

INVESTIGATION OF ASTROTOURISM ACTIVITIES IN SOCIAL MEDIA ENVIRONMENT WITHIN THE SCOPE OF CONTENT ANALYSIS: THE CASE OF KONYA SCIENCE CENTER

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Abstract

Astrotourism is defined as a type of travel that includes activities related to the sky and space. It is preferred by participants who are interested in astronomy and want to observe the stars. Observation points and astronomy tours in rural areas support this form of tourism. Accompanied by telescopes and expert guides, visitors are provided with information and an unforgettable experience. Astrotourism encourages people to escape their daily lives and discover the fascinating beauties of the sky. The study was prepared primarily to explain the concept of astrotourism and to reveal the activities carried out in this context and the interest in them. The data evaluated within the scope of content analysis were obtained from studies in national and international literature and posts on the official Instagram account of Konya Science Center. The main reason for choosing Konya Science Center is that it allows individuals of all age groups to evaluate daily events with science and technology. For this purpose, astrotourism-related photo and video posts on the relevant social media accounts were analysed by dividing them into themes. A general evaluation was made by determining the qualities of the posts, comments and likes on them. In line with the data analysed and interpreted through the MAXQDA qualitative data analysis program, strategies for diversifying tourism and developing astrotourism were developed. In addition, recommendations are presented to relevant people and organisations.

Keywords: autoethnography, department head, department chair, training, development

JEL Classification: I23, M12, J24

1. INTRODUCTION

Technological advances have started to change travel and vacation habits. People now search for different experiences and destinations instead of traditional sea-sand-sun vacations. Astrotourism is a new tourism trend that has become popular worldwide for those looking for different experiences.

Throughout history, humanity has endeavoured to understand and interpret the objects, events and phenomena around it. In this process, an intense interest is shown, especially in the sky. From meteorological phenomena in the sky to the movements of the stars and planets, many subjects have drawn people's curiosity to the sky. Since ancient times, people have organised rituals, created calendars and studied astronomy by looking at the sky. The Babylonian civilisation carried out the first sophisticated astronomical studies in Mesopotamia about 4000 years ago. (Tasarer and Arica, 2023). The natural human desire to explore the mysterious has been an important factor in promoting tourism for many years. On the other hand, Astrotourism offers many opportunities for anyone interested in the sky (Jiwaji, 2016).

Astrotourism is a trend that offers travellers and host communities a meaningful tourism experience based on the conservation of natural resources, sharing knowledge and contributing to scientific research (FayosSolá et al., 2014). Astrotourism activities allow travellers to explore more of the universe while also contributing to the local economy. In addition to protecting nature and science,

astrotourism encourages people to learn more about the universe and work together to make new discoveries.

Astrotourism is a type of tourism that can be included in the category of nature tourism. It can also be classified as adventure tourism, educational tourism and sustainable tourism. One of its most important advantages is that the sky does not need any correction or improvement. The sky is a place where there is no possibility of deterioration of its own natural beauty that has always existed. The more educated people are, the more they enjoy the beauty of the sky. Therefore, whether day or night, the sky is considered sustainable tourism (Najafabadi, 2012).

2. ASTROTOURISM

Astrotourism means watching various celestial and astronomical events such as celestial phenomena, constellations, planets, lunar and solar eclipses, meteor showers, comets and northern lights. It includes accommodation and travel activities within certain intervals to observe these celestial events (Görgülü, 2022). Astrotourism is a type of tourism that usually takes place in rural dark areas. It includes activities related to celestial phenomena, such as sky observation and astrophotography (Taşarer and Arica, 2023). According to the International Dark-Sky Association, astrotourism is defined as "tourism that involves visiting the night sky and astronomy-related facilities such as observatories and science centers" (Visit Scotland, 2019). According to another definition, astrotourism refers to tourism to observation sites around the world to view the night sky. This niche tourism is one of the fastest-growing areas in

the tourism industry in recent times (Jiwaji, 2016). Astrotourism draws attention as a type of tourism that will give people unforgettable experiences under the stars and bring a different dimension to sky observations.

Year 2009 was declared the International Year of Astronomy by the International Dark Sky Association (IDA) and the United Nations Educational, Scientific and Cultural Organization (UNESCO). The importance of protecting dark skies and areas free from light pollution was emphasised. The International Union for Conservation of Nature has encouraged information gathering and advocacy, emphasising the need to protect dark skies and starry night environments. As a result of these efforts, places such as Dark Sky and Starlight Parks have contributed to the conservation of natural and cultural heritage and created new tourism values (Tapada et al., 2021).

Astrotourism represents a travel for astronomy enthusiasts to discover the beauty of the sky. Nowadays, observing the starry sky has become very difficult due to the intense light pollution in cities and the climate. Therefore, astro-tourists travel to natural and dark environments away from city lights. They travel to areas with low light pollution, such as mountainous regions, islands or remote villages (Akeshova and Seidigali, 2023). In this way, they can observe the stars, planets and other celestial bodies in the sky more clearly and impressively. Astrotourism offers these passionate travellers a unique experience, giving them the opportunity to uncover the deep secrets hidden in the sky.

In 2001, Dennis Tito became the world's first astro-tourist, paying \$20 million to the Russian space agency for a one-week visit to the International Space Station. This event was considered a groundbreaking step in astrotourism and increased interest in space travel (Cater, 2010). However, since going into space is expensive and requires high investments, it is not possible for people to actively participate. Instead, astro-tourists today are more likely to participate in astrotourism activities such as observation activities with professional guides, attending lectures in planetariums, and astrotourism activities without leaving Earth (Tadić, 2016).

According to Kanianska et al. (2020), astrotourism is considered a new type of ecotourism associated with rural, green, and adventure tourism. This type of tourism is usually carried out in rural, semi-urban or non-industrialised areas far from big cities and is an attractive option for astronomy enthusiasts (Tarek et al., 2023). Astrotourism offers tourists a different experience by observing the sky in rural areas. The sky has a critical potential to ensure the region's economic, social and environmental sustainability while offering tourists a different experience. While contributing to the local economy, it is aimed to protect the environment and provide tourists with a unique experience (Karaca et al., 2018). Astrotourism attracts the attention of amateur skywatchers as well as professional astronomers. Observing various astronomical events in the night sky,

meteor showers, and different celestial phenomena allows all age groups to participate in such activities (Bingöl, 2024).

Astrotourism is a type of sustainable tourism that focuses on observing the dark sky in destinations without light pollution and does not harm the environment (Tarek et al., 2023). For the sustainability of astrotourism activities, protecting the dark sky is of great importance. To this end, training tourism personnel and providing suitable infrastructure for observers is necessary. It is also vital to promote sustainable practices and raise awareness to preserve the environment's natural balance (Mitura et al., 2017).

Astrotourism is divided into four main groups. The first group is associated with sightseeing and cultural tourism. It is visiting astronomy facilities such as observatories, museums, and planetariums. It includes the lives of famous astronomers who contributed to the development of this field of science and all research on space science. The second group is astrotourism activities, which involve travelling to observe temporary celestial events such as solar and lunar eclipses, meteor showers, and comets. Some celestial phenomena (auroras, solar and lunar eclipses) can only be observed in certain parts of the world. For this reason, tourists interested in these attractions should participate in travel agencies' programs that specifically organise these tours. The third group is to visit destinations famous for their dark skies without light pollution. The birth of this tourism group is linked to the phenomenon called light pollution. There are dark sky protection areas in a few regions of the world that are free from artificial light pollution. The last group of astrotourism is space travel (Iwanicki, no date).

2.1. Light Pollution and Dark Sky Locations

While the widespread use of electricity with technological advances is accepted as a sign of civilisation and development, it has brought with it the problem of light pollution. Light pollution deprives people of natural night views and reduces the natural brightness of the sky. Therefore, it is necessary to pay attention to appropriate lighting methods and measures to protect the natural environment and human health (Taşarer and Arica, 2023). The celestial luminosity in cities seriously threatens amateur and professional astro-tourists. This situation, which negatively affects the environment and astronomical research, is called light pollution (Çetegen and Batman, 2005). Another factor that hinders sky observation is air pollution. Fog, cloudiness, and pollution prevent a clear sky view. This makes it difficult for tourists visiting the region for astrotourism to observe the sky. Therefore, it is essential to provide a suitable environment for viewing the sky (Karaca et al., 2018).

Facilities that have an important role in the development of astrotourism are often referred to as dark sky parks or starry sky parks. These facilities are located in areas protected from artificial light pollution and offer ideal conditions for tourists wishing to observe. In addition,

these parks aim to raise environmental awareness by protecting natural ecosystems. In order to contribute to the development of astrotourism, these facilities usually include observatories, accommodation units, training centres and astronomy activities (Mitura et al., 2017). According to the International Dark Sky Association, there are five types of Dark Sky Place certifications with different standards and criteria (Harrison, 2023). These certificates are:

- International Dark Sky Protected Areas (19),

- International Dark Sky Reserves (22),
- International Dark Sky Parks (122),
- International Dark Sky Societies (46),
- Urban Night Sky Places (9).

The first DarkSky-approved accommodation center was established in 2023 in Southwest America in Under Canvas Lake Powell—Grand Staircase. This accommodation includes campsites, recreation areas, hotels, and resorts. Astrotourism lodges are also available to observe the dark sky, promoting ecotourism.

Figure 1. | The Effect of Light Pollution on the Sky (source: Turkish Space Agency (TUA), 2024)

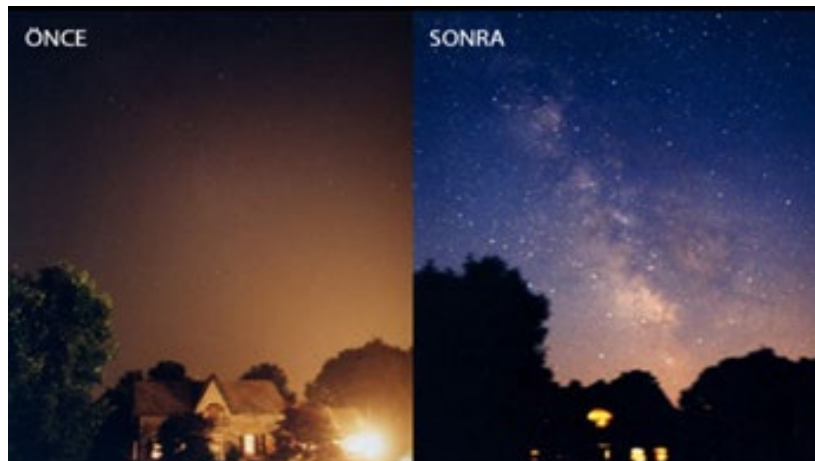


Figure 2. | DarkSky Verified Accommodation (source: Brigagliano, 2023)



Figure 3. | Cappadocia Astrofest Sky Observation Event (source: Konya Science Center, 2021).



In Turkey, astrotourism includes observation events, Astro festivals, workshops and talks. These events, which include participants of all age groups from different regions, are usually organised as day trips or overnight stays. For the first time in 2018, the Astronomy Festival organised by the Konya Science Center with the slogan 'A Little Sky for Everyone' took place in Cappadocia with astronomy enthusiasts.

Konya Science Center contributes to popularising astronomy with the events it organises nationwide. Within the scope of astrotourism, it organised the Astronomy Festival in Cappadocia in 2018 and 2019, in Konya's Taşkent district in 2021, and in Beyşehir in 2022 (Konya Science Center, 2021).

In addition, Konya Science Center encourages astrotourism to become more widespread in Turkey by conducting many observation activities, workshops, and interviews. Photo and video posts about astronomy on the Konya Science Center's social media account were examined by dividing them into themes. The qualities of the posts, comments, and likes were determined to make a general evaluation.

3. METHOD

In this study, the content analysis method, one of the qualitative research methods, was used to analyse the content shared by Konya Science Center through its official Instagram account. Content analysis is the process of gathering similar data around certain concepts and themes and organising and interpreting them in a way that the reader can understand (Yıldırım and Şimşek, 2016). The data were collected through document analysis and made suitable for analysis by the researcher. For this purpose, the theme of the relevant account and the number of likes and comments were analysed. The types of activities related to astrotourism, the content of the comments, the number of likes and their distribution by years were evaluated within the scope of the research. The creation of themes and posts about astrotourism were created by the researcher using the descriptive analysis method. The purpose of determining Konya Science Center is to provide individuals of all age groups with the opportunity to evaluate daily events with science and technology. It is also the first science centre supported by TÜBİTAK.

The study population consists of the posts on the official Instagram account of Konya Science Center, and the sample consists of the likes and comments of the posts of Konya Science Center between April 26, 2014 and March 25, 2024. A total of 1,968 posts (photos and videos), likes, and comments were included in the study. A total of 1,728 posts were categorised by the researcher into themes (science, technology, etc.). Only the number of comments and likes of the categorised themes were included in the research. The number of likes and comments of 240 posts (photos and videos) related to astrotourism were also analysed and included in the scope of the study. In this context, 1,541 comments were analysed, and 945

comments were divided into positive and negative and questions were included in the scope of the study.

The data for the research were taken from the Konya Science Center's Instagram account. In order to make it easier and faster to access the data to be used in content analysis, access to the Instagram page of Konya Science Center was provided with an internet browser. The authors entered the data into two separate Excel files according to the order of sharing. In the first Excel file, themes were determined, and the authors created the number of likes and comments. The themes were determined by considering the content of the photos and videos shared, hashtags, and the description and title of the posts. It was then transferred to Maxqda Analytics Pro 2020 software for analysis. For each post, a code number (see1, see2, see3), image, like, comment, year and event type title were created before the posts about astrotourism were imported into the other Excel file. According to the order of sharing, photos and videos were defined by the authors in the Excel file under the visual title, such as likes, comments, year, and type of activity. The data were transferred to Maxqda Analytics Pro 2020 software to be analysed by content analysis, one of the qualitative research methods. The authors determined categories/codes and subcategories/codes through descriptive analysis. All posts were analysed, and categories/ codes were assigned to them individually. Word cloud, crosstabulation, hierarchical code/subcode models and code frequencies were created with Maxqda Analytics Pro 2020 software and interpreted in the findings section. In total, 13,891 codes were coded in two separate documents.

4. FINDINGS AND INTERPRETATIONS

In the findings section of the study, the themes and the number of likes of the posts were analysed. The number of likes, comment content, types of activities, and distribution by years of astrotourism-related posts were also analysed. According to the data of the study, a frequency table, hierarchical sub-code model, cross table and word cloud were created and interpreted. According to the data, the themes of the posts were formed with the frequency tables of likes, comment contents, activity types and years. The hierarchical sub-code model of the theme and activity types and the activity distribution according to years and liking criteria were created and interpreted with cross-tables. A word cloud was created and interpreted according to the content and frequency of comments about astrotourism.

Astrotourism, which is considered within the scope of artificial and special interest tourism, is considered a type of tourism in which only rich people can participate in terms of cost, time and authenticity. However, it is accepted as an alternative type of tourism in which individuals from all segments can participate in terms of the formation of astronomy culture, the development of rural areas and the realisation of natural areas. Therefore, Konya Science Centre, which is determined as the research sample, accepts visitors from all segments and

contributes to the development of astrotourism by hosting different activities. The findings related to the activities are interpreted within the tables below.

In the first place in the distribution of the posts made in Konya Science Centre, according to the themes, are the

Table 1 | Distribution of posts according to themes

| THEMES | N | % |
|--------------|-------------|---------------|
| Science | 484 | 28,01 |
| Nature | 414 | 23,96 |
| Technology | 262 | 15,16 |
| Health | 163 | 9,43 |
| Education | 86 | 4,98 |
| Art | 84 | 4,86 |
| History | 80 | 4,63 |
| Announcement | 80 | 4,63 |
| Tourism | 41 | 2,37 |
| Other | 34 | 1,97 |
| TOTAL | 1728 | 100,00 |

Table 3 | Distribution of posts about astrotourism according to liking criteria

| NUMBER OF LIKES | N | % |
|-----------------|------------|---------------|
| 100 and less | 40 | 16,67 |
| 101-200 | 69 | 28,75 |
| 201-300 | 39 | 16,25 |
| 301-400 | 24 | 10,00 |
| 401-500 | 22 | 9,17 |
| 501-600 | 9 | 3,75 |
| 601-700 | 7 | 2,92 |
| 701-800 | 7 | 2,92 |
| 801-900 | 6 | 2,50 |
| 901-1000 | 4 | 1,67 |
| 1001 and above | 13 | 5,42 |
| TOTAL | 240 | 100,00 |

Table 5 | Distribution of posts about astrotourism according to comment criteria

| COMMENT TYPE | N | % |
|--------------|------------|---------------|
| Positive | 435 | 46,03 |
| Negative | 211 | 22,33 |
| Question. | 299 | 31,64 |
| TOTAL | 945 | 100,00 |

posts under the title of science with a total of 484 posts. In second place are nature-based posts, with 414 of them. The posts with the lowest values are those under the titles of announcement (80), tourism (41) and other (34).

Table 2 | Distribution of themes according to liking criteria

| NUMBER OF LIKES | N | % |
|-----------------|-------------|---------------|
| 100 and less | 367 | 21,24 |
| 101-200 | 571 | 33,04 |
| 201-300 | 264 | 15,28 |
| 301-400 | 134 | 7,75 |
| 401-500 | 93 | 5,38 |
| 501-600 | 57 | 3,30 |
| 601-700 | 38 | 2,20 |
| 701-800 | 44 | 2,55 |
| 801-900 | 39 | 2,26 |
| 901-1000 | 23 | 1,33 |
| 1001 and above | 98 | 5,67 |
| TOTAL | 1728 | 100,00 |

Table 4 | Distribution of posts about astrotourism according to activity types

| EVENT TYPE | N | % |
|-----------------|-----------|---------------|
| Sky observation | 56 | 60,22 |
| Workshop | 15 | 16,13 |
| Interview | 12 | 12,90 |
| Planetarium | 6 | 6,45 |
| Astrofest | 4 | 4,30 |
| TOTAL | 93 | 100,00 |

Table 6 | Distribution of posts about astrotourism by years

| YEAR | N | % |
|--------------|------------|---------------|
| 2014 | 2 | 0,83 |
| 2015 | 3 | 1,25 |
| 2016 | 5 | 2,08 |
| 2017 | 18 | 7,50 |
| 2018 | 26 | 10,83 |
| 2019 | 45 | 18,75 |
| 2020 | 24 | 10,00 |
| 2021 | 21 | 8,75 |
| 2022 | 43 | 17,92 |
| 2023 | 30 | 12,50 |
| 2024 | 23 | 9,58 |
| TOTAL | 240 | 100,00 |

Table 2 was created to examine the distribution of the themes according to the liking criteria. When the distribution of the total (1,728) values according to the criteria within the scope of the research was analysed, it was seen that the posts generally received less than 400 likes. In general, the number of likes above 500 is low.

Table 3 was prepared to determine the participants' likes of posts about Astro. When the table is analysed, it is seen that the posts on astrotourism received only 240 likes. In other words, the participants showed more interest in posts related to the themes and the topics of astrotourism.

Table 4 was prepared to determine the status of the activities carried out within the scope of astrotourism. A total of 93 activities related to astrotourism were held at Konya Science Centre, 60.22% of which were sky observation activities. The most minor activities related to astrotourism were organised within the scope of planetarium (6) and astrofest (4).

In the Table 5, the contents of the comments made on the posts about astrotourism were also analysed. For this purpose, comments were grouped as positive, negative and questions. Almost half of the participants (46.03%) made positive comments, while 31.64% asked questions about the posts. The number of negative comments is limited to 211. Accordingly, it is assumed that the posts about astrotourism are generally liked and the participants are curious about the posts.

Table 6 was prepared to analyse the distribution of posts about astrotourism according to years. According to the results of the analysis, the least number of posts (2) was made in 2014. This is because the Konya Science Centre's social media account was opened in April 2014. The distribution of posts has continuously increased over the years, and there is a decrease only in 2020 and 2021. The main reason for the decrease in these years is the COVID-19 outbreak. Most of the posts were made in 2019 and 2022. Since the data for 2024 was until March, it was limited to 23.

Table 7 | Distribution of activities by years

| Event Type/Year | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | Total |
|-----------------|----------|----------|----------|-----------|-----------|-----------|----------|----------|-----------|----------|----------|-----------|
| Interview | 0 | 0 | 1 | 2 | 1 | 6 | 0 | 0 | 0 | 0 | 2 | 12 |
| Planetarium | 0 | 0 | 0 | 5 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 6 |
| Workshop | 0 | 0 | 0 | 2 | 3 | 5 | 0 | 0 | 1 | 3 | 1 | 15 |
| Astrofest | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 4 |
| Sky observation | 1 | 1 | 1 | 11 | 10 | 12 | 3 | 2 | 8 | 5 | 2 | 56 |
| TOTAL | 1 | 1 | 2 | 20 | 15 | 25 | 3 | 3 | 10 | 8 | 5 | 93 |

Table 8 | Distribution of activity types according to interpretation criteria

| COMMENT TYPE | Astrofest | Workshop | Sky observation | Planetarium | Interview | Total |
|--------------|-----------|-----------|-----------------|-------------|-----------|------------|
| Question. | 18 | 47 | 114 | 6 | 4 | 189 |
| Negative | 7 | 22 | 34 | 8 | 24 | 95 |
| Positive | 5 | 4 | 112 | 4 | 5 | 130 |
| Total | 30 | 73 | 260 | 18 | 33 | 414 |

Table 9 | Distribution of activity types according to question criteria

| TYPES OF QUESTIONS | Astrofest | Workshop | Sky observation | Planetarium | Interview | Total |
|--------------------|-----------|-----------|-----------------|-------------|-----------|------------|
| Clock | 0 | 1 | 10 | 1 | 0 | 12 |
| Event | 5 | 20 | 52 | 1 | 3 | 81 |
| Accommodation | 2 | 0 | 1 | 0 | 0 | 3 |
| Age | 3 | 2 | 19 | 2 | 1 | 27 |
| Transportation | 3 | 4 | 12 | 0 | 0 | 19 |
| Fee | 5 | 20 | 20 | 2 | 0 | 47 |
| Total | 18 | 47 | 114 | 6 | 4 | 189 |

In Table 7, the distribution of the activities carried out in Konya Science Centre over the years is examined. Accordingly, it was concluded that the most common activity type in the last ten years was sky observation (56),

and the least activity type was astrofest (4). The second most common activity type was workshop (15), followed by talks (12) and planetarium (6). Most activities were organised in 2019. The fewest events were organised in

the highest number of posts are concentrated on the themes of science (484), nature (414), and technology (262). Other posts are listed as education, art, history and announcements.

Sky observation is the activities carried out by those interested in astronomy to observe and observe the celestial bodies in the sky. Astrofest is a festival where people who are interested in astronomy and experts in their field come together, and conferences, exhibitions and workshops are organised. The talks are an opportunity for information sharing and discussions by astronomy experts or enthusiasts. The planetarium is a show hall that helps with sky observation, where images

of celestial bodies are presented in a more realistic way with projection technology. Workshops are environments where participants receive training on astronomy-related topics and develop their experiences (Tübitak Science Centres, 2024). Therefore, another code hierarchy model (Figure 6) was prepared to determine the activities related to astrotourism in Konya Science Centre.

When the visual prepared on the subject is analysed, it is seen that only 93 events related to astrotourism have been held since 2014. More than half of the activities are sky observation activities (56). The reason for the low number of other activities is interpreted as the fact that visitors generally travel daily, and such activities are costly.

Figure 5. | Code hierarchy model of the themes within the scope of astrotourism

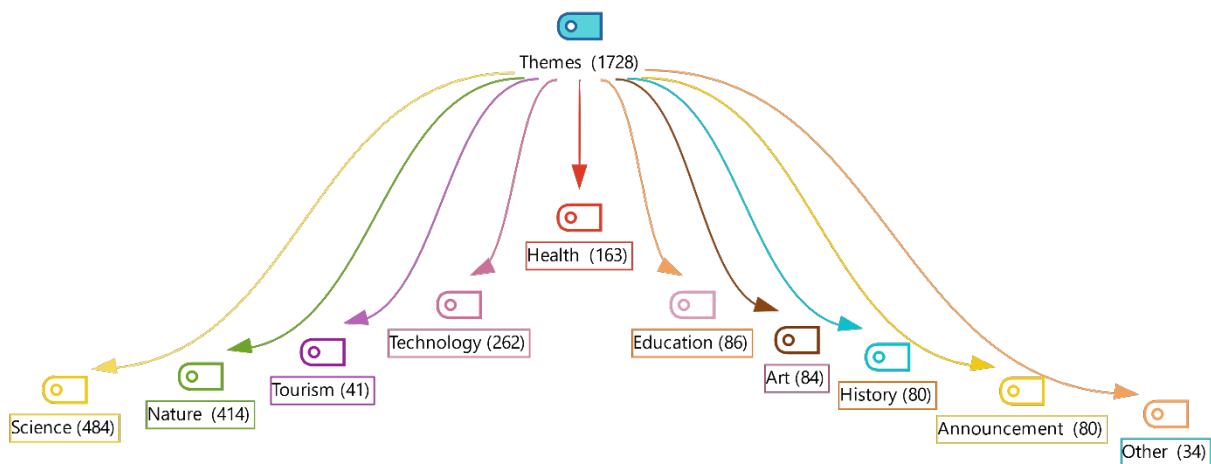
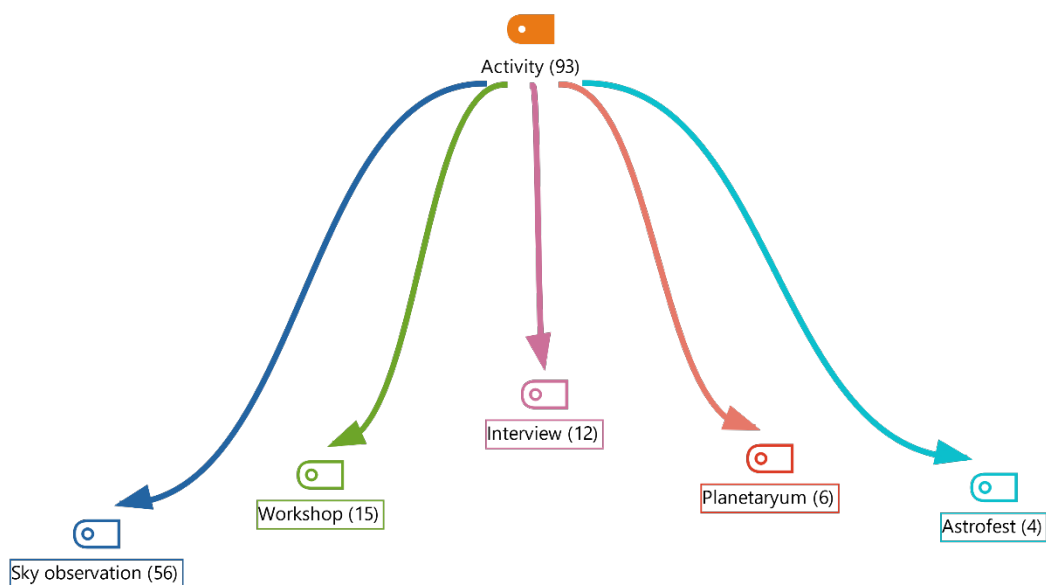


Figure 6. | Hierarchical Code Model of Astrotourism-Related Activities



5. CONCLUSIONS

Today, people are searching for alternative tourism types other than traditional tourism types. Alternative tourism types contribute to the development of the tourism sector in terms of sustainability and diversity. At the same time, they increase the economic and social welfare of local people and protect cultural heritage. It provides a

more meaningful travel experience by allowing tourists to interact with local people. In this context, astrotourism is an alternative tourism type where activities related to the sky and astronomy are carried out. Astrotourism increases environmental awareness by protecting regions with dark skies and contributes to reducing light pollution. Astrotourism is an important alternative tourism type that

attracts nature and science enthusiasts and is compatible with sustainable tourism principles.

In this study, the content of 1,968 posts on the Instagram account of Konya Science Center between 2014-2024 was examined using the content analysis method. Of these posts, 1,928 were further analysed using descriptive analysis with theme codes and sub-codes. The 'comment content', 'number of likes', 'year' and 'type of activity' of 240 posts related to astrotourism were analysed. According to the study data, most of the posts focused on the themes of science and nature. It was noteworthy that astrotourism posts were the most shared type after science and nature criteria. According to the findings of the study, it was observed that the most common type of activity related to astrotourism was sky observation, and sky observation received the most positive comments.

The research findings indicate that the majority of activities were held in 2019. The number of events increased after 2017. Based on the research data, we can say that astro events cover the majority of posts related to astrotourism.

Considering the criteria of appreciation within the study's limitations, it was seen that the science theme received

the highest number of likes. It is understood that the sky observation activity received the highest number of likes within the scope of astrotourism. The low number of other activity types affects the number of likes. It is recommended that other types of activities be included within the scope of the activity.

Looking at the types of questions under the heading of interpretation criteria of the research, it was seen that most questions were about the event and the fee. It was concluded that the participants were most curious about the cost of the event and the content of the event. Accordingly, it is seen that the relevant Instagram account has deficiencies in the promotion section. It is recommended that they provide more information about the types of events in the content of the posts. In addition, the fact that most of the comments are in the criteria of questions about the event shows that the participants are interested and curious about astrotourism activities.

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