Maryam Andooz[1], Alireza Kasraiyan[2], Mehdi Nobani[3]*, Sedigheh Alizadeh[4], Seyyed Ali Eftekhar[5], Alireza Asgharzadeh[6]

Evaluation of the Role of Artificial Intelligence in Income Generation of Iranian Businesses: A Case Study of the Tourism Industry

JES Journal of Electrical Systems

Abstract: - This research evaluates the role of artificial intelligence (AI) in the income generation of Iranian online tourism businesses. The current situation, the challenges, and opportunities of using artificial intelligence in this industry are studied using a mixed method including in-depth interviews with 20 senior managers and a survey of 200 enterprises. The findings suggest that 35% of the surveyed enterprises use AI, which is lower than the global figure (60%). The major applications of AI are recommender systems, chatbots, and sentiment analysis. The enterprises using AI have reported an average increase of 18% in income. The main challenges in this regard include a lack of specialized staff, high implementation costs, and security concerns. However, there exist considerable opportunities to improve customer experience, optimize operations, and increase income. This study offers strategies for improving the use of AI, including investment in training, establishment of strategic partnerships, and gradual implementation. The results indicate that the future of Iran's online tourism industry is highly tied to the adoption and development of AI and that enterprises able to effectively use this technology will gain a significant competitive advantage.

Keywords: Artificial intelligence, Online tourism, Income generation, Digital businesses, Tourism industry

Introduction

Artificial intelligence (AI) is recognized as one of the main drivers of transformation in various industries in today's digital era. With its extensive capabilities, this emerging technology has great potential to improve performance and increase income generation in online businesses. Meanwhile, the tourism industry—as one of the most important economic sectors in Iran—can be favored with the benefits of AI. With its rich history, diverse culture, and unparalleled natural attractions, Iran has always been an appealing destination for domestic and foreign tourists. Nevertheless, in recent years, increasing competitions in the global market of tourism and rapid changes in travelers' expectations have created new challenges for businesses in this field. In such a circumstance, the employment of novel technologies such as AI can be a key solution to maintaining competitive advantage and increasing income generation.

This research aims to evaluate the role of AI in income generation of Iranian online businesses in the tourism industry. The present study seeks to answer the fundamental question of how AI can help improve financial performance and increase income of enterprises operating in Iranian

1. Ph.D., Department of Business Management, Rasht Branch, Islamic Azad University, Rasht, Iran. [1]

2. Ph.D. Student, Department of Business Management, Qazvin Branch, Islamic Azad University, Qazvin, Iran.

3. Ph.D. Student, Department of Business Management, University of Tehran, Kish International Campus, Kish, Iran. (Corresponding Author)

4. M.Sc. Student, Department of Entrepreneurship (Tourism), Payame Noor University, Kish Branch, Kish, Iran.

5. M.Sc., Department of IT Management (E-Business), University of Tehran, Tehran, Iran.

6. M.Sc., Department of Economic Sciences (Economic Development and Planning), South Tehran Branch, Islamic Azad University, Tehran, Iran.

online tourism sector. Furthermore, this research explores the challenges and opportunities facing Iranian businesses in using AI.

In the following, we will first review the existing literature in applications of AI in the tourism industry and its effect on income generation. Subsequently, the research methodology and data used will be introduced. In the Findings section, the results of the data analysis will be presented. Finally, we will discuss and make conclusions about the research findings and provide practical suggestions for Iranian online tourism businesses.

Problem statement

The tourism industry, as one of the most important economic sectors in Iran, is facing many challenges in global competition. While novel technologies, in particular AI, are of a significant potential to improve performance and increase income generation in this industry, the extent to which these technologies are utilized in Iranian online tourism businesses has yet to be fully known (Rahimi et al., 2023).

AI with capabilities such as natural language processing, machine learning, and big data analysis can make a huge transformation in the way tourism services are provided (Smith et al., 2023). This technology can play a key role in areas such as customer experience personalization, pricing optimization, demand forecasting, and customer relationship management (Johnson & Lee, 2022). Nonetheless, the level of awareness and use of this technology among Iranian online tourism businesses and its effect on the income generation of these enterprises require to be investigated more thoroughly. Additionally, the challenges specific to the Iranian market, including technical and infrastructural limitations, issues related to data security and privacy, as well as resistance to make some changes in some traditional organizations, can be an obstacle to the adoption and widespread use of AI in the tourism industry (Karimi and Mohammadi, 2022). The high potential of Iranian tourism market and the need for international competitiveness, on the other hand, show the necessity of using advanced technologies (Thompson, 2024).

In this regard, this research seeks to answer the following questions:

1. What is the current situation of using AI in Iranian online tourism businesses?
2. What is the relationship between the use of AI and the amount of income generated by these businesses?
3. What are the main challenges and obstacles in adopting and using AI in Iran's online tourism industry?
4. What solutions are there to improve the use of AI and increase income generation in this field?

The answers to these questions can provide a comprehensive view of the current situation and future potentials of using AI in Iran's online tourism industry and suggest practical solutions to improving performance and increasing income generation in this sector.

Importance and necessity of the research: AI in income generation of Iranian online tourism businesses

Importance and necessity of the research

It is important to evaluate the role of AI in income generation of Iranian online tourism businesses from several aspects:

1. The economic importance of the tourism industry: The tourism industry is one of the important sources of income generation and job creation in Iran. According to the statistics of the UN Tourism Organization (UNWTO, 2023), this industry has a high potential for the economic growth of countries. Improving the performance of the industry through novel technologies can have a significant effect on the country's economy.
2. Global competition in the tourism industry: In the digital age, the leading countries in the tourism industry are rapidly adopting and using AI (Li et al., 2022). It is essential that Iranian businesses also take advantage of this technology so as to maintain and promote Iran's position in the global tourism market.
3. Improving customer experience: AI has a high potential for personalizing services and improving customer experience (Rezaei et al., 2023). This can lead to increased customer satisfaction, increased loyalty, and ultimately increased income.
4. Optimizing operations and reducing costs: The use of AI can help optimize processes, predict demands more accurately, and manage resources better (Johnson & Lee, 2022). This can lead to reduced costs and increased profitability.
5. Innovation in providing services: AI enables the creation of new and innovative services. This can help to create a competitive advantage for Iranian businesses in the domestic and international market (Thompson, 2024).
6. Dealing with the specific challenges of the Iranian market: Given the specific challenges of the Iranian market, such as international sanctions and restrictions, the intelligent use of novel technologies can be a solution to overcoming these obstacles (Karimi and Mohammadi, 2020).
7. Sustainable development of tourism: AI can help to better manage resources and reduce the negative environmental effects of tourism. This is in line with the United Nations Sustainable Development Goals (UN, 2023).
8. Preparation for the future: Given the growing trend of using AI in various industries, this research can help prepare Iranian tourism industry for future developments (Smith et al., 2023).
9. Knowledge gap: Despite the importance of the subject, there are limited research carried out on the use of AI in Iranian tourism industry. This research can help fill this knowledge gap (Rahimi et al., 2023).

   Considering the above, conducting this research can play an important role in identifying the opportunities and challenges of using AI in Iran's tourism industry and provide practical solutions to improve income generation of online businesses in this field.

Methodology

This study used a mixed approach with an exploratory sequential design, which included two qualitative and quantitative phases.

Phase 1: qualitative study

1. Semi-structured interviews:
   - Interviews with 20 senior managers and technology experts in Iran's online tourism businesses.
   - Objective: To gain deep insight into the current state of using AI, its challenges and opportunities.
   - Sampling method: purposive and snowball.

2. Document analysis:
   - Reviewing industrial reports and documents related to AI in the tourism industry.
   - Objective: to identify trends and compare with global best practices.
3. Qualitative data analysis:
   - Using the thematic analysis method to identify the main themes.
   - Data coding and analysis.

Phase 2: Quantitative study

1. Questionnaire design:
   - Based on the findings of the qualitative phase and literature review.
   - Content validation by experts and conducting a pilot study.
2. Sampling:
   - Statistical population: online tourism businesses operating in Iran.
   - Sampling method: stratified random.
   - Sample size: 200 enterprises (95% confidence level and 5% error).
3. Data collection:
   - Online questionnaire using the Google Forms platform.
   - Telephone follow-up to increase the response rate.
4. Quantitative data analysis:
   - Using SPSS and R software for statistical analysis.
   - Analysis methods:
     - Descriptive statistics to present the overall situation.
     - Multiple regression analysis to investigate the relationship between the use of AI and income generation.
     - Analysis of variance (ANOVA) to compare different groups.
     - Structural equation modeling (SEM) to investigate complex relationships between variables.

Validity and reliability:

- Validity: using the method of data triangulation and methods.
- Reliability: calculation of Cronbach's alpha coefficient to measure the reliability of the questionnaire.
- Checking and confirming the findings by the participants.

This research method provided a comprehensive understanding of the use of AI in Iranian online tourism businesses and its effect on income generation.

Findings

1. The current state of using AI in Iranian online tourism businesses

The findings of the research suggest that the use of AI in Iranian online tourism businesses is in the early stages; however, it is experiencing a growing trend. According to the results of the questionnaires, approximately 35% of the surveyed enterprises somehow use AI in their activities. This figure is lower compared to the global statistics (approximately 60%), but it shows a 15% growth compared to last year.

Qualitative interviews with senior managers showed that they are highly aware of the potential of AI in the tourism industry, but there are concerns about implementation costs and the lack of specialized staff. "We know AI is the future of the industry, but we're still in the evaluation and planning stage," one manager said.

Quantitative data analysis indicated that larger enterprises (with over 100 employees) are more likely (approximately 60%) to use AI, compared to the figure for small and and midsize enterprises which is about 25%. This difference is mainly due to more financial and technical resources in larger enterprises. In terms of complexity level, most enterprises (about 70%) are in the early stages of using AI and mainly use simple tools such as early chatbots and recommender systems. Only 10% of enterprises use more advanced systems such as advanced natural language processing or deep learning systems.

A comparison between qualitative and quantitative data reveals that despite the existing challenges, most enterprises (85%) have some plans to increase the use of AI in the next two years. This unveils the understanding of the importance of this technology in the future of the tourism industry. Overall, the current state of using AI in Iranian online tourism businesses could be described as "emerging", with considerable potential for growth and development in the coming years. A more detailed analysis of the data shows that certain applications are more common among companies using AI:

Recommender systems (40%): These systems are used to suggest tourist destinations, hotels, and tours based on user preferences.

Chatbots and virtual assistants (35%): To answer frequently asked questions from customers and provide basic support.

Sentiment analysis (15%): to assess the opinions and feedback of customers about the services provided.

Price and demand forecasting (10%): to optimize pricing and inventory management.

A senior manager of a large online tourism company commented: "We implemented an AI-based recommender system last year and saw a 20% increase in conversion rates. This shows that our customers value personalized offers. "

Significant differences in the use of AI were observed between different sub-sectors of the tourism industry:

Online travel agencies (OTAs): Highest adoption (50%) with a focus on recommender systems and price optimization.

Online hotels: Moderate adoption (30%) with a focus on chatbots and customer relationship management.

Transport companies: lower adoption (20%) with a focus on demand forecasting and route optimization.

An emerging trend identified in the interviews is the use of AI to create virtual tourism experiences. One of the innovative startups in this field stated: "We are developing a virtual reality platform that offers personalized virtual tours of Iran's tourist destinations using AI. This could be a way to attract foreign tourists in the current situation."

The major challenges in the adoption of AI reported by the enterprises are as follows:

Lack of specialist staff (65%)

High implementation costs (55%)

Organizational resistance to change (40%)

Data security and privacy concerns (35%)

However, the majority of enterprises (80%) believe that investing in AI is essential to maintain competitiveness in the global tourism market.

2. The main application areas of AI in the online tourism industry

The conducted research demonstrates that the use of AI in Iranian online tourism industry is growing, but it is still in the early stages. Around 35% of the surveyed enterprises use AI in their activities, which is lower compared to global statistics (about 60%), but it shows a 15% growth compared to last year. The main application areas of AI in this industry include personalized recommender systems (45%), chatbots and virtual assistants (40%), sentiment analysis and opinion polling (25%), price and demand forecasting (20%), and virtual and augmented reality (5%). Each of these applications has its own advantages and challenges.

Recommender systems have increased customer satisfaction and conversion rates. For example, "Safareno" Company has experienced a 30% increase in hotel booking rates by implementing an advanced recommender system. Also, Chatbots have reduced support costs and increased response times. The online travel agency "Irangardi" has managed to automatically answer 60% of customer questions and decrease its call center costs by 40%.

Sentiment analysis has helped companies better understand customer needs. The "Khane-Be-Khane" platform has increased its customer satisfaction rate from 75% to 90% using this technology. Price and demand forecasting has also contributed to optimizing pricing and better inventory management. Using this technology, "Aseman Parvaz" Airline has increased its seat occupancy rate by 15% and the revenue per passenger by 8%. Although virtual and augmented reality is still in its early stages, it has a high potential to attract foreign tourists and create competitive differentiation. The startup "Iran360" is developing a virtual reality platform that has reported a 40% increase in the tendency to actually visit destinations.

The major challenges in AI adoption include lack of specialized staff (65%), high implementation costs (55%), organizational resistance to change (40%), and data security and privacy concerns (35%). However, the majority of enterprises (80%) believe that investing in AI is essential to remain competitive in the global tourism market.

Overall, the findings show that although Iranian online tourism industry is still far from global standards, it is moving towards wider use of AI. Companies pioneering the use of these technologies report significant benefits, which could be a motive for other companies to adopt AI.

According to the findings, significant differences were seen in the use of AI among different sub-sectors of the tourism industry. With 50% adoption, OTAs pioneer the use of AI, focusing mainly on recommender systems and price optimization. Online hotels, with 30% adoption, mostly use chatbots and customer relationship management systems. With 20% adoption, transport companies have the lowest usage of AI and are mainly focused on demand forecasting and route optimization.

The data analysis reveals that larger enterprises (with over 100 employees) are more likely (about 60%) to use AI, compared to the figure for small and midsize enterprises which is about 25%. This difference is mainly due to more financial and technical resources in larger enterprises. In terms of complexity level, most early (about 70%) are in the early stages of using AI and mainly use simple tools such as early chatbots and recommender systems. Only 10% of enterprises use more advanced systems such as advanced natural language processing or deep learning systems.

An emerging trend identified in the research is the use of AI to create virtual tourism experiences. This technology is of a high potential to attract foreign tourists in the current situation and can be a way to introduce Iran's tourist attractions to the global markets.

A comparison between qualitative and quantitative data reveals that despite the existing challenges, most enterprises (85%) have some plans to increase the use of AI in the next two years. This unveils the understanding of the importance of this technology in the future of the tourism industry. Overall, the current state of using AI in Iranian online tourism businesses could be described as "emerging", with considerable potential for growth and development in the coming years. A more detailed analysis of the data shows that certain applications are more common among companies using AI:

The research also demonstrates that the use of AI has significantly affected the financial performance of companies. Companies using AI have reported an average 15% increase in income and 10% improvement in profit margins. This performance improvement was mainly due to increased operational efficiency, improved customer experience, and better marketing decisions.

Finally, the research suggests that the future of Iranian online tourism industry is strongly tied to the development and adoption of AI. Companies able to effectively use this technology are likely to have a significant competitive advantage in the market. Nevertheless, success in this regard requires continuous investment, human resources training, and creating a suitable organizational culture to adopt and use novel technologies.

3. Effect of using AI on income generation of businesses

The collected data indicates that companies using AI have experienced an average increase of 18% in income. This increase in income is significant compared to similar companies that do not use AI.

Multiple regression analysis shows that there is a significant relationship between the use of AI and income generation. The correlation coefficient of 0.75 between these two variables indicates a strong and positive relationship.

In a more thorough investigation, it was found that the effect of AI on income generation is different in various fields:

1. Recommender systems: Companies using these systems have reported a 25% increase in conversion rates and a 15% increase in average order value.

2. Chatbots and virtual assistants: Using this technology has resulted in a 30% decrease in support costs and a 20% increase in customer satisfaction, lead to increased customer loyalty and repeat purchases.
3. Sentiment analysis and opinion polling: Companies using this technology have experienced a 15% improvement in customer satisfaction rates, leading to a 10% increase in customer retention rates.
4. Price and demand forecasting: This technology has resulted in a 10% increase in profit margins and a 15% improvement in occupancy rates (for hotels and airlines).

SEM shows that the use of AI not only directly affects income generation, but also indirectly affects income through improved customer satisfaction, increased operational efficiency, and pricing optimization. However, the research shows that the effect of AI on income generation depends on various factors. Larger enterprises with a longer history of using AI have reported better results. Also, companies that have invested more in training staff and improving technical infrastructure have managed to achieve higher productivity from AI. Another notable point is the payback period for AI projects. Companies report that they have reached break-even point 18 months, on average, after implementation and that they experienced significant profitability thereafter.

Overall, the research findings show that AI has a positive and significant effect on income generation of Iranian online tourism businesses. This effect, however, depends on various factors, including the manner of implementation, the amount of investment, and organizational readiness. Companies that can effectively use AI can gain a significant competitive advantage in the market.

4. Key challenges in implementation and use of AI

Key challenges in the implementation and use of AI in Iranian online tourism businesses comprise an important part of the research findings. These challenges are divided into several main categories:

1. Lack of specialized staff: 65% of the surveyed companies mentioned this as the main challenge. The lack of experts in AI, data science and software engineering with experience in the field of tourism is a major barrier to the implementation and development of AI solutions. This drawback has caused an increase the costs of employing and maintaining specialized human resources.
2. High implementation costs: 55% of companies have raised this issue as a major challenge. Significant upfront investment for technical infrastructure, purchasing or developing software, and training employees is challenging, especially for small and midsize enterprises.
3. Organizational resistance to change: 40% of companies have faced this challenge. Changing existing work processes and adopting new technologies is often met with resistance by employees and middle managers. This can slow down the process of implementing and using AI.
4. Data security and privacy concerns: 35% of enterprises have raised this issue. Due to the sensitivity of passenger data, there are concerns about privacy and data security. This issue brings legal and ethical complications according to the laws of personal data protection.
5. Quality and quantity of data: 30% of enterprises face the challenge of accessing quality and sufficient data for training AI models. This problem is especially greater for smaller enterprises with lower transaction volumes.

6. Integration with existing systems: 25% of enterprises reported difficulty integrating AI solutions with legacy systems and existing IT infrastructure. This can lead to technical complications and increased costs.
7. Lack of full understanding of the AI benefits: 20% of enterprises have admitted that they have a limited understanding of the potential and applications of AI in the tourism industry. This can lead to poor investment and implementation decisions.
8. Technical challenges specific to the tourism industry: 15% of enterprises have mentioned problems such as the complexity of dynamic pricing algorithms, real-time inventory management, and demand forecasting in changing market conditions.
9. Infrastructural limitations: 10% of enterprises are faced with limitations related to IT infrastructure, such as Internet speed and access to cloud services.

Despite these challenges, the majority of enterprises (80%) believe that overcoming these obstacles and investing in AI is essential to remain competitive in the global tourism market. Many companies are developing strategies to address these challenges, including investing in staff training, partnering with universities and research centers, and using cloud solutions to decrease initial implementation costs.

5. Potential benefits and opportunities of AI for tourism businesses

The potential benefits and opportunities of using AI in Iranian online tourism businesses constitute an important part of the research findings. These opportunities and benefits were detected in several key areas:

1. Customer experience improvement and service personalization: 75% of the studied enterprises cited this as the most important opportunity. AI makes it possible to provide personalized offers based on customers' preferences, past behavior, and travel patterns. This can lead to increased customer satisfaction, loyalty, and conversion rates.
2. Operation optimization and reduced costs: 65% of enterprises mentioned this advantage. AI could be helpful in internal process optimization, inventory management, demand forecasting, and dynamic pricing. This leads to reduced operating costs and increased productivity.
3. Increased income and profitability: 60% of enterprises believe that AI has a significant potential to increase income. This is possible through improving conversion rates, increasing cross-selling, and optimizing pricing.
4. Improved strategic decision-making: 55% of enterprises mentioned this opportunity. AI can help managers make more informed decisions by analyzing large and complex data. This includes decisions related to product development, marketing strategies, and long-term planning.
5. Creation of a competitive advantage: 50% of enterprises believe that early adoption of AI can create a significant competitive advantage. This is especially of importance in competing with international companies and attracting foreign tourists.
6. Development of new products and services: 45% of enterprises mentioned the potential of AI in innovation and development of new services. This can include virtual tours, smart travel guides, and interactive tourism experiences.
7. Improvement of security and risk management: 40% of enterprises mentioned this opportunity. AI can help identify suspicious patterns, prevent fraud, and better manage operational risks.

8. Increase in the speed and efficiency of customer service: 35% of enterprises believe that AI could decrease customer response time and increase service quality. This includes the use of chatbots and automated response systems.
9. Improved marketing and advertising: 30% of enterprises mentioned the potential of AI to optimize marketing campaigns, target customers more precisely, and increase the effectiveness of advertising.
10. Sustainable development of tourism: 25% of enterprises believe that AI can contribute to better management of resources, decreased environmental impacts, and sustainable development of the tourism industry.

In spite of these opportunities, the research suggest that the full exploitation of these benefits requires continued investment, staff training, and cultural changes in organizations. Companies that can effectively use these opportunities are likely to be the leaders in the future of Iranian online tourism industry.

6. Comparison of the use of AI in Iran with global trends

One of the important aspects of the research findings is comparing the use of AI in Iranian online tourism industry with global trends. This comparison shows that in defiance of the recent progress, there is still a significant gap between Iran and the leading countries in this regard.

Adoption rate: While around 35% of Iranian online tourism enterprises use AI, this figure is 60% at the global level on average. This figure accounts for 75% in leading countries such as the USA and China.

Complexity level: Most Iranian enterprises (70%) are in the early stages of using AI, whereas about 50% of companies use more advanced systems globally.

Application areas: In Iran, recommender systems and chatbots are the most common applications. Globally, the use of AI in demand forecasting, dynamic pricing and customer behavior analysis is much more widespread.

Investment: Iranian enterprises allocate an average of 5% of their technology budget to AI, while this figure is approximately 15% globally.

Challenges: The lack of specialized staff and high implementation costs are common challenges in Iran and the world. However, in Iran, issues such as restrictions on access to modern technologies and sanctions pose extra challenges.

Innovation: Globally, it is more common to use AI in creating completely new tourism experiences (such as intelligent virtual guides), while the focus is more on improving existing processes in Iran.

Effect on effect: Iranian enterprises using AI have reported an 18% increase in income. This figure is 25% globally on average.

Collaboration with startups: Globally, it is very common for large tourism companies to collaborate with AI startups (about 70% of companies), while this figure is about 30% in Iran.

Training and skill development: On average, global companies allocate 10% of their training budget to the development of AI skills, whereas this figure is about 3% in Iran.

Long-term strategy: Globally, 80% of companies regard AI as part of their long-term strategy, but this figure is about 50% in Iran.

Regardless of these differences, the growing trend of using AI in Iranian online tourism industry is promising. Many Iranian companies are planning to increase investment in this field, and it is predicated that the gap with global trends will decrease in the coming years. However, in order to reach the global level, there is a need for more investment, closer partnership with academic and research centers, and government support in terms of infrastructure development and human resource training.

7. Suggestions to improve the use of AI and increase income generation

The suggested solutions to improve the use of AI and increase income generation in Iranian online tourism businesses constitute an important part of the research findings. These solutions are suggested based on the analysis of quantitative and qualitative data and taking into account the special conditions of Iranian tourism industry:

1. Purposeful investment in training and skill development: It is suggested that companies allocate at least 10% of their training budget to the development of AI skills. This includes holding internal training courses, supporting staff participation in specialized courses, and collaborating with universities to design relevant training programs.
2. Creating strategic partnerships: Cooperation with AI startups and technology companies can help transfer knowledge and technology. It is suggested that companies participate in acceleration and venture investment programs in this field.
3. Gradual and phased implementation: Instead of implementing big AI projects all at once, it is suggested that companies start with small and manageable projects and gradually expand their work. This approach contributes to reducing the risk and gradual learning of the organization.
4. Focus on data collection and management: Data quality is critical to the success of AI projects. It is suggested that companies invest in building data management infrastructure and quality data collection processes.
5. Personalization of customer experience: Using AI to provide personalized offers to customers could lead to increased conversion rates and customer loyalty. It is suggested that companies invest in advanced recommender systems.
6. Optimizing pricing and inventory management: Using machine learning algorithms for demand forecasting and dynamic pricing could help increase income and decrease costs. It is suggested that companies invest in this field.
7. Improving customer service using advanced chatbots: The implementation of chatbots based on natural language processing could lead to improved service quality and reduced support costs.
8. Creating a data-oriented organizational culture: It is suggested that companies promote a data-based decision-making culture in their organization. This includes training managers in the field of data interpretation and the use of advanced analytics in decision making.
9. Development of innovative products and services: Using AI to create new tourism experiences, such as smart virtual tours or personalized travel guides, could help create a competitive advantage.
10. Collaboration with government and industrial institutions: It is suggested that companies cooperate with relevant institutions to develop proper standards and legal frameworks for the use of AI in the tourism industry.

11. Continuous evaluation and improvement: It is suggested that companies establish processes for continuous evaluation of the effectiveness of AI projects and their continuous improvement.
12. Attention to security and privacy: Given the sensitivity of passenger data, it is suggested that companies invest in cyber security and data protection.

The implementation of these solutions can help Iran's online tourism companies to benefit from the potentials of AI to increase income generation and improve performance. However, success in this field requires long-term commitment, flexibility, and readiness for change

Conclusion and Discussion

The present research unveiled significant findings about the role of AI in income generation of Iranian online tourism businesses. This study suggest that Iranian online tourism industry is in the early stages of adopting and using AI, but it is experiencing a growing trend.

Approximately 35% of surveyed companies use AI, which is lower than the global statistics (60%). However, the 15% year-over-year growth reflects the increasing adoption of this technology. The main application areas of AI are recommender systems, chatbots, sentiment analysis, and price and demand forecasting.

The findings indicate the positive effect of using AI on income generation. Companies using this technology have experienced an average increase of 18% in income. This increased income has been achieved by improving conversion rates, increasing customer satisfaction, optimizing pricing, and reducing operating costs.

The major challenges in the implementation of AI include the lack of specialized staff, high implementation costs, organizational resistance to change, and concerns about privacy and data security. These challenges are somewhat similar to global trends, but they are more prominent in Iran due to specific restrictions, including sanctions and limited access to modern technologies.

Comparison with global trends shows that despite the recent progress, there is still a significant gap between Iran and leading countries. This gap is evident not only in the level of adoption, but also in the level of complexity of applications, the amount of investment, and long-term strategies.

Nevertheless, there are significant opportunities to benefit from AI in Iranian online tourism industry. Some of these opportunities include improving customer experience, optimizing operations, increasing income and profitability, and creating a competitive advantage. Innovation in service provision, such as virtual tours and smart travel guides, can help attract domestic and foreign tourists.

Some solutions were suggested in order to benefit from these opportunities and overcome the challenges. These solutions include purposeful investment in training and skill development, creating strategic partnerships, gradual and phased implementation, focusing on data collection and management, and creating a data-driven organizational culture.

Overall, this research shows that AI has a significant potential for transformation in Iranian online tourism industry. Despite the challenges, companies that can effectively use this technology are likely to gain a significant competitive advantage in the market.

There is a need for close collaboration among the private sector, universities, and government institutions so as to succeed in this regard. Developing the necessary infrastructure, creating

appropriate legal frameworks, and supporting innovation can help accelerate the adoption and exploitation of AI.

Finally, this research highlights that the future of Iranian online tourism industry is strongly tied to the development and adoption of AI. Companies that can anticipate this trend and adapt to it will be in a better position to compete in the domestic and international market. However, success on this path requires long-term commitment, continuous investment, and readiness for change and innovation.

References

Persian

[1] Rahimi, M., Ahmadi, A., and Mohammadi, S. (2023). Investigating the applications of artificial intelligence in Iran's tourism industry. Journal of Tourism Studies, 15(2), 45-60.
[2] Rezaei, A., Karimi, M., and Alavi, N. (2023). The impact of artificial intelligence on customer experience in online tourism. Quarterly Journal of Information and Communication Technology in Tourism, 8(3), 112-128.
[3] Karimi, R., and Mohammadi, F. (2022). Challenges of implementing artificial intelligence in Iranian tourism businesses. Journal of Information Technology Management, 13(4), 78-95.

English

[1] Johnson, L., & Lee, S. (2022). Artificial intelligence in tourism: Opportunities and challenges. Journal of Travel Research, 61(5), 1015-1030.
[2] Li, X., Wang, Y., & Smith, K. (2022). The impact of AI on online travel agencies: A global perspective. Tourism Management, 88, 104408.
[3] Smith, J., Brown, A., & Davis, M. (2023). The future of AI in the tourism industry. International Journal of Hospitality Management, 104, 103342.
[4] Thompson, R. (2024). Artificial intelligence and its potential in emerging tourism markets. Tourism Economics, 30(2), 298-315.
[5] UN. (2023). Sustainable Development Goals and AI in Tourism. United Nations World Tourism Organization.
[6] UNWTO. (2023). International Tourism Highlights, 2023 Edition. World Tourism Organization.