of other studies such as Awa et al. (2016) in social network adoption, Evangelista et al. (2020) in open-source intelligence applications, and Lama et al. (2020) e-tourism implementation in developing countries. In contrast, the influence of perceived competition pressures on the likelihood of using AI in tourism businesses was significant but in the opposite direction than hypothesized in this study.

The results of this study provide important implications. First, in terms of theoretical contribution, this study proposed a measurement model combining the technology, organization, and environment context model (TOE), and the benefits, organizational readiness, and external pressure model (BOE). Such a model can assist scholars in extending research on the adoption of AI technologies in different tourism businesses. Additionally, this present study contributes to a better knowledge of the influential factors in AI adoption in tourism businesses in Egypt, where there is a shortage of this kind of research. Second, considerable practical implications provided by this study are that the perceived benefits predict than any other factor, the likelihood of using AI in tourism businesses. As a result, the tourism public and private sectors should enhance the awareness of AI technologies implementation for a more prosperous, productive, and competitive tourism sector in Egypt.

On a final note, the conclusions of this study cannot be generalized beyond the Egyptian context. Hence, the measurement model should be verified in another context and in other tourism businesses, such as the airline industry, which is supposed to be an early adopter of AI tools. Furthermore, testing the moderating effects of enterprise size and ownership structure on AI adoption in tourism should be further investigated.

References

Abou-Shouk, M. A., Lim, W. M., & Megicks, P. (2016). Using competing models to evaluate the role of environmental pressures in ecommerce adoption by small and medium sized travel agents in a developing country. Tourism Management, 52, 327-339.

Alonso, M. M., & Ribeiro, C. (2018, February). Use of Social Media within tourism travel behaviour. In Final Conference Social Networks and Travel Behaviour. Milan.

Alsheibani, S., Cheung, Y., & Messom, C. (2018). Artificial Intelligence Adoption: AI-readiness at Firm-Level. In PACIS (p. 37).

Awa, H. O., Ukoha, O., & Eke, B. C. (2016). Adoption of emerging ICTs: The role of actors in a social network. Cogent Business & Management, 3(1), 1259879.

Bowen, J., & Whalen, E. (2017). Trends that are changing travel and tourism. Worldwide Hospitality and Tourism Themes, 9 (6), 592–602.

Brynjolfsson, E., & Mcafee, A. N. D. R. E. W. (2017). Artificial intelligence, for real. Harvard Business Review.

Buhalis, D. (2019). Technology in tourism-from information communication technologies to eTourism and smart tourism towards ambient intelligence tourism: a perspective article. Tourism Review.

Bulchand-Gidumal J. (2020). Impact of Artificial Intelligence in Travel, Tourism, and Hospitality. In: Xiang Z., Fuchs M., Gretzel U., Höpken W. (eds) Handbook of e-Tourism. Springer, Cham.

Dignum, V. (2019). Responsible artificial intelligence: how to develop and use AI in a responsible way. Springer Nature.

Evangelista, J. R. G., Sassi, R. J., Romero, M., & Napolitano, D. (2020). Systematic literature review to investigate the application of open source intelligence (osint) with artificial intelligence. Journal of Applied Security Research, 1-25.

Ezzaouia, I., & Bulchand-Gidumal, J. (2020). Factors influencing the adoption of information technology in the hotel industry. An analysis in a developing country. Tourism Management Perspectives, 34, 100675.

Filieri, R., D'Amico, E., Destefanis, A., Paolucci, E., & Raguseo, E. (2021). Artificial intelligence (AI) for tourism: an European-based study on successful AI tourism start-ups. International Journal of Contemporary Hospitality Management.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of marketing research, 18(1), 39-50.

Gaur, L., Afaq, A., Singh, G., & Dwivedi, Y. K. (2021). Role of artificial intelligence and robotics to foster the touchless travel during a pandemic: a review and research agenda. International Journal of Contemporary Hospitality Management.

Geisler, R. (2018). Artificial intelligence in the travel & tourism industry adoption and impact (Doctoral dissertation). Nova School of Business and Economics, Portugal.

Grundner, L., & Neuhofer, B. (2021). The bright and dark sides of artificial intelligence: A futures perspective on tourist destination experiences. Journal of Destination Marketing & Management, 19, 100511.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. Journal of Marketing theory and Practice, 19(2), 139-152.

Henseler, J., Hubona, G., & Ray, P. A. (2016). Using PLS path modeling in new technology research: updated guidelines. Industrial management & data systems.

Horowitz, M. C., Allen, G. C., Kania, E. B., & Scharre, P. (2018). Strategic competition in an era of artificial intelligence. Center for a New American Security.

Huang, A., Chao, Y., de la Mora Velasco, E., Bilgihan, A., & Wei, W. (2021). When artificial intelligence meets the hospitality and tourism industry: an assessment framework to inform theory and management. Journal of Hospitality and Tourism Insights.

Iacovou, C. L., Benbasat, I., & Dexter, A. S. (1995). Electronic data interchange and small organizations: Adoption and impact of technology. MIS quarterly, 465-485.

Ivanov, S., & Webster, C. (2019). Economic fundamentals of the use of robots, artificial intelligence, and service automation in travel, tourism, and hospitality. In Robots, artificial intelligence, and service Automation in travel, tourism and hospitality. Emerald Publishing limited.

Jackson, P. C. (2019). Introduction to artificial intelligence. Courier Dover Publications.

Kazak, A. N., Chetyrbok, P. V., & Oleinikov, N. N. (2020). Artificial intelligence in the tourism sphere. In IOP Conference Series: Earth and Environmental Science (Vol. 421, No. 4, p. 042020). IOP Publishing.

Kiliçhan, R., & Yilmaz, M. (2020). Artificial intelligence and robotic technologies in tourism and hospitality industry. Erciyes Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, (50), 353-380.

Kirtil, İ. G., & Aşkun, V. (2021). Artificial Intelligence in Tourism: Artificial Intelligence in Tourism: A Review and Bibliometrics Research. Advances in Hospitality and Tourism Research (AHTR).

Koehler, J. (2018). Business process innovation with artificial intelligence: Levering Benefits and

controlling operational risks. European Business & Management, 4(2), 55-66.

Kuan, K. K., & Chau, P. Y. (2001). A perception-based model for EDI adoption in small businesses using a technology–organization–environment framework. Information & management, 38(8), 507-521.

Kuo, C. M., Chen, L. C., & Tseng, C. Y. (2017). Investigating an innovative service with hospitality robots. International Journal of Contemporary Hospitality Management.

Lama, S., Pradhan, S., & Shrestha, A. (2020). Exploration and implication of factors affecting e-tourism adoption in developing countries: a case of Nepal. Information Technology & Tourism, 22(1), 5-32.

Markiewicz, T., & Zheng, J. (2020). Getting Started with Artificial Intelligence. O'Reilly Media, Incorporated.

Mokgohloa, K., Kanakana, G., & Maladzhi, R. (2020). Development of a Technology and Digital Transformation Adoption Framework of the Postal Industry in Southern Africa: From Critical Literature Review to a Theoretical Framework. Advances in Science, Technology and Engineering Systems Journal, 5 (6), 1190-1206.

Nam, K., Dutt, C. S., Chathoth, P., Daghfous, A., & Khan, M. S. (2020). The adoption of artificial intelligence and robotics in the hotel industry: Prospects and challenges. Electronic Markets, 1-22.

Naude, W. (2021). Artificial intelligence: neither Utopian nor apocalyptic impacts soon. Economics of Innovation and new technology, 30(1), 1-23.

Nunnally, J. C. (1994). Psychometric theory 3E. Tata McGraw-hill education.

Oliveira, T., & Martins, M. F. (2010). Understanding e-business adoption across industries in European countries. Industrial Management & Data Systems.

Peric, M., & Vitezic, V. (2021). Tourism Getting Back to Life after COVID-19: Can Artificial Intelligence Help?. Societies, 11(4), 115.

Rasoolimanesh, S. M., Jaafar, M., Kock, N., & Ramayah, T. (2015). A revised framework of social exchange theory to investigate the factors influencing residents' perceptions. Tourism Management Perspectives, 16, 335-345.

Rogers, E. M. (1995). Diffusion of Innovations: modifications of a model for telecommunications. In Die diffusion von innovationen in der telekommunikation (pp. 25-38). Springer, Berlin, Heidelberg.

Ruiz, L. M., Rodríguez, L., & Navio-Marco, J. (2018). Application of communication technologies (ICT) within the tourism industry in the European Union. Tourism: An International Interdisciplinary Journal, 66(2), 239-245.

Samala, N., Katkam, B. S., Bellamkonda, R. S., & Rodriguez, R. V. (2020). Impact of AI and robotics in the tourism sector: a critical insight. Journal of tourism futures.

Samara, D., Magnisalis, I., & Peristeras, V. (2020). Artificial intelligence and big data in tourism: A systematic literature review. Journal of Hospitality and Tourism Technology.

Tornatzky, L. G., Fleischer, M., & Chakrabarti, A. K. (1990). Processes of technological innovation. Lexington books.

UNWTO (2021). Travel and Tourism Tech Startup Ecosystem and Investment Landscape. World Tourism Organization. Madrid.

Zhang, K., Chen, Y., & Li, C. (2019). Discovering the tourists' behaviors and perceptions in a tourism destination by analyzing photos' visual content with a computer deep learning model: The case of Beijing. Tourism Management, 75, 595-608.

Zhang, L., & Sun, Z. (2019, August). The application of artificial intelligence technology in the tourism industry of Jinan. In Journal of Physics: Conference Series (Vol. 1302, No. 3, p. 032005). IOP Publishing**.**

.