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4 The New Economic Paradigm Formed by Metaverse in the Tourism Sector

Touristic GIG Economy

Sabri Öz and Pınar Başar

Introduction

Technological and digital transformation is realizing the most important paradigm shifts of the 21st century. Especially after COVID-19, every component of digital transformation, disciplines such as data integration, big data, AI, and cyber security began to rapidly show their impact in every field. In this context, virtual reality and augmented reality (AR/VR) technologies have also accelerated, especially with metaverse structures. It is seen that there are intensive practices to be effective in every field of the services sector.

With remote working after COVID-19 and the transformation of many jobs and studies to online platforms, the way of working has also caused radical transformations in labor markets. The transformation process is still ongoing. It is seen that AR/VR technologies have an impact in many areas, especially in the gaming industry. The most important working platforms in this field are associated with the metaverse.

The purpose of this study is to determine the weight of metaverse applications included in the GIG Economy in terms of PESTLE (Political, Economical, Social, Technological, Law-Legislation, and Environmental aspects) components. In other words, it is to investigate the answer to the question of what way metaverse applications will affect the tourism industry. The methodology of the study can be called mixed-method. The combination of literature review, bibliometric analysis, analytical hierarchical process (AHP) analysis, and PESTLE analysis seems to be in line with the mixed method approach.

The plan of the study includes a literature review in the first part, which will be related to tourism on a conceptual basis, and then a bibliometric analysis where all concepts are used together and carried out with the keywords of the study. In the second part, there is an application where AHP Analysis and PESTLE Analysis are evaluated together. The study will end with the Findings and Discussion section where the analysis results are evaluated.

Literature Review and Bibliometric Analysis

There are many intensive studies on tourism in the literature. There are over 123,000 studies on tourism on the Web of Science (WoS) platform alone. In this section,

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studies containing the keywords GIG Economy, metaverse, and AHP along with tourism will be questioned.

GIG Economy and Tourism

Of the 123,000 studies mentioned earlier, while approximately 30,000 are related to technology, only 17 studies contain the words "GIG Economy" and "Tourism" together in the title, abstract, and keywords of the studies (TS=GIG Economy AND TS=Tourism) (Clarivate, 2023). In Figure 4.1, the 123,000 tourism-related studies on the WoS platform are categorized.

Figure 4.1 shows that there are a total of 30,963 studies in the fields of management, business, technology, and social sciences, assuming that they are completely or partially related to technology.

In studies involving the concepts of tourism and GIG Economy, studies on the sharing of income of the sharing economy can be found in the field of tourism (Chen et al., 2022). It can be seen that the GIG Economy is discussed with its positive and negative aspects (C. Kobis et al., 2021). Just as the resignations that came with the COVID-19 epidemic and are closely related to the tourism sector have been examined, it is seen that specific areas have also been studied and a relationship has been established with the GIG Economy (Liu-Lastres et al., 2023).

When GIG Economy is mentioned, important platforms such as Uber, Airbnb, and Amazon come to mind. In this context, studies related to the GIG Economy, sharing economy, and Airbnb are seen and the effects are analyzed (Cassell & Deutsch, 2023; Hall et al., 2022).

It is seen that there are also studies on the basis of countries and regions in the field of GIG Economy and tourism and, again, studies on Ashmania and Cuba where the Airbnb effect was investigated (Cassell & Deutsch, 2023; Nemer et al., 2018). Additionally, it is possible to see a study on Malaysia (Nga et al., 2021)



Figure 4.1 Tree map of WoS categories of the query: "TS=Tourism" (Clarivate, 2023).

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including COVID-19 and unemployment and studies on the same subject in the Southern African region (Baum & Giddy, 2021).

There are also studies on bibliometric analysis of the GIG Economy, especially the sharing economy (Gürsoy, 2023; Klarin & Suseno, 2021). In addition to bibliometric studies, systematic scanning and mapping studies have also been seen (Laurenti et al., 2019).

Metaverse and Tourism

Although metaverse has started to gain popularity, especially with the ecosystem to be created on blockchain, its influence has started to decrease recently. However, with the spread and especially the development of AR/VR technologies and the beginning of the study of MR and XR disciplines, R&D activities carried out on a sectoral basis also become valuable. Just looking at the titles on the WoS platform, there are 23 studies containing the words tourism and metaverse (TI=Metaverse AND TI=Tourism).

When we look at the studies on countries in Figure 4.2, we see that the distribution is concentrated in certain regions.

According to Figure 4.2, seven of the 23 studies are on the People's Republic of China and four are on the USA, accounting for approximately half (48%) of the studies.

Since the subject of metaverse is still a new understanding, it is seen that conceptual studies are included and future approaches are discussed (Gursoy et al., 2022; Koo et al., 2022; Volchek & Brysch, 2023; F. X. X. Yang & Wang, 2023).

In studies on metaverse and tourism, some analyses have focused on concerns and anxieties (Buhalis, Leung, et al., 2023; Monaco & Sacchi, 2023; Wei, 2023).

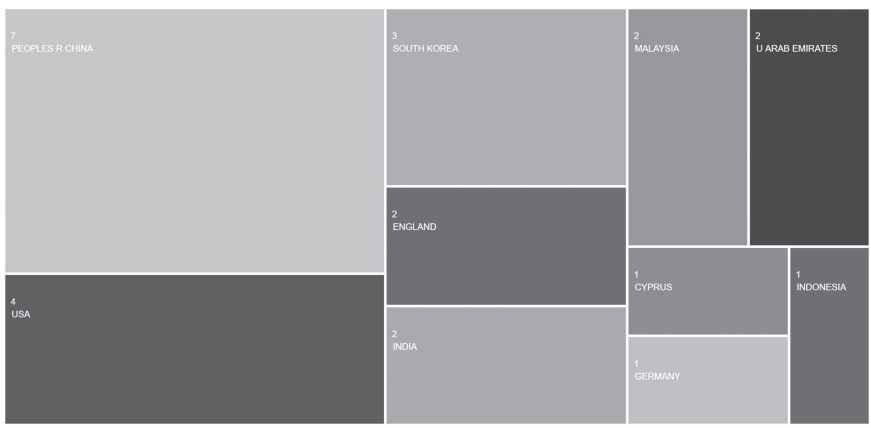

Figure 4.2 Tree map of countries/regions of the query: "TI=Tourism AND TI=Metaverse" (Clarivate, 2023).

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Some of them include positive contributions to the tourism market and what positive results it will bring in the future (Tsai, 2022; Ucgun & Sahin, 2023).

In studies that directly express the relations between the tourism market and the metaverse, the effects and roles of other disciplines of technological and digital transformation have been investigated, and it has been observed that the most intense relationship in this field is created by artificial intelligence (AI) and blockchain (Jo, 2023; Lin et al., 2023).

In addition to these studies, it is seen that there are also studies in the literature on a sectoral basis (such as smart tourism, health field, sports field, and muse tours) (Buhalis, Lin, et al., 2023; Sanchez-Amboage et al., 2023; Shaygani et al., 2022; Suanpang et al., 2022).

AHP Analysis and Tourism

When looking at AHP studies in the field of tourism on the WoS platform, the number of documents found is 56. It is seen that more than half of the studies are related to the environment and sustainability, and very few of them are focused on technological and digital transformation. In a sense, this reveals the distinctive feature of this study. Figure 4.3 shows the distribution of AHP and tourism-related studies by WoS category.

As can be seen from Figure 4.3, while there are 36 studies on environment and sustainability, fields directly based on technology are much less.

When the studies are examined, it is seen that AHP is generally used with Fuzzy AHP or a different derivative (such as Fuzzy AHP) and the focus is on weighting. AHP has become a particularly preferred method for weighting the criteria that will affect decisions in multi-criteria decision-making techniques. It is considered an advanced tool for criterion weighting, especially in studies based on qualitative

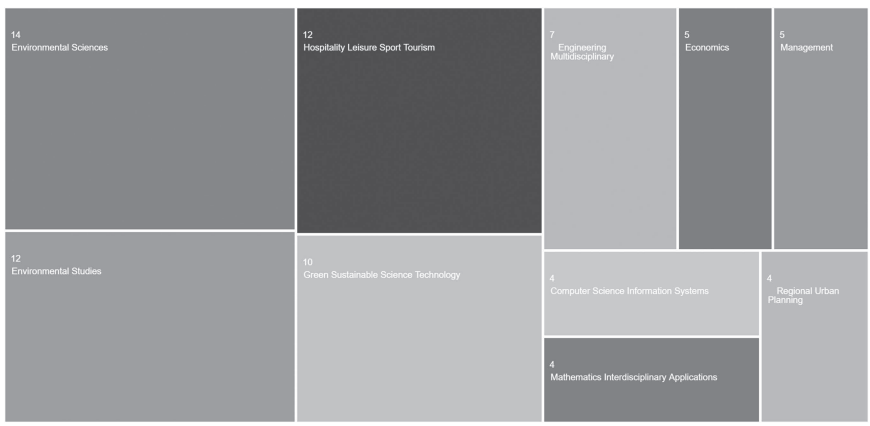

Figure 4.3 Tree map of WoS categories of the query: "TI=AHP AND TI=Tourism" (Clarivate, 2023).

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and subjective data (Buyukozkan et al., 2021; Cao, 2022; Kim et al., 2017; Tian et al., 2020; Wang et al., 2016; S. Yang & Kong, 2022).

Criteria weighted by the AHP method are important in scoring alternatives and providing input in choosing among alternatives. When we look at the studies on the tourism sector using multi-criteria decision-making techniques in choosing among alternatives, it can be seen that there is no intensive work on the WoS platform. It is seen that Topsis and Promethee methods are used in choosing between alternatives (Butowski, 2018; Tian et al., 2020; Ulkhaq et al., 2016).

Combining the Scope via Bibliometric Analysis

When working on the WoS platform with an overview of the keywords of this study, the following results are obtained:

- TI=(Tourism) AND (TS=("GIG Economy") OR TS=(Metaverse) OR TS=(AHP)) gives 274 results whereas
- TI=(Tourism) OR TI=("GIG Economy") OR TI=(Metaverse) 61,857 and
- When we narrow the research for the last five years (2020-2021-2022-2023-2024), it is seen that 17,985 documents were obtained.

In this section, the bibliometric analysis of the 274 studies obtained, and subsequently, the 17,985 data will be briefly reviewed with the VosViewer program.

In the study, where 274 printouts were taken, a search was made with the keywords Metaverse, AHP, and GIG economy, which are the subject of this study, depending on the tourism keyword. The data were exported as input to the Vosviewer program and then the program was run. Based on 274 studies, a total of 857 keywords were found and 27 of them were repeated at least five times. Figure 4.4 shows the distribution and relationships of keywords.

Overlay visualization is a network visual that expresses how often keywords are used over time and how often they are used in relation to which keywords. It is stated in Figure 4.4 that tourism and AHP and derivative keywords have been intensively studied in the past (2014–2018 periods), whereas, as a part of the GIG Economy, topics related to metaverse, VR, and sustainability have been intensively studied recently. When looking at the study density (the size of the spheres symbolizing the keywords), it can be interpreted that recent studies (Metaverse and VR) can be studied more. When the link and clustered keywords are examined, it is seen that these three separate disciplines are strong between AHP and tourism, but weaker with the fields representing the GIG Economy. This is why this study is important.

Figure 4.5 shows the clustered keywords.

In Figure 4.5, the aforementioned separation can be seen more clearly. Keywords related to the GIG Economy appear independently of the others in Cluster 3.

On the other hand, when 17,985 of the 61,857 documents obtained with the (TI=Tourism OR TI=GIG Economy OR TI=Metaverse) SQL query in the last five

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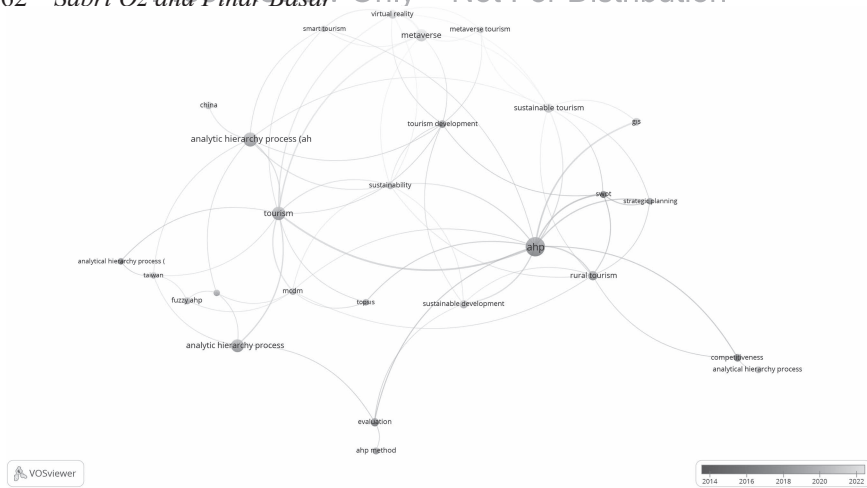

Figure 4.4 Overlay visualization of the query on WoS: TI=Tourism AND (TS=GIG Economy OR TS=Metaverse OR TS=AHP) (Vosviewer, 2023).

27 items (6 clusters):

Cluster 1 (8 items)
analytic hierarchy process
analytical hierarchy proces
fuzzy ahp
mcdm
medical tourism
taiwan
tops1s
tourism

Cluster 3 (5 items)
metaverse
metaverse tourism
smart tourism
tourism development
virtual reality

Cluster 2 (6 items)
ahp
gis
rural tourism
strategic planning
sustainable tourism
swot

Cluster 4 (3 items)
ahp method
evaluation
sustainable development

Cluster 5 (3 items)
analytic hierarchy process
china
sustainability

Cluster 6 (2 items)
analytical hierarchy proces
competitiveness

Figure 4.5 Clusters of the query on WoS: TI=Tourism AND (TS=GIG Economy OR TS=Metaverse OR TS=AHP) (Vosviewer, 2023).

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years are examined in their entirety, the results of the WoS platform on the work areas are shown in Figure 4.6.

Figure 4.6 shows that of the 17,985 studies that included the words tourism, GIG Economy, or metaverse in their study titles, more than half focused on the environment, sustainability, and types of tourism.

When 17,985 documents are studied in the VosViewer program, the overlay visualization output of the keywords is seen in Figure 4.7.

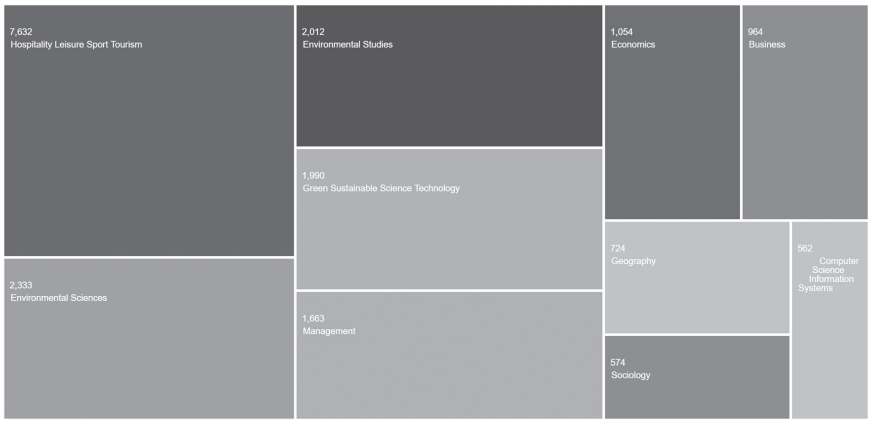

Figure 4.6 Tree map of WoS categories of the query: TI=Tourism OR TI=GIG Economy OR TI=Metaverse (Clarivate, 2023).

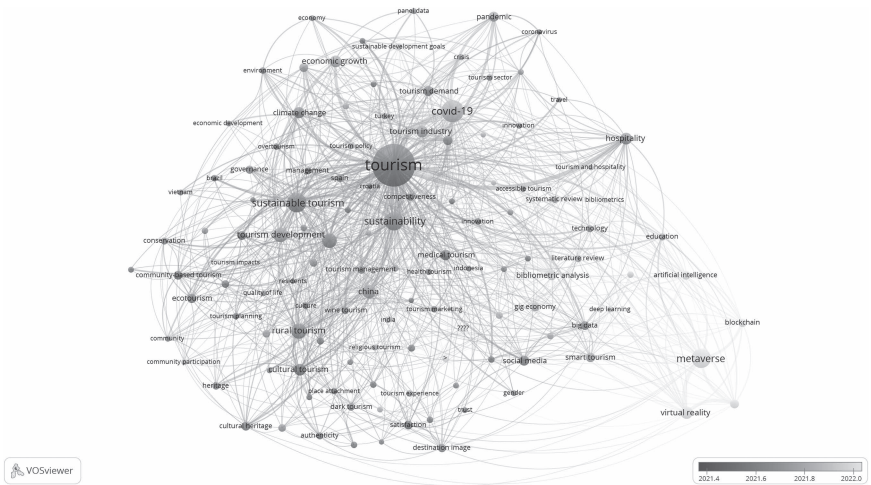

Figure 4.7 Overlay visualization of the query on WoS: TI=Tourism OR TI=GIG Economy OR TI=Metaverse (Vosviewer, 2023).

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Interestingly, when looking at the picture from above, areas that include technological and digital transformation such as VR, metaverse, blockchain, and AI, which can be considered parts of the GIG Economy, are both less studied and less studied than keywords such as tourism, sustainability, COVID-19 in previous years. It can be seen in Figure 4.7 that it has been studied. In the analysis of 17,985 documents, it was found that 33,237 different keywords were used and 125 keywords shown in Figure 4.7 were repeated at least 50 times (Vosviewer, 2023).

The density chart of 125 keywords for the same query, with the same settings, regardless of time, shows that the GIG Economy is not sufficiently associated with tourism, regardless of time, and is still studied at low intensity.

Methodology: AHP Analysis via Pestle Components

In this section, the implementation of the study in the field is seen. The study gathered demographic information of the business people and conducted interviews with nine experienced business people on tourism, technological, and digital transformation, and PESTLE analysis was carried out in accordance with the AHP analysis structure. PESTLE analysis studied which political, economic, social, technological, legal, and environmental dimensions are more important for the future of metaverse, representing the GIG Economy in tourism.

Contributors to AHP Analysis

In this study, evaluation was made with the fuzzy logic version of AHP analysis. Demographic information of the nine sector representatives participating in the research is shown in Table 4.1.

Participants in the business world, who have been familiar with the tourism sector for at least 15 years, were encouraged to think about the future of the tourism sector, and especially by giving preliminary information about the GIG Economy, the purpose was explained and their opinions were received through a

Table 4.1 Demographic data of participants

Name/surname	*Experience*	*Field*	*Sector*	*Location*	*Code*
Ö**K**	42	Management	Aviation	Italy	P1
M**Ö**	16	Service	Tourism	Misc.	P2
V**Ü**	31	Catering Owner	Tourism	Türkiye	P3
Ö**F**Y**	18	Hotel. Owner	Service	Türkiye	P4
R**Y**	16	Manager	IT-Tourism	Hungary	P5
P**Ö**B**	19	CEO	Restaurant	Germany	P6
S**Y**O**	20	Co. Owner	Service	Türkiye	P7
V**F**B**	20	Manager	Tourism Finance	Hungary	P8
S**H**	25	Management	Aviation-Cargo	Misc.	P9

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semi-structured interview in accordance with the AHP rules. In the tourism sector, the structures on the metaverse were explained, examples were given, and then the aspects in which the tourism sector would be affected were emphasized.

The first question will be,

> Considering the impact of sightseeing tours on the Tourism sector in virtual environments such as Metaverse, is the "Political" impact or the "Economic" impact more important? If you were to rate the level of importance, would you say how many times it is effective, with 1 being the least effective and 9 being the most effective?

The same question frame would be asked by changing the impact factors such as political, economic, social, technological, legislation, and environmental, which are the components of PESTLE.

Particular efforts were made to ensure that the business people interviewed had the same issue to understand with each question. Although the participants coded P1, P3, P8, and P9 emphasized that the issue would vary depending on the sector, especially when evaluating the political and legal situation, they were persuaded to make an average judgment.

AHP Analysis

While performing the AHP Analysis, the six criteria considered were asked to be compared in pairs, and a comparison was requested based on numerical data regarding which criterion was more important and its degree of importance. In this analysis method developed by Saaty (SAATY, 1966; Saaty, 1974, p. 2) in order to minimize subjectivity, information was given in the field of GIG Economy and metaverse and discussions were made about the applications. Although none of the participants had metaverse experience, it was observed that they were knowledgeable about metaverse and AR/VR technologies.

A total of 30 questions were asked to each participant, as they were asked to make pairwise comparisons of six criteria and then rate them. (There are two questions in each comparison – which one is important and how important it is.) A minimum of 72 and a maximum of 91 minutes of study was conducted with each participant.

The information obtained from the studies was compiled using the MS Excel program for AHP analysis to create a decision matrix. For each comparison, the value from each participant was reduced to a single value to create its geometric mean. For example, when each participant was asked which of the economic and environmental factors was more important, the values given in Table 4.2 were obtained, and the calculation is also shown in Table 4.2.

As shown in Table 4.2, P3 said that the environmental issue is more important than economic criteria when thought the impact of metaverse on tourism. P4 said that both are of equal importance. And the rest of the participants thought that the economic factor is more important than the environmental factor. Therefore, the

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Table 4.2 Comparison of economic (Ec) and environmental (En) criteria for metaverse on tourism

	P1	*P2*	*P3*	*P4*	*P5*	*P6*	*P7*	*P8*	*P9*
Which one is important?	Ec	Ec	**En**	=	Ec	Ec	Ec	Ec	Ec
The level of importance?	2	3	**3**	1	3	2	3	2	3

Geometric average = 9th root of: 2*3***1/3***1*3*2*3*2*3 =1.82 (Economic)

Initial Matrix

	P	Ec	S	T	L	En
P	**1.000**	0.183	0.127	0.121	0.189	0.149
Ec	5.475	**1.000**	2.961	0.333	3.769	1.817
S	7.882	0.338	**1.000**	0.523	1.489	0.914
T	8.258	3.000	1.912	**1.000**	3.425	4.215
L	5.294	0.265	0.672	0.292	**1.000**	0.783
En	6.730	0.550	1.094	0.237	1.277	**1.000**
Sum	34.639	5.336	7.766	2.507	11.149	8.878

Normalized Matrix

	P	Ec	S	T	L	En	weight
P	0.029	0.034	0.016	0.048	0.017	0.017	**0.027**
Ec	0.158	0.187	0.381	0.133	0.338	0.205	**0.234**
S	0.228	0.063	0.129	0.209	0.134	0.103	**0.144**
T	0.238	0.562	0.246	0.399	0.307	0.475	**0.371**
L	0.153	0.050	0.086	0.116	0.090	0.088	**0.097**
En	0.194	0.103	0.141	0.095	0.115	0.113	**0.127**
Sum	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**	

Weighted Matrix

	P	Ec	S	T	L	En	sum	sum/weight
P	0.027	0.043	0.018	0.045	0.018	0.019	0.170	**6.320**
Ec	0.147	0.234	0.427	0.124	0.367	0.230	1.528	**6.538**
S	0.212	0.079	0.144	0.194	0.145	0.116	0.890	**6.174**
T	0.222	0.701	0.276	0.371	0.333	0.534	2.437	**6.564**
L	0.142	0.062	0.097	0.108	0.097	0.099	0.606	**6.233**
En	0.181	0.129	0.158	0.088	0.124	0.127	0.806	**6.365**
						Eigenevalue. e. (Average of the sum/weight) :		**6.366**
						Consitancy Index. CI. [CI = (e−6)/(6−1)] :		**0.073**
						Consistancy Ratio. CR. [Consitant if CR = CI/R16 < 0.10] :		**0.058**

Figure 4.8 Calculations for AHP analysis.

geometric average of economic factor is 1.82 times more important than the environmental issue when it is thought the impact of metaverse on tourism.

As Figure 4.8 depicts, since economic criteria are 1.82 times more important than the environment, the opposite is also relevant: Environmental issue is 1/1.82 = 0.55 times more important than economic issue.

Table 4.3 shows the AHP output.

As seen in Table 4.3, it is stated that metaverse and GIG Economy will have the most impact on the tourism sector with its technological aspect. In this context, it can be interpreted that the tourism sector should develop a strategy by focusing on the technological field. The economic criterion comes second. In this context, investment and budgeting will be of great importance. The fact that the social dimension of the issue should not be ignored comes third.

Findings and Discussion

The most intense criticism of AHP analysis stems from the fact that it starts with subjective evaluations. In this study, the fact that each participant was informed

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Table 4.3 Output of the AHP

Number of parameters (components), n		*6*
Calculated eigenvalue, e		6.375
Consistency index, CI = (e-n)/(n-1)		0.075
Random Saaty index, RI_6		1.252
Consistency ratio, $CR=CI/RI_6$		0.06
Analysis result (CR<0.10 is consistent)		**Consistent**
Components	**Weight**	**Rank**
(**P**)olitical	0.03	6
(**Ec**)onomical	0.24	2
(**S**)ocial	0.14	3
(**T**)echnological	0.37	1
(**L**)egislation and laws	0.10	5
(**En**)vironmental	0.13	4

to ensure a homogeneous understanding of the parable, was informed about the study in advance, and provided the participants with the opportunity to prepare was intended to alleviate this criticism.

On the other hand, would the situation be different if the opinions received from the participants were evaluated with direct questions without any information or even a conversation? This is a matter of debate, but the method applied in this study was informed.

As stated in the sections above, some participants emphasized that the answers given to the questions may vary depending on the type of tourism. Therefore, another issue that can be discussed is "what would the result be if the study was developed on a sectoral scale?" may be the answer to the question. Therefore, it may be useful to renew this study for different species in different tourism fields. Different results may occur in health tourism, beach tourism, educational tourism, or sports tourism, and important results can be obtained in developing strategies according to the types of tourism.

In this study, metaverse and AR/VR technologies, as a component of the GIG Economy, were scanned through a bibliometric study, and analyses were made based on this. The studies carried out can also be supported by studies carried out in other countries. Different conclusions can also be drawn from the fact that studies on countries and regions are concentrated.

It has long been a matter of debate why bibliometric analysis is performed only on WoS. WoS is one of the leading database hosting platforms in the world. There may be sectoral advantages in platforms from time to time. In the field of social sciences, WoS is considered sufficient. Studies have shown that, for example, a bibliometric analysis conducted on Scopus and the WoS platform gives similar results (Öz, 2023).

As can be seen from the literature review and bibliometric analysis, there are other components of the GIG Economy. When metaverse and other components are compared, a study can be conducted to determine which one will have a more intense impact on tourism. While this is a matter of discussion for this study, it

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is also important in terms of guiding other studies. Components and disciplines involved in technological and digital transformation, such as AI, blockchain, or cyber security, may produce different results. Moreover, these components are disciplines that also play an active role in the GIG Economy.

The consistency of the results and opinions obtained with AHP analysis, in a sense, represents a known or predicted fact. In this study, this situation can be considered proven with an analytical methodology. Essentially, depending on this, strategic road maps to be implemented by the sector can be shaped. If technology is the first important factor in the analysis handled with AHP, what could be the next step to evaluate this result? Since AHP provides an input into the algorithmic methodologies to be used in choosing between alternatives, how can it guide a tourism company that wants to improve its technology? As an answer to this question, one can try to consider the components of Industry 4.0 as alternatives and choose between them. By using methods such as Topsis or Promethee, Electra, a study can be produced that includes the AHP output and explains and guides the investor on which component should be used in technological and digital transformation.

In a mechanism where alternatives are ready, criticism based on subjective opinions on the AHP side can be eliminated by using the CRITIC method, one of the multi-criteria decision-making techniques.

Conclusion

Technological and digital transformation is very effective in the tourism sector, as in every field. Tourism is the most heavily affected and damaged sector due to COVID-19. It has to develop actions for both competitive advantage and efficient and effective use of resources through technological transformation. This being the case, the GIG Economy, which emerged with the influence of technological developments, causes new paradigms to emerge. In the GIG Economy, metaverse applications are the most important component. People can perform many actions such as traveling to other universes from where they are, creating other universes, and even visiting museums and participating in sports activities and events. Moreover, they have the opportunity to carry out these activities by actually touching, feeling, and experiencing the three-dimensional designs at a lower cost, right from their home, without wasting time, without changing places, and without experiencing transportation problems. Therefore, metaverse was deemed worthy of research for tourism within the GIG Economy, and what its effects could be and with what criteria it could affect the sector were investigated.

In the research, a detailed bibliometric analysis was conducted on the GIG Economy, AHP analysis, tourism, and metaverse. According to the analysis made on the WoS platform, it seems that there are very few studies on the metaverse and the tourism sector, that studies have started recently, and that it is still an open subject to be studied. Bibliometric analysis also shows that AHP analysis is supported by intensive studies accepted in the tourism sector. Despite the critical approaches to AHP, it has been observed that it is also used extensively in the tourism sector in weighting criteria in terms of multi-criteria decision-making techniques. For this

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reason, this study makes this study unique in that it is a study in which GIG Economics and AHP methodology have been applied together in the tourism sector, and its intensive use means that AHP can be applied to tourism.

The originality of the study should be stated once again, as a study that assumes the PESTLE components of AHP analysis as criteria and applies these criteria on the GIG Economy (and therefore metaverse) and tourism. In this original study, the Political, Economic, Social, Technological, Legal, and Environmental effects, which are among the PESTLE components, were accepted as the effects of metaverse applications on tourism, and these criteria were weighted with AHP analysis. As a result of the study and analysis, it was seen that technology was the most important criterion, as stated by nine participants. It is accepted that technological factors have a very important place in establishing competitive advantages, maintaining and developing competitive advantages, resource use, and efficiency. In this regard, the technological factor is the most important factor (0.37), which carries a positive message about the future, the planning of businesses, the investments they will make in strategic areas, and the roadmaps they will follow toward digitalization. In this case, it can be suggested that they should accelerate their work on alternatives to technological and digital transformation.

The second and most important criterion is seen as the economic factor (0.24). It can be thought that the reason why the economic factor is so important is because technology, especially AR/VR technologies, is already a capital-intensive product. For this reason, this study emphasizes that investments in technological and digital transformation are necessary and that budgeting and financing are very important.

The third important factor appears to be the social factor. According to the results of the AHP analysis, this factor, which has a weight of 0.14, is one of the most discussed areas for metaverse in technological and digital transformation, but tourism is more positive in this sense.

Environmental factors have been discussed very intensively recently in areas such as climate crisis and green energy. Tourism has long been referred to as "industry without smokes." It means that it is chimney-free, therefore smoke-free, and therefore has the lowest level of greenhouse gases. Traffic and transportation are the most important environmental pollutants in the tourism sector. Since an application like metaverse eliminates the transportation issue, the harmful factors will also be eliminated. For this reason, it is normal that it ranks fourth in the evaluation.

There is no applicable legal regulation regarding metaverse platforms yet. In countries that have norms in certain areas, it is not possible for it to work with all its content because new applications are developed every day. For these and similar reasons, both state legal regulations and policy criteria have been determined as factors at the lowest level.

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