

**Aleksandra
Krajnović** **ASTROTURIZAM KAO
SELEKTIVNI OBLIK TURIZMA:
KONCEPTUALNI OKVIR**

**ASTROTOURISM AS SPECIAL
INTEREST TOURISM:
CONCEPTUAL FRAMEWORK**

SAŽETAK: Astroturizam kao selektivni oblik turizma zauzima sve veću pažnju znanstvenika i praktičara. U radu se prikazuje teoretski doseg recentnih istraživanja na području ovog novog oblika turizma, koji je počeo kao svojevrsni oblik tržišne niše, da bi danas postao respektabilan oblik turističke ponude u mnogim zemljama svijeta. U radu se daje pregled recentne literature na temu astroturizma, što bi trebalo poslužiti kao konceptualni okvir razmatranja ovog pojma i razumijevanja njegove primjene u praksi. Očekuje se da će trenutna situacija pandemije sve više okrenuti motive i interese na turističkom tržištu u pravcu znanstveno-ekoloških formi turističke ponude, pa u tom smislu ovaj rad dobiva i na aktualnosti.

KLJUČNE RIJEČI: astroturizam, svemirski turizam, edukacijski turizam, ekološki turizam, svjetlosno onečišćenje, Dark-Sky parkovi

JEL klasifikacija: Z32

ABSTRACT: Astrotourism as special interest tourism is increasingly gaining attention from scientists and practitioners. The paper presents an overview of recent research in the field of this new form of tourism, which began as a kind of market niche, to become today a respectable form of tourism offer in many countries of the world. The overview provided in the paper should serve as a conceptual framework for considering the category of astrotourism and understanding its application in practice. It is expected that the current situation of pandemics will increasingly turn the motives and interests of the tourist market towards the scientific and ecological (more sophisticated) forms of tourist offer, and in this sense this paper gets in actuality.

KEY WORDS: astrotourism, space tourism, educational tourism, eco tourism, light pollution, Dark-Sky parks

JEL classification: Z32

“Neka bude mrak...” (“Let there be dark...”)

(Environmental Impact of Light Pollution and its Abatement – Special Report of the Journal of The Royal Astronomical Society of Canada)

UVOD

Astroturizam spada u novije forme turističke ponude, a obuhvaća promatranje nebeskih tijela uz popularno tumačenje i popratne aktivnosti, zasnovano na astrološkim fenomenima. U domaćoj literaturi spominje se prvi put 1999. u radu autora Korlević i Krajnović “Razvoj astroturizma u Višnjanu”. Ovaj rad opisuje prvi slučaj osmišljene turističke ponude zasnovane na promatranju nebeskih tijela, astronomiji te s njom povezanim znanostima u Republici Hrvatskoj.

Cilj ovoga istraživanja je dati prikaz recentne znanstvene literature iz područja astroturizma, što bi moglo poslužiti kao konceptualni okvir za buduća istraživanja i praktičnom istraživanju. Riječ je o sekundarnom istraživanju, izvršenom u ožujku i travnju 2020. godine, a istraživanjem je obuhvaćeno 40 radova relevantnih za istraženu temu.

Kako bi se mogao izraditi konceptualni okvir za daljnje istraživanje pojma i koncepta astroturizma, potrebno je identificirati njegove dimenzije. U ovom radu je to učinjeno pomoću vlastitoga modela autorice, koja je konceptualnu analizu izvršila temeljem sljedećih parametara: godina izdanja, autor(i), područje istraživanja, istaknute funkcije astroturizma, povezana područja istraživanja/prakse, prikazane studije slučaja, implikacije. Rezultati su prikazani tabelarno, nakon čega slijedi kritički osvrt na prikazano i smjernice za daljnja istraživanja. Analizom su obuhvaćeni samo oni radovi u kojima se astroturizam obrađuje eksplicitno, odnosno nisu obuhvaćeni oni koji taj oblik turizma obrađuju kao dio šireg okvira (u radovima najčešće kao jedan od selektivnih oblika turizma).

“Let there be dark...”

(Environmental Impact of Light Pollution and its Abatement – Special Report of the Journal of The Royal Astronomical Society of Canada)

INTRODUCTION

Astrotourism belongs to new forms of tourism offer, comprising the observance of celestial bodies with the popular interpretations and accompanying activities, based on astrological phenomena. Domestic literature mentions it in 1999 for the first time in the paper by Korlević and Krajnović “Astrotourism development in Višnjan”. This paper describes the first case of a conceptualised tourism offer based on observing celestial bodies, astronomy and related sciences in the Republic of Croatia.

The objective of research is to provide an overview of recent scientific literature in the area of astrotourism that would serve as a conceptual framework for future research and practical research. The research is secondary in nature, conducted in March and April of 2020 and it comprises 40 papers relevant to the research topic.

In order to generate a conceptual framework for further research of the concept of astrotourism, it is necessary to define its dimensions. In this paper the author uses her own method to do so, by conducting a conceptual analysis based on the following parameters: year of publication, author(s), research area, highlighted astrotourism functions, related research/practical areas, mentioned case studies, implications. The results are shown in a form of a table, followed by a critical reflection and guidelines for further research. The analysis comprises only the papers that deal with astrotourism explicitly, meaning that it does not comprise papers dealing with this form of tourism as part of a wider research framework (most frequently as one of forms of special interest tourism).

ASTROTURIZAM – NAZNAKA NOVE PARADIGME RAZVOJA TURIZMA ILI RE-INTERPRETACIJA KLASIČNOGA „GLEDANJA U NEBO“?

Collison (2012, cit. u Herrero, 2019) navodi da je astroturizam evoluirao od posjeta lokacijama s pretpovijesnih arheoloških lokaliteta, kao što su Stonehenge, Nabta Playa, Mesa Verde i Chichen Itza ka trendu putovanja koje je povezano s opservacijom nebeskih tijela i s time povezanim iskustvom.

Jiwaji (2016, p. 1) navodi da je astroturizam novi fenomen koji se razvija u cijelom svijetu. On ističe da se kroz astroturizam posjetiteljima pruža prilika da spoje znatiželju posjeta nepoznatim dijelovima svijeta s uzbuđenjem koje im pruža opservacija tajanstvenog svijeta svemira.

Mizon (2016) navodi da “većina ljudi koji gledaju (i traže) zvijezde nisu profesionalni astronomi”. On navodi i da je njihovo znanje o astronomiji ograničeno, ali i da ih fascinira ideja *svemira i ništavila* kao kognitivnog koncepta (Ingle, 2010). Korlević i Krajnović (1999, p. 89) navode: “Podsvjesni strah od nepoznatog, a s druge strane sklonost ka tajanstvenom, imanentni su čovjekovoj prirodi, što najbolje dokazuje nesmanjena popularnost znanstvene fantastike. Od svih znanosti, astronomija je jedna od najbližih tom graničnom području između znanosti i umjetnosti (mašte).”

Cater (2019) piše o *komodifikaciji svemira*, navodeći da će, paralelno s komodifikacijom *iskustva svemira*, doći ujedno i do komodifikacije samog svemira. Cater dalje nastavlja da, “premda, tehnički, nitko ne može posjedovati svemir, postoje brojni komercijalni načini da se to ipak učini” (2019, 51). On ukazuje na to da se će se u tom smislu astroturizam razvijati i pretvarati u rastuću turističku industriju, što će biti popraćeno odgovarajućom ikonografijom, uz jačanje aspiracija potrošača. Za astroturizam navodi da predstavlja ono nešto neobično u

ASTROTURISM – INDICATION OF A NEW PARADIGM OF TOURISM DEVELOPMENT OR A RE-INTERPRETATION OF THE TRADITIONAL „SKY GAZING“?

Collison (2012, in Herrero, 2019) states that astrotourism evolved from visiting locations with prehistoric archaeological localities, such as Stonehenge, Nabta Playa, Mesa Verde and Chichen Itza to a travelling trend related to observing celestial bodies and the accompanying relevant experiences.

Jiwaji (2016, p. 1) states that astrotourism is a new phenomenon emerging throughout the world. He points that astrotourism provides visitors with an opportunity to merge their curiosity of visiting unknown parts of the world with excitement provided by the observation of the mysterious world of the universe.

Mizon (2016) states that most people gazing at (and searching for) the stars are not professional astronomers. He says that their astronomy knowledge is limited, but they are fascinated by the idea of *space and nothingness* as a cognitive concept (Ingle, 2010). Korlević and Krajnović (1999, p. 89) state that the subconscious fear of the unknown, with a tendency toward the mysterious on the other hand, are immanent to human nature, which is best proved by the unwavering popularity of science fiction. Among all the sciences, astronomy is one of the closest to the fringe area of science and art (imagination).

Cater (2019) writes about the *commodification of space*, stating that the commodification of the *experience of space* will simultaneously bring about the commodification of space itself. Cater goes on to say the although, technically, no one can own space, there are numerous commercial ways to achieve this (2019, 51). He points to the fact that astrotourism will continue to develop and transform into a growing tourism industry, which will be accompanied by the corresponding iconography, with strengthening of consumer

“dosadnoj” realnosti. Jiwaji (2016, p. 5) ističe da se astroturizam može brzo razviti kao specifičan brend u turizmu, bez potrebe da se nepotrebno troši vrijeme i drugi resursi, a kao primjer za to opisuje Tanzaniju.

Najafabadi (2012) pored naziva astroturizam koristi i pojam *astronomski turizam*, što su kasnije učinili i brojni drugi autori. Isti autor smatra da astroturizam ulazi u skupinu ekoturizma. Također smatra da se u pojam astroturizma može uvrstiti i promatranje neba tijekom dana (danjeg svjetla). Kako se i mnogi drugi autori slažu da je astroturizam širok pojam, moglo bi se zaključiti da postoji astroturizam u užem smislu (opservacija noćnog neba – zvijezda i drugih nebeskih tijela - noću) i u širem smislu (sve ostale aktivnosti opservacije neba: zalazak sunca, pomrčina Sunca i opservacije drugih nebeskih pojava - danju).

No očito je da postoji konceptualni problem već kada je riječ o definiciji, kao i o klasifikaciji, pojma astroturizam. Dok se većina autora slaže da je astroturizam u užem smislu prilično jasno definiran, problem definicije i konceptualizacije nastaje kada se promatra širi okvir *space turizma* (“svemirskog turizma”). Kako u ovaj, širi pojam spadaju i putovanja u svemir, sasvim je jasno da je riječ o dvama suštinski oprečnim (ne prema sadržaju već prema osnovnom konceptu) formama turizma: dok je astroturizam u najužem smislu orijentiran na različite tržišne segmente, može biti *low-cost*, manjih, srednjih i većih razmjera, a osnovni motiv i aktivnost je – promatranje zvijezda, koje, tehnički, može biti sasvim besplatno, kada je riječ o putovanjima u svemir, koncept je sasvim sigurno potpuno oprečan. Stoga autorica ovog rada zastupa mišljenje da se ta dva pojma odvojeno sagledavaju, premda je njihovo osnovno “područje djelovanja” jednako, a to je – svemir. No svi se autori (primjerice, Soleimani i dr., 2019) slažu u tezi da je riječ o relativno novom području istraživanja, za koje su ovakve konceptualne nedorečenosti logične i prirodne.

aspirations. He states that astrotourism represents the unusual in the “dreary” reality. Jiwaji (2016, p. 5) emphasizes that astrotourism could develop rapidly as a specific brand in tourism without the need to waste money or other resources, providing an example of Tanzania.

Najafabadi (2012), besides the name of astrotourism, also uses the concept of *astronomical tourism*, which has been subsequently done by numerous other authors. The author considers that astrotourism falls under the category of eco-tourism. He also considers that the concept of astrotourism can also involve observing the sky during daylight. Since plenty of other authors agree that astrotourism is a wide concept, a conclusion can be drawn that there is astrotourism in a narrow sense (observing the night sky – stars and other celestial bodies – at night) and in a wider sense (all other activities of sky observation: sunset, eclipse of the Sun and observation of other celestial phenomena – in daylight).

Nevertheless, there is obviously a conceptual issue even with the definition itself, as well as the classification of the concept of astrotourism. While most authors agree that astrotourism is quite clearly defined in its narrow sense, the problem of defining and conceptualising emerges once the wider framework of *space tourism* is observed. As this, wider concept also consists of space travel, it is perfectly clear that there are two essentially opposed (not in content but in basic concept) forms of tourism. Astrotourism, in its most narrow sense, targets various market segments, can be low-cost, small, medium and large scale and its basic motive and activity is star-gazing, that can, technically, be free of charge; whereas, space travel is certainly a completely opposing concept. This is why the author thinks that the two concepts should be observed separately, although their fundamental area is the same – space. However, all authors agree (for example, Soleimani et.al., 2019) that we are dealing with a relatively new research area, whereby all such conceptual uncertainties are logical and natural.

Isti se problem pojavljuje i kada je riječ o iscrpnoj klasifikaciji pojma astroturizam, koji, prema većini autora, pripada kako pojmu svemirskog turizma (*space tourism*), tako i pojmu “turizma zasnovanog na prirodi” (*nature-based tourism*), što u hrvatskom jeziku najbolje odgovara istoznačnici *ekoturizam*. Očito je da se i ovdje srećemo s dva pojma višeg reda – svemirski turizam i ekoturizam, koji nužno ne moraju biti povezani, kao ni utemeljeni na istim tezama, što onda predstavlja problem i za njihovo ekonomsko sagledavanje – poslovne modele koji su na njima zasnovani. Stoga je ovo zasigurno jedna od važnijih tema za daljnje analize i znanstvene rasprave kada je riječ o astroturizmu.

Star-friendly osvjetljenje – nužan uvjet za razvoj astroturizma

Autori se jednoglasno slažu u tezi da je najvažniji faktor razvoja astroturizma kvaliteta neba, odnosno nebo koje nije svjetlosno onečišćeno, što se postiže adekvatnim osvjetljenjem (*star-friendly lighting*; Mizon, 2016) Osim toga, važna je i odgovarajuća infrastruktura, od one koja omogućuje jednostavna iskustva, koja Tadić (2016) naziva “astronomija golim okom”, do izgrađenih i visokokvalitetno opremljenih centara za posjetitelje pri opservatorijima. Treba reći da epitet *star-friendly* ujedno predstavlja snažan potencijal za brendiranje, kako turističke destinacije, tako i pojedinih smještajnih objekata. U tom smislu, u svojoj knjizi *Finding a Million-Star Hotel, An Astro-Tourist’s Guide to Dark-Sky Places* iz 2019. godine Mizon opisuje moguće poslovne modele u okviru astroturizma, kao što su: astro-tematski hoteli i kampovi, astronomski *eventi*, *stargazing* lokacije i slično.

O uskoj povezanosti astroturizma i ekologije piše i Matos (2017), navodeći da su ekologija i održivost *conditio sine qua non* razvoja astroturizma, posebice kroz brigu o svjetlosnom onečišćenju, ali i kroz zaštitu bioraznolikosti (kao posljedice brige o svjetlosnom onečišćenju).

Jiwaji (2016, p. 5 i 6) predlaže da za razvoj astroturizma najprije treba identificirati tzv.

The same issue emerges with a meticulous classification of the concept of astrotourism, which, according to the majority of authors, belongs both to the concept of *space tourism* and the concept of *nature-based tourism*, which is synonymous with *eco-tourism* in the Croatian language. Here is obviously also where we are encountering two higher-level concepts – space tourism and eco-tourism that need not necessarily be related, nor founded on the same thesis, which in turn poses a problem for their economic analysis – business models upon which they are founded. Therefore, this is certainly one of the significant topics for further analyses and scientific discussions when researching astrotourism.

Star-friendly lighting – a precondition for astrotourism development

Authors unanimously agree with the assumption that the most important factor of astrotourism development is the quality of the sky, i.e., the sky that isn’t light-polluted, which is achieved by adequate lighting (*star-friendly lighting*; Mizon, 2016). Furthermore, an adequate infrastructure is as significant, ranging from the one facilitating simple experiences that Tadić (2016) calls “naked-eye astronomy”, to the built visitor centres in observatories containing high-quality equipment. It is noteworthy that the attribute *star-friendly* also represents a strong branding potential, as much for the tourism destination as for individual accommodation facilities. In this sense, Mizon in his book *Finding a Million-Star Hotel, An Astro-Tourist’s Guide to Dark-Sky Places* from 2019 describes the possible business models within astrotourism, such as: astro-themed hotels and campsites, astronomy events, *star-gazing* locations and similar.

Matos (2017) also writes about the close relatedness of astrotourism and ecology, stating that ecology and sustainability are the *conditio sine qua non* of astrotourism development, especially with regard to protection from light pollution, as well as the protection of biodiversity (as consequence of light pollution protection).

dark-sky lokacije za astroturističke aktivnosti, determinirati snagu ekonomskih učinaka za javni i privatni sektor, izvršiti specifikaciju lokalno dostupnih tehnoloških uvjeta i druge opreme i materijalnih resursa te analizirati dostupne znanstvene i druge resurse. Ovo može ujedno poslužiti i kao početni poslovni model za razvoj pojedinih astroturističkih destinacija.

Kako bi se poduprijeli naponi i inicijative za obranu od svjetlosnog onečišćenja, nužno je educirati i senzibilizirati stanovništvo i relevantne *stakeholdere*, poduprijeti inicijative i preporuke koje izdaje IDA (*International Dark-Sky Association*), donijeti adekvatnu zakonsku regulativu, ali i borbu protiv svjetlosnog onečišćenja uključiti u razvojne planove i strategije na svim razinama, a razvoj astroturizma u strateške planove razvoja turizma u onim zemljama i regijama gdje postoje predispozicije za njegov razvoj.

REZULTATI ISTRAŽIVANJA

U Tablici 1 prikazana je analiza relevantnih znanstvenih radova kao temelj za razradu konceptualnog modela koji se prikazuje u ovom radu. On se zasniva na dimenzijama koje su prikazane u tablici, razrađenima temeljem vlastitih promišljanja autorice. Slijedi sinteza prikazanih rezultata:

Razdoblje istraživanja. U razmatranje je uzeto razdoblje od 1999. do 2020. godine. Kao značajniji raniji rad 1999. godine pojavljuje se rad naziva “Razvoj astroturizma u Višnjaju” autora Korlević i Krajnović. Daljnji značajniji radovi uglavnom se odnose na razdoblje od 2009. godine do recentnih istraživanja 2020. godine, pa se može reći da su značajnija istraživanja u ovom području nastala nakon 2009. godine. Uočeno je da se broj radova na temu astroturizma povećava, pa se može očekivati da će se ovo područje značajnije istraživati, kako u znanstvenoj teoriji, tako i kroz praktičnu primjenu.

Autori. Uočen je velik broj autora iz različitih zemalja svijeta i s različitih kontinenata. Može

Jiwaji (2016, pp. 5 and 6) suggests that for astrotourism development it is firstly necessary to identify the so-called dark-sky locations for astrotourism activities, determine the strength of economic effects for the public and private sector, conduct the specification of locally available technological conditions and other equipment and material resources, and analyse the available scientific and other resources. This can also serve as the starting business model for the development of individual astrotourism destinations.

In order to support the efforts and initiatives for light pollution protection it is necessary to raise awareness of and educate the population and the relevant stakeholders, support the IDA (*International Dark-Sky Association*) initiatives, pass adequate legal regulations, but also include the fight against light pollution in development plans and strategies in all levels, with the inclusion of astrotourism development in the tourism development strategic plans in the countries and regions that feature the preconditions for its development.

RESEARCH RESULTS

Table 1 shows the analysis of relevant scientific papers as basis for the elaboration of the conceptual model shown in this paper. It is based on the dimensions that are shown in the table, which the author elaborates in accordance with her own contemplation. The synthesis of results is as follows:

Research time period. The research encompasses a time period from 1999 to 2020. A more significant paper in 1999 was by Korlević and Krajnović titled “Astrotourism development in Višnjaj”. Further significant papers mostly relate to the time period between 2009 to the recent research papers of 2020, thus leading to a conclusion that the most significant research in this area appeared after 2009. It is noticeable that the number of research papers on astrotourism has been increasing, leading to an expectation that this area of interest will be researched more

se istaknuti značajan doprinos autora iz područja afričkih zemalja, što se vjerojatno temelji na činjenici da je na području Afrike smješten najveći *Dark-Sky* rezervat na južnoj polutki. Što se tiče europskih autora, moglo bi se reći da oni donekle zaostaju za autorima s drugih kontinenta, s izuzetkom nekoliko autora (među obrađenim radovima) iz Poljske, Češke, Italije, Hrvatske i Srbije, što je razvidno iz tablice.

Područje istraživanja. Velik dio radova se, razumljivo, odnosi na analizu uspješnih studija slučaja kada je u pitanju astroturizam. Svi se autori slažu da je riječ o značajnom potencijalu za razvoj turizma. Uočeni su zanimljivi radovi koji obrađuju rezultate primarnih istraživanja, primjerice stavove dionika o razvoju astroturizma, analizu turističkih proizvoda u astroturizmu, predstavljanje uspješnih projekata o astroturizmu i slično. Očekivano, kada je riječ o novijim područjima istraživanja kao što je to astroturizam, napisan je relativno mali broj radova koji obrađuje teoretski koncept astroturizma, čemu bi, kao prilog, trebao poslužiti i ovaj rad.

Istaknute funkcije astroturizma. Svi se autori analiziranih radova, eksplicitno ili implicitno, slažu s tezom da je astroturizam značajan faktor društvenog i ekonomskog razvoja, a pri tom se posebno ističe njegova ekološka, edukativna, ali i znanstvena funkcija, s obzirom da je to forma selektivnog turizma u uskoj povezanosti s astronomijom, ekologijom i drugim prirodnim znanostima. Posebno je zanimljivo istaknuti istraživanja nekolicine afričkih teoretičara koji povezuju astroturizam s kulturnom antropologijom, o čemu će biti više riječi u opisu sljedeće dimenzije. Autori se slažu i s činjenicom da astroturizam dodaje vrijednost turističkoj destinaciji i njenom imidžu, što u procesu brendiranja može biti temelj za izgradnju specifične ikonografije brenda, utemeljene na epitetima kao što su: *stargazing*, *star-friendly*, *dark-sky* i slično.

Povezana područja. Za relativno novo područje kao što je astroturizam, vrlo je zanimljivo pratiti povezane fenomene i kategorije.

significantly both in scientific theory as in its practical applications.

Authors. There are a great number of authors from different countries of the world and different continents. Noteworthy is the vast contribution of authors from African countries, probably based on the fact that the African region is home to the largest Dark-Sky Reserve on the Southern Hemisphere. As regards European authors, they seem to somewhat lag behind the authors from other continents, with the exception of several authors (among researched papers) from Poland, the Czech Republic, Italy, Croatia and Serbia, evident in the Table.

Research area. A great number of papers, understandably, relates to the analysis of successful case studies related to astrotourism. All authors agree that this poses a significant potential for tourism development. The author notices interesting papers dealing with results of primary research, for example, stakeholder attitudes toward astrotourism development, tourism product analysis in astrotourism, representation of successful projects in astrotourism and similar. When it comes to new areas of research, such as astrotourism, it is expected that there are a relatively small number of papers dealing with a theoretical concept of astrotourism, to which purpose this paper should make a contribution.

Highlighted functions of astrotourism. All authors of analysed papers, either explicitly or implicitly, agree with the thesis that astrotourism is a significant factor of social and economic development, whereby its ecological, educational, but also scientific functions are emphasised, considering that it is a form of special interest tourism closely connected to astronomy, ecology and other natural sciences. It is especially noteworthy to mention research by a few African theoretical scientists that relate astrotourism with cultural anthropology, covered in more detail in the description of the following dimension. The authors agree with the fact that astrotourism represents an added value to a tourism destination and its image, which can serve

TABLICA 1. PRIKAZ ANALIZIRANIH RADOVA NA TEMU ASTROTURIZMA (1999.-2020.)
TABLE 1. AN OVERVIEW OF ANALYSED PAPERS ON THE TOPIC OF ASTROTURISM (1999-2020)

GOD. YEAR	AUTOR AUTHOR	PODRUČJE ISTRAŽIVANJA RESEARCH AREA	ISTAKNUTE FUNKCIJE HIGHLIGHTED FUNCTIONS
1999.	Korlević i Krajnović	Pregled pojma i prakse astroturizma uz dvije studije slučaja; uvođenje pojma <i>astroturizam</i> u domaću znanstvenu literaturu Overview of astrotourism concept and practice with two case studies; introduction of the concept of <i>astrotourism</i> in domestic literature	Edukacijska, turistička Educational, tourism
2010.	Cater	Astroturizam kao oblik svemirskog turizma ("space tourism"), motivacija za astroturizam Astrotourism as a form of space tourism, motivation for astrotourism	Edukativna, razvojna Educational, developmental
2010.	Ingle	<i>Rebranding</i> turističke destinacije, utjecaj selektivnih oblika turizma na lokalnu zajednicu Rebranding of a tourism destination, the impact of special interest tourism on the local community	Razvojna funkcija Development function
2011.	Weaver	Astroturizam ("nebeski eko-turizam") kao segment eko-turizma Astrotourism ("celestial ecotourism") as a segment of eco-tourism	Održivost (ekologija) Sustainability (ecology)
2012.	Najafabadi	Analiza koncepta astroturizma ("astronomskog turizma") kao segmenta ekoturizma ("turizma zasnovanog na prirodi" – <i>nature-based tourism</i>), istraživanje glavnih atraktora za astro-turiste Astrotourism ("astronomical tourism") concept analysis as a segment of eco-tourism ("nature-based tourism"), research into the main attraction factors for astro-tourists	Razvojna funkcija, investicijska funkcija, utjecaj na zapošljavanje, razvoj poduzetništva, razvoj tehnologije Development, investment function, employment effects, entrepreneurship development, technology development
2012.	Austin, Hearnshaw, Butler i Loveridge	Predstavljanje <i>Dark-Sky</i> rezervata, koji je ujedno tada i najveći na svijetu, s visokim IDA (<i>International Dark-Sky Association</i>) certifikatom Presentation of the Dark-Sky Reserve, also the biggest in the world, holding distinguished IDA (<i>International Dark-Sky Association</i>) certificate	Ekološka, razvojna Ecology, developmental

POVEZANA PODRUČJA RELATED AREAS	STUDIJE SLUČAJA CASE STUDIES	IMPLIKACIJE IMPLICATIONS
<p>Astronomija; centri za posjetitelje u sklopu opservatorija Astronomy; visitor centres within observatories</p>	<p>Zvezdarnica Višnjan (Hrvatska), Griffith Observatory and Planetarium, Los Angeles (SAD) Višnjan Observatory (Croatia), Griffith Observatory and Planetarium, Los Angeles (USA)</p>	<p>Potencijali za razvoj astroturizma; izgradnja astroturističkih centara za posjetitelje s popratnim djelatnostima Astrotourism development potential; construction of astrotourism visitor centres along with ancillary businesses</p>
<p>Edukacija, zabava, tehnologija, turistička industrija Education, entertainment, technology, tourism industry</p>	<p>Studije slučaja "svemirskog turizma" u SAD-u Space tourism case studies in the USA</p>	<p>Potencijali za razvoj astroturizma Astrotourism development potentials</p>
<p>Turistički proizvod u astroturizmu i turistički motivi – kongitivne asocijacije: <i>svemir</i> (space) i <i>ništavilo</i> Tourist product in astrotourism and tourist motives – cognitive associations: <i>space</i> and <i>nothingness</i></p>	<p>Karoo (JAR) Karoo (The Republic of South Africa)</p>	<p>Inicijative za daljnji razvoj astroturizma u javnoj (vladinij) politici Further development initiatives for astrotourism in the public (government) policy</p>
<p>Opservatoriji – ujedno i centri za posjetitelje; borba protiv svjetlosnog onečišćenja; 2009. – Međunarodna godina astronomije Observatories – also visitor centres; fight against light pollution; 2009 – International year of astronomy</p>	<p>–</p>	<p>Suradnja organizacija u eko-turizmu s etabliranim astronomskim institucijama Cooperation of eco-tourism organisations with renowned astronomy institutions</p>
<p>Ekoturizam Eco-tourism</p>	<p>Cebu (Filipini) Cebu (The Philippines)</p>	<p>Javne i privatne investicije u turistički sektor, razvoj proizvoda kao dio razvojne strategije u turizmu, marketinška promocija u turizmu Public and private investment in the tourism sector, product development as part of tourism development strategy, tourism marketing promotion</p>
<p>Svjetlosno onečišćenje, zakonska regulativa o svjetlosnom onečišćenju, kvaliteta zraka i neba kao faktori razvoja astroturizma; značenje monitoringa u <i>Dark-Sky</i> rezervatima Light pollution, legal regulations on light pollution, air and sky quality as factors of astrotourism development; the significance of monitoring in <i>Dark-Sky</i> reserves</p>	<p>Rezervat <i>The Aoraki Mackenzie International Dark-Sky Reserve</i> (Novi Zeland) The Aoraki Mackenzie International Dark-Sky Reserve (New Zealand)</p>	<p>Važnost razvoja <i>Dark-Sky</i> rezervata; upravljanje i promocija u području astroturizma; značenje IDA za promociju i razvoj astroturizma Importance of <i>Dark-Sky</i> Reserve development; management and promotion in astrotourism; the significance of IDA in astrotourism promotion and development</p>

GOD. YEAR	AUTOR AUTHOR	PODRUČJE ISTRAŽIVANJA RESEARCH AREA	ISTAKNUTE FUNKCIJE HIGHLIGHTED FUNCTIONS
2012.	Mrozek, Kołomański, Żakowicz, Kornafel, Czarnecki, Suchan i Kamiński	Predstavljanje projekta <i>Astro Izery</i> Presentation of <i>Astro Izery</i> project	Edukacija i informiranje turista i domaćeg stanovništva; ekološka funkcija Education and informing of tourists and local population; ecology function
2012.	Welch i Dick	<i>Dark-Sky parks</i> – pregled lokacija u svijetu Dark-Sky parks – overview of locations around the world	<i>Dark-Sky-protection</i> , turistička valorizacija Dark-Sky parkova, edukativna funkcija, ekološka funkcija, zdravstvena funkcija Dark-Sky-protection, tourism valorisation of Dark-Sky parks, educational function, ecology function, healthcare function
2013.	Collison i Poe	Analiza turističkih proizvoda u astro-turizmu; statistička analiza posjetitelja na primjeru nacionalnog parka <i>Bryce Canyon</i> Tourism product analysis in astrotourism; statistical analysis of visitors on the example of Bryce Canyon National Park	Ekološka i razvojna funkcija Ecology and development function
2014.	Fayos-Solá, Marín i Jafari	Pregled odabranih inicijativa u području astroturizma Overview of selected initiatives in the area of astrotourism	Dodana vrijednost i pozicioniranje turističke destinacije Added value and positioning of a tourism destination
2014.	Noeth	Arhitektonski dizajn Međunarodne astronomske škole i Astroturističkog centra – prijedlog Architectural design of the International School of Astronomy and Astrotourism Centre – proposition	Edukacija, razvoj turizma Education, tourism development
2015.	Hearnshaw	Predstavljanje <i>Aoraki Mackenzie International Dark-Sky Reserve</i> kao najvećeg svjetskog <i>Dark-Sky</i> rezervata Presentation of Aoraki Mackenzie International Dark-Sky Reserve as the largest global Dark-Sky Reserve	Edukacijska funkcija, ekološka funkcija Educational function, ecology function

POVEZANA PODRUČJA RELATED AREAS	STUDIJE SLUČAJA CASE STUDIES	IMPLIKACIJE IMPLICATIONS
<p>Kolaborativni pristup: suradnja više institucija na međunarodnoj razini; djelovanje u cilju sprječavanja svjetlosnog onečišćenja</p> <p>Collaborative approach: collaboration of several institutions at an international level; acting with the purpose of light pollution prevention</p>	<p><i>Izera</i>, Poljska i Češka <i>Izera</i>, Poland and The Czech Republic</p>	<p>Razvoj ovoga i sličnih projekata kroz permanentne (stalne) i povremene proizvode/segmente u astroturizmu</p> <p>Development of this and similar projects through permanent and temporary products/segments in astrotourism</p>
<p>Veza s kulturom i tradicijom kraja – <i>storytelling</i> (mitovi i legende kraja)</p> <p>Connection to culture and tradition of the region – Storytelling (regional myths and legends)</p>	<p>Pregled najpoznatijih <i>Dark-Sky</i> parkova</p> <p>Overview of the most renowned <i>Dark-Sky</i> parks</p>	<p>Suradnja s drugim <i>stakeholderima</i> (mediji i sl.); inicijativa Međunarodno udruženje <i>Dark-Sky</i> parkova</p> <p>Cooperation with other stakeholders (media and the like); initiative for an international <i>Dark-Sky</i> park association</p>
<p>Astronomski i <i>Dark-Sky</i> programi</p> <p>Astronomy and <i>Dark-Sky</i> programmes</p>	<p>Nacionalni park <i>Bryce Canyon</i> (SAD)</p> <p>Bryce Canyon National Park (USA)</p>	<p>Značenje razvoja proizvoda u turizmu, značenje specifičnih <i>evenata</i> u astroturizmu</p> <p>Significance of product development in tourism, significance of specific events in astrotourism</p>
<p>Utjecaj astroturizma na zajednicu i razvoj društva</p> <p>Impact of astrotourism on community and social development</p>	<p>–</p>	<p>Astroturizam kao faktor marketinškog pozicioniranja destinacije i lokalnog razvoja</p> <p>Astrotourism as a factor of destination positioning and local development of a destination</p>
<p>Veza znanosti, edukacije i turizma; astroturizam i arhitektura</p> <p>Connection among science, education and tourism; astrotourism and architecture</p>	<p>JAR</p> <p>The Republic of South Africa</p>	<p>Izgradnja centara za posjetitelje i edukacijskih centara u sklopu razvoja astronomije i astroturizma</p> <p>Visitor centre and educational centre construction within astronomy and astrotourism development</p>
<p>Značenje upravljanja i promocije <i>Dark-Sky</i> rezervata; svjetlosno onečišćenje; IDA (<i>International Dark-Sky Association</i>), značenje astroturističkih <i>evenata</i></p> <p>Significance of <i>Dark-Sky</i> reserve management and promotion; light pollution; IDA (<i>International Dark-Sky Association</i>), significance of astrotourism events</p>	<p><i>Aoraki Mackenzie International Dark-Sky Reserve</i> (Novi Zeland); <i>Starlight festival</i> kao primjer <i>eventa</i> u astroturizmu</p> <p><i>Aoraki Mackenzie International Dark-Sky Reserve</i> (New Zealand); <i>Starlight festival</i> as event example in astrotourism</p>	<p>Razvoj i jačanje potencijala <i>Dark-Sky</i> rezervata za razvoj turizma</p> <p>Development and potential enhancement of <i>Dark-Sky</i> reserves aimed at tourism development</p>

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2015.	Belij, Tadić	Mogućnosti razvoja astroturizma u zemljama s manjim opservatorijima, na primjeru Srbije Potential of astrotourism development in countries featuring fewer observatories, an example of Serbia	Obogaćivanje ponude turističke destinacije Enrichment of tourism supply in a tourism destination
2016.	Tadić	Specifičnosti turističkih proizvoda u astroturizmu Specific nature of tourism products in astrotourism	Značenje konteksta u artikulaciji turističkog isustva u astroturizmu The significance of context in articulating tourist experiences in astrotourism
2016.	Jiwaji	Istraživanje potencijala za razvoj astroturizma u Tanzaniji Research into astrotourism development potentials in Tanzania	Astroturizam kao komplementarna turistička aktivnost u destinaciji; razvojna uloga, održivi razvoj Astrotourism as complementary tourism activity at a destination; development role, sustainable growth
2017.	Matos	Turistička motivacija u astroturizmu, klasifikacija astroturizma Tourist motivation in astrotourism, classification of astrotourism	Razvoj turističke destinacije koji je moguć i uz ograničene resurse Tourism destination development that is possible with limited resources
2017.	Toivonen	Održivo planiranje u <i>space</i> turizmu Sustainable planning in space tourism	Održivi razvoj Sustainable development
2017.	Pisarek, Gargała-Polar i Dudek	Stavovi lokalnog stanovništva o razvoju astroturizma u Poljskoj, regija Podkarpackie Local population attitudes on astrotourism development in Poland, Podkarpackie region	Regionalni i lokalni razvoj, edukacijska funkcija Regional and local development, educational function
2017.	Tobin i Dunne	Analiza potencijala za <i>Dark-Sky</i> turizam na primjeru Međunarodnog <i>Dark-Sky</i> rezervata Kerry, Irska Dark-Sky tourism potential analysis on the example of International Dark-Sky Reserve Kerry, Ireland	Lokalni razvoj, ekologija (borba protiv svjetlosnog onečišćenja) Local development, ecology (fight against light pollution)
2018.	van Wyk-Jacobs	Razvoj selektivnih oblika turizma u kontekstu ruralnog održivog razvoja Special interest tourism development in the context of rural sustainable growth	Ruralni razvoj, održivi razvoj Rural development, sustainable development

POVEZANA PODRUČJA RELATED AREAS	STUDIJE SLUČAJA CASE STUDIES	IMPLIKACIJE IMPLICATIONS
<p>Povezivanje resursa u astroturizmu s drugim resursima za razvoj selektivnih oblika turizma (prirodni resursi, povijest i sl.) Joining astrotourism resources with other resources aimed at special interest tourism development (natural resources, history and the like)</p>	<p>Beograd (Srbija) Belgrade (Serbia)</p>	<p>Suradnja relevantnih dionika (primjerice astronomskih društava i zvjezdarnica) s dionicima u turizmu; kreiranje specifičnih programa i prezentacija u astroturizmu Cooperation of relevant stakeholders (for example astronomy associations and planetariums) with tourism stakeholders; creating specific astrotourism programmes and presentations</p>
<p>Astroturizam manjih razmjera ("astronomija golim okom") Small-scale astrotourism ("naked-eye astronomy")</p>	<p>Beograd (Srbija) Belgrade (Serbia)</p>	<p>Mogućnosti razvoja astroturizma u manjim zemljama Potentials of astrotourism development in smaller countries</p>
<p>Mračno nebo (koje nije svjetlosno onečišćeno); geografska lokacija kao faktor razvoja astroturizma Dark-Sky (not polluted by light); geographical location as a factor of astrotourism development</p> <p>Mračno nebo (koje nije svjetlosno onečišćeno) Dark-sky (that is not light-polluted)</p>	<p>Tanzanija Tanzania</p> <p>–</p>	<p>Nužnost razvoja infrastrukture i preduvjeta za razvoj astroturizma (mobilni ili fiksni opservatoriji – zvjezdarnice, teleskopi, educirani astro-vodiči i sl.) The necessity of infrastructure development and preconditions for astrotourism development (mobile or fixed observatories – planetariums, telescopes, educated astro-guides and the like)</p> <p>Astroturizam kao razvojni potencijal Astrotourism as a development potential</p>
<p>Strateško planiranje Strategic planning</p>	<p>–</p>	<p>Značenje planiranja u astroturizmu; integracija astroturizma u strateške planove u turizmu Significance of planning in astrotourism; integration of astrotourism into strategic plans in tourism</p>
<p>Značenje stavova lokalnog stanovništva o razvoju astroturizma Significance of attitudes of local population on astrotourism development</p>	<p><i>Dark-Sky park</i> u planinama Bieszczady, Poljska Dark-Sky park in the Bieszczady mountains, Poland</p>	<p>Značenje edukacije i senzibilizacije lokalnog stanovništva za razvoj astroturizma Meaning of education and awareness raising of local population for astrotourism development</p>
<p>Značenje certifikata "gold tier" od strane IDA za <i>Dark-Sky</i> rezervate; <i>stakeholderski</i> pristup Significance of "gold tier" awarded by IDA for Dark-Sky reserves, stakeholders' approach</p>	<p>Međunarodni <i>Dark-Sky</i> rezervat Kerry, Irska International Dark-Sky Reserve Kerry, Ireland</p>	<p>Potencijali za razvoj astroturizma u funkciji razvoja lokalne sredine Astrotourism development potentials in the function of local community development</p>
<p><i>Stakeholderski</i> pristup, integralno upravljanje turističkom destinacijom Stakeholders' approach, integral management of a tourism destination</p>	<p>Južnoafrička Republika The Republic of South Africa</p>	<p>Kreiranje turističkih ruta zasnovanih na astroturizmu Creating tourism routes based on astrotourism</p>

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2018.	Yuna i Premadi	Istraživanje potencijala za lokacije za astroturizam temeljem parametara vlastitog modela autora Research into astrotourism location potentials based on parameters of models developed by the authors	Održivi turizam Sustainable tourism
2018.	Yazar	Astroturizam kao oblik ruralnog turizma – analiza primjera provincije Balikesir Astrotourism as a form of rural tourism – case study analysis of the Balikesir province	Ruralni razvoj, ekologija Rural development, ecology
2019.	Kunjaya, Melany, Sukmaraga i Arsono	Potencijali razvoja turizma u Indoneziji; razvoj turističke destinacije; koncept <i>dark-sky</i> turizma Tourism development potentials in Indonesia; tourism destination development; dark-sky tourism concept	Održivi razvoj turizma, ekonomski razvoj Sustainable tourism development, economic development
2019.	Soleimani, Bruwer Gross i Lee	Konceptualizacija pojma astroturizam; istraživanje artikulacije astroturizma u imidžu turističke destinacije Conceptualisation of astrotourism; research into astrotourism articulations in the image of a tourism destination	Razvoj turističke destinacije Tourism destination development
2019.	Zanazzi i Bacciotti	Predstavljanje projekta o astroturizmu u Firenci Presentation of astrotourism project in Florence	Edukacijska i kulturna funkcija astroturizma Educational and cultural function of astrotourism
2019.	Cater	Povijest “svemirskog turizma” (<i>space tourism</i>) The history of “space tourism”	Razvojna funkcija Development function

POVEZANA PODRUČJA RELATED AREAS	STUDIJE SLUČAJA CASE STUDIES	IMPLIKACIJE IMPLICATIONS
<p>Istraživanje relevantnih parametara za razvoj astroturizma kao što su: kvaliteta zraka, kvaliteta tamnog neba, godišnja prosječna naoblaka, karakteristike terena</p> <p>Research into relevant parameters for astrotourism development such as: air quality, dark-sky quality, average annual overcast season, terrain characteristics</p>	<p>Indonezija Indonesia</p>	<p>Mogućnosti primjene modela i za druge turističke destinacije. Model je utemeljen na Geograskim informacijskim sustavima (GIS) i metodi multikriterijske analize u višedimenzionalnom odlučivanju.</p> <p>Possibility of applying models for other tourism destinations. Model is based on GIS (Geographic Information System Mapping) method of multi-criteria analysis in multidimensional decision-making.</p>
<p>Astroturizam kao novi trend, svjetlosno onečišćenje</p> <p>Astrotourism as a new trend, light pollution</p>	<p>Provincija Balikesir (Turska) Balikesir province (Turkey)</p>	<p>Razvojni potencijal astroturističkih centara</p> <p>Development potential of astrotourism centres</p>
<p>Veza kulture i turizma; važnost <i>Dark-Sky</i> parkova za razvoj astroturizma; veza klimatskih i sezonskih specifičnosti okacije i astroturizma</p> <p>Connection between culture and tourism; importance of <i>Dark-Sky</i> parks for astrotourism development; connection between climatic and seasonal characteristics of the destination and astrotourism</p>	<p>Nacionalni <i>Dark-Sky</i> park u blizini Mount Timau, National Observatory in Kupang, Istočna Nusa Tenggara (Indonezija)</p> <p>National <i>Dark-Sky</i> park near Mount Timau, National Observatory in Kupang, Eastern Nusa Tenggara (Indonesia)</p>	<p>Važnost integriranja astroturizma u nacionalne strategije razvoja turizma; razvoj eko-sistema astroturizma</p> <p>Importance of integrating astrotourism in national strategies for tourism development; astrotourism eco-system development</p>
<p>Kontekst ekoturizma; opservacija mračnog neba, astrofotografija</p> <p>Ecotourism context; dark-sky observation, astrophotography</p>	<p>–</p>	<p>Razvoj astroturizma kao novog medija konceptualizacije imidža turističke destinacije; kombinacija nebeskih pojava sa “zemaljskim” prirodnim atrakcijama</p> <p>Development of astrotourism as a new medium of conceptualising the image of a tourism destination; combination of celestial phenomena with the “earthly” natural attractions</p>
<p>Kontekst značajnog znanstvenog i umjetničkog okruženja za razvoj astroturizma</p> <p>The context of significant scientific and artistic environment for astrotourism development</p>	<p>Firenca (Italija) Florence (Italy)</p>	<p>Ukazuje se na značenje povezivanja umjetnosti, znanosti i turizma</p> <p>Indication to the significance of connecting art, science and tourism</p>
<p>Podsegmenti <i>space</i> turizma: imaginativni, virtualni i realni</p> <p>Subsegments of space tourism: imaginative, virtual and realistic</p>	<p>–</p>	<p>Značajan razvojni potencijal <i>space</i> turizma</p> <p>Significant development potential of space tourism</p>

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2019.	Caballero-Sánchez, Sánchez-Medina, Alonso-Hernández i Voltes-Dorta	Prijedlog dviju probabilističkih metoda za modeliranje NSB-a (<i>night sky brightness</i>) – ARIMA i ANN Proposition of two probable methods for NSB (<i>night sky brightness</i>) modelling – ARIMA and ANN	Ekonomski razvoj; ekološka funkcija astroturizma Economic development; ecology function of astrotourism
2019.	Priyatikanto, Admiranto Putri, Maryam i Suryana	Svjetlosno onečišćenje u turističkoj destinaciji Light pollution in a tourism destination	Ekološka funkcija, razvojna funkcija Ecology function, developmental function
2019.	Honorato i Violin	Potencijali za razvoj astroturizma na primjeru <i>Morro do Diabo</i> Potentials for the development of astrotourism on the example of <i>Morro do Diabo</i>	Održivi razvoj, napori protiv svjetlosnog onečišćenja Sustainable development, efforts against light pollution
2020.	Jacobs, Du Preez i Fairer-Wessels	Astroturizam kao faktor razvoja ruralnih krajeva, istraživanje tržišta ponude i potražnje u astroturizmu Astrotourism as development factor in rural regions, research into supply and demand in astrotourism	Ruralni razvoj, održivi razvoj; razvoj tehnologije, društveni razvoj Rural development, sustainable development, technology development, social development
2020.	Kulvinder, Bichang'a, Wafula et al.	Razvoj astroturizma kao turističkog proizvoda – poslovni model; uvođenje pojma etnoastronomije u kontekst astroturizma – veza sa <i>storytellingom</i> (mitovi i legende vezane za zvijezde, planete i nebeske konstelacije i sl.) Developing astrotourism as a tourism product – business model; introduction of ethnoastronomy in the context of tourism – relation to storytelling (myths and legends related to stars, planets and celestial constellations, etc.)	Održivi razvoj, lokalni razvoj, zapošljavanje Sustainable development, local development, employment

POVEZANA PODRUČJA RELATED AREAS	STUDIJE SLUČAJA CASE STUDIES	IMPLIKACIJE IMPLICATIONS
<p>Smanjenje svjetlosnog onečišćenja, metode mjerenja kvalitete neba (NSB – <i>night sky brightness</i>), inicijative UNESCO (<i>Astronomy and World Heritage</i> i sl.) i drugih institucija (<i>Starlight Foundation, Globe at Night</i> i druge)</p> <p>Light pollution reduction, sky quality measurement methods (NSB – <i>night sky brightness</i>), initiatives by UNESCO (<i>Astronomy and World Heritage, etc.</i>) and other institutions (<i>Starlight Foundation, Globe at Night and others</i>)</p>	<p>Model je testiran na primjeru "NAOJ" (<i>National Astronomical Observatory of Japan, Tokio</i>)</p> <p>The model has been tested on the example of "NAOJ" (National Astronomical Observatory of Japan, Tokyo)</p>	<p>Korištenje lokalnih geografskih parametara kao prediktora u prognozama za mjerenje kvalitete neba; Promocija astroturizma</p> <p>Using local geographic parameters as predictors in forecasts for sky quality measuring; Astrotourism promotion</p>
<p>Napori protiv svjetlosnog onečišćenja Efforts against light pollution</p>	<p>Bandung (Indonezija) Bandung (Indonesia)</p>	<p>Poticaji za istraživanje svjetlosnog onečišćenja u turističkim destinacijama Incentives for research into light pollution in a tourism destination</p>
<p>Astroturizam i prirodni rezervati; veza kulture i astroturizma; pozitivan utjecaj na ljudsko zdravlje Astrotourism and natural reserves; connection between culture and astrotourism; positive impact on human health</p>	<p>Nacionalni park <i>Morro do Diabo</i> (Brazil) <i>Morro do Diabo</i> National Park (Brazil)</p>	<p>Astroturizam kao razvojni potencijal Astrotourism as a development potential</p>
<p>Integrirani menadžment turističke destinacije – kontekst ruralnog razvoja; <i>stakeholderski</i> pristup Integrated tourism destination management – rural development context; <i>stakeholders'</i> approach</p>	<p>Karoo (JAR) Karoo (JAR)</p>	<p>Suradnja više segmenata turizma: astroturizam, agroturizam, kulturni turizam; razvoj proizvoda u astroturizmu, integriranje astroturizma u turističke strategije Cooperation of several tourism segments: astrotourism, agritourism, cultural tourism; astrotourism product development, integrating astrotourism into tourism strategies</p>
<p>Kontekst održivog razvoja (prirodni rezervati), ekologija (lokacije bez svjetlosnog onečišćenja); trenirani vodiči u astroturizmu, veza s lokalnom kulturom Sustainable development context (natural reserves), ecology (locations without light pollution); trained guides in astrotourism, connection to local culture</p>	<p>Prirodni rezervat <i>Maasai Mara</i> (na granici između Tanzanije i Kenije) <i>Maasai Mara</i> natural reserve (on the border between Tanzania and Kenya)</p>	<p>Mogućnosti razvoja turizma u prirodnim zaštićenim područjima; javno-privatno partnerstvo u funkciji razvoja astroturizma Possibility of tourism development in protected natural areas; public-private partnership in the function of astrotourism development</p>

U središtu pažnje je, svakako, astronomija, no zanimljivo je uočiti multidimenzionalnost fenomena astroturizma, a samim time i potrebu da se isti sagledava kroz interdisciplinarnu prizmu. Tako se u obrađenim radovima pojavljuju istraživanja vezana uz područja psihologije (motivi i asocijacije turista vezani uz uključivanje u astroturizam), pedagogije (edukacijski programi kao segment astroturizma), ekologije (prvenstveno borba protiv svjetlosnog onečišćenja), pravnih znanosti (zakonska regulativa vezana uz svjetlosno onečišćenje), kulturna antropologija i etnoastronomija (*storytelling* i astroturizam – priče i legende kraja, prvenstveno one koje su vezane uz astronomske fenomene), sociologija (utjecaj astroturizma na društvo; stavovi dionika o astroturizmu i sl.), ekonomije (poslovni modeli i ekonomski potencijal razvoja astroturizma), geografija, klimatologija i meteorologija (u kontekstu elaboriranja prirodnih preduvjeta za razvoj astroturizma te predviđanja i kreiranje razvojnih modela astroturizma), arhitekture, arheologije, umjetnosti (astrofotografija), medicine (pozitivan utjecaj mračnog neba na ljudsko zdravlje), biologije (pozitivan utjecaj mračnog neba na biosferu) i slično.

Studije slučaja. Analizirani radovi obrađuju vrlo zanimljive studije slučaja – od onih manjih razmjera u manjim zemljama (Višnjan, Beograd) do značajnih astroturističkih lokacija koje postoje u Africi (Tanzanija, JAR), ali se razvijaju i drugdje u svijetu (SAD, Španjolska, Filipini, Novi Zeland, Poljska, Češka, Irska, Turska, Brazil, Japan, Italija, Indonezija, Velika Britanija, Kanada i druge).

Implikacije. Vrlo je zanimljivo istaknuti i znanstvene i praktične implikacije analiziranih radova koji se radikalno šire u više smjerova, ovisno o užem području istraživanja u pojedinom radu. No generalno se može reći da se, u praktičnom smislu, teoretičari zalažu za daljnje senzibiliziranje, razvoj i razradu modela razvoja astroturizma u praksi, dok smjernice za daljnja istraživanja upućuju na daljnje analize studija slučaja, pri čemu mogu biti korisne i njihove komparacije,

as a foundation of a specific brand iconography in the branding process, based on attributes such as: *stargazing, star-friendly, dark-sky* and the like.

Related areas. For a relatively new area, such as astrotourism, it is very interesting to monitor related phenomena and categories. The centre of attention is, certainly, astronomy; however, it is interesting to notice the multidimensional aspect of the astrotourism phenomenon, followed by the necessity to observe it through an interdisciplinary prism. Thus, the analysed papers mention research related to the areas of psychology (tourist motives and associations related to participation in astrotourism), pedagogy (educational programmes as astrotourism segment), ecology (primarily fighting light pollution), legal science (legal regulations related to light pollution), cultural anthropology and ethno-astronomy (*storytelling* and astronomy – stories and legends of the regions, primarily those related to astronomical phenomena), sociology (social impacts of astrotourism, astrotourism stakeholder attitudes, etc.), economy (business models and economic potential of astrotourism development), geography, climatology and meteorology (within the context of elaborating natural preconditions for astrotourism development and predicting and creating development models of astrotourism), architecture, archaeology, art (astrophotography), medicine (positive effects of the dark sky on human health), biology (positive effects of the dark sky on the biosphere) and others.

Case studies. The analysed papers deal with very interesting case studies – from small-range ones in smaller countries (Višnjan, Belgrade) to more significant astrotourism locations that exist in Africa (Tanzania, The Republic of South Africa), but also those developing elsewhere in the world (USA, Spain, The Philippines, New Zealand, Poland, The Czech Republic, Ireland, Turkey, Brazil, Japan, Italy, Indonesia, The Great Britain, Canada and others).

Implications. It is also interesting to mention the scientific and practical implications of the

ali i za razradu konceptualnog teoretskog modela o astroturizmu, čemu bi trebao pridonijeti i ovaj rad. Razmimoilaženja se mogu pronaći u definiciji, opsegu i klasifikaciji pojma i koncepta astroturizma, pa će daljnje znanstvene rasprave zasigurno ići u smjeru “izlučivanja” zajedničkih spoznaja i stvaranja jedinstvenog istraživačkog okvira za razvoj astroturizma.

SITUACIJA U HRVATSKOJ

Kada je riječ o Hrvatskoj, treba reći da je ovdje ključnu ulogu odigrala svjetski poznata Zvezdarnica i Edukacijski centar Višnjan (na čelu s eminentnim znanstvenikom Koradom Korlevićem). No uočeno je da se i na nekim drugim lokalitetima u Hrvatskoj i drugim manjim zemljama iz okruženja stvaraju određeni “nukleusi” za razvoj astroturizma (Slovenija, Srbija).

No veliki problem predstavlja svjetlosno onečišćenje. Dobrota (2019) navodi da “zbog svjetlosnog onečišćenja, zagrebačko nebo nudi pogled na samo 15-ak najsajnijih zvijezda koje se mogu promatrati amaterskim teleskopima”, ali ističe i da je situacija drugačija u ruralnim sredinama Hrvatske, gdje još uvijek postoji mnogo lokacija s minimumom svjetlosnog zagađenja. U travnju 2019. donesen je i Zakon o zaštiti od svjetlosnog onečišćenja koji bi trebao ograničiti javnu rasvjetu i pomoći očuvanju prirodne svjetlosti i ravnoteže između prirodnog osvjetljenja i tame.

No značajnijeg razvoja astroturizma u Hrvatskoj još uvijek nema, unatoč značajnom potencijlu. Osim Zvezdarnice Višnjan, u Hrvatskoj postoji još nekoliko zvezdarnica koje posjetiteljima otvaraju svoja vrata određenim danima u tjednu za simboličnu naknadu, npr. Zvezdano selo Mosor, ili bez naknade, npr. Zagrebačka zvezdarnica na Popovom tornju (Dobrota, 2019). “Njihova namjera je popularizacija znanosti i širenje ljubavi prema astronomiji, posebno među mlađom populacijom.” (Dobrota, 2019). No dobra je vijest da je Hrvatska 2019. godine dobila svoj prvi

analysed papers that extend radially in several directions, depending on the narrow research field of each paper. On the whole, I can say that, in a practical sense, theoretical scientists support further awareness, development and elaboration of development model of astrotourism in practice, while further research guidelines indicate further case study analyses, making their comparison useful, but also an elaboration of a conceptual theoretical astrotourism model, to which this paper can also contribute. Misalignments appear in determining the definition, scope and classification of the astrotourism concept, leading further scientific discussions in the direction of extracting common knowledge and creating a unique scientific research framework for astrotourism development.

SITUATION IN CROATIA

As regards Croatia, it is noteworthy to mention that the key role in this area was played by the Observatory and Educational Centre Višnjan (headed by the eminent scientist Korad Korlević). However, several other localities in Croatia and other smaller surrounding countries were noticed to create specific “nuclei” for astrotourism development (Slovenia, Serbia).

Nevertheless, a major problem is presented by light pollution. Dobrota (2019) states that due to light pollution, Zagreb sky offers a view of only 15 or so brightest stars that can be observed with amateur telescopes, but he also emphasises that the situation is different in rural Croatian areas, where there are still a lot of locations with minimal light pollution. In April 2019, the Act on Light Pollution Protection was passed, which should limit public lighting and help to preserve natural light and balance between natural lighting and darkness.

However, there still has not been a significant astrotourism development in Croatia, despite significant potential. Besides the Višnjan Observatory, there are several observatories in Croatia that open their doors to visitors in

međunarodni Park tamnog neba na Petrovoj gori. “Za sjajnu vijest možemo zahvaliti članovima Astronomskog društva Beskraj, čiji članovi ulažu višegodišnje napore u sustavnu popularizaciju astronomije na navedenoj lokaciji, u suradnji s javnim institucijama i tijelima lokalnih samouprava. Priznanje je značajno za očuvanje okoliša Petrove gore i promociju Hrvatske kao astro destinacije.” (Dobrota, 2019).

ZAKLJUČAK

Astroturizam, artikulacija iskonske želje čovjeka za gledanjem u zvijezde, kao i sama astronomija, podjednako su stari, koliko i novi fenomeni. Riječ je o fascinantnom području znanosti koje ne prestaje pobuđivati pažnju i znatiželju svih generacija, što je u konačnici dobilo i svoju formu kroz specifičan selektivni oblik turizma – astroturizam.

Ovo je znanstveno područje, kao i suvremena praksa astroturizma, sasvim nova, što je razvidno i iz rezultata koji su prikazani u ovom radu. Astroturizam kao ekološki iznimno prihvatljiv, specifičan oblik turizma zasnovan je na znatiželji, misteriji, romantici, želji za znanjem, ali i introspekciji te fascinaciji nepoznatim svemirom. Samim time, dokazana je početna teza u ovom radu da je riječ o praktičnom području iznimnog razvojnog potencijala, ali i o nedovoljno istraženoj znanstvenoj temi koja će se zasigurno i dalje istraživati i pobuđivati sve veću pažnju znanstvenika i stručnjaka u praksi. Jer smo, uostalom, svi mi sazdana od zvijezda...

return for a symbolic fee, such as the Mosor Star Village, or at no charge, such as the Zagreb Observatory at Priest’s Tower (Dobrota, 2019). They aim to popularise science and spread love toward astronomy, especially among the younger population (Dobrota, 2019). The good news is that Croatia received its first International Dark-Sky Park in Petrova gora (Peter’s Hill). The great news is owed to the members of the Astronomy Association Beskraj, who have been making efforts for several years to achieve a systematic popularisation of astronomy at the mentioned location, in cooperation with public institutions and local self-government entities. The recognition is significant for environment preservation of Petrova gora and promotion of Croatia as an astro-destination (Dobrota, 2019).

CONCLUSION

Astrotourism, the articulation of an inherent human desire to gaze at the stars, as well as astronomy itself are both old as much as they are new phenomena. It is about a fascinating scientific area that does not cease to capture attention and curiosity of all generations, which finally received its form as a special interest tourism – astrotourism.

This scientific area, as well as the modern astrotourism practice, is completely new, which is discernible from the results shown in this paper. Astrotourism, as an ecologically highly acceptable form of special interest tourism has been based on curiosity, mystery, romance, pursuit of knowledge, but also introspection and fascination with unknown space. This proves the preliminary thesis of this paper stating that it is a practical field of a high development potential, but also an insufficiently researched scientific topic, that will certainly be explored further and spark more and more attention of scientists and practical experts. Because, after all, we are all made of stars...

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