PREMIUM MOBILITY SOLUTIONS

PAMETNA MOBILNOST I PARKIRANJE KAO USLUGA

SMART PARKING AND MOBILITY AS A SERVICE

MOBILISIS®

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SADRŽAJ

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UVOD

Gradovi diljem svijeta kao koncentratori pretežitog dijela stanovništva i najveći potrošači energije nastoje, između ostalog, smanjiti stalne ili povremene gužve u prometu uzrokovane i traženjem slobodnog parkirnog mjesta. Budući da su prostorni resursi u gradskim središtima uglavnom potrošeni, rješenja se pronalaze u primjeni suvremenih tehnologija. Te tehnologije temelje se na GPS navođenju, umjetnoj inteligenciji, brzim komunikacijskim vezama, obradi velikih količina podataka te mreži međusobno povezanih uređaja (senzora). Iskustva iz svijeta pokazuju da se primjenom tih tehnologija može utjecati na smanjenje prometnih gužvi, osobito na smanjenje prometnih gužvi u gradovima koji su prostorne resurse u svojim središtima već iskoristili.

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INTRODUCTION

Cities all over the world, as concentrators of the majority of the population and the biggest energy consumers, are striving to reduce constant or occasional traffic congestions caused, among other things, by the search for free parking spot. Given that spatial resources in the city centres are mostly used up, solutions lie in the application of modern technology. That technology is based on GPS tracking, artificial intelligence, fast communication links, processing of large amounts of data and the network of interconnected devices (sensors). Experiences from around the world show us that by applicating that kind of technology, we can influence the reduction of traffic congestions, especially in the cities that have already used up all their spatial resources in their centres.

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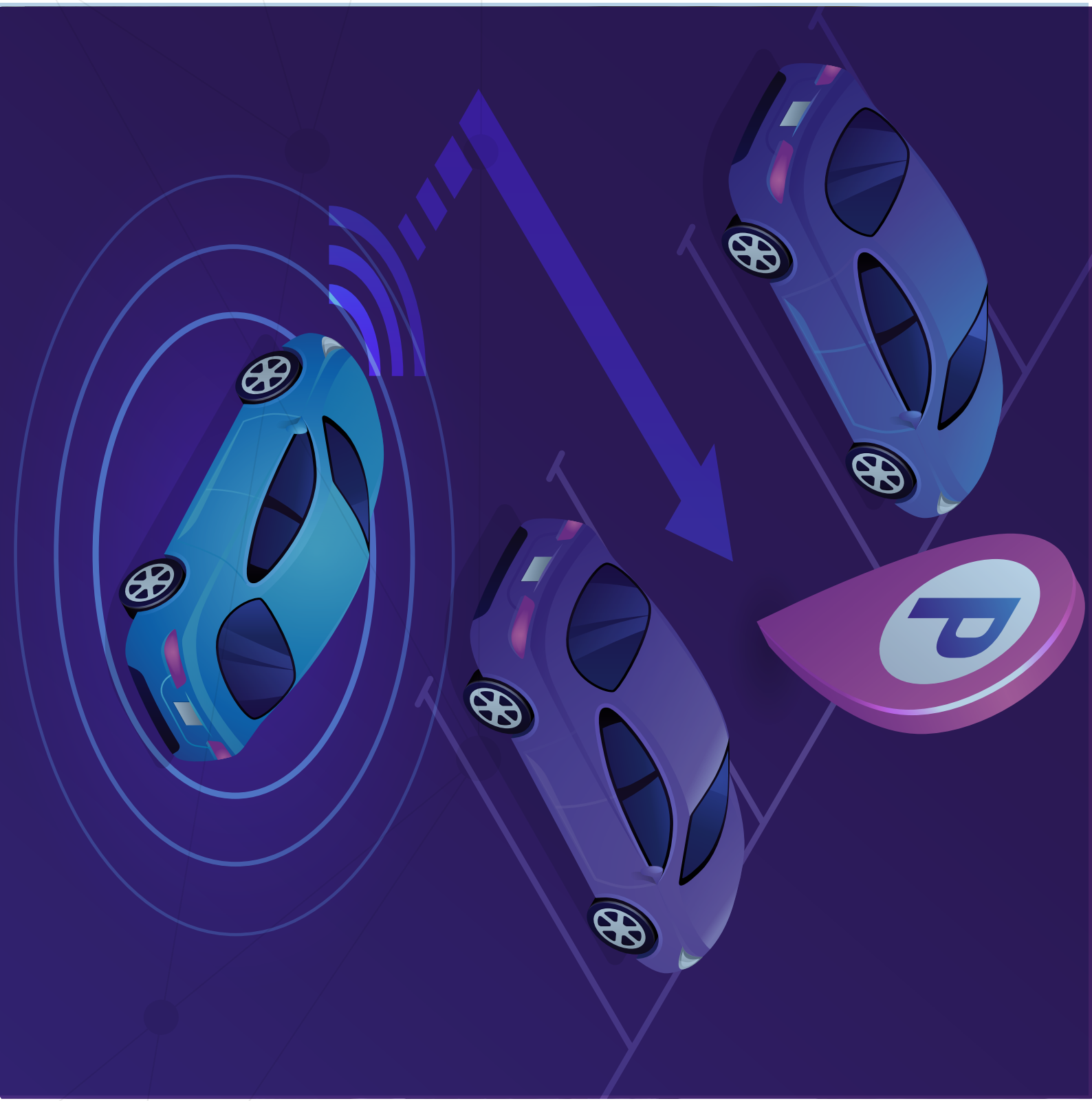

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DRUŠTVENO-EKONOMSKI TROŠAK PRONALAŽENJA SLOBODNOG PARKIRNOG MJESTA

Prema sveobuhvatnom istraživanju[1] prije pandemije bolesti COVID-19 o društveno-ekonomskim troškovima nastalih zbog suboptimalnog parkiranja provedenog za Sjedinjene Američke Države, Ujedinjeno Kraljevstvo i Njemačku, u prosjeku se godišnje troši od 186 € po stanovniku u USA do 548 € po stanovniku godišnje u Njemačkoj. Grubi prosjek se procjenjuje na približno 289 € po stanovniku godišnje. Radi se o troškovima uzrokovanim produljenim vremenom zbog traženja parkiranja, dodatnog utroška goriva te troškova emisije stakleničkih plinova. Vozači osobnih vozila u prosjeku izgube od 17 do 44 sata godišnje na pronalaženje slobodnog parkirnog mjesta. Radi se o potrošenom vremenu, gorivu i emisiji stakleničkih plinova zbog pronalaženja slobodnog parkirnog mjesta u središtima gradova. Iz istraživanja[2] nezadovoljstva vozača prometnim uslugama 61% vozača osjeća stres kod pokušaja pronalaska parkirnog mjesta, 42% je zbog traženja slobodnog parkirnog mjesta propustilo sastanak, 34% vozača je odustalo od putovanja zbog problema s parkiranjem te 23% vozača je osjećalo veliko nezadovoljstvo (bijes) u postupcima pronalaska slobodnog parkirnog mjesta.

Uzevši u obzir broj stanovništva, razliku u intenzitetu gradskih gužvi u prometu, manji broj većih gradova kao i geografsko-povijesna obilježja prostora u gradskim središtima, procjenjuje se da bi društveno-ekonomski trošak potrošenog vremena, goriva i dodatne emisije stakleničkih plinova zbog traženja slobodnog parkirnog mjesta u većim gradovima u Republici Hrvatskoj mogao biti približno 18 kuna po parkirnom mjestu dnevno. Ukoliko je trošak provedbe projekata vezanih uz parkiranje manji od ove vrijednosti, društveno je opravdano i ekonomski racionalno ulagati u takve projekte, projekte koji bi zbog potrošenih prostornih resursa mogli doprinijeti učinkovitosti gradskog prometa, osobito u najužim središtima.

[1] Cookson, G.; Pishue, B. (2017). The Impact of Parking Pain in the US, UK and Germany, INTRIX Research, July

[2] https://www.easyparkpartners.com/blog/2018/5/22/cutting-the-cost-of-the-search-for-parking

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SOCIO-ECONOMIC COST OF FINDING FREE PARKING SPACE

According to comprehensive research[1], before the COVID-19 pandemic, about socio-economic costs caused by suboptimal parking, conducted for the United States, United Kingdom and Germany, on average, it costs from € 186 per capita in the USA to € 548 per capita, annually, in Germany. The rough average is estimated at approximately € 289 per capita per year. These are costs caused by extended time due to the search for parking space, additional fuel consumption and greenhouse gas emission costs. Drivers of personal vehicles loose, on average, from 17 to 44 hours a year to find a free parking space. It is about the time and fuel consumptions, and greenhouse gas emissions due to finding a free parking space in city centres. From the research on dissatisfaction of traffic services' drivers, 61% of drivers feel stressful when trying to find free parking space, 42% missed the meeting trying to find free parking space, 34% of drivers gave up on the travel because of the parking problems and 23% of them feel furious in the process of finding free parking space.

Taking into account the population, the difference in the intensity of urban traffic congestions, the smaller number of larger cities and the geographical and historical characteristics of urban areas, it is estimated that the socio-economic cost of time and fuel consumptions, and greenhouse gas emissions, due to the search for free parking space, in larger cities in Republic of Croatia, could be approximately 18 kuna per parking space daily. If the cost of implementing projects related to parking is less than this value, it is socially justified and economically rational to invest in such projects, projects that could contribute to the efficiency of urban traffic due to the spent space resources, especially in the narrowest centres.

[1] Cookson, G.; Pishue, B. (2017). The Impact of Parking Pain in the US, UK and Germany, INTRIX Research, July

[2] https://www.easyparkpartners.com/blog/2018/5/22/cutting-the-cost-of-the-search-for-parking

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PROMJENA PREFERENCIJA VOZAČA UZROKOVANA KRIZOM COVID-19

Kriza uzrokovana pandemijom bolesti COVID-19 svakako ima utjecaja na parkirnu industriju. Prema nekim izvorima[3], rad od doma, smanjeni odlazak na posao, smanjena putovanja i restrikcija kretanja uslijed naredbe o održavanju društvenog razmaka uzrokovala je pad potražnje za parkirnim mjestima približno 90%. Pad potražnje podjednako se odnosi na parkirna mjesta vezana uz velike trgovačke centre, restorane, hotele, aerodrome i gradsko garažno i cestovno parkiranje. Točnije, od dvostruko veće potražnje u odnosu na ponudu parkirnih mjesta prije krize, potražnja je tijekom krize pala za 70% do 95%[4]. Krajem 2020. godine potražnja se vratila na približno 66% pred-krizne potražnje. Prema kriteriju veličine gradova, bilježi se veći pad potražnje u manjim nego u većim gradskim središtima. Očekuje se da će se nakon krize potražnja za parkirnim mjestima ponovno vratiti na predkriznu razinu, tj. na dvostruko veću vrijednost od raspoloživih parkirnih mjesta. Upravo je zato i ova kriza ujedno prilika za pripremu projekata čijom bi se provedbom parkiranje u gradskim središtima moglo građanima učiniti ugodnijim, smanjiti gužve u gradskom prometu te doprinijeti manjem zagađenju zraka manjom emisijom stakleničkih plinova.

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THE CHANGE OF DRIVERS' PREFERENCES CAUSED BY COVID-19 CRISIS

The crisis caused by COVID-19 pandemic, definitely had an impact on parking industry. According to some sources[3], work from home, decreased going to work, decreased travels and movement restriction due to the order to maintain social distance caused the drop in demand for parking spaces for approximately 90%. The drop in demand equally applies to parking spaces related to large shopping malls, restaurants, hotels, airports, city's garages and city's road parking. Specifically, from twice the demand compared to the supply of parking spaces before the crisis, demand decreased by 70% to 95%[4] during the crisis. By the end of 2020, demand returned to approximately 66% of pre-crisis demand. According to the criterion of city size, there is a larger decrease in demand in smaller than in larger urban centres. It is expected that, after the crisis, the demand for parking spaces will return to pre-crisis levels, i.e. to double the value of available parking spaces. That's exactly why this crisis is also the opportunity to prepare projects whose implementation could make parking in city centres more comfortable for citizens, reduce congestions in city traffic and contribute to a decrease of air pollution due to smaller greenhouse gas emissions.

[3] https://thehustle.co/covid-19-business-of-parking-lots/, https://spothero.com/press/covid-19/

[4] https://www.kimley-horn.com/curbing-covid19-parking-impact/

Kada se govori od promjeni ljudskih navika u odnosu na sklonost korištenju parkirnih mjesta, ali i šire u kombinaciji s javnim gradskim prijevozom, onda se dadu uočiti sljedeći trendovi:

- smanjenje turističkih putovanja;
- manje lokalnog putovanja na posao;
- manja sklonost posjećivanju lokalnih događaja;
- manja sklonost korištenja javnog gradskog prijevoza;
- manja sklonost korištenja car-sharinga;
- veća sklonost korištenja osobnog vozila;
- veća sklonost primjeni beskontaktnog plaćanja i pristupa parkirnom mjestu.

Iz provedenih istraživanja dade se zaključiti da su glavna obilježja budućih trendova u parkirnoj industriji:

1. Preferencija sigurnosti u odnosu na cijenu parkiranja;
2. Preferencija pješačenja, privatnih bicikla, romobila i skutera u odnosu na javni prijevoz;
3. Suzdržavanje od fizičkog kontakta te
4. Navigacija i rezervacija parkirnih mjesta.

U tom smislu moderna informacijsko-komunikacijska tehnologija odigrat će značajnu ulogu u spajanju ponude i potražnje za parkirnim mjestima.

When it comes to changing human habits in relation to the tendency to use parking spaces, but also more widely in combination with public city transport, then the following trends can be noticed:

- Reduction of tourist trips
- Reduction of local travel to work
- Reduced tendency to attend local events
- Reduced tendency to use public transport
- Reduced tendency to use car-sharing
- Increased tendency to use personal vehicles
- Increased tendency to use contactless paying and contactless access to parking spaces

From the conducted research it can be concluded that the main features of future trends in the parking industry are:

1. Preference for safety over the cost of parking
2. Preference for walking, private bicycles, scooters and mopeds over public transport
3. Refrain from physical contact
4. Navigation to and reservation of parking spaces

In that sense, modern information and communication technology will play a significant role in combining supply and demand for parking spaces.

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KOMERCIJALNI POTENCIJAL PARKIRNOG MJESTA I PLATFORME

Osnovna svrha digitalnih informacijsko-komunikacijskih platformi u području gradske mobilnosti je doprinijeti uređenom prometu u kretanju i mirovanju. Njihovim korištenjem omogućuje se veća protočnost gradskog prometa, multimodalno korištenje prijevoznih sredstava, jednostavnije plaćanje i slično. Međutim, one mogu značajno doprinijeti i dodatnoj komercijalizaciji, primjerice, parkirnih mjesta jednostavnijom i jeftinijom širom ponudom različitih usluga koje mogu značajno doprinijeti povećanju zadovoljstva građana i smanjivanju društveno-ekonomskih troškova gradskog prometa. U pogledu samog komercijalnog potencijala parkirnog mjesta neka istraživanja[5] procjenjuju da bi on mogao biti u rasponu od 5 do 10 tisuća dolara godišnje. Radi se o značajnim mogućnostima povećanja prihoda od parkiranja koja nije moguće postići bez primjene suvremenih digitalnih informacijsko-komunikacijskih rješenja.

Neki od primjera tog potencijala su:

1. Dinamička cijena usluge ovisno o potražnji za mjestima,
2. Rezervacija parkirnog mjesta,
3. Navigacija putnika do slobodnog parkirnog mjesta,
4. Rezervacija slobodnih komunalnih bicikla,
5. Prodaja podataka o kretanju putnika,
6. Električna energija,
7. Preuzimanje kupljenih roba na parkirnom mjestu,
8. Plaćanje prijevoza u javnom gradskom prijevozu,
9. Plaćanje usluge prijevoza u ostalim oblicima prijevoza (međugradski, morski, riječni, avio i slično),
10. Planiranje multimodalnog putovanja,
11. Objedinjeno plaćanje usluga (sms, kartica, kriptovaluta).

[5] https://www.cleverciti.com/en/resources/blog/the-ultimate-smart-city-parking-guide-2021-is-here

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COMMERCIAL POTENTIAL OF PARKING SPACE AND PLATFORM

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The main purpose of digital information and communication platforms in the city mobility field is to contribute to regulated traffic in motion and at rest. Their use enables a more efficient flow of city traffic, multimodal use of transport services', easier payment and the like. However, they can also significantly contribute to the additional commercialization of, for example, parking spaces by simpler and cheaper offer of various services that can make an impactful contribution to an increase in citizen satisfaction and reducing socio-economic costs of urban transport. Regarding the commercial potential of the parking space, some research[5] estimates that it could be in the range of 5 to 10 thousand dollars a year. These are significant opportunities to increase revenue from parking, which cannot be achieved without the application of modern digital information and communication solutions.

Some examples of that potential are:

1. Dynamic price of the service depending on the demand for places,
2. Parking space reservation,
3. Passenger navigation to a free parking space
4. Reservation of available public bicycles,
5. Sale of passenger movement data,
6. Electricity,
7. Picking up purchased goods in the parking lot,
8. Payment for transport in public city transport,
9. Payment for other forms of transport services (intercity, sea, river, air, etc.),
10. Multimodal travel planning,
11. Unified payment services (sms, card, cryptocurrency).

[5] https://www.cleverciti.com/en/resources/blog/the-ultimate-smart-city-parking-guide-2021-is-here

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SUVREMENA NABAVA SMART CITY PROJEKATA IZ PODRUČJA MOBILNOSTI

U posljednjih dvadesetak godina, u svrhu brže, transparentnije, održivije, otpornije, priuštivije i ekonomičnije provedbe javnih **građevinskih** projekata, javni naručitelji su u isporuku javnih građevina uključili privatno poduzetništvo prenoseći na njih rizike kojima ovi bolje upravljaju. Pozitivna iskustva uključivanja privatnog poduzetništva u isporuku građevinskih javnih projekata, u posljednjih nekoliko godina proširila su se i na **negrađevinske** projekte poput raznih informatičkih rješenje, opreme, uređaja, strojeva i slično. Radi se o trendu nabave javnih projekata u okviru kojih javni naručitelji ne nabavljaju radove već uslugu raspoloživosti. U okviru takvih modela nabave poduzetnici preuzimaju rizike i troškove vezane uz projektiranje, dobavu, ugradnju, proizvodnju, financiranje, održavanje i upravljanje projektima. Poznati su pod različitim generičkim nazivima poput **SaaS** (Software as a Service), **EaaS** (Equipment as a Service), **SPaaS** (Smart Parking as a Service), odnosno, **XaaS** (Everything as a Service). Takav je i **PMSaaS**, odnosno, **P**remium **M**obility **S**olutions as a **S**ervice.

U okviru PMSaaS javni naručitelj nabavlja uslugu raspoloživosti procesa navigacije i rezervacije parkirnih mjesta te integriranog plaćanja isporučenih usluga. Javni naručitelj definira standarde usluga, a poduzetnik izrađuje rješenje te isporučuje raspoloživost takvog rješenja naručitelju u skladu s definiranim standardima kako bi on mogao isporučivati usluge krajnjim korisnicima. Važno obilježje tog modela nabave je da naručitelj uslugu raspoloživosti plaća ex-post, nakon provjere je li usluga isporučena u skladu sa standardima u proteklom razdoblju (obično mjesec dana). Ukoliko je sustav raspoloživ naručitelj će uslugu platiti, a ukoliko nije platit će umanjeno ili neće uopće platiti. Prvo plaćanje naručitelja nastaje kada sustav postane raspoloživ, a svi troškovi naknade za raspoloživost predstavljaju operativni trošak naručitelja.

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MODERN PROCUREMENT OF SMART CITY PROJECTS IN THE MOBILITY FIELD

In the last twenty years, in order to implement faster, more transparent, more sustainable, more resilient, more affordable and more economical public **construction** projects, contracting authorities have involved private entrepreneurship in the delivery of public buildings, transferring to them the risks that they manage in a more efficient manner. Positive experiences of involving private entrepreneurship in the delivery of public construction projects, in recent years have spread to **non-construction** projects such as various IT solutions, equipment, devices, machinery and the like. It is about a trend in the procurement of public projects in which contracting authorities do not procure works but the availability service. Under such procurement models, entrepreneurs assume the risks and costs associated with the design, supply, installation, production, financing, maintenance and project management. They are known by various generic names such as **SaaS** (Software as a Service), **EaaS** (Equipment as a Service), **SPaaS** (Smart Parking as a Service), and **XaaS** (Everything as a Service), respectively. Such is **PMSaaS**, that is, **P**remium **M**obility **S**olutions as a **S**ervice.

Within PMSaaS, the contracting authority procures the service of availability of the process of navigation and reservation of parking spaces and integrated payment for delivered services. The contracting authority defines the standards of services, and the contractor develops a solution and delivers the availability of such a solution to the contracting authority in accordance with the defined standards so that it can deliver services to end users. An important feature of this procurement model is that the customer pays for the availability service ex-post, after checking whether the service has been delivered in accordance with the standards in the previous period (usually one month). If the system is available, the client will pay for the service, and if not, he will pay less or not pay at all. The first payment of the client occurs when the system becomes available, and all costs of the availability fee represent the customer's operating cost.

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PODJELA RIZIKA U SVRHU POSTIZANJA NAJBOLJE VRIJEDNOSTI ZA NOVAC

Ugovaranjem nabave usluge raspoloživosti moguće je postići optimalnu podjelu ukupnih rizika projekta. Primjenjuje se pravilo po kojem pojedine rizike preuzima onaj koji njima najbolje upravlja. Primjenom tog pravila postiže se najmanja naknada (premija) za preuzete rizike što dovodi do minimizacije ukupnih životnih troškova projekta kako za naručitelja tako i za poduzetnika.

RIZIK	KOMUNALNO DRUŠTVO	PODUZETNIK
Potražnja	✓	
Prekoračenje roka provedbe		✓
Prekoračenje budžeta provedbe		✓
Tehnološko zastarijevanje		✓
Dostupnost korisnicima		✓
Broj parkirnih mjesta	✓	
Uklanjanje nepropisno parkiranih vozila	✓	
Financiranje provedbe		✓
Sposobnost komunalnog društva u plaćanju usluge raspoloživosti		✓
Viša sila	✓	✓
Inflacija	✓	
Kamatna stopa, valuta		✓

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RISK SHARING FOR THE PURPOSE OF ACHIEVING THE BEST VALUE FOR MONEY

By contracting the procurement of the availability service, it is possible to achieve an optimal division of all the risks of the project. The rule is applied according to which certain risks are taken over by the one who manages them the best. By applying this rule, the lowest compensation (premium) is achieved for the assumed risks, which leads to the minimization of the total cost of the project for both the client and the entrepreneur.

RISK	UTILITY COMPANY	ENTREPRENEUR
Demand	✓	
Project time overrun		✓
Project budget overrun		✓
Technological obsolescence		✓
Availability to users		✓
Number of parking spaces	✓	
Removal of improperly parked vehicles	✓	
Financing the implementation		✓
The ability of the utility company to pay for the availability service		✓
Force majeure	✓	✓
Inflation	✓	
Interest rate, currency		✓

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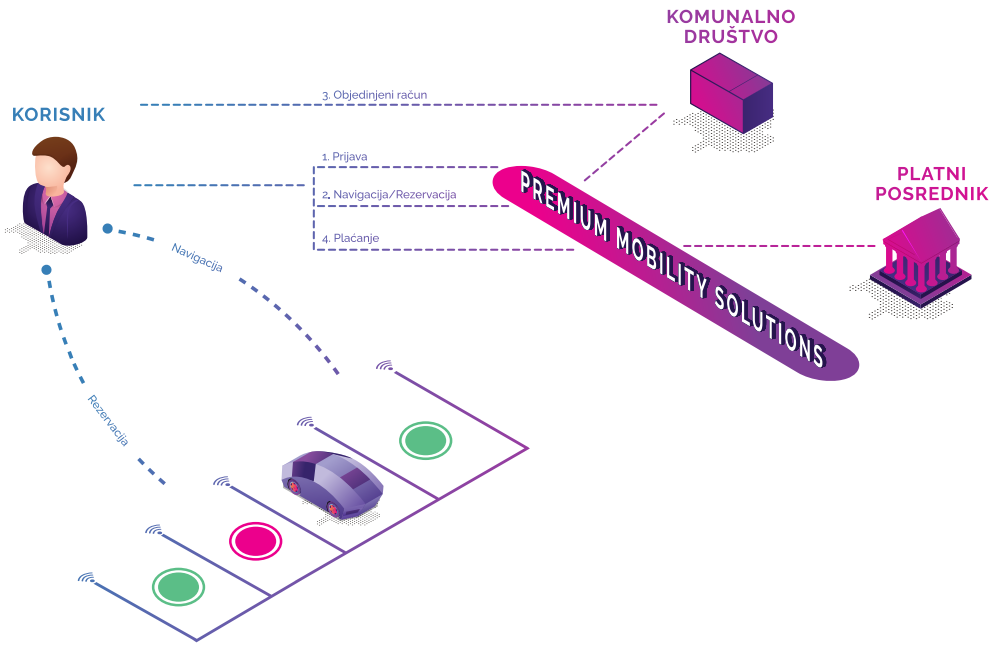
ZAKLJUČAK

Mobilisis d.o.o. razvio je platformu Premium Mobility Solutions kao jedinstven multifunkcionalan sustav za praktičnu i učinkovitu podršku projektima iz područja pametne mobilnosti. Jedan njegov dio odnosi se na projekte pametnog parkiranja koji omogućava komunalnim društvima da svojim korisnicima, građanima, isporuče usluge navigacije i rezervacije parkirnih mjesta na vrlo jednostavan način. Poseban dio omogućava jednostavnu integriranu naplatu komunalnih usluga koje plaćaju korisnici. To su usluge poput parkiranja, javnog gradskog prijevoza, međugradskog prijevoza, morskog prijevoza, vode, komunalnog otpada i sličnih. Korisnik pomoću nekoliko klikova može odabrati način plaćanja – sms, kartica, kriptovaluta ili neki drugi raspoloživ način.



Za razliku od uobičajenih načina nabave ovakvih rješenja, Mobilisis d.o.o. omogućuje komunalnim društvima nabavu Premium Mobility Solutions kao uslugu (PMSaaS). Takva vrsta nabave rasterećuje komunalna društva brige o projektiranju, nabavi softvera i hardvera, financiranju i održavanju. Komunalna društva se ne zadužuju već mjesečno plaćaju uslugu raspoloživosti cijelog sustava ukoliko je raspoloživ i to kao operativni trošak. Takav poslovni odnos može trajati do 5 godina.

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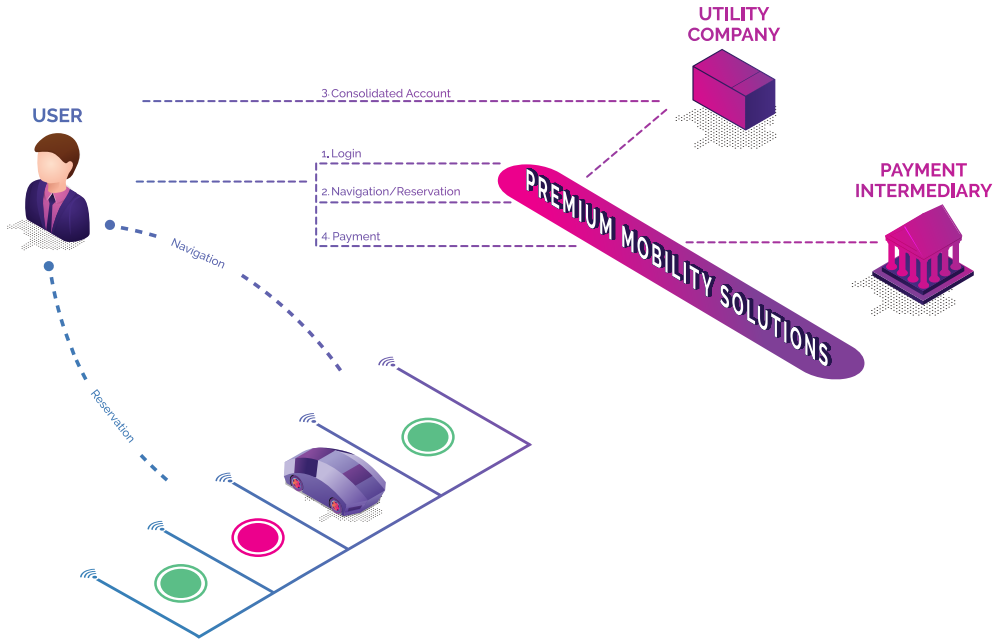
CONCLUSION

Mobilisis Ltd. has developed the Premium Mobility Solutions platform as a unique multifunctional system for practical and efficient support for smart mobility projects. One part of it relates to smart parking projects that enable utility companies to deliver navigation services and parking space reservations to their customers, in a very simple way. A special part allows easy integrated billing of utilities paid by users. These are services such as parking, public city transport, intercity transport, sea transport, water, waste and the like. With a few clicks, the user can choose the method of payment - SMS, credit/debit card, cryptocurrency or some other available method.



Unlike the usual ways of procuring such solutions, Mobilisis Ltd. enables utilities to procure Premium Mobility Solutions as a service (PMSaaS). This type of procurement relieves utility companies of worries about design, procurement of software and hardware, financing and maintenance. Utility companies pay monthly for the availability of the entire system through its operating cost, without borrowing it. Such a business relationship can last up to 5 years.

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