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Residents' Views on Cyclist Safety and Cycling Infrastructure in the City Municipality of Celje

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Purpose:

The paper presents the results of two research studies analysing the views of different target populations on cyclist safety and the adequacy of preventive measures in Slovenia. The purpose of both research studies was to identify the shortcomings of different approaches to ensuring cyclist safety, evaluate the adequacy of planned solutions and propose some improvements of preventive actions taken by various stakeholders.

Design/Methods/Approach:

A field survey was conducted among the residents of the City Municipality of Celje (n = 171) on their satisfaction with cyclist safety, while an online survey was carried out among internet users (n = 210) on the usefulness of an alternative approach to raise cyclists' awareness by digitising cycling routes and safety risks.

Findings:

Results show that respondents are generally not satisfied with cyclist safety, as most believe that municipal efforts are insufficient to ensure it. It was observed that cycling infrastructure needs to be properly regulated and that a positive traffic culture should be promoted at the municipal level, including through the promotion of preventive activities. Both internet users and local residents recognise a strong need to digitise cycle paths by indicating safety risks. Therefore, it would be reasonable to upgrade conventional approaches to raising public awareness by introducing solutions that are useful for cyclists.

Research Limitations/Implications:

The limitation of the research study arises from the fact that its results cannot be generalised to all municipalities, since they apply different approaches to ensuring cyclist safety due to their autonomy and are facing different safety risks. Moreover, due to the use of a non-random sample, caution is necessary when generalising research results.

Practical Implications:

The results of the presented studies are primarily useful to decision-makers and infrastructure managers at national and local level when planning changes and safety measures in the field of cyclist safety.

Originality/Value:

The paper encompasses two studies, the findings of which complement one another substantially and provide a deeper insight into the issues of cyclist safety and preventive actions taken by different stakeholders. They serve as a basis for further exploring this issue in different local environments with a view of obtaining a more comprehensive insight into the key challenges of traffic safety from a broader perspective.

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Keywords: safety, cyclists, cycling infrastructure, safety risks, resident's perceptions, City Municipality of Celje

Stališča prebivalcev o varnosti kolesarjev in kolesarski infrastrukturi v Mestni občini Celje

Namen prispevka:

V prispevku predstavljamo rezultate raziskav, s katerima smo analizirali stališča različnih ciljnih populacij o kolesarski varnosti in primernosti preventivnih ukrepov v Sloveniji. Namen raziskav je ugotoviti pomanjkljivosti v pristopih k zagotavljanju varnosti kolesarjev, oceniti primernost načrtovanih rešitev in predlagati izboljšave na področju preventivnega ukrepanja različnih deležnikov.

Metode:

V okviru prispevka smo izvedli terensko raziskavo med prebivalci Mestne občine Celje (n = 171) o zadovoljstvu z urejenostjo kolesarske varnosti in spletno anketo med uporabniki spleta (n = 210) o uporabnosti alternativnega pristopa k ozaveščanju kolesarjev skozi digitalizacijo kolesarskih poti in varnostnih tveganjih.

Ugotovitve:

Rezultati kažejo, da anketiranci na splošno niso zadovoljni z varnostjo kolesarjev, saj večina meni, da občina za varnost kolesarjev ne naredi dovolj. Ugotavljamo, da je na ravni občine treba zagotoviti ustrezno urejenost kolesarske infrastrukture in spodbujati kulturo udeležencev v cestnem prometu, tudi skozi spodbujanje preventivnega ukrepanja. Uporabniki spleta kot tudi prebivalci Mestne občine Celje prepoznavajo visoko potrebo po digitalizaciji kolesarskih poti z označbo varnostnih tveganj, zato je smiselno klasične pristope k ozaveščanju javnosti nadgraditi z rešitvami, ki so uporabne za kolesarje.

Omejitve/uporabnost raziskave:

Omejitev raziskave je v tem, da je ne gre posplošiti na vse občine, saj občine zaradi svoje suverenosti različno pristopajo k zagotavljanju varnosti kolesarjev, prav tako pa se v vsaki občini pojavljajo različna varnostna tveganja. Obenem je zaradi neslučajnostnega vzorca potrebna previdnost tudi pri posploševanju rezultatov raziskave.

Praktična uporabnost:

Rezultati prispevka so primarno uporabni za odločevalce in upravljavce na državni ravni ter lokalni ravni pri načrtovanju sprememb in varnostnih ukrepov na področju varnosti kolesarjev.

Izvirnost/pomembnost prispevka:

Prispevek vključuje raziskavi, katerih ugotovitve se pomembno dopolnjujejo in omogočajo globlji vpogled v problematiko varnosti kolesarjev ter preventivnega ukrepanja različnih deležnikov. Prispevek predstavlja podlago za nadaljnje raziskovanje tovrstne problematike v različnih lokalnih okoljih za pridobitev celovitejšega vpogleda v ključne izzive prometne varnosti na širši ravni.

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Ključne besede: varnost, kolesarji, kolesarska infrastruktura, varnostna tveganja, stališča prebivalcev, Mestna občina Celje

1 INTRODUCTION

Developed countries are increasingly focusing on the environmental protection, healthy lifestyles, better traffic management and, hence, alternative concepts of sustainable mobility when drafting their development priorities. Recent trends in Slovenia show that the share of physically active population has been increasing, which may also be observed in the growth of various types of cycling (Kolesarska zveza Slovenije [Slovenian Cycling Federation], n. d.), such as cycling as a form of recreational or sports activity, cycling for families or tourist groups and occasional cycling. Therefore, cycling infrastructure is increasingly congested and cyclists tend to be among the most vulnerable road users due to their defencelessness and exposure to numerous risks (Policija [Police], n. d. a). Traffic accidents involving cyclists often produce severe consequences, which is clearly demonstrated by numerous fatalities and injuries. In Slovenia, the number of such accidents is very high and exceeds the EU average (European Commission [EC], n. d.), which is why it is extremely important to ensure greater traffic safety and raise public awareness about cyclist safety and related issues.

A study conducted by researchers in the US and Canada on associations between cyclists' characteristics, availability of cycling infrastructure and the perceptions of cycling shows that the availability of cycling infrastructure is strongly correlated with the perception or, to put it differently, the feeling of safety. Therefore, increasing the availability of cycling infrastructure in cities would make it significantly more likely for respondents to perceive cycling as safer and enhance the frequency of cycling, even though personal characteristics also have an important role in such perceptions (Branion-Calles, Nelson, Fuller, Gauvin, & Winters, 2019). A study assessing the impacts of building a separate cycling infrastructure on drivers' behaviour shows, for instance, that separate cycling infrastructure would substantially reduce cyclists' exposure to risks and the likelihood of traffic accidents, however, researchers note that the construction of separate cycling infrastructure might also produce a negative impact. The greater

absence of cyclists from mixed traffic situations could impair proper behaviour and reduce tolerance to cyclists, particularly among drivers, which would in turn increase the risk for cyclists on the roads (Thompson, Wijnands, Savino, Lawrence, & Stevenson, 2017). Therefore, adequate road or cycling infrastructure combined with measures for maintaining the roadworthiness of vehicles and promoting proper behaviour of all road users seems to be the most important aspect for guaranteeing cyclist safety in road traffic (Javna agencija Republike Slovenije za varnost prometa [Slovenian Traffic Safety Agency, STSA], 2013c; Šumah, 2012).

The lack of cyclists' awareness of safety risks and the specific characteristics of cycle paths, as well as insufficient cycling infrastructure, particularly in urban environments and cities, represent the most prominent issues in the field of cyclist safety in Slovenia (Belca et al., 2018a, 2018b, 2018c; Brcar, 2017). Due to insufficient and poorly executed or maintained cycling infrastructure, municipalities in Slovenia are perceived to be rather unfavourable to cyclists (STSA, 2013b). According to the STSA, problems related to cyclist safety also arise from the fact that Slovenia currently has no institution that would deal with cyclist safety and cycling as a mode of transport in a comprehensive manner and that in practice, cycling is generally not considered as an integral part of road traffic (STSA, 2017b).

Better planning of cycling traffic and the construction of adequate cycling infrastructure would boost a more widespread use of bicycles, thus contributing to greater mobility and to tackling issues related to traffic flow capacity, while simultaneously improving cyclist safety (Šumah, 2012). Improving cycling infrastructure is the first step towards increasing the share of cycling in cities, however, it is currently hindered by a haphazard approach to the construction of adequate infrastructure and the lack of strategy, which may be observed in the implementation of individual, separate and unconnected projects (Ministrstvo za infrastrukturo [Ministry of Infrastructure, MI], 2017). This is also confirmed by the programme of activities for cyclists, which states that the reason for the (still) insufficient number of cyclists in road traffic is primarily related to the underdeveloped cycling infrastructure and extremely flawed legislative framework (MI, 2017). Accordingly, statistical data show that most traffic accidents involving cyclists occur in built-up areas, which clearly points to the need for adopting more efficient measures at the local level and for a greater interaction between national and local levels (STSA, 2017b). Apart from the provision of adequate infrastructure, other important measures contributing to greater cyclist safety also include raising the awareness of all road users about preventive behaviours and the promotion of appropriate road traffic culture. Currently, there is no comprehensive overview of the situation in the field of cycling infrastructure in Slovenia, which would provide cyclists with the necessary information about the condition and difficulty levels on individual cycle paths, thus enabling them to prepare for potential perils and risks. Moreover, the likelihood of traffic accidents is much higher due to road users' poor driving culture or, in other words, the inconsiderate attitude towards the safety of other users, which is often reflected in intolerance and violation of the highway code.

This paper presents the results of two quantitative research studies analysing the views of two different target groups on cyclist safety and the adequacy of

preventive measures. The two studies were aimed at establishing shortcomings in the provision of cyclist safety, evaluating the suitability of planned solutions and proposing improvements in the field of preventive action. Since traffic accidents involving cyclists in the Savinjska region (a region in the centre-east of Slovenia), which is currently witnessing a strong upward trend in cycling, are extremely frequent and well above Slovenia's average, the researchers decided to analyse the level of satisfaction with the current cycling infrastructure and cyclist safety among the residents of its largest municipality (i.e. Mestna občina Celje [The City Municipality of Celje, CMC]). In the second study, internet users were asked to share their views on the need to digitise cycle paths, their characteristics and safety risks in order to evaluate potential positive implications of such information and awareness raising activities.

2 SAFETY SITUATION AND THE REGULATORY FRAMEWORK GOVERNING CYCLE PATHS IN SLOVENIA

Discussions about the need to improve the traffic safety of cyclists by focusing on the protection of vulnerable road users have been widely promulgated in 2013 by the European Transport Safety Council (ETSC), while the European Parliament proposed its own initiatives for improving the situation and called upon the EC and Member States to consider pedestrians and cyclists as an integral part of the traffic system (STSA, 2013a). Calls for expanding and improving cycling infrastructure with a view to provide a higher level of cyclist safety are also evident from reports on cyclist safety in south-east European regions (ROSEE, 2013; STSA, 2013c). According to the EC (2017), roads in the EU are the safest in the world, however, the number of fatalities and injuries remain too high. In 2016, the average number of fatalities among cyclists in Europe amounted to four per million population, while the average in Slovenia reached 5.8, which means that Slovenia ranks 8th when it comes to the annual number of fatalities among cyclists per million population (EC, 2017). Therefore, Slovenia is one of the countries in which the share of fatalities among cyclists is higher than the EU average and is thus facing an important traffic safety issue which it needs to address accordingly.

Results of the STSA annual reports show that in the last five years, the average number of fatalities among cyclists in Slovenia has remained more or less the same, namely 11.8 (STSA, 2019). On the basis of statistical data regarding the number of fatalities among cyclists, these may be broken down into different categories, for instance, according to the cause and type of accident, cyclists' age or gender. In this respect, the STSA finds that a whopping 25% of all fatalities involve cyclists older than 55 years of age. Accordingly, the Slovenian Police (Policija [Police], n. d. b) also state that older cyclists represent the most vulnerable road users. In Slovenia, the largest share (66%) of accidents resulting in a grave injury or death of a cyclist is actually caused by cyclists themselves, who fail to comply with the highway code rules regarding priority, speeding or riding in the wrong direction (STSA, 2019). According to Gabršček (2015), the growing number of cyclists in road traffic often leads to conflicts between cyclists, drivers

and pedestrians. This means that cyclists themselves can contribute significantly to the reduction of accidents by engaging in self-protective behaviour, complying with the rules and acting according to their capabilities; at the same time, State and municipal bodies can also achieve great progress by adopting adequate infrastructure plans and preventive measures. The STSA (2013b) observes that it would also be necessary to improve statistical data management practices and the quality of analytical data on traffic accidents involving cyclists, particularly in terms of processing statistical data according to the type of cyclist. This could contribute to the development of more suitable and efficient preventive measures and promotional activities aimed at specific target groups.

To understand cyclist safety concerns and current challenges it is not only important to study the actual state-of-play, but to also consider the guidelines or directives adopted in international and national strategies. The EU decided to tackle these issues by adopting the Vision Zero and Safe System approach aimed at eliminating fatalities and serious injuries caused by road accidents on all European roads, which requires close cooperation with competent authorities of its Member States. This approach is implemented by adopting laws, supporting public education campaigns, helping Member States and other road safety actors in sharing relevant experience and providing co-funding to support similar campaigns and preventive measures (EC, n. d.).

Slovenia pursues similar goals, as its Resolucija o nacionalnem programu varnosti cestnega prometa za obdobje od 2013 do 2022 (Resolution on the National Programme on Road Traffic Safety for the 2013–2022 period, 2013; henceforth: Resolution) sets out the following long-term goal: "zero deaths and zero serious injuries cause by road accidents in Slovenia". The Resolution imposes an obligation on State authorities and organisations, authorities of local self-government communities, expert bodies, civil society organisations and individuals to dedicate any decisions and actions towards its implementation, as well as to adapt and plan the traffic system with a view of preventing further fatalities and injuries (Resolution, 2013). The STSA, whose mission is to reduce the worst consequences of traffic accidents (fatalities and injuries of road users), is particularly active in this field (STSA, 2010).

In Slovenia, the two most important legal acts regulating cyclist safety and defining the responsibilities of individual stakeholders are the Road Traffic Rules Act (Zakon o pravilih cestnega prometa, 2013) and the Roads Act (Zakon o cestah, 2010). The Road Traffic Rules Act (Zakon o pravilih cestnega prometa, 2013) stipulates rules applicable to riding a bicycle, regulates cycling areas, defines the principles of road (and cycling) traffic, and prescribes the conduct of road users in order to guarantee free-flowing, calm and safe traffic. The Act also imposes the obligation to obey the rules and prescribes detailed conditions for riding a bicycle and cycling in road traffic. It stipulates that cyclists are obliged to ride their bicycles on designated cycle paths, cycle lanes or cycle routes, observe traffic signalisation (traffic signs, illuminated signs and road markings), as well as maintain their bicycles and other equipment (lights, protective helmet and reflectors) in good condition (Zakon o pravilih cestnega prometa [Road Traffic Rules Act], 2013). The Roads Act (Zakon o cestah, 2010), which categorises cycling infrastructure

as public service infrastructure, defines, *inter alia*, basic terms related to cycling infrastructure and stipulates the manner of regulating and funding State and municipal cycle routes. Much like public roads, cycling infrastructure must also be properly maintained, which is why Article 62 of the Roads Act (Zakon o cestah, 2010) stipulates that the maintenance of traffic surfaces (including cycling routes) located in built-up areas falls into the remit of municipalities. In addition, municipalities are responsible for the routine maintenance of State cycling routes on municipal roads (Zakon o cestah [Roads Act], 2010). In terms of guaranteeing cyclist safety, the applicable legislation is rather unfavourable to cyclists, since the Roads Act confers a broad discretionary power on infrastructure managers, which means that they are able to invoke numerous reasons (economic, spatial, environmental, etc.) for not complying with the prescribed solutions, which would ensure greater safety for cyclists (STSA, 2013b).

2.1 Regulation of Cycling and Cycle Paths in the City Municipality of Celje

The rise of cycling is closely related to the development of tourism, since increasing numbers of people are engaging in tourist and recreational cycling, which is a particularly noticeable trend in the CMC. The tourism sector in Celje has been growing continuously and recent tourism statistical data show extremely positive and optimistic trends for the future of the CMC (Dorn, 2016). However, the growing flow of people and traffic also increases the likelihood for cyclists to be involved in traffic accidents. The fact that in 2015, a whopping 15% of all traffic accidents involving a cyclist occurred on the territory of the Celje Police Directorate (STSA, 2017a) and that at least one cyclist dies every year in this region is particularly alarming. In the past five year, 12.5% of all injuries among cyclists in Slovenia happened in the Savinjska region, which is why it ranks 3rd when it comes to the frequency of injuries among cyclists (STSA, 2017a). A total of 835 cyclists' injuries were reported between 2012 and 2016 in the Savinjska region (STSA, 2017a) and most accidents involving cyclists, i.e. approximately 85%, occurred in built-up areas (STSA, 2017b).

In the CMC, cycling surfaces are regulated by a specific municipal ordinance, which categorises municipal roads and cycle paths in Celje, however, it fails to specifically mark or separate cycle paths from all other types of paths or roads. This is particularly problematic, as many cycling routes in the CMC run along other road traffic routes, which is why cyclists are often using the roads together with motorised vehicle drivers and are thus more vulnerable (Odlok o kategorizaciji občinskih cest in kolesarskih poti Celje [Ordinance on the Categorisation of Municipal Roads and Cycle Paths in Celje], 2010). Therefore, additional measures, which are addressed below, have been implemented to improve cyclist safety.

The CMC is striving to reduce the negative impacts of traffic by gradually introducing changes to the mobility habits and behaviours of its residents in the scope of various projects aimed at improving cycling infrastructure at the local level. However, in order to change residents' commuting habits, it is vital to provide adequate infrastructure, which would enable the use of alternative

modes of commuting (Razvojni center Inženiringi Celje [Development Center Engineering Celje, DCEC], 2017). To achieve this objective, the CMC is currently implementing various projects aimed at improving the links between urban areas and the outskirts. According to the CMC City Council, this would reduce traffic jams, improve the quality of life in urban areas and increase traffic safety (CMC, n. d.).

Measures aimed at tackling cycling issues have been implemented at the regional and local level. The purpose of regional measures is to build cycling routes across the Savinjska region, thus promoting tourism development and increasing the quality of life for all residents of the region (Razvojna agencija Savinjske regije [Development Agency of the Savinjska Region], 2009). The objective of such measures is to site cycle paths so that they would run across and connect the entire region, thus promoting the use of different options for daily commute and enabling sustainable mobility. In cooperation with the municipalities of Štore, Šentjur, Žalec, Vojnik, Dobrna, and Laško, the CMC completed the preliminary design project for the siting of regional cycling routes. To tackle the issues identified in relation to traffic and workers' mobility, the CMC has also been adopting local measures. For instance, the CMC devised an Integrated Transport Strategy, which contains various measures in the field of sustainable mobility aimed at establishing a high-quality and integrated transport system, which would meet the needs of local residents, businesses and visitors alike (DCEC, 2017). With respect to improving cycling traffic, the CMC first introduced a public bicycle-sharing system. It then focused on providing an integrated cycling network at the local level and ensured the necessary conditions for improving cyclist's daily commute within the city of Celje by regulating the network of cycling routes in the CMC, which – by considering the expectations and habits of modern cyclists – provided access to the most important points of interest (CMC, 2018a). The objective of establishing a network of cycling routes is to create a safe and attractive cycling network on the territory of the CMC by 2022, improve and upgrade existing cycling infrastructure, increase the share of cyclists and simultaneously reduce the number of traffic accidents involving cyclists (CMC, 2018c). Experience from developed European cities shows that the possibility of affordable and convenient parking accompanied with a direct access to the public bicycle-sharing system can substantially reduce traffic-related problems. Therefore, the CMC decided to establish a P&R (park and ride) system, which contributes to the reduction of air and noise pollution, while increasing the attractiveness of urban areas (CMC, 2018b).

2.2 Projects and Measures for Improving Cyclist Safety

With a view of improving cyclist safety, the EU and Slovenia have been implementing numerous preventive activities and projects. For instance, the pan-European BIKE PAL project, which stresses the need to improve cycling safety, particularly in terms of protecting vulnerable road users through the implementation of measures defined in the EC Policy Orientations on Road Safety 2011-2020, is a prominent example of such projects (STSA, 2013a). Its aim is to

improve cycling safety through information and awareness raising of decision- and policy-makers. Researchers working on the BIKE PAL project also ranked EU Member States based on cycling safety, conducted a scientific review of existing policies on cycling safety and used it to devise a manual on safe cycling, which is suitable for all categories of cyclists (European Transport Safety Council, 2014).

In Slovenia, important preventive activities have been carried out by the Zavod Varna pot (Safe Journey Institute). These are based on the Vision Zero and Safe System approach, and include education activities for children, adolescents, their parents and other adults on appropriate conducts and behaviours to ensure road safety at various safe driving ranges and stations (Varna pot [Safe Journey], n. d.). Furthermore, the Federation of Drivers' and Auto Mechanics' Associations organises annual projects for safe cycling, which are carried out in the form of a nation-wide preventive action and entails media campaigns, training courses dedicated to cycling and obtaining a cyclist's licence, activities for the promotion of cycling and inspections of local cycling infrastructure (STSA, 2018b). Apart from awareness raising activities, other projects focusing on sustainable mobility have also been implemented in Slovenia. For instance, researchers working on the CYCLO – Cycling Cities project are striving to promote the use of bicycles as a daily means of transport and develop cycling tourism. They also produced a manual entitled Cycling in the Heart of Slovenia and carried out educational and promotional activities in municipalities across Slovenia (CYCLO, 2012). In addition, Slovenia's municipalities have recently been addressing the need for encouraging mobility by providing public bicycle-sharing systems, which are achieving the desired results. However, as previously mentioned, the growing number of cyclists in urban areas also increases the likelihood of accidents.

As part of the Creative Path to Knowledge Programme (2016–2020), the topic of cyclist safety was addressed in 2018 by the Faculty of Criminal Justice and Security of the University of Maribor [UM] in cooperation with the Faculty of Electrical Engineering and Computer Science of the UM and the SGB d.o.o. company in the framework of a project entitled Digitising and Analysing Safety Risks on Cycle Paths in Slovenia [Datkol:S]. The fundamental premise of the project relied on the fact that the information about the general condition of cycle paths in Slovenia was currently insufficient, while its objective was to improve the availability of information about the safety situation on cycle paths. To improve cyclists' awareness of potential risks identified along popular cycle paths in Slovenia, researchers digitised all safety risks and marked them on publicly available online maps (Belca et al., 2018a, 2018b, 2018c). The project relied on a creative approach to ensuring a higher degree of safety among cyclists by firstly devising a list of the most commonly identified risks on cycle paths and then developing a model, which allows a quantitative assessment of cycle paths' safety. The model was tested on five recreational cycle paths in Slovenia, including on the Teharje – Podčetrtek cycle path (which is part of the CMC). Subsequently, safety risks were analysed and digitised in publicly available online maps. The results are useful to all categories of cyclists, particularly to tourists, who are embarking on a given cycle path for the first time and wish to familiarise themselves about its safety profile. The idea for the project originates from the fact that the information

provided to cyclists about safety risks along certain cycle paths could be improved through digitisation and user-friendly presentation, thus encouraging cyclists to adopt preventive behaviours (Belca et al., 2018a, 2018b, 2018c).

To further analyse issues, challenges and potential solutions related to cyclist safety, a research study was first conducted in the CMC to establish whether its residents were satisfied with the situation regarding cycling infrastructure and cyclist safety. A second study was then carried out to explore internet users' views on the usefulness of digitising cycle paths and safety risks for raising cyclists' awareness and promoting preventive action.

3 METHODOLOGY

This section presents the results and findings of both research studies, which included (1) the analysis of the CMC residents' satisfaction with the situation regarding cycling infrastructure and cyclist safety on cycle paths in Celje [R1]; and (2) the evaluation of the usefulness or practicality of digitising cycle paths and safety risks on the basis of views expressed by internet users [R2]. Both research studies were conducted by applying a survey method, whereby information was gathered by two separate structured questionnaires. The two studies were carried out separately, since they involved different target populations, namely R1 focused on the CMC residents and R2 involved internet users.

R1 was conducted in July 2019; data were gathered by field survey (in shopping centres and the old town centre) in Celje. This method allowed researchers to involve residents of all age groups, thus providing a higher representativeness of results. The questionnaire consisted of five sets of questions and included a total of 45 variables. Researchers assessed residents' satisfaction with the current situation regarding cycling infrastructure and cyclist safety in the CMC; residents' views on the responsibility of individual stakeholders and the adequacy of preventive action; their attitude towards planned changes in the field of cycling and their experience with traffic accidents involving cyclists. Respondents were expressing their views on 5- and 3-point scales of agreement (where 1 stood for the lowest degree of agreement) and by answering dichotomous questions (yes/no). The questionnaire also comprised single- and multiple-choice questions.

R2, which was conducted in the form of an online survey (by using the 1ka online tool), was aimed at establishing respondents' views on the digitisation of cycle paths and safety risks on such paths. The survey encompassed internet users, since they are the primary users of online maps, which would be used to implement the proposed digitisation in the public domain. R2 was conducted between January and April 2019; data collection was organised by sharing the link to the questionnaire on various online cycling forums and in specific social media groups. The questionnaire consisted of two sets of questions and a total of 10 variables, which were used to assess whether internet users and cyclists recognised the need for the aforementioned digitisation and whether they identified any potential implications and usefulness of such information sharing. Respondents expressed their views by answering dichotomous questions (yes/no), as well as single- and multiple-choice questions.

Due to divergent approaches taken when conducting the two studies and the reliance on two different target populations, the samples used in R1 and R2 vary in terms of demographic characteristics. These are presented in tables 1 and 2 below.

Table 1: Demographic data in R1

	Responses	Frequency (n = 171)	%
Gender	Male	75	44
	Female	96	56
Age	Average	45	/
	Minimum age	20	/
	Maximum age	70	/
Education	Elementary or lower	12	7
	Secondary	58	34
	Third-level college or university education	89	52
	Specialisation, MA or PhD	12	7
Status	Student	12	7
	(Self-)employed	117	68
	Unemployed	8	5
	Retired	34	20

The sample in R1 consisted of 171 respondents residing in the territory of the CMC, while the gender ratio was relatively equal. Respondents' average age was 45 and slightly more than half of respondents completed third-level college or university education. Two thirds of respondents were employed (Table 1).

Table 2: Demographic data in R2

	Responses	Frequency (n = 210)	%
Gender	Male	107	51
	Female	103	49
Age	Less than 20	25	12
	21-40	132	63
	41-60	48	23
	61 or older	5	2
Education	Elementary	13	6
	Secondary	122	58
	Higher	75	36
Status	Student	90	43
	Employed	101	48
	Unemployed	9	4
	Retired	5	2
	Other	5	2

The sample in R2 comprised 210 respondents with an equal gender ratio. Two thirds of respondents were between 21 and 40 years of age, while more than half

of them completed secondary education and more than one third completed higher education. Slightly less than half of respondents were employed, while 43% of respondents were still studying (Table 2).

4 RESULTS

Results obtained in the scope of both research studies are summarised below by applying descriptive statistics. The results of R1 are presented in tables 3 to 9, while those of R2 are put forward in tables 10, 11 and 12.

Table 3: Respondents' satisfaction with the situation regarding infrastructure and cyclist safety

n = 171	Satisfaction with the situation			Assessment of the current state-of-play		
	μ	*SD*	*Me*	μ	*SD*	*Me*
Cycling infrastructure in the CMC	2.8	0.91	3	2.9	0.83	3
Transport infrastructure for cyclists in the CMC	2.8	0.89	3	2.9	0.89	3
Cyclist safety in the CMC	2.7	0.92	3	2.9	0.92	3

Table 3 shows the average values (μ) of respondents' satisfaction with the situation regarding cycling infrastructure and transport infrastructure used by cyclists, as well as with the general state-of-play pertaining to cyclist safety in the CMC. Respondents rated their level of satisfaction on a 5-point scale, where 1 stood for "extremely unsatisfied" and 5 meant "very satisfied". The largest share of respondents rated their satisfaction with all three segments (cycling infrastructure, transport infrastructure for cyclists and cyclist safety) by selecting the value of 3 (neither unsatisfied nor satisfied). The average level of satisfaction with cycling and transport infrastructure amounted to 2.8, while the average satisfaction with the general cyclist safety in the CMC reached 2.7. The second column in Table 3 contains data regarding the perceived situation in the aforementioned segments, which were also assessed by respondents on a 5-point scale (where 1 denoted extremely poor situation and 5 referred to an excellent situation). Again, most respondents evaluated all segments with the average score of 3 (neither good nor bad), while the average grade regarding the adequacy of the current situation amounted to 2.9 with respect to all three segments.

Table 4: Perceived shortcomings in ensuring cyclist safety

n = 171		*n*	%
Poorly maintained cycling infrastructure	(yes)	80	46.4
	(no)	91	53.6
Inexistence of cycling infrastructure	(yes)	78	45.6
	(no)	93	54.4
Inexistence of transport infrastructure for cyclists	(yes)	79	46
	(no)	92	54

Respondents believed that the above-listed risks or shortcomings (Table 4) were somewhat equally distributed, since 46.4% of respondents selected poorly maintained cycling infrastructure and inexistence of transport infrastructure for cyclists, while the inexistence of cycling infrastructure was chosen by 45.6% of respondents. Since not all residents are, in fact, cyclists, the perception of shortcomings among the general public in the CMC is relatively high.

Table 5: Respondents' views on CMC's endeavours in the field of cyclist safety

n = 171	1	2	3	μ	*SD*
Cycling infrastructure in the CMC	41%	46%	13%	1.7	0.97
Transport infrastructure for cyclists in the CMC	43%	40%	17%	1.7	1.01
Cyclist safety in the CMC	37%	47%	16%	1.8	0.93

As presented in Table 5, respondents were asked to express their views on whether the municipality's endeavours had been sufficient to improve cyclist safety on a 3-point scale (where 1 meant "Insufficient", 2 stood for "Neither/Nor" and 3 denoted "Sufficient"). Less than half of all respondents (between 40% and 47%) believed that the CMC's efforts had been neither insufficient nor sufficient. This is followed by the share of respondents ranging from 37% to 43%, who believed that its endeavours had been insufficient. Only 13% to 17% of all respondents were of the view that the CMC has done enough.

Table 6: Respondents' views on who is responsible for traffic accidents involving cyclists

n = 171		*n*	%
Cyclists themselves (by disobeying the highway code)	(yes)	142	83
	(no)	29	17
Car drivers (aggressive driving, speeding)	(yes)	113	66
	(no)	58	34
Non-governmental organisations in the field of road safety	(yes)	29	17
	(no)	142	83
Police	(yes)	19	11
	(no)	152	89
Municipality	(yes)	43	25
	(no)	128	75
State	(yes)	29	17
	(no)	142	83

Respondents were also given a multiple-choice question aimed at establishing who was, in their opinion, responsible for traffic accidents involving cyclists. Table 6 clearly shows that most respondents (83%) believed that cyclists themselves were responsible because they failed to comply with the highway code. Furthermore, 66% of respondents thought that accidents were caused by car drivers due to aggressive driving behaviours and/or speeding, while 25% of respondents blamed the municipality. 17% of respondents attributed such a responsibility to the State and an equal share of respondents believed the responsibility for traffic accidents involving cyclists was borne by NGOs in the field of road safety. Only 11% of respondents were of the opinion that such a responsibility also lay with the police.

n = 171		*n*	%
Maintaining sound cycling infrastructure and transport infrastructure for cyclists	(yes)	123	72
	(no)	48	28
Building cycling infrastructure that is separate from other types of road traffic	(yes)	130	76
	(no)	41	24
Tighter control of motor vehicle drivers by the police	(yes)	72	42
	(no)	99	58
Tighter control of cyclists by the police	(yes)	70	41
	(no)	101	59
Digitisation of safety risks on all cycle paths and their marking on publicly available online maps	(yes)	108	63
	(no)	163	37
Organisation of other preventive actions and measures	(yes)	96	56
	(no)	75	44

Table 7: Respondents' views on the efficiency of approaches to cyclist safety

Respondents were then given a multiple-choice question asking them which were, in their opinion, the most efficient approaches to ensuring cyclist safety. As evident from Table 7, respondents believed that the building of separate cycling infrastructure was the most efficient approach (76%), followed by the maintenance of sound cycling infrastructure and transport infrastructure for cyclists (72%). Another very efficient approach includes the digitisation of safety risks on cycle paths in the CMC (63%), while more than half of all respondents (52%) also believed that a higher degree of safety could be guaranteed by other preventive actions and measures. A relatively large share of respondents was of the view that tighter police control of drivers (42%) and cyclists (41%) could also prove efficient.

	Familiarity with changes			Usefulness		
n = 171	*μ*	*SD*	*Me*	*μ*	*SD*	*Me*
Introduction of the public bicycle-sharing system	2.6	0.94	3	2.5	0.94	3
Introduction of the P&B system	1.9	0.86	2	2.5	1.08	3
Constructing the northern connecting road together with the necessary infrastructure for cyclists and pedestrians	1.7	0.82	2	2.7	1.10	3
Improving and upgrading the network of cycling routes	1.9	0.87	2	2.7	0.97	3
Constructing regional cycling routes	2.1	093	3	2.7	0.95	3

Table 8: Respondents' familiarity with and views on the need to improve cyclist safety

As can be observed from Table 8, researchers used a 3-point scale (where 1 meant "I am not familiar with the measure at all."; 2 stood for "I am partly familiar with the measure."; and 3 meant "I am fully familiar with the measure.") to establish the extent to which respondents were familiar with individual measures, which have been recently implemented by the CMC with a view to improve cyclist safety. Respondents were most familiar with the functioning of the public bicycle-sharing system and with the construction of regional cycling routes, which are completely separated from other modes of transport. They were slightly less familiar with the introduction of the P&B (park and bike) system and with the improvements and planned upgrades of the 30-kilometre network of cycling routes in the CMC.

Respondents were the least familiar (average value of 1.7) with the construction of the northern connecting road together with the necessary infrastructure for cyclists and pedestrians. Respondents were then asked to share their views on whether these measures, which are aimed at improving cyclist safety, were at all necessary. They did so by using a 3-point scale (where 1 stood for "Unnecessary"; 2 denoted a "Neither/Nor" response; and 3 meant "Necessary"). Regardless of their familiarity with individual measures, respondents believed that all measures were necessary, since most respondents marked them with the score of 3.

Table 9: Respondents' use of measures aimed at improving sustainable mobility

n = 171	*M*	*SD*	*Me*
Introduction of the public bicycle-sharing system	2.0	0.94	2
Introduction of the P&B system	2.0	0.86	2

Respondents used a 3-point scale (where 1 meant "Never", 2 stood for "Occasionally" and 3 meant "Frequently") to express their intention of using activities/measures aimed at improving sustainable mobility. Only half of all respondents are (or intend to) use these measures, which clearly points to a certain degree of reservedness towards the planned changes (Table 9).

Since both the results of R1 as well as various road safety reports show that road users and municipalities are most often perceived as those responsible for ensuring road safety, preventive measures and projects must target these two areas. Respondents believe that cyclists' awareness and information or, in other words, their level of preparedness, could be enhanced through the digitisation of cycling infrastructure, cycle paths and their characteristics, which is a rather creative and modern approach to awareness raising. The following paragraphs thus present the results obtained in the scope of R2, which reflect the views of internet users on the usefulness of such a solution. Respondents' experience with traffic accidents involving cyclists were the subject of the first question.

Table 10: Internet users' experience with traffic accidents involving cyclists

n = 210		*n*	%
Involvement in an accident involving a cyclist	(yes)	53	25
	(no)	157	75
Involvement of a family member-cyclist in an accident involving a cyclist	(yes)	74	35
	(no)	136	65
Witnessing an accident involving a cyclist	(yes)	101	48
	(no)	109	52

As may be inferred from Table 10, one in four respondents has already been involved in a traffic accident involving a cyclist, while one in three has a family member, who has already been involved in such an accident. The fact that almost half of all respondents has already witnessed such an accident is also rather alarming.

n = 210		*n*	%
Recreational cyclist (*n* = 78)	(yes)	64	82
	(no)	14	18
Family cyclist (*n* = 11)	(yes)	9	80
	(no)	2	20
Occasional cyclist (*n* = 83)	(yes)	71	85
	(no)	12	15
Non-cyclist (*n* = 38)	(yes)	35	92
	(no)	3	8
Total (*n* = 210)	(yes)	179	85
	(no)	31	15

Table 11: Respondents' view on the usefulness of digitising cycle paths and safety risks

Table 11 shows respondents' views on the need for digitising cycle paths and safety risks broken down according to the category of cyclist. The usefulness of such a measure was mostly recognised by non-cyclists (92%), followed by occasional cyclists (85%) and recreational cyclists (82%). Family cyclists believed this measure to be slightly less useful (80%), however, their share was still relatively high

n = 210		*n*	%
Cyclists setting out for their ride would be better prepared for potential safety risks along their path.	(yes)	174	83
	(no)	36	17
This is an innovative and user-friendly approach to prevention and awareness raising among cyclists.	(yes)	120	57
	(no)	90	43
The number of fatalities among cyclists would decrease.	(yes)	132	37
	(no)	78	63
None of the above.	(yes)	17	8
	(no)	193	92

Table 12: Respondents' view on the positive implications of digitising cycle paths and safety risks

Table 12 shows that most respondents believed that the most positive implication of digitising safety risks on cycle paths was related to the fact that the provision of such information would allow cyclists to be better prepared for potential safety risks along their path (83%). This was followed by the opinion that digitisation was an innovative and user-friendly approach to increasing cyclists' preventive behaviours and awareness (57%), and that the use of such a preventive measure would result in fewer fatalities (37%).

5 DISCUSSION

Residents perceive traffic safety as an extremely important aspect, as has also been confirmed by a research study on the perception of safety conducted by Virtič and Gorenak (2008), which shows that Slovenia's residents feel most threatened by public law and order violations, crime and the situation related to traffic safety. A study on the perception of threats and the provision of safety and security in local communities, which was carried out by Sotlar and Tominc (2012), also demonstrates that road safety is one of the priorities identified by residents. With the growing

popularity of cycling and the adoption of measures aimed at sustainable mobility (Poljak Istenič, 2015), issues related to cyclist safety are becoming increasingly pertinent. Indeed, a research study analysing traffic accidents shows that built-up areas and cities are witnessing growing numbers of pedestrians and cyclists, which in turn increase the likelihood of accidents involving cyclists (Brcar, 2017). Therefore, the purpose of this paper was to analyse residents' satisfaction with the situation and regulation of cycling infrastructure and cyclist safety on the basis of a specific example of a city municipality in Slovenia (i.e. the CMC), which has been facing with a large share of accidents involving cyclists. The obtained results were then complemented with the results of the second study, which was conducted among internet users and aimed at establishing the usefulness of informing the public about safety risks by means of digitising cycle paths and their characteristics, thus promoting cyclists' preventive behaviours. Both studies demonstrate which shortcomings and risks are most frequently perceived by residents and help researchers to identify required solutions. Research results show that respondents are of the view that the situation regarding cyclist safety in the CMC is generally neither good nor bad, which is why their satisfaction with cycling and transport infrastructure, and with cyclist safety as a whole is also somewhat average. Respondents are overall quite dissatisfied with measures addressing cyclist safety and believe that it could be improved not only by measures adopted at municipal level but also by providing better information to cyclists about risks and threats along cycle paths.

Approximately 50% of respondents believe that poorly maintained cycling infrastructure and the absence of cycling infrastructure and transport infrastructure for cyclists in Celje are the most prominent shortcomings. These findings are in line with the results obtained within the Datkol:S project (Belca et al., 2018a, 2018b, 2018c), where the analysis of the Teharje – Podčetrtek cycle path revealed that inadequately maintained cycling infrastructure on certain sections and the inexistence on cycling and transport infrastructure were identified as the most problematic aspects. The research also shows that 80–90% of respondents believe municipal efforts in the field of cyclist safety to be insufficient. Accordingly, 25% of respondents are convinced that the municipality is responsible for addressing traffic accidents involving cyclists that occur on its territory. Since respondents are relatively dissatisfied with municipal measures, it is worth noting that the responsibility for ensuring road safety at the local level also lies with municipal traffic wardens, whose role has recently been significantly strengthened, as they have been conferred more powers both in the field of road traffic and in the provision of law and order (Modic, 2015; Modic, Lobnikar, & Dvojmoč, 2014). Therefore, municipalities have an enormously important role not only in regulating and maintaining infrastructure, but also in terms of enforcing rules and exercising control over their application, which is implemented through various practical approaches to minor offences and other violations (Tičar, 2015).

The first part of the research also focused on the degree of residents' familiarity with measures and projects dedicated to improving cyclist safety, which have been implemented in Celje. It established that respondents were most familiar with the introduction of the public bicycle-sharing system and the construction

of regional cycling routes. Regardless of the degree of their familiarity, most respondents were convinced that all measures were necessary. However, most respondents claim that they would only occasionally make use of measures focusing on sustainable mobility (bicycle-sharing system and the P&R system). Therefore, research findings suggest that it would be necessary to better inform local residents and encourage them to use alternative measures for achieving sustainable mobility in order to bring such planned changes to life and genuinely contribute to improvements.

In the second part of the research, users of online social networks and cycling forums were asked whether there was a need to digitise cycle paths and safety risks in Slovenia. Results show that a whopping 85% of respondents recognise the need for such a solution. It was also established that one in four respondents has already been involved in a traffic accident involving a cyclist, one in three respondents has a family member, who was involved in such an accident, while almost half of all respondents have already witnessed such an accident. This finding is most likely conducive to the fact that respondents recognise various positive implications of the proposed digitisation, since 83% of them believe that by using such preventive measures, cyclists would be better prepared to face safety risks along their path. Furthermore, more than half (57%) of all respondents believe this to be an innovative and user-friendly approach to promote cyclists' preventive behaviours and awareness. Considering the frequency of respondents' experience with traffic accidents involving cyclists and their acknowledgment of the need for digitising safety risks on cycle paths, the researchers believe that such digitisation measures should be gradually introduced on the most accident-prone cycling paths in Slovenia. This could improve information and awareness raising of cyclists and draw the attention of decision-makers and infrastructure managers to some of the most pertinent safety risks, which must be eliminated as a matter of priority.

6 CONCLUSION

The paper presented the results of two research studies, which analysed the views of different target populations on cyclist safety and the adequacy of preventive measures implemented in Slovenia. The purpose of these two studies was to identify the challenges and shortcomings of different approaches to ensuring cyclist safety, assess the adequacy of planned solutions and propose improvements in the field of preventive measures adopted by various stakeholders.

The findings presented in this paper could be used to devise the following proposals and recommendations for improving the situation both at the local and at national level: (1) Digitisation of safety risks on all cycle paths in the CMC and across Slovenia with a view to raise awareness of safety risks and provide a broader overview of priority measures for all key stakeholders; (2) Greater promotion of sustainable mobility and adoption of programmes for ensuring a higher degree of knowledge regarding measures aimed at sustainable mobility with a view to increase the use of such measures; and (3) Regular maintenance of cycling infrastructure, as well as the improvement and regulation of transport

infrastructure used by cyclists with a view of adopting a comprehensive approach to prevention and improving cyclist safety.

The value and originality of the research work presented in this paper stems from the fact that it involves the very first study of its kind conducted in a local environment, which provides both the findings regarding residents' views on the safety of cycling infrastructure on the territory of a specific municipality, as well as the usefulness of the applied methodology for analysing the safety of cycle paths in Slovenia. Since the research work combines the results of two studies, the findings of which substantially complement one another, it provides a deeper insight into the issue of cyclist safety and reveals respondents' views on tackling this issue. Therefore, research results may be of great use to decision-makers and cycling infrastructure managers at the State level when planning priority measures. Furthermore, they are particularly useful to the key stakeholders at the level of the CMC (Celje Police Directorate and the CMC City Council), since they might contribute significantly to the planning of future priorities, safety measures and preventive activities in the field of cyclist safety.

In Slovenia, the issue of cyclist safety at the local level is currently under-researched, which is why the results presented herein may also prove useful to other researchers focusing on safety and security issues in local communities. The limitations of research studies stem from the use of non-random samples, which is why their findings may not be generalised to all municipalities and residents. Moreover, municipalities apply different approaches to ensuring cyclist safety due to their autonomy, which may be more or less efficient, and are faced with different safety risks. However, given the fact that the vast majority of traffic accidents occurs in built-up areas, it would be extremely important to conduct any further research of this phenomenon and tackle the identified issues at the local level. With a view of comparing the efficiency of different approaches and promote the exchange of best practices, it would also be reasonable to conduct a comprehensive research study encompassing all municipalities in Slovenia.

REFERENCES

Belca, E., Bračko, A., Hozjan, V., Kristančič, Ž., Lepoša, M., Lunežnik, P., … Prislan, K. (2018a). *Raziskovalno poročilo: Analiza varnosti kolesarjev in kolesarskih površin* [Research report: Analysis of the safety of cyclists and cycling paths] Ljubljana: Fakulteta za varnostne vede. Retrieved from https://psivim.fvv.um.si/moodle/pluginfile.php/187/mod_resource/content/4/Analiza_varnosti_kolesarjev_in_kolesarskih_povr%C5%A1in.pdf

Belca, E., Bračko, A., Hozjan, V., Kristančič, Ž., Lepoša, M., Lunežnik, P., … Prislan, K. (2018b). *Raziskovalno poročilo: Model za prepoznavo in analizo varnostnih tveganj na kolesarskih poteh* [Research Report: A model for identifying and analysing safety risks on cycling paths]. Ljubljana: Fakulteta za varnostne vede. Retrieved from https://psivim.fvv.um.si/moodle/pluginfile.php/188/mod_resource/content/2/Model_za_prepoznavo_in_analizo_varnostnih_tveganj_na_kolesarskih_poteh.pdf

Belca, E., Bračko, A., Hozjan, V., Kristančič, Ž., Lepoša, M., Lunežnik, P., … Prislan, K. (2018c). *Raziskovalno poročilo: Ocena varnostnih tveganj na kolesarskih poteh s priporočili interesnim skupinam* [Research Report: Assessment of safety risk on cycling paths with recommendations to stakeholders]. Ljubljana: Fakulteta za varnostne vede. Retrieved from https://psivim.fvv.um.si/moodle/pluginfile.php/189/mod_resource/content/2/Ocena_varnostnih_tveganj_na_kolesarskih_poteh_s_priporo%C4%8Dili_interesnim_skupinam.pdf

Branion-Calles, M., Nelson, T., Fuller, D., Gauvin, L., & Winters, M. (2019). Associations between individual characteristics, availability of bicycle infrastructure, and city-wide safety perceptions of bicycling: A cross-sectional survey of bicyclists in 6 Canadian and U.S. cities. *Transportation Research Part A: Policy and Practice,* (123), 229–239. Retrieved from https://www.sciencedirect.com/science/article/pii/S0965856417314933

Brcar, F. (2017). Analiza nesreč v prometu v zadnjih 20-ih letih v Sloveniji [Analysis of traffic accidents in the last 20 years in Slovenia]. *Revija za univerzalno odličnost, 6*(4), 323–333. Retrieved from https://www.fos-unm.si/media/pdf/ruo/2017-6-4/ruo_097_brcar.pdf

CYCLO. (2012). *Priročnik za pripravo okvirnega načrta razvoja kolesarstva v lokalnih skupnostih* [Guidelines for the assessment of the cycling status in a municipality/town]. Retrieved from http://www.razvoj.si/UserFiles/File/CYCLO-MASTERPLAN_final.pdf

Dorn, U. (July 14, 2016). Celje z okolico vse bolj priljubljena destinacija za turiste [Celje with its surroundings is an increasingly popular destination for tourists]. *Celje.info*. Retrieved from https://www.celje.info/splosno/celje-z-okolico-vse-bolj-priljubljena-destinacija-za-turiste/

Gabršček, L. (June 11, 2015). Si kolesarji res jemljejo več prostora, kot jim pripada? [Do cyclists really take up more space than they own?]. *Dnevnik*. Retrieved from https://www.dnevnik.si/1042714609

European Commission [EC]. (2017). *Traffic safety – basic facts 2017.* Retrieved from https://ec.europa.eu/transport/road_safety/sites/roadsafety/files/pdf/statistics/dacota/bfs2017_main_figures.pdf

European Commission [EC]. (n. d.). *Road safety.* Retrieved from https://ec.europa.eu/transport/road_safety/home_en

European Transport Safety Council. (2014). *Promoting best practice in cycling safety.* Retrieved from https://etsc.eu/projects/bike-pal/

Javna agencija Republike Slovenije za varnost prometa [Slovenian Traffic Safety Agency, STSA]. (2010). *Poslanstvo* [Mission]. Retrieved from https://www.avp-rs.si/o-agenciji/o-agenciji/

Javna agencija Republike Slovenije za varnost prometa [Slovenian Traffic Safety Agency, STSA]. (2013a). *Izboljšanje varnosti kolesarjev v Evropski uniji* [Improving cyclist safety in the European Union]. Retrieved from https://www.avp-rs.si/izboljsanje-varnosti-kolesarjenja-v-evropski-uniji/

Javna agencija Republike Slovenije za varnost prometa [Slovenian Traffic Safety Agency, STSA]. (2013b). *Poročilo s seminarja Varnost kolesarjev in kolesarskega prometa* [Report from the seminar on cyclist safety and cycling]. Retrieved from http://www.mobile2020.eu/fileadmin/files_si/downloads/01_Seminar__porocilo_osnutek_koncni.pdf

Javna agencija Republike Slovenije za varnost prometa [Slovenian Traffic Safety Agency, STSA]. (2013c). *Varnost v cestnem prometu na območju regij Jugovzhodne Evrope* [Road safety in the SEE region]. Retrieved from https://www.avp-rs.si/wp-content/uploads/2013/05/STSA_Kon%C4%8Dna_bro%C5%A1ura.pdf

Javna agencija Republike Slovenije za varnost prometa [Slovenian Traffic Safety Agency, STSA]. (2017a). Kolesarji – akcijski program [Cyclists – Action plan]. Retrieved from https://www.avp-rs.si/wp-content/uploads/2017/05/NPVCP-akcija-KOLESARJI-akcijski-nacrt-2017.pdf

Javna agencija Republike Slovenije za varnost prometa [Slovenian Traffic Safety Agency, STSA]. (2017b). Letno poročilo Javne agencije Republike Slovenije za varnost prometa za leto 2016 [Annual report of STSA on traffic safety for 2016]. Ljubljana: Javna agencija Republike Slovenije za varnost prometa. Retrieved from https://www.avp-rs.si/wp-content/uploads/2016/03/LP-AVP-2015_250202016.pdf

Javna agencija Republike Slovenije za varnost prometa [Slovenian Traffic Safety Agency, STSA]. (2018a). *Letno poročilo Javne agencije Republike Slovenije za varnost prometa za leto 2017* [Annual report of STSA on traffic safety for 2017]. Ljubljana: Javna agencija Republike Slovenije za varnost prometa. Retrieved from https://www.avp-rs.si/wp-content/uploads/2018/07/20180614144730543.pdf

Javna agencija Republike Slovenije za varnost prometa [Slovenian Traffic Safety Agency, STSA]. (2018b). *Varno kolo* [Safe bike]. Retrieved from https://www.avp-rs.si/preventiva/preventivne-akcije/varnost-kolesarjev/varno-kolo/

Javna agencija Republike Slovenije za varnost prometa [Slovenian Traffic Safety Agency, STSA]. (2019). *Analiza in pregled stanja varnosti v cestnem prometu za leto 2018* [Road safety analysis and review for 2018]. Ljubljana: Javna agencija Republike Slovenije za varnost prometa. Retrieved from https://www.avp-rs.si/wp-content/uploads/2019/03/Analiza-in-pregled-stanja-varnosti-cestnega-prometa-v-letu-2018.pdf

Kolesarska zveza Slovenije [Slovenian Cycling Federation]. (n. d.). *Zgodovina Kolesarske zveze Slovenije* [The history of Slovenian Cycling Federation]. Retrieved from http://kolesarska-zveza.si/sl/delovanje-kzs/zgodovina-kolesarske-zveze-slovenije/

Mestna občina Celje [The City Municipality of Celje, CMC]. (December 17, 2018a). *Mestna občina Celje bo tudi v 2019 ohranila dobro investicijsko kondicijo* [In 2019, the City Municipality of Celje will maintain its good investment condition]. Retrieved from https://moc.celje.si/novice-in-obvestila/6122-mestna-obcina-celje-bo-tudi-v-2019-ohranila-dobro-investicijsko-kondicijo

Mestna občina Celje [The City Municipality of Celje, CMC]. (December 17, 2018b). *Med železniško postajo in Savinjo želimo urediti sistem P+R* [We want to set up a P+R system between the railway station and the Savinja River]. Retrieved from https://moc.celje.si/novice-in-obvestila/5908-med-zeleznisko-postajo-in-savinjo-zelimo-urediti-sistem-p-r

Mestna občina Celje [The City Municipality of Celje, CMC]. (May 18, 2018c). *Mestna občina Celje namerava s pomočjo evropskih sredstev ob severni vezni cesti urediti infrastrukturo za kolesarje in pešce* [City Municipality of Celje intends to regulate cycling and pedestrian infrastructure with the help of European funds

along the northern connecting road]. Retrieved from https://moc.celje.si/novice-in-obvestila/5846-mestna-obcina-celje-namerava-s-pomocjo-evropskih-sredstev-ob-severni-vezni-cesti-urediti-infrastrukturo-za-kolesarje-in-pesce

Mestna občina Celje [The City Municipality of Celje, CMC]. (n. d.). *Ureditev mreže kolesarskih povezav v Mestni občini Celje* [Setting up a network of cycling paths connections in the City Municipality of Celje]. Retrieved from https://moc.celje.si/projekti/6016-ureditev-mreze-kolesarskih-povezav-v-mestni-obcini-celje

Ministrstvo za infrastrukturo [Ministry of Infrastructure, MI]. (2017). *Kolesarjem prijazna infrastruktura: Smernice za umeščanje kolesarske infrastrukture v urbanih območjih* [Cyclist friendly infrastructure: Guidelines for placing cycling infrastructure in urban areas]. Retrieved from http://www.mzi.gov.si/fileadmin/mzi.gov.si/pageuploads/DPR/STMPP/Kolesarjem_prijazna_infrastruktura_-_smernice_za_umescanje_kolesarskih_povrsin_v_urbana_naselja_V1.00_podpis.pdf

Modic, M. (2015). Vloga in vidiki sodelovanja občin pri zagotavljanju varnosti na lokalni ravni – predstavitev ugotovitev ciljnega raziskovalnega projekta [The role and aspects of municipal involvement in local safety – presenting the findings of a targeted research project]. In G. Meško (ed.), *Varnost v lokalnih skupnostih: Zbornik prispevkov* (pp. 46–54). Ljubljana: Fakulteta za varnostne vede.

Modic, M., Lobnikar, B., & Dvojmoč, M. (2014). Policijska dejavnost v Sloveniji: Analiza procesov transformacije, pluralizacije in privatizacije [Policing in Slovenia: An analysis of the processes of transformation, pluralization, and privatization]. *Varstvoslovje, 16*(3), 217–241.

Odlok o kategorizaciji občinskih cest in kolesarskih poti v Mestni občini Celje [Ordinance on the Categorisation of Municipal Roads and Cycle Paths in Celje]. (2010, 2015). *Uradni list RS,* (19/10, 51/15).

Policija [Police]. (n. d. a). *Varno na kolo* [Safe on the bike]. Retrieved from https://www.policija.si/index.php/component/content/article/156/801-varno-na-kolo

Policija [Police]. (n. d. b). *Prometna varnost* [Traffic safety]. Retrieved from https://www.policija.si/index.php/preventiva-/prometna-varnost-category-blog/801-varno-na-kolo

Poljak Istenič, S. (2015). Kolo kot akter ustvarjalne urbane regeneracije [Bicycle as an agent of creative urban regeneration]. *Glasnik Slovenskega etnološkega društva, 55*(3/4), 23–37.

Razvojna agencija Savinjske regije [Development Agency of the Savinjska Region]. (2009). *Kolesarsko omrežje Savinjske regije* [The cycling network of the Savinja Region]. Retrieved from http://www.rasr.si/si/projekti/kolesarsko-omrezje-savinjske-regije

Razvojni center Inženiringi Celje [Development Centre Engineering Celje, DCEC]. (2017). *Ureditev mreže kolesarskih povezav v Mestni občini Celje* [Setting up a network of cycling paths in the City Municipality of Celje]. Retrieved from http://www.rci.si/portfolio/diip-ukrepi-za-izboljsanje-kolesarskega-prometa-in-javnega-potniskega-prometa-v-mestni-obcini-celje/

Resolucija o nacionalnem programu varnosti cestnega prometa za obdobje od 2013 do 2022 [Resolution on the National Programme on Road Traffic Safety for the 2013–2022 period]. (2013). *Uradni list RS*, (39/13).

ROSEE. (2013). *Road safety in South East European regions.* Retrieved from http://www.southeast-europe.net/en/projects/approved_projects/?id=204

Sotlar, A., & Tominc, B. (2012). Zaznava deklarativnih virov ogrožanja nacionalne varnosti v slovenski družbi [The perception of declarative threats of national security in Slovenian society] *Varstvoslovje, 14*(3), 231–258.

Šumah, D. (2012). *Varnost kolesarjev v RS* (Diplomsko delo) [Cyclists safety in Slovenia]. Ljubljana: Fakulteta za varnostne vede.

Thompson, J., Wijnands, S. J., Savino, G., Lawrence, B., & Stevenson, M. (2017). Estimating the safety benefit of separated cycling infrastructure adjusted for behavioral adaptation among drivers; An application of agent-based modelling. *Transportation Research Part F: Traffic Psychology and Behaviour*, (49), 18–28. Retrieved from https://www.sciencedirect.com/science/article/pii/S136984781630239X

Tičar, B. (2015). Pravna ureditev varnosti na lokalni ravni [Legal regulation of the Slovenian Police and the Municipal Warden Service]. In G. Meško (ed.), *Varnost v lokalnih skupnostih: Zbornik prispevkov* (pp. 34–45). Ljubljana: Fakulteta za varnostne vede.

Varna pot [Safe Journey]. (n. d.). *Z znanjem do večje prometne varnosti* [With knowledge towards higher traffic safety]. Retrieved from https://varna-pot.si/z-znanjem-do-vecje-prometne-varnosti/

Virtič, F., & Gorenak, V. (2008). Varnost v lokalni skupnosti – študija primera [Local community safety – case study]. *Lex Localis, 6*(1), 41–70.

Zakon o cestah [Roads Act]. (2010, 2012, 2015, 2018). *Uradni list RS*, (109/10, 48/12, 46/15, 10/18).

Zakon o pravilih cestnega prometa [Road Traffic Rules Act]. (2013, 2016, 2017). *Uradni list RS,* (82/13, 68/16, 54/17, 69/17).

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