



Zagreb



Integrated Action Plan City of Zagreb

Zagreb, May 2018





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Zagreb Economy Snapshot



Executive Summary

As in most other cities within the URBACT network, the objective and biggest challenge of the urban development of Zagreb is to provide efficient and cost-effective service to citizens and businesses.

SmartImpact project aims at exploring and developing innovative management tools for municipalities to finance, build, manage and operate a smart city by developing approaches that support decision making, investments, management and maintenance of smart solutions to achieve the city's development goals.

Innovative and smart Zagreb is our delivery framework that will focus on providing a transparent, flexible, efficient, management-oriented, cost-cutting and service-based management that, promotes innovation and new technologies as development drivers. We will develop our own model and brand Zagreb as an innovative city.

Zagreb SmartImpact Integrated Action Plan (hereinafter referred as IAP) was developed using the URBACT Method¹. It is the result of a participative planning process of stakeholder representatives from the Mayor's professional services office, other city offices, ICT department, Development Agency of Zagreb and Zagreb Holding.

The delivery framework includes 11 project initiatives supporting five SmartImpact themes² to be initiated, implemented and monitored by teams with members coming from city offices, Development Agency Zagreb, University of Zagreb, scientific and research centers, other incubation centers/hubs, companies and consultants. The teams will initiate, implement, monitor, report and follow up each project in line with the rules formulated within the framework of each project plan, based on local government rules and regulations. At the same time, we will propose and test Smart policies with other significant stakeholders to allow new business models. The activities on some of the proposed projects have already started and the last project delivery is planned to be achieved in 2020.

In addition, the integration was achieved on the horizontal level using Digital Business Platform - ARIS to collaborate for true end-to-end business and IT improvement. ARIS is being used for business process mapping, change management, monitoring and control of the implementation of strategic initiatives/programs/projects in the City of Zagreb, for several years. This good practice brought an additional quality to the IAP by identifying and mapping interconnections and integrative components of all IAP projects, from infrastructure, resource, stakeholder outreach and usability prospective.

The integration of proposed projects is mapped in ARIS and ensured by inclusion in broader city strategies and masterplans and their inter-dependencies on resource and infrastructure level (see Annex).

The funding scheme is based on a combination of existing proven and innovative financing and procurement methods. The majority of the measures in the IAP are also included as measures previously mentioned in other major programmes and plans of City of Zagreb and are being financed by the city budget. However, the application for EU funding that has been used before will be necessary for the IAP implementation as well. New forms of public-private collaboration for smart city investments and innovation-based procurement are included in IAP measures, actions and proposed projects.

If changes were to take place on the political, local government organisational or budgeting level, there is a risk that in the long term the projects will not be implemented as planned. Certain projects also require additional funding – for example, the Data Platform project. During the last year a preliminary city and Zagreb holding budgets were allocated although at the present time there is no guarantee that allocated and required funding will be available for all project implementations.

¹ The URBACT method emphasises that the participative and transnational process of drafting an Integrated Action Plan is in itself as important as the result. (source: *URBACT Guidelines to produce an Integrated Action Plan*)

² Main project themes: Organisational Development, Data Governance & Integration, Supporting Local Innovation Ecosystems, Smart Finance & Procurement and Supportive Regulations & Incentives



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1 About the City of Zagreb

Located in the northwest of the country, Zagreb is the largest city and capital of the Republic of Croatia. It is home to central government, administrative bodies and government ministries. Today the City of Zagreb has 800,000 inhabitants, with twofold growth in the last fifty years.

Zagreb is the most important transport hub in Croatia where Central Europe, the Mediterranean and Southeast Europe meet, making the Zagreb area the centre of road, rail and air traffic networks of Croatia. It is a city known for its diverse economy, high quality of living, museums, sporting, and entertainment events. The main areas of its economy are high-tech industries and the service sector.

As an important trading hub and tourist destination, the city recognizes the importance of efficient transport and works on developing new plans to manage traffic and expand public transport links. The motorway network has brought Croatia closer to Europe and has a positive impact on its regional integration of Croatia.

The city’s identity is built on both its historic background and modern facilities. An important element in the identity of the city is its cultural and architectural heritage. There is a strong university and student presence and the city has a significant number of start-up and innovation businesses, mostly in digital industries.

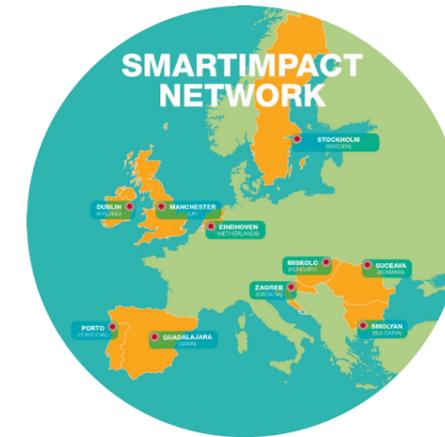
The vision for the City of Zagreb is to be an urban incubator of sustainable concepts, entrepreneurship and new values.

The vision of the City of Zagreb as an urban incubator is being realized by pushing borders in all fields of work and activity relevant for the City and by using the entrepreneurial approach – an approach that does not settle for the status quo, but seeks new ideas in the creative process, and strives to create new values.



2 Focus and Objectives

SmartImpact is a two-year project (May 2016 – May 2018) funded by the European Commission (URBACT). Led by the Manchester City Council, the focus is cities, people and the promotion of smart, sustainable development. The network is supported by the Fraunhofer Institute, a leading research group and authority on smart cities. Along with the development of a model for smart cities, 10 partners are working to develop action plans to make their own cities smarter.



The focus of action plan development is less about technology solutions in themselves and more about governance structures, process and business models. The partners are specifically working together to:

1. Develop models of how organizations can adapt their structures to deliver smart cities;
2. Effectively finance smart solutions and creating new ways of understanding value with co-investment strategies;
3. Develop and support innovation ecosystems within cities;
4. Explore the role of regulations and incentives, e.g. the carrot and stick approach;
5. Better understand how data integration and urban data platforms can support the smart city

The themes have been developed from the baseline study of each partner city. In that context, the focus of the City of Zagreb SmartImpact team is on the development of the Integrated Action Plan (IAP) of the City of Zagreb by identifying a number of projects and aligning them with the existing City of Zagreb development strategy³.

The overall objective is to capitalize on digital technologies to accelerate value through business process insights, innovation and collaboration to make better decisions, optimize across the value chain, unlock new resources, improve safety and increase efficiency.

The URBACT Method⁴ was used to ensure an integrated approach to the IAP development by addressing the social, economic, physical planning, territorial and environmental dimensions of

³ City of Zagreb development strategy for the period up to 2020

⁴ The URBACT Programme provided some guidelines, examples and ideas on what could and should be included within an Integrated Action Plan being produced as part of an URBACT network.

The URBACT method emphasises that the participative and transnational process of drafting an Integrated Action Plan is in itself as important as the result.

- Ensuring an integrated approach: the IAP should address the different dimensions of the problem, i.e. social, economic, physical and environmental dimensions, and consider the various territorial levels relevant to the solutions to be implemented.
- Using transnational networking and URBACT partners for transnational exchange on how to tackle the policy challenge, and how to boost the integrated and participative approach in the IAP.
- The IAP is the result of a participative process; it is developed with the stakeholders involved in the URBACT Local Group.



the plan. Action planning cycle was guided by the IAP development process comprising of a number of consultation workshops where representatives of key stakeholders agreed on actions/projects, priorities and resourcing and co-produced the IAP.

A list of projects grouped by themes is outlined in the table below.

Organisational Development	
	<ol style="list-style-type: none"> 1. Developing organizational structures and processes to support the strategic development of a Smart City Zagreb 2. Engages citizens and local stakeholders in local innovation processes
Data Governance & Integration	
	<ol style="list-style-type: none"> 3. City of Zagreb's Intelligent platform 4. Intelligent Security Solution System Cyber Security – Critical infrastructure 5. Intelligent Security Solution System Civil Security – Data protection 6. zAgI communication channel 7. Process improvement of management portfolio services of Zagreb Holding 8. Development of new smart city models within the Energy Atlas
Supporting Local Innovation Ecosystems	
	<ol style="list-style-type: none"> 9. Digital Stream Zagreb (DSZ) 10. Development of new business models for public lighting reconstruction project
Smart Finance and Procurement	
	<ol style="list-style-type: none"> 11. Financing and public procurement of innovative solutions
Supportive Regulations & Incentives	
	<p>Create or change laws and regulations to allow new business models</p>

3 IAP Projects

The URBACT method was used for the development of the IAP Integrated Action Plan for the City of Zagreb. During a number of workshops, the local team created a concept that included

- articulation of problems and challenges in a city,
- a strategy for addressing those problems and challenges with expected objectives met and results to be achieved with priorities taken from the existing development strategy document,
- the definition of 11 projects that will achieve the results and bring benefits and
- the implementation framework with an estimate of the required resources, timeframe and result indicators to measure progress and drive monitoring and control of activities and tasks to be performed.

The short description of each project with its benefits and related indicators is summarized below. The detailed description of each project is elaborated in the Appendix.



SmartImpact Meeting Zagreb, 4th – 5th April 2017





SmartImpact Project – Final Event: Manchester, 20th March 2018



SmartImpact Meeting Zagreb, 12th – 13th December 2017 - Development of the Integrated Action Plan

3.1 Organisational Development

Project Name: 1. ZGS BPM
Developing Organizational Structures and Processes to Support the Strategic Development of a Smart City of Zagreb

City Vision

Vision - to be a smart, creative and innovative city.

Mission - to provide people-centered services that are high-quality, sustainable and affordable.

Short description of project / measure

- Innovative and smart Zagreb
- Development of the City of Zagreb services in order to provide better quality services to citizens by providing a transparent, flexible, efficient, management-oriented, cost-cutting and service-based management that promotes innovation and new technologies.
- Develop our own model and brand Zagreb as an innovative city
- Select priority areas and sectors
- Monitor and evaluate implementation
- Provide best practice examples and disseminate knowledge to other Croatian cities
- Develop vision and create strategic alliance of all important stakeholders
- Develop the Zagreb Innovation Strategy with a clear action plan and allocated funds
- Implement business strategies and business models to:
 - Align strategy with business processes
 - Implement a balance scorecard
 - Define KPIs for success measurement
 - Set critical success factors
 - Use reports to analyze goals in real time

Benefits:

- Perform strategic analysis and investigate our position
- Use as-is and to-be scenarios to help top-level managers make the right strategic decisions
- Benchmark our business performance compared to competitors to identify business challenges and opportunities
- Derive critical success factors for our strategy
- Easily communicate our strategy to different stakeholders
- Improve performance planning and implementation using balanced scorecards
- Run and plan initiatives to improve the quality of our business processes and services
- Provide key metrics to our top-level managers
- Achieve transparency and optimized communication based on a single language and collaboration for all stakeholders

Related Indicators:

- Established and updated Repository of business processes of the City of Zagreb
- Ensure alignment with business strategy
- Number of improved business models/ business processes
- Improved customer services and increased efficiency
- Growth in the number of digital services
- Achieve business transparency
- Increase process agility
- Growth in the number of educated employees for continuous improvement

Contact

CITY OF ZAGREB The Mayor's Office
 Trg Stjepana Radića 1/III | HR-10000 Zagreb
 Tel.: +385 1 610 0101 | E-mail: ured.gradonacelnika@zagreb.hr



Project Name: 2. ZGS Citizen Engagement Platform Engages Citizens and Local Stakeholders in Local Innovation Process	
City Vision Vision - to be a smart, creative and innovative city. Mission - to provide people-centered services that are high-quality, sustainable and affordable.	
Short description of project / measure <ul style="list-style-type: none"> Empower citizens and businesses engagement Establish standardized methodology for co-created innovation solutions Develop citizen engagement platform - IT toolset to match stakeholders, interests and expertise Include all project development phases into one co-creation method Evaluation of the impact of co-creation projects on the society Ability to treat citizens or businesses as customers – empowered by the definition of customer journeys and touch points between the internal organization of the City, citizens and businesses 	
Benefits: <ul style="list-style-type: none"> Strengthening democracy Social integration/ break down barriers User-centered innovations / demand - driven innovations Better understanding of what citizens want 	Related Indicators: <ul style="list-style-type: none"> Definition of a co-creation business model Definition of a co-creation processes Development supporting IT platform
Contact CITY OF ZAGREB The Mayor's Office Trg Stjepana Radića 1/III HR-10000 Zagreb Tel.: +385 1 610 0101 E-mail: ured.gradonacelnika@zagreb.hr	

3.2 Data Governance & Integration

Project Name: 3. ZGS Intelligent Platform City of Zagreb's Intelligent Platform	
City Vision <ul style="list-style-type: none"> G2G (Government to Government) refers to the City's work interaction with other city administration bodies and state administration bodies G2B (Government to Business; Administration to a Business Entity) refers to interactions between city administration bodies and business entities operating in the Zagreb area G2C (Government to Citizen, a citizen's administration) refers to interactions between city government bodies and citizens 	
Short description of project / measure <ul style="list-style-type: none"> It is necessary to develop a reference architecture of the entire ICT system based on a set of predefined rules and principles that support organizational business processes. The reference architecture serves as a basis for the development of all specific services, whether it is modernization of the working environment of city officials or the implementation of new e-services for citizens. All services have to be interoperable by design to fully utilize their potentials. 	



Benefits: <ul style="list-style-type: none"> All information in one place Transparency Interoperability Standardization Reducing the use of different systems Establishing the basis for innovations 	Related Indicators: <ul style="list-style-type: none"> Adoption of standards Achieved openness Defined design of model architecture Development and implementation of a standardized e-platform Clearly defined procedures and roles with special emphasis on the ICT sector All protocols in place Better data visibility
Contact CITY OF ZAGREB - Professional Service of the Mayor Trg Stjepana Radića 1/III HR-10000 Zagreb Tel.: +385 1 610 1390 E-mail: strucna.sluzba.gradonacelnika@zagreb.hr	

Project Name: 4. ZGS Cyber Security Intelligent Security Solution System Cyber Security – Critical Infrastructure	
City Vision <ul style="list-style-type: none"> Building confidence in the City's digital services Change citizens' perception about using city services - consider them to be reliable and secure Single security method cannot solve the security problem and many traditional and new technologies and strategies must be used to protect the system as a whole 	
Short description of project / measure <ul style="list-style-type: none"> A smart security system should aim for security, physical security and citizen protection. The security system should be able to respond to critical situations such as natural disasters or terrorist attacks, incidents, identification of offenders, etc. Special attention is to be paid towards (private and confidential) data as required by local regulation and GDPR. 	
Benefits: <ul style="list-style-type: none"> Reliable protection system (confidentiality, integrity, availability) Higher confidence in service usage Continuous service availability Secure IT infrastructure Regulate and control the use of the system, including the applications, data and its infrastructure. Compliance with the law 	Related Indicators: <ul style="list-style-type: none"> Secure devices, systems, infrastructure and communications Availability of services Physical security of data centers and assets Education of all stakeholders (internal and external)
Contact CITY OF ZAGREB - Professional Service of the Mayor Trg Stjepana Radića 1/III HR-10000 Zagreb Tel.: +385 1 610 1390 E-mail: strucna.sluzba.gradonacelnika@zagreb.hr	



Project Name: 5. ZGS Civil Security Intelligent Security Solution System Civil Security – Data Protection	
City Vision Data is obtained, held and disclosed in accordance with the law and data access is confined to those with specific authority to view and/or change the data	
Short description of project / measure <ul style="list-style-type: none"> A smart security system should aim for citizen security, citizen protection and protection of citizens' personal data 	
Benefits: <ul style="list-style-type: none"> Reliable protection system Clear data security plan Education and awareness programs Security training User behavior analysis, tracking and alarm in case of anomalies Compliance with the law 	Related Indicators: Information security control must include four review methods: <ol style="list-style-type: none"> Examination (system and data specification) Interviewing (a level of understanding of the security control) Testing (review objects under specified conditions to compare actual with expected behavior) and Monitoring/Reporting
Contact CITY OF ZAGREB - Professional Service of the Mayor Trg Stjepana Radića 1/III HR-10000 Zagreb Tel.: +385 1 610 1390 E-mail: strucna.sluzba.gradonacelnika@zagreb.hr	

Project Name: 6. ZGS zAgI zAgI – City of Zagreb Smart Communication Channel	
City Vision <ul style="list-style-type: none"> Proof of usage of AI in city-driven processes. Build new BOT scenarios based on initial outcomes of zAgI project. 	
Short description of project / measure <ul style="list-style-type: none"> Utilize (hybrid) Cloud solutions to drive deeper data insight and modern e-services for citizens. Create AI-based personalized solutions for citizens and integrate those solutions into “regular” communication channels. We would develop “zAgI - Virtual City Officer”, an AI-based BOT that would be available to citizens 24/7. 	
Benefits: <ul style="list-style-type: none"> Better understanding of citizens' needs High-level quality e-services for citizens and businesses Personalized experience based on real data insights 	Related Indicators: <ul style="list-style-type: none"> Number of unique zAgI users Average time to address citizens' issues/questions Public perception indicators (FB, general media, etc.)
Contact CITY OF ZAGREB - Professional Service of the Mayor Trg Stjepana Radića 1/III HR-10000 Zagreb Tel.: +385 1 610 1390 E-mail: strucna.sluzba.gradonacelnika@zagreb.hr	



Project Name: 7. ZGS e-Management Process Improvement of Management Portfolio Services of Zagreb Holding	
City Vision <ul style="list-style-type: none"> Make Zagreb Holding a reliable digital location so that users can fully trust it. The goal is to minimize the need for using paper documentation and turn to electronic communication with users (the vision of a Smart city is achieved through smart e-Management). 	
Short description of project / measure <ul style="list-style-type: none"> The Zagreb Holding group (hereinafter ZGH) provides a wide range of services on a daily basis to citizens, entrepreneurs, and visitors of Zagreb – the users of Zagreb Holding services. Encouraged by actual trends and ever-increasing opportunities for development and improvement of services and the existing bad state of the IT system, it is evidently necessary to initiate a project to improve the service portfolio management process, master data, as well to improve existing IT systems and build the so-called Unique Platform. The Unique Platform of Zagreb Holding will be the new central IT service management platform and service user system, and it will serve for the development of new digital communication channels for data presentations and interactive communication to all users of utility, energy and other services of the ZGH group, considering existing e-Systems and portals that are already developed in individual members of the Group or the City of Zagreb 	
Benefits: For users/customers of Zagreb Holding, a unique Platform would primarily ensure digital communication to service users and: <ul style="list-style-type: none"> Overview of all necessary information about services that are provided by the Zagreb Holding Group (subsidiaries and affiliated companies in one place) Activation and deactivation of certain services (where applicable) Overview of all services and payment of debt due using modern digital technology and channels Central registry of master data management and a faster transaction system 	Related Indicators: <ul style="list-style-type: none"> Data transparency Rationalization of operating costs Reduction of time spent on analysis Faster information flow
Contact ZAGREB HOLDING Ulica grada Vukovara 41 HR-10000 Zagreb Tel: +385 1 6420 000 E-mail: info@zgh.hr	



Project Name: 8. ZGS Energy Atlas Development of New Smart City Models within the Energy Atlas	
City Vision Development of smart solutions and cost-effective energy services for different customer groups and energy consumers.	
Short description of project / measure <ul style="list-style-type: none"> The Energy Atlas (EA) is an interactive tool that connects the spatial characteristics of energy consumption and visually displays them on the city level. Those displays show energy infrastructure (heating, gas, electricity) and energy consumption centers which enable energy distributors and infrastructure owners to better plan the construction of the required capacity. According to the spatial planning aspect, the energy atlas enables identification of objects and city districts that are suitable for energy renovation or urban areas which provide the option for using renewable energy sources. 	
Benefits: <ul style="list-style-type: none"> EA is one of the tools for implementing energy transition. It contributes to the achievement of three of the six strategic development goals defined in the City of Zagreb development strategy for the period up to 2020: <ul style="list-style-type: none"> C3 Environmental protection and sustainable management of natural resources and energy C4 Improving Spatial Quality and City Functions C6 Improving the development management system 	Related Indicators: <ul style="list-style-type: none"> Database of consumption of energy sources and water that are connected to the spatial unit Spatial units which contain key data such as number of apartments in the building, number of household members etc. Use of energy consumption by purpose Energy Efficiency indicators <ul style="list-style-type: none"> total annual energy savings total annual CO2 reduction
Contact CITY OF ZAGREB - City Office for Economy, Energetics and Environment Protection Trg Stjepana Radića 1/I HR-10000 Zagreb Tel.: +385 1 610 1194 E-mail: gospodarstvo@zagreb.hr	

3.3 Supporting Local Innovation Ecosystems

Project Name: 9. ZGS Digital Stream Digital Stream Zagreb (DSZ)	
City Vision Our vision is to create a central hub for creating innovative solutions and enable faster development i.e. co-development between different players in selected industry segments. Such a setup would also enable faster industrialization of such developed solutions by close interaction between the involved parties in consortium.	
Strategic framework: <ul style="list-style-type: none"> City of Zagreb development strategy for the period up to 2020 Strategy for Innovation Encouragement of the Republic of Croatia 2014-2020 – building innovation infrastructure, developing financial mechanisms oriented towards innovations, strengthening human capital through e-skills (linked with the eCroatia Strategy 2016-2020), Croatian National Social Welfare Strategy for the Elderly 2017-2020 	

Short description of project / measure <ul style="list-style-type: none"> DIGITAL STREAM ZAGREB, a user-centered open innovation ecosystem that will foster collaborative and inclusive intersectional innovation procurement and the development of complete product and services solutions with and for SMEs and citizens. It acts as an urban incubator and accelerator for commercialization of innovation. Digital Stream Zagreb (DSZ) as a smart urban value chain connects local government authorities and public entities with scientific and research institutions, academic community, SMEs, large enterprises, NGOs and citizens at the center of co-creation process. 	
Benefits: Digitalization as a city-wide transformation process that enables the City not just to identify technical and technological solutions, but to directly finance and nurture the innovations ecosystem to a level that they may actually be implemented within the city and contribute to improved competitiveness and better quality of life for the citizens.	Related Indicators: <ul style="list-style-type: none"> The Innovation Output Indicator (IOI) TEA index representing the number of entrepreneurially active people
Contact Development Agency Zagreb - TPZ Ltd. Dragutina Golika 63 HR-10000 Zagreb Tel.: +385 1 366 7101 E-mail: info@raza.hr	

Project Name: 10. ZGS Public Lighting Development of New Business Models for the Public Lighting Reconstruction Project	
City Vision <ul style="list-style-type: none"> Environmental protection and sustainable management of natural resources and energy. Modernization and reconstruction of the public lighting system plays an important role in the development of Zagreb and increase of the living standard for citizens. 	
Short description of project / measure <ul style="list-style-type: none"> Reconstruction of public lighting in the City of Zagreb includes modernization of the public lighting system, implementation of energy efficiency measures, new energy efficient light sources and power regulation systems, as well as modernization of other existing public lighting parts like poles, cables etc. According to the abovementioned, it is necessary to define compatible solutions related to the results of the performed energy audits and the latest available technology. The main points of this project include defining models and needs for implementation of a new ecological and energy efficient system that should be upgraded by implementation of the light management system – a type of a centralized dashboard which is used to control and reduce energy consumption of a town's public lighting system and can be combined with various types of services (pollution sensors, noise sensors, parking availability sensors, cameras etc.). 	
Benefits: <ul style="list-style-type: none"> Reduction of light pollution and CO2 emission Electrical energy savings Cost savings Improved level of visibility by using various types of information and services through one system Improved maintenance efficiency 	Related Indicators: <ul style="list-style-type: none"> Savings in energy consumption up to 65% Savings in public lighting system maintenance up to 75% Total operating cost savings of approximately EUR 5 million per year
Contact CITY OF ZAGREB - City Office for Economy, Energetics and Environment Protection Trg Stjepana Radića 1/I HR-10000 Zagreb Tel.: +385 1 610 1194 E-mail: gospodarstvo@zagreb.hr	



3.4 Smart Financing and Procurement

Project Name: 11. ZGS Public Procurement Financing and Public Procurement of Innovative Solutions	
City Vision <ul style="list-style-type: none"> • First commercial procurement of goods/services and diffusion by procurement of innovative goods/services only recently available at the market 	
Short description of project / measure <ul style="list-style-type: none"> • Building a strategic framework for financing and public procurement of innovative solutions in the City of Zagreb that will enable the City not just to identify technical solutions, but to finance and nurture innovations to a level in which they may actually be implemented within the City and contribute to improved competitiveness and better quality of life for the citizens 	
Benefits: <ul style="list-style-type: none"> • Defining a framework and pilot implementation of a strategy for capacity building to boost usage of public procurement of innovative solutions with a cost-benefit analysis for the public and private sector 	Related Indicators: <ul style="list-style-type: none"> • Compliance testing - activity to determine, directly or indirectly, that a process, product or service meets relevant technical standards and fulfills relevant requirements • The Innovation Output Indicator • Cost-Benefit Analysis • Number of innovative procurements
Contact Development Agency Zagreb - TPZ Ltd. Dragutina Golika 63 HR-10000 Zagreb Tel.: +385 1 366 7101 E-mail: info@raza.hr	

4 IAP Implementation Framework

The IAP implementation process is planned to be managed by the stakeholders on the city level, the representatives of administrative bodies of the City of Zagreb, with coordinators being the members of the SmartImpact project local team. The coordinators responsible for the implementation for each proposed project are:

- **City of Zagreb, The Mayor’s Office** for
 - ZGS BPM: Developing organizational structures and processes to support the strategic development of a Smart City of Zagreb
 - ZGS Citizen Engagement Platform: Engages citizens and local stakeholders in local innovation processes
- **City of Zagreb, Professional Service of the Mayor** for
 - ZGS Intelligent Platform: City of Zagreb’s intelligent platform
 - ZGS Cyber Security: Intelligent Security Solution System: Cyber Security – Critical infrastructure
 - ZGS Civil Security: Intelligent Security Solution System: Civil Security – Data protection
 - ZGS zAgl: Zagl – City of Zagreb smart communication channel
- **Zagreb Holding**
 - ZGS e-Management: Process improvement of management portfolio services of Zagreb Holding
- **City of Zagreb, Office for Economy, Energetics and Environment Protection**
 - ZGS Energy Atlas: Development of new smart city models within the Energy Atlas
- **Development Agency Zagreb – TPZ Ltd.**
 - ZGS Digital Stream: Digital Stream Zagreb (DSZ)
 - ZGS Public Procurement: Financing and public procurement of innovative solutions
- **City of Zagreb, City Office for Physical Planning, Construction of the City, Utility Services and Transport**
 - ZGS Public Lighting: Development of new business models for the public lighting reconstruction project.

Engagement of external stakeholders from other institutions on the state, county and local level, academic community, public institutions and organizations, business sector, citizens and experts is planned in the role of implementation team members and/or members of advisory, monitoring and evaluation teams.



IAP Projects Indicators			
1.	ZGS BPM	Repository of business processes up-to-date	6. ZGS zAgl
		Business processes aligned with business strategy	
		Number of documented business processes increased	
		Number of digital services increased	
		Number of educated employees increased	
2.	ZGS Citizen Engagement Platform	Co-creation business model and processes defined	7. ZGS e-Management
		Supporting IT platform developed	
		Users connected	
		Operating costs decreased	
3.	ZGS Intelligent Platform	Communication between stakeholders centralised and unified	8. ZGS Energy Atlas
		Decrease in cost of IT development projects	
		A real-time multi-functional dashboard in operation	
4.	ZGS Cyber Security	Secure devices, systems, infrastructure and communications	9. ZGS Digital Stream
		Availability of services	
		Physical security of data centers and assets	
		Education of all stakeholders (internal and external)	
		IOI - the Innovation output indicator increased	
5.	ZGS Civil Security	Asset Policy developed and in function	10. ZGS Public Lighting
		Security-based framework architecture established	
		Business Continuity Plan developed and implemented	
		GDPR compliance insured	
			11. ZGS Public Procurement
			Number of innovative procurements increased
			The Innovation Output Indicator increased

The monitoring of implementation progress will be done using the ARIS Platform⁵ (ARIS Architect, ARIS Business Strategy, ARIS MashZone) software tools. The alignment of the City of Zagreb strategy and its operationalization through process mapping and action plans definition and control was done in stages since 2012. The City of Zagreb strategic development plans, organizational and

⁵ Software AG Digital Business Platform



functional roles and responsibilities of its employees, project budget allocations and usage are all entered in the repository. They are being regularly updated, monitored against plans and controlled through AVE and Balanced ScoreCard methodologies.

The Product/Service Tree (PST) and the Business Segment Matrix (BSM) have already been developed during the workshops where the local SmartImpact team, with the coordination of Alanus von Radecki from the Fraunhofer Institute, Germany, integrated project tasks, resources and results.

The measurable indicators which will be used to monitor the IAP implementation progress were tailored to each project to enable efficient and effective progress reporting, monitoring and control.

The indicators have a wide range of presentation options from the ARIS tool. The objective diagram for key (KSF) and objective diagram for critical success factors (CSF) will be used, as well as the key performance indicator diagram (KPI).

4.1 Schedule

The timeframe for the implementation of IAP projects is a three-year period, from 2018 till the end of 2020 to fit within the time-frame of the current development strategy of the City of Zagreb that covers the period till 2020.

The goals and scope of IAP projects which will be developed and delivered will contribute to the current development strategy of the City of Zagreb as they share the same vision and goals in developing a competitive economy and human resources, ensuring environmental protection and sustainable management of natural resources and energy, improving urban quality, the development of city management system and functions and the quality of life of its citizens.

IAP projects (measures)		Implementation timeframe			planned project continuation
		previous project phases	2018	2019	
1.	ZGS BPM	2012 - 2017			
2.	ZGS Citizen Engagement Platform	2013 - 2017			
3.	ZGS Intelligent Platform				
4.	ZGS Cyber Security	2014 - 2017			
5.	ZGS Civil Security	2017			
6.	ZGS zAgl				
7.	ZGS e-Management				
8.	ZGS Energy Atlas				
9.	ZGS Digital Stream				DSZ 2.0 till 2022
10.	ZGS Public Lighting				till 2021 (+ELENA funding)
11.	ZGS Public Procurement				



As is evident from the Gantt chart above, some of IAP projects had a significant planning and initialization phase and some of them had implementation phases leading to 2018 where smart solutions are to be acquired and implemented. In addition, for two proposed projects, ZGS Digital Stream and ZGS Public Lighting, the plans were made and funding allocated for the continuation beyond the scope of the IAP implementation.

4.2 Funding scheme

The cost estimates and resource requirements for the implementation of IAP projects amount to nearly 10 million € and include staff, external experts, equipment purchase and license or IT service provision costs. The funding for 29% of the estimated costs will be provided from the City of Zagreb and Zagreb holding budgets.

IAP projects		City Budget	Required Financing	Total	City budget component %
1.	ZGS BPM	784 000 €	646 000 €	1 430 000 €	55%
2.	ZGS Citizen Engagement Platform	135 000 €	120 000 €	255 000 €	53%
3.	ZGS Intelligent Platform	266 000 €	732 000 €	998 000 €	27%
4.	ZGS Cyber Security	48 000 €	659 000 €	707 000 €	7%
5.	ZGS Civil Security	48 000 €	316 000 €	364 000 €	13%
6.	ZGS zAgl	48 000 €	64 500 €	112 500 €	43%
7.	ZGS e-Management	670 000 €	470 000 €	1 140 000 €	59%
8.	ZGS Energy Atlas (prep. activities)	275 000 €	0 €	275 000 €	100%
9.	ZGS Digital Stream	410 000 €	2 190 000 €	2 600 000 €	16%
10.	ZGS Public Lighting	200 000 €	1 800 000 €	2 000 000 €	10%
11.	ZGS Public Procurement	28 000 €	0 €	28 000 €	100%
		2 912 000 €	6 997 500 €	9 957 500 €	29%

The remaining required financing is planned to be secured from ERDF and ESF Operational Programmes for 2014 to 2020 and Horizon 2020 funds.

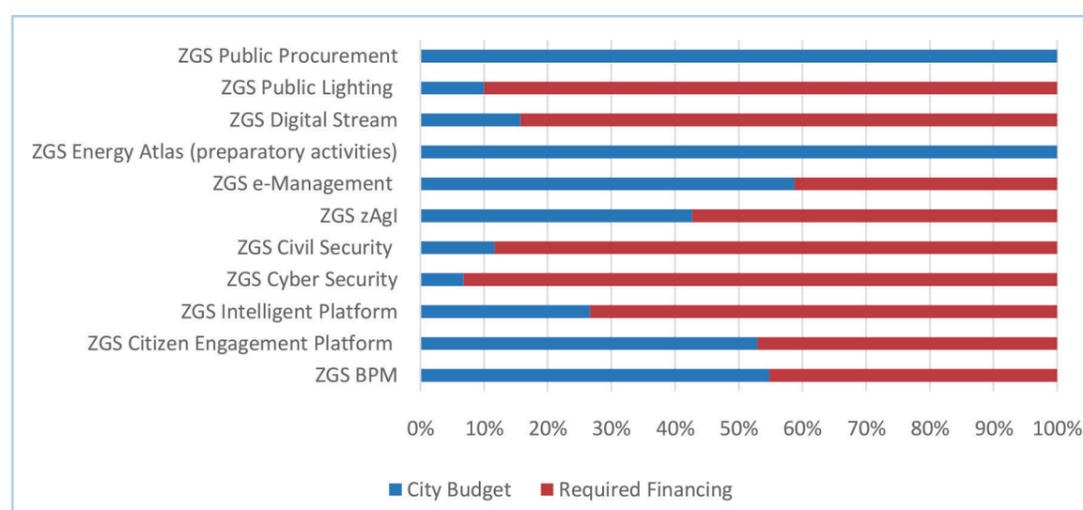
Innovative financing solutions like co-financing, resource sharing and crowdfunding are included as well:

- Energy Atlas development project has secured 10% of required budget by using scientific infrastructure (tools, methodology, equipment etc.) of the project partner.
- Cyber Security – Critical infrastructure and Civil Security – Data protection projects are using funding from OSCAR (Horizon 2020: DS-07- 2017 (IA).
- zAgl– City of Zagreb smart communication channel development project plans to use vendors’ investment in initial Proof-of-Concept of their AI solutions use in developing the Virtual City Officer application.
- The Cooperative for Ethical Financing – eBank is the member of the implementation consortium on Data Stream project that will assist with crowdfunding while other consortium partners will contribute with resource and expertise sharing (University of Zagreb with PLC automatization, Mechatronics and Concrete testing labs and Ericsson Nikola Tesla with corporate incubator lab facilities).

More than 80% of the project budget comes from OP Competitiveness and Cohesion - Development of business infrastructure (BRI) fund.

Membership fees, training, contract R&I, testing and service brokerage are all potential revenue streams and will be used for covering project costs.

- Public Lighting project uses loan (ELENA Technical Assistance Contract)/grant (EIB) combined with the city budget for financing massive reconstruction of public lighting in the City of Zagreb.



5 Appendix

The detailed description of Integrated Action Plan (IAP) projects is elaborated as follows:

5.1 Developing organizational structures and processes to support the strategic development of a Smart City of Zagreb

	Transfer	
	New concept/ solution	X
	Other	

Project Overview

Short description of the problem you try to solve	
Lack of agility, flexibility and speed to compete in a dynamic environment of city administration to help customers achieve results that exceed their expectations. Lack of transparency and standardization led to duplications, information silos, uncoordinated efforts, months-long approval times and hampered city planning.	
Short description of project / measure	Potential
<p>Innovative and smart Zagreb</p> <p>Development of the City of Zagreb services in order to provide better quality services to citizens by providing a transparent, flexible, efficient management-oriented cost-cutting and service-based management, promoting innovation and new technologies</p> <p>Develop our own model and brand Zagreb as innovative city</p> <p>Select priority areas and sectors</p> <p>Monitor and evaluate implementation</p> <p>Provide best practice examples and disseminate knowledge to other Croatian cities</p> <p>Develop vision and create strategic alliance of all important stakeholders</p> <p>Develop Zagreb Innovation Strategy with a clear action plan and allocated funds</p> <p>Implement business strategies and business models to:</p> <ul style="list-style-type: none"> Align strategy with business processes Implement a balance scorecard Define KPIs for success measurement Set critical success factors Use reports to analyze goals in real time 	<p>City of Zagreb should lobby the Central Government to make necessary policy changes with a view of improving all Networking and Information Security (NIS) Directive components and their strategic alignments.</p> <p>City of Zagreb should lobby for better national investment in R&D and invest more of its own funds.</p> <p>Develop strategic partnerships with other smart and innovative cities in Europe.</p> <p>Promote Zagreb as an innovative city worldwide.</p> <p>Relevant actors</p> <p>Mayor – strong voice and supporter of innovation, the City of Zagreb, Zagreb Holding, Development Agency Zagreb, academia - University of Zagreb, scientific and research centers, other incubation centers/hubs, citizens</p>



Benefit	References
<ul style="list-style-type: none"> Perform strategic analysis and investigate our position Use as-is and to-be scenarios to help top-level managers make the right strategic decisions Benchmark our business performance compared to competitors to identify business challenges and opportunities Derive critical success factors for our strategy Easily communicate our strategy to different stakeholders Improve performance planning and implementation using balanced scorecards Run and plan initiatives to improve the quality of our business processes and services Provide key metrics to our top-level managers Achieve transparency and optimized communication based on a single language and collaboration for all stakeholders 	<p>Repository of business processes of the City of Zagreb</p> <p>Repository of business processes contains individual knowledge of employees of the City, contained in the knowledge base of city business that is easy to understand, analyze and evaluate. Repository of business processes, with integrated strategic development plans of the City of Zagreb, is a strong basis for the development of Zagreb in the direction of smart city and implementation of relevant projects.</p>

What current problem is the project trying to solve		
Harmonization of strategic and operational objectives with business processes and key resources for the realization of City of Zagreb strategy and establishment of responsibility for key processes. Key focus is on integrating and standardizing the processes across the City, in order to provide better quality services to citizens.		
Related indicators	Related action fields	Related impact factors
<ul style="list-style-type: none"> Established and updated Repository of business processes of the City of Zagreb Ensure alignment with business strategy Number of improved business models/ business processes Improved customer services and increased efficiency Growth in the number of digital services Achieve business transparency Increase process agility Growth in the number of educated employees for continuous improvement 	<ul style="list-style-type: none"> Project Business Process Modeling in the City of Zagreb (10th December 2012 – 10th April 2013) Project Development of the Business Process Management System (23rd January 2014 – 29th December 2014) Project Process Function Analyses of Organizational Units of the City of Zagreb (18th November 2015 – 30th April 2016) Project Design and Implementation of the Real-Time Process Control and Monitoring System (06th February 2017 – 31st July 2017) 	<ul style="list-style-type: none"> Digital Agenda for Europe 2020 Croatian Strategy for the Development of Public Administration for the period from 2015 to 2020 e-CROATIA 2020 STRATEGY Regional Development Strategy of the Republic of Croatia for the period until the end of 2020 Tallinn Declaration on eGovernment Business Process Management program in City of Zagreb



DNA of Project

Job to get done (Goal)	Core value	Consortium
<p>Goal: improve service delivery based on the development of organizational structures and processes to support the strategic development of a Smart City of Zagreb Business process design, analysis and optimization</p> <p>Harmonization of strategic and operational objectives with business processes and key resources for the realization of City of Zagreb strategy and establishment of responsibility for key processes.</p> <p>Development of continuous control and optimization system of business processes through defining procedures for changing AS-IS processes and documenting TO-BE processes.</p> <p>Development of the City of Zagreb services catalogue and the book of projects for implementation in a next period.</p> <p>e-services - Repository of business processes of the City of Zagreb supports the implementation of information technology and software solutions for all processes in order to establish a unified information system due to customer needs.</p>	<p>Establish an effective, efficient, transparent, flexible, customer-focused City Administration. Achieve business excellence and provide better services to citizens and entrepreneurs.</p> <p>Meet the digital demands of citizens and entrepreneurs.</p> <p>Support Smart City initiatives. Customer-centric innovations, based on optimizing processes for smarter decisions and better services.</p> <p>Achieve business objectives faster using the world's best practice, knowledge, methodologies and tools.</p> <p>Share process information with a flexible and customizable role-based process portal.</p> <p>Collaboration - unlock the power of collaborative process improvement, empowering anyone, anytime, anywhere to collaborate.</p>	<ul style="list-style-type: none"> All city offices Process owners, process managers, employees responsible for specific business processes Zagreb Holding Development Agency Zagreb Academia - University of Zagreb Scientific and research centers Other incubation centers/hubs Consultants

Minimum Viable Project

Must have
<p>Eliminate information silos and promote collaboration.</p> <p>Capture and leverage business knowledge and intellectual property.</p> <p>Increase productivity and effectiveness through standardization and automation.</p> <p>Reduce approval times and improve customer services encompassing: process strategy, design, integration, control and data management.</p> <p>End-to-end Business Process delivering low Total-Cost of Ownership and high ease of use.</p> <p>Increase service quality and reduce processing times, to eliminate service variations and automate processes that were largely undocumented.</p>
Should have
<p>Process view enables management to identify deficiencies and target improvements.</p> <p>City enterprises-wide transparency and visibility enables collaboration.</p> <p>Time-saving reports provide accurate, up to-date information and enable enhanced planning.</p>
Could have
<p>Release cycles for new, complex systems are reduced.</p> <p>Opportunity to leverage intellectual property to assist other municipalities and generate revenue.</p> <p>With an additional process alignments and integration with other government departments - reducing process approval times.</p>



Process

Activities to deliver the project goal	Technologies
<ul style="list-style-type: none"> Defining the key services of the City (business areas), and the user groups that they are intended for Documenting the existing business processes for defined key services Business processes modeling using the ARIS technological platform Creating a catalog of services, in accordance with the defined legal framework and the concept of the development of smart and sustainable citizen-oriented city administration, as the basis for the development of a project book to be implemented sequentially Defining key success factors and key performance indicators for key processes Business process analysis Developing proposals for improving and developing To-Be model of improved business processes in line with the objectives of increasing cost efficiency and transparency, and increasing the quality and sustainability of services provided to citizens, economic entities and other key stakeholders Supporting of process-oriented organization implementation – roles and responsibilities for business process management Developing a process portal on the intranet of the City of Zagreb Developing e-Services of the City of Zagreb - Business process repository provides support to the implementation of information technology and software solutions for all processes in order to establish a unified information system due to customer needs Developing, introducing and integrating information systems for digitization, automation and business process management Continuous education of employees, building not only their expertise, but also encouraging changes in behavior and the manner of conducting operations through the introduction of analyses and continuous improvement of business as usual activities Continuous project management in accordance with best practices and internal procedures of the City of Zagreb 	<ul style="list-style-type: none"> Software AG Digital business platform - world's best practice, knowledge, methodologies and tools <p>ARIS Platform:</p> <ul style="list-style-type: none"> ARIS Architect is used to create, analyze, manage and administer the whole enterprise model, from strategy over business processes to information architectures, application landscapes and services ARIS Business Strategy bridges the gap between strategy and operations with easy-to-use modeling capabilities as well as collaboration support and strategy communication ARIS MashZone enables creating mashups to see how data's being used and how processes are performing AVE methodology Balanced ScoreCard

References

Similar projects	Products and tools
<ul style="list-style-type: none"> Project Business Process Modeling in the City of Zagreb (10th December 2012 – 10th April 2013) Project Development of the Business Process Management System (23rd January 2014 – 29th December 2014) Project Process Function Analyses of Organizational Units of the City of Zagreb (18th November 2015 – 30th April 2016) Project Design and Implementation of the Real-Time Process Control and Monitoring System (06th February 2017 – 31st July 2017) 	<ul style="list-style-type: none"> Software AG Digital business platform - world's best practice, knowledge, methodologies and tools ARIS Platform Microsoft SharePoint Portal



Financing and investment

Project costs	
Staff	All City offices Process owners, process managers and process users – process experts
Equipment	Existing Digital Business Platform – ARIS Platform (including ARIS MashZone) Implementation of a new digital platform - not within the project scope
Licenses	Existing ARIS licenses and ARIS MashZone Licenses
Other costs	Contracting of consultants – business process experts

Financing – City Budget (EUR)				Financing – EU (EUR)
	BPM	E-Services	Total	EU co-financing
2018	116 000	135 000	251 000	162 000
2019	128 000	135 000	263 000	215 000
2020	135 000	135 000	270 000	269 000
Total	379 000	405 000	784 000	646 000

Expected Outcomes

Measuring success	City vision	Beyond the city
<p><u>Ensure alignment with business strategy</u></p> <ul style="list-style-type: none"> Product/Service Tree (PST) Business Segment Matrix (BSM) Objective diagram - Key Success Factors (KSF) Objective diagram - Critical Success Factors (CSF) Key Performance Indicator diagram (KPI) Process Map (Value-Added Chain Diagram - VACD) Business Processes (Event-Driven Process Chain diagram – EPC) Critical business process diagram 	<p>Vision - to be a smart, creative and innovative city. Mission - to provide people-centered services that are high-quality, sustainable and affordable.</p>	<p>Effective business process management contributes to the simplification and modernization of administrative procedures, providing efficient and reliable support to citizens and businesses, facilitates the preparation and implementation of projects and increases transparency and competitiveness of the City of Zagreb, which will enable better development of entrepreneurship, attract investment and boost overall social and economic development.</p>



5.2 Engages citizens and local stakeholders in local innovation processes

	Transfer	
	New concept/ solution	X
	Other	

Project Overview

Short description of the problem you try to solve

Lack of engagement of citizens, local companies and businesses. Lack of empowerment for citizens and businesses to express their opinion, which would allow policy makers to collect new ideas, involve citizens in the creation of public services and provide better digital public services. Lack of the Customer Experience Management solution which provides capabilities and methods to design and analyze processes from an “outside-in” perspective.

Short description of project / measure

- Empower citizens and businesses engagement
- Establish standardized methodology for co-created innovation solutions
- Develop citizen engagement platform - IT toolset to match stakeholders, interests and expertise
- Include all project development phases into one co-creation method
- Evaluation of the impact of co-creation projects on the society
- Ability to treat citizens or businesses as customers – empowered by the definition of customer journeys and touch points between the internal organization of the City, citizens and businesses

Potential

Develop strategic partnership with other smart and innovative cities in Europe
Promote Zagreb as an innovative city worldwide
Enabling the involved participants, primarily citizens, with the opportunities to shape planning processes from the creation of initial ideas to their execution (co-creation approach).

Relevant actors

- City of Zagreb
- Citizens
- Local companies and businesses

Benefit

- Strengthening democracy
- Social integration/ break down barriers
- User-centered innovations/ demand-driven innovations
- Better understanding of what citizens want

References

- FUPOL – Future Policy Modelling
- <http://www.fupol.eu/en/solutions/fupol-in-action/zagreb>
- Zagreb Innovative City
- <http://www.zg-inovacija.eu/>



What current problem is the project trying to solve

Benefits of the proposed project support the opening up of the city administration by exchanging initiatives and a communicative planning approach, which builds upon the better understanding of citizens' needs (demand driven action/innovation).
Strengthen democratic processes by infusing social integration and breaking down the barriers as well as providing more transparency and accountability of decision-makers.

Related indicators	Related action fields	Related impact factors
<ul style="list-style-type: none"> Definition of a co-creation business model Definition of a co-creation processes Development supporting IT platform 	<ul style="list-style-type: none"> Project Business Process Modeling in the City of Zagreb (10th December 2012 – 10th April 2013) Project Development of the Business Process Management System (23rd January 2014 – 29th December 2014) Project Process Function Analyses of Organizational Units of the City of Zagreb (18th November 2015 – 30th April 2016) Project Design and Implementation of the Real-Time Process Control and Monitoring System (06th February 2017 – 31st July 2017) Project FUPOL – Future Policy Modeling (01st October 2011 - 30th September 2015) Pilot Project Zagreb Innovative City (07th April 2017 – 30th June 2017) 	<ul style="list-style-type: none"> Digital Agenda for Europe 2020 Croatian Strategy for the Development of Public Administration for the period from 2015 to 2020 e-CROATIA 2020 STRATEGY Regional Development Strategy of the Republic of Croatia for the period until the end of 2020 Tallinn Declaration on eGovernment European Innovation Partnership on Smart Cities and Communities Regulation on the receipt and evaluation of initiatives, approval, establishment, implementation and closure of projects in the City of Zagreb

DNA of Project

Job to get done (Goal)	Core value	Consortium
<p>Generation of an (IT-supported) co-creation method to foster innovative development of the City of Zagreb that:</p> <ul style="list-style-type: none"> Engages citizens, local companies and businesses in the local innovation processes Supports Co-creative processes of project development: <ul style="list-style-type: none"> Co-creative definition of local needs for innovation Co-creative development of innovative solutions and projects Co-creative implementation of innovative solutions and projects Co-creative solution/ project evaluation Provides supporting IT platform to connect stakeholders with matching interests, expertise and resources Promotes the City of Zagreb as a livable city by supporting innovative city development and evaluates the social impact of co-creation activities 	<ul style="list-style-type: none"> Opening towards a 'new wave' of public engagement where 'co-creation' is a key notion. Increased interest in co-construction of policies, co-evaluation, co-funding and co-production of products and services. Combination with place-based activities involving smart cities, living labs, and the regional dimension linked to Smart Specialization Strategies. Approaches and opening to the "creation of spaces for public engagement" contributing towards the processes of involving citizens and the co-creation of knowledge. Focus on the realized outcomes and their impact on the society as well as their embedment in institutions and practices. 	<ul style="list-style-type: none"> City of Zagreb Private businesses Universities Artistic/ creative industries/ associations Platform developers

Minimum Viable Project

Must have
Online participation Voting Posting ideas Direct link to co-creative processes of project development with resources and employees Crowdsourcing
Should have / Could have
Link to resources Link to participatory budget Crowdfunding Integrative platform, formats to integrate different groups of society Offline-Online: Different offline formats besides the online platform, e.g. workshops, resource library, recordings, videos Artistic / creative interpretations, real world events The primary beneficiaries of the project would be the local citizens themselves, as well as public authorities and politicians who would respond to and act upon the user-centered, public-driven calls and initiatives.

Process

Activities to deliver the project goal	Technologies
<ul style="list-style-type: none"> Co-develop the co-creation methodology and ensure the suitability for local development process Development supported by an IT platform. The methodology will be applied within at least one local development process in order to test and adapt the method and to understand the social impact of the co-creation process Use of a toolset for co-creation (method design and stakeholder matching tool) Development of a local co-creation strategy Break down your customer-centric strategy into achievable business objectives Model customer journeys, identify and specify touchpoints and relate initiatives to the business objectives Create and improve the business processes being the backbone of citizens' corresponding journeys 	<ul style="list-style-type: none"> Software AG Digital business platform - world's best practice, knowledge, methodologies and tools Web platform Social networks Balanced ScoreCard

References

Similar projects	Products and tools
<ul style="list-style-type: none"> Project Business Process Modeling in the City of Zagreb (10th December 2012 – 10th April 2013) Project Development of the Business Process Management System (23rd January 2014 – 29th December 2014) Project Process Function Analyses of Organizational Units of the City of Zagreb (18th November 2015 – 30th April 2016) Project Design and Implementation of the Real-Time Process Control and Monitoring System (06th February 2017 – 31st July 2017) Project FUPOL – Future Policy Modeling (01st October 2011 - 30th September 2015) Pilot Project Zagreb Innovative City (07th April 2017 – 30th June 2017) 	<ul style="list-style-type: none"> Software AG Digital business platform Web platform Social networks Pilot project: <ul style="list-style-type: none"> http://www.zg-inovacija.eu/ https://www.facebook.com/idejemaric/



Financing and investment

Project costs	
Staff	All City offices Process owners, process managers and process users – process experts
Equipment	Web platform
Licenses	Existing ARIS licenses (budgeted under ZGS BPM: Developing organizational structures and processes to support the strategic development of a Smart City of Zagreb project)
Other costs	Contracting of consultants

	Financing – City Budget (EUR)	Financing – EU (EUR)
2018	45 000	40 000
2019	45 000	40 000
2020	45 000	40 000
Total	135 000	120 000

Expected Outcomes

Measuring success	City vision	Beyond the city
<ul style="list-style-type: none"> Defined co-creation business model Defined co-creation processes Developed supporting IT platform Connected stakeholders A defined local development process in order to test and adapt the method and to understand the social impact of the co-creation process Well-designed touchpoints match both perspectives which leads to customer/citizen-centricity 	<p>Vision - to be a smart, creative and innovative city.</p> <p>Mission - to provide people-centered services that are high-quality, sustainable and affordable.</p>	<p>Introducing the possibility of crowdfunding or some other forms of fund raising: e.g. using ideas for participatory budgeting process initiatives, attracting donations, materials and workforces.</p> <p>Empowering citizens and businesses to express their opinion, which would allow policy makers to collect new ideas, involve citizens in the creation of public services and increase transparency which will enable better development of entrepreneurship, attract investment and boost overall social and economic development.</p>



5.3 City of Zagreb's intelligent platform

	Transfer	
	New concept/solution	X
	Other	

Project Overview

Short description of the problem you try to solve

Business and IT systems of the City of Zagreb and its affiliates are very heterogeneous. They are built of outdated technologies, which hampers the possibility of application integration and information exchange.

At the moment, integrations are developed for each application and every segment of data whose maintenance is complex and cost intensive. Lack of communications between systems.

Short description of project / measure

It is necessary to develop a reference architecture of the entire ICT system based on a set of predefined rules and principles that support organizational business processes.

The reference architecture serves as a basis for the development of all specific services, whether it is modernization of the working environment of city officials or the implementation of new e-services for citizens. All services have to be interoperable by design to utilize their potentials to the full extent.

Potential

Submitted data platform model provides a framework for the independent implementation of information technologies (regardless of the manufacturer or the process being dealt with).

Ease of (re)use of data no matter where they are, or who uses them.

Creating a sustainable local software economy ecosystem.

Relevant actors

City of Zagreb, Zagreb Holding Company and their affiliated companies

Benefit

- All information in one place
- Transparency
- Interoperability
- Standardization
- Reducing the use of different systems
- Establishing the basis for innovations

References

City of Zagreb IT Development Strategy – internal document

Agreement on Business Cooperation between the City of Zagreb, Zagreb Holding Company and their affiliated companies - locally adopted decision



What current problem is the project trying to solve		
Due to a high level of heterogeneousness, which has been created over the last decade, we are now facing obsolete technology and assets, potential system unreliability, connectivity issues, a lot of manual processing, hard and time-consuming access to information, data redundancy, lack of communication between key stakeholders, etc.		
Related indicators	Related action fields	Related impact factors
<ul style="list-style-type: none"> Adoption of standards Achieved openness Defined design of model architecture Development and implementation of a standardized e-platform Clearly defined procedures and roles with special emphasis on the ICT sector All protocols in place Better data visibility 	<ul style="list-style-type: none"> Defining clear standardization mechanisms and related platform components Drive consensual approach to technology Improvement of the open data portal through new data sources as well as value-added apps Establishment of a predictive analytics system 	European Interoperability Framework (EIF); COM (2017)134

DNA of Project

Job to get done (Goal)	Core value	Consortium
<p>It is essential that applications and infrastructure that connect systems and services must be interoperable. Aspects of technical interoperability include interface specifications, interconnection services, data integration services, data display and exchange, and secure communication protocols.</p> <p>It is necessary to ensure that solutions are built through standardized and open APIs built on Representational State Transfer (REST) standards.</p> <p>All program interfaces for integration with other city administration bodies and public authorities should be based on SOA / API architecture to facilitate integration, create new services, and provide long-term cost reduction.</p>	<p>The City of Zagreb is a digitally transformed city that uses modern technology to provide quality services to its citizens.</p> <p>ICT services provided by the City to city administration and citizens are a reference model for creating new concepts and using advanced technologies in everyday life and work.</p> <p>The business objective of this project is to provide a complete insight into the activities of the City of Zagreb, Zagreb Holding Company and its affiliated companies to ensure simple and transparent management of the city as a whole, regardless of the authority of individual city administration bodies, or services that each of them provide to individual internal and / or external users.</p>	<ul style="list-style-type: none"> All city offices (process owners, process managers, employees responsible for specific business processes) City administrative bodies Local government City institutions (social welfare, education, health care and other institutions)



Minimum Viable Project

Must have
<p>Strong support for top management in implementing change, which is propagated in all organization parts and refers to the abandonment of outdated practices and modes of work and propagates integration and standardization.</p> <p>A phased approach to project implementation, including platform implementation from basic to advanced functionalities and service packs depending on complexity.</p> <p>Organizational adjustments required to embrace the change.</p>
Should have
<p>Communication is the most common problem of project failure. Therefore, it is necessary to establish clear streams of information so that project activities can proceed according to the plan.</p>
Could have
<p>ISO 37120: Sustainable development - indicators for city services and quality of life.</p>

Process

Activities to deliver the project goal	Technologies
<ul style="list-style-type: none"> Integrate different data sources through standardized interfaces Cleaning data in existing IT systems and improving data quality Enable different applications to utilize data required by functionalities of respective app Utilize REST APIs Utilize Cloud micro-services in order to speed-up development and other Cloud resources to secure scalability Establishing a single, central place for communicating with digital channel users on platforms Establishment of Enterprise Service Bus (ESB), which will enable standardized integration and data exchange among IT systems 	<p>The used technology supports all types of integration through APIs and /or services. Technology (HW, SW, Infrastructure) is not limited to manufacturers but also on functions and specifications (openness, integration, interoperability, support, etc.)</p>

References

Similar projects	Products and tools
<ul style="list-style-type: none"> EIP-SCC Urban Platform Management Framework 	<ul style="list-style-type: none"> Open standard technologies Cloud computing capabilities (where acceptable) Leverage currently deployed leading-edge technologies and build upon them; lower dependency on outdated products and tools



Financing and investment

Project costs	
Staff	All City offices, Zagreb Holding Company and its affiliated companies Process owners, process managers and process users – process experts
Equipment	Existing Platform's Implementation/development of a new digital platform
Licenses	Existing licenses
Other costs	Contracting of consultants

Financing (EUR)			
	2018	2019	2020
Staff	16 000	16 000	16 000
Equipment	70 000	270 000	-
Licenses	270 000	135 000	70 000
Other costs	-	135 000	-
Total	356 000	556 000	86 000

Financing: CEF DIGITAL (CEF TELECOM), Horizon 2020, City budget (staff cost)

Expected Outcomes

Measuring success	City vision	Beyond the city
<ul style="list-style-type: none"> Increase interoperability among heterogeneous IT systems by establishing standard solutions and common data exchange mechanisms Decrease costs of developing IT projects by enabling reuse of the existing system components Improving the quality of communication, both internally and externally Providing information to citizens using one IT system Efficiency - clear, competent and high-quality work results of all stakeholders of city administration bodies. A real-time multi-functional dashboard 	<ul style="list-style-type: none"> G2G (Government to Government) refers to the City's work interaction with other city administration bodies and state administration bodies G2B (Government to Business; Administration to a Business Entity) refers to interactions between city administration bodies and business entities operating in the area of Zagreb G2C (Government to Citizen, a citizen's administration) refers to interactions between city government bodies and citizens 	<p>Development of e-Platform for data presentation and interactive communication with utility, energy and other service users. Also, it is possible to integrate with different systems of the existing individual e-solutions.</p>



5.4 Intelligent Security Solution System: Cyber Security – Critical infrastructure

	Transfer	
	New concept/solution	X
	Other	

Project Overview

Short description of the problem you try to solve

Smart city cyber-security is a significant concern for government respondents. Nearly 7 in 10 government respondents fear a hack of critical infrastructure and 58 percent of respondents are concerned about theft and exploitation of private citizen data.

Security is such a concern that 51 percent of respondents said a major breach could cause a “loss of confidence in smart cities.” Worse yet, 65 percent of cities are either not equipped or “partially well-equipped” to handle security breaches (CompTIA Study, 2017).

The one of main components of the smart city is the information and communication technology, especially the IoT ecosystem whose state of security is very poor and the cities must find ways to ensure an acceptable level of security and confidence in their use.

Short description of project / measure	Potential
<p>A smart security system should aim for security, physical security and citizen protection. The security system should be able to respond to the need to address critical situations such as natural disasters or terrorist attacks, incidents, identification of offenders, etc.</p> <p>Special attention is to be paid towards (private and confidential) data as required by local regulation and GDPR.</p>	<ul style="list-style-type: none"> Development of real time detection and response to cyber threats on vital infrastructure assets. Protection on all city IT assets A reference model for building a security system.
	Relevant actors
	<p>Mayor, the City of Zagreb, scientific and research centers and technical universities, CERT – National Computer Emergency Response Team, IT security vendors</p>
Benefit	References
<ul style="list-style-type: none"> Reliable protection system (confidentiality, integrity, availability) Higher confidence in service usage Continuous service availability Secure IT infrastructure Regulate and control the use of the system, including the applications, data and its infrastructure. Compliance with the law 	<p>Disaster Recovery Project - threat and vulnerability assessment of the most critical applications or IT systems of the City of Zagreb.</p> <p>Project Analysis of the Information and Communication System of the City of Zagreb - Analysis and status of compliance with ISO 27001 information security requirements.</p> <p>Feasibility study for the construction of a single data center of the City of Zagreb, Zagreb Holding Company and its affiliated companies.</p>



What current problem is the project trying to solve

Failure of ICT or one of its parts may produce serious cascade effects given that a small change in one system may have serious repercussions in another (especially in interconnected systems, IOT, etc.). Security Solution System must respond to:

- Bandwith consumption
- Incident management
- Proactive cyber security

It is very important to define who may access the infrastructure with corresponding rights to perform actions as well as how the different users interact.

Related indicators	Related action fields	Related impact factors
<ul style="list-style-type: none"> • Secure devices, systems, infrastructure and communications • Availability of services • Physical security of data centers and assets • Education of all stakeholders (internal and external) 	<p>Projects:</p> <ul style="list-style-type: none"> • Smart public lighting • Public safety (Security Cameras Monitoring Center) • Data platform implementation • All IT-related devices and assets 	<ul style="list-style-type: none"> • National Cyber Security Strategy, ((HR) - NN 108/15) • Regulation on Organizational and Technical Standards for Connecting to the State Information Infrastructure, ((HR) - NN 60/2017) • General Data Protection Regulation, ((EU) 2016/679)

DNA of Project

Job to get done (Goal)	Core value	Consortium
<p>The goal of the project is to develop information security model which will include planning, deploying and monitoring of all devices, infrastructure and communications required to ensure and maintain information security.</p> <p>Remote access to the infrastructure should be provided by using secure and reliable technology but particular care should be taken when optimizing access to information systems.</p> <p>Project is aimed at assessing the risks and consequences of attacks, identifying preventive and recovery measures and developing protection solutions to ensure security.</p> <p>In a nutshell, it is mandatory to ensure business continuity at all levels.</p>	<p>Ensuring an acceptable level of security is essential for continuous operation of the entire organization.</p> <p>Defining information security measures and procedures is necessary to ensure trust in the use of city e-services.</p> <p>Prevent increasingly intrusive cyber-incidents affecting municipal information systems.</p>	<ul style="list-style-type: none"> • IT city office • Academia - University of Zagreb • Scientific and research centers • CERT • IT Security Consultants/ Vendors • Service providers • Vendors



Minimum Viable Project

Must have
Security Information and Event Management, Information Security Incident Management Process, DLP - Data Loss Prevention, RMS - Rights Management services (prevent data leakage), Service Security Categorization, Data categorization.
Should have
Assessment and processing of information security risk.
Could have
Enterprise Mobility Management, Information Security Management Systems (ISMS) as defined in ISO27000, New security concepts (e.g. Blockchain) at proof-of-concept level.

Process

Activities to deliver the project goal	Technologies
<ul style="list-style-type: none"> • Developing adequate and timely detection and response mechanisms to cyber incidents. • Developing and implementing educational and awareness programs on cybersecurity • Measuring impacts created by cyber-incidents through simulations • Developing guidelines to protect smart infrastructures from cyber incidents • Detecting and responding to attacks • Enabling Secure Data Transfer protocols • Developing classification policy • Establishing a clear organization and defining responsibilities related to information security • Defining BCM strategies • Defining criteria for proclaiming incidents • Defining the process of solving incidents • Define the escalation procedure for dealing with incidents • Proactive monitoring and improving security 	<p>Physical security assets:</p> <ul style="list-style-type: none"> • Surveillance cameras • Security sensors <p>Hardware components:</p> <ul style="list-style-type: none"> • Smart switches/routers • Smart firewall appliances <p>Software components:</p> <ul style="list-style-type: none"> • High-end software firewall, AV and similar software • DLP software • RMS software

References

Similar projects	Products and tools
<ol style="list-style-type: none"> 1. Disaster Recovery Project - threat and vulnerability assessment of the most critical applications or IT systems of the City of Zagreb 2. Project Analysis of the Information and Communication System of the City of Zagreb - Analysis and status of compliance with ISO 27001 information security requirements 3. SmartImpact – Local Impacts from Smart City Planning (URBACT III 2014-2020) - Aimed at exploring and developing innovative management tools for municipalities to finance, build, manage and operate a smart city The network will develop approaches that support decision making, investments, management and maintenance of smart solutions to achieve the city’s development goals (2015-2018). 4. A feasibility study on the construction of City of Zagreb’s Data Center 5. City of Zagreb IT Development Strategy – Digital Transformation 	<ul style="list-style-type: none"> • Threats list that has been created in accordance with the ISO27005 standard • SIEM tools • ISO 27001/27002:2013 standard



Financing and investment

Project costs	
Staff	All City offices, Zagreb Holding Company and its affiliated companies Process owners, process managers and process users – process experts
Equipment	Existing Security Tools AntiVirus protections
Licenses	Existing + new licenses
Other costs	Contracting of consultants

Financing (EUR)			
	2018	2019	2020
Staff	16 000	16 000	16 000
Equipment	70 000	107 000	-
Licenses	135 000	160 000	187 000
Other costs	-	-	-
Total	221 000	283 000	203 000

Financing: OSCAR (Horizon 2020: DS-07- 2017 (IA))

Expected Outcomes

Measuring success	City vision	Beyond the city
<ul style="list-style-type: none"> Acceptable use of assets will be well defined in the assets policy which states all the acceptable risk levels especially for different types of users and internal staff Security-based framework architecture Well-planned contingency strategy Minimize human errors Ensure information security when using e-services Ensure unique security by applying a basic model to be used in all future and ongoing projects 	<ul style="list-style-type: none"> Building confidence in City's digital services. Change citizens' perception about using city services - consider them to be reliable and secure. Single security method cannot solve the security problem and many traditional and new technologies and strategies must be used to protect the system as a whole 	<ul style="list-style-type: none"> Regional security leader Drive innovation in technology adoptions (such as Blockchain) through Development Agency and/or Technology Park Zagreb



5.5 Intelligent Security Solution System: Civil Security – Data protection

	Transfer	
	New concept/solution	X
	Other	

Project Overview

Short description of the problem you try to solve

The protection of natural persons in relation to the processing of personal data is a fundamental right. Article 8(1) of the Charter of Fundamental Rights of the European Union (the 'Charter') and Article 16(1) of the Treaty on the Functioning of the European Union (TFEU) provide that everyone has the right to the protection of personal data concerning him or her- (REGULATION (EU) 2016/679 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 April 2016).

Short description of project / measure

A smart security system should aim for citizen security, citizen protection and protection of citizens' personal data.

Potential

It is essential to ensure measures of acceptable data and privacy protection of citizens and visitors of the City of Zagreb.

Relevant actors

Mayor, the City of Zagreb, scientific and research centers and technical universities, IT security vendors.

Benefit

- Reliable protection system
- Clear data security plan
- Education and awareness programs
- Security training
- User behavior analysis, tracking and alarm in case of anomalies
- Compliance with the law

References

Disaster Recovery Project - threat and vulnerability assessment of the most critical applications or IT systems of the City of Zagreb.

Project Analysis of the Information and Communication System of the City of Zagreb - Analysis and status of compliance with ISO 27001 information security requirements.

Feasibility study for the construction of a single data center of the City of Zagreb, Zagreb Holding Company and its affiliated companies.



What current problem is the project trying to solve		
<p>It is very important that data security plan must be compliant to the General Data Protection Regulation (GDPR), and that all data have clearly defined ownership, purpose and legitimacy.</p> <p>Security Solution System must respond to:</p> <ul style="list-style-type: none"> • Privacy issues • Data ownership • Incident management 		
Related indicators	Related action fields	Related impact factors
<p>Information security control must include four review methods:</p> <ul style="list-style-type: none"> • Examination (system and data specification) • Interviewing (a level of understanding of the security control) • Testing (review objects under specified conditions to compare actual with expected behavior) • Monitoring/Reporting 	<ul style="list-style-type: none"> • Alignment of City of Zagreb's information systems with the GDPR • Information and Communication System of the City of Zagreb – Penetration testing 	<ul style="list-style-type: none"> • National Cyber Security Strategy ((HR) - NN 108/15) • Regulation on Organizational and Technical Standards for Connecting to the State Information Infrastructure ((HR) - NN 60/2017) • General Data Protection Regulation ((EU) 2016/679)

DNA of Project

Job to get done (Goal)	Core value	Consortium
<ul style="list-style-type: none"> • In accordance with all the compliance requirements: ensure compliance with a number of regulations and obligations such as personal data protection in accordance with the General Data Protection Regulation (GDPR) • Identify internal measures and controls to ensure compliance, easily document control execution and establish regular efficiency assessments and report to the respective authorities • Identify the affected organizational units, processes and IT systems • Reduce auditing efforts and ensure confidence with clearly defined responsibilities 	<p>Provide education on information security.</p> <p>Promote awareness on information security threats.</p> <p>Promote importance of data security as one of the key core values of City administration.</p>	<ul style="list-style-type: none"> • City's IT office • Academia - University of Zagreb • Scientific and research centers • IT security consultants/vendors • Service providers • Vendors



Minimum Viable Project

Must have
<p>Regulatory compliance</p> <p>DLP - Data Loss Prevention</p> <p>RMS - Rights Management Services (prevent data leakage)</p> <p>Data access control</p> <p>Addressing security issues</p> <p>Security & Privacy policy</p> <p>Data Protection Impact Assessment – DPIA</p>
Should have
<p>Assessment and processing of information security risk.</p> <p>Organization's technical security controls should be defined, documented, implemented and maintained according to technical security standards.</p>
Could have
<p>ISO/IEC 27000:2009, Information technology – Security techniques – Information security management systems.</p>

Process

Activities to deliver the project goal	Technologies
<ul style="list-style-type: none"> • Enabling Secure Data Transfer protocols • Developing classification policy • Establishing a clear organization and defining responsibilities related to information security and data protection • Defining criteria for proclaiming incidents • Defining the process of solving incidents • Deploying security measures to prevent unauthorized access to data in each processing step • Describing information flow • Identifying data protection and related risks • Identifying data protection solutions to reduce or eliminate risks • Integrate data protection solutions into each project • Indicators that will help us measure project success are: <ul style="list-style-type: none"> • Compliance with legal requirements concerning data security • Elimination of identity theft and protection of privacy 	<p>Software components:</p> <ul style="list-style-type: none"> • DLP software • RMS software • Use of widely recognized automated tools

References

Similar projects	Products and tools
<ol style="list-style-type: none"> 1. Feasibility study for the construction of a single data center of the City of Zagreb, Zagreb Holding Company and its affiliated companies. 2. City of Zagreb IT Development Strategy – Digital Transformation 	<ul style="list-style-type: none"> • SIEM tools • ISO 27001/27002:2013 standard



Financing and investment

Project costs	
Staff	All City offices, Zagreb Holding Company and its affiliated companies Process owners, process managers and process users - process experts
Equipment	Existing IT Platforms Implementation of key security technologies
Licenses	Existing + new licenses
Other costs	Contracting of consultants

Financing (EUR)			
	2018	2019	2020
Staff	16 000	16 000	16 000
Equipment	70 000	27 000	27 000
Licenses	27 000	27 000	14 000
Other costs	70 000	27 000	27 000
Total	183 000	97 000	84 000

Financing: OSCAR (Horizon 2020: DS-07- 2017 (IA))

Expected Outcomes

Measuring success	City vision	Beyond the city
<ul style="list-style-type: none"> Respect data privacy when sharing information Manage data conscientiously Compliant with the General Data Protection Regulation (GDPR) 	Data is obtained, held and disclosed lawfully and data access is confined to those with specified authority to view and/or change the data.	Lead by example and set standards which are to be adopted by other local and regional governments as well as those on the national level.

5.6 zAgl - Virtual City Officer

	Transfer	
	New concept/ solution	X
	Other	

Project Overview

Short description of the problem you try to solve

We live in a data-driven world. Smart city is all about transforming data into actionable information. Smart city is expected to act in (near-) real time, whether it is existing data contained in our databases or data being constantly generated owing to a growing number of new sources (general public, social media, sensors, etc.). In addition; we are also expected to utilize artificial intelligence capabilities to gain deeper understanding of our business and our customers – citizens.

In order to do so, we must be fast and agile. We must work with flexible data platform solutions that provide a consistent experience across platforms and, at the same time, drives the innovation for better citizen e-services.

Short description of project / measure

Utilize (hybrid) Cloud solutions to drive deeper data insight and modern e-services for citizens. Create AI-based personalized solutions for citizens and integrate those solutions into “regular” communication channels.

We would develop “zAgl - Virtual City Officer”, AI-based BOT which would be at citizens’ service 24/7.

Potential

zAgl’s initial scope will cover 2 most relevant cases for interaction with citizens and will be implemented only through website www.zagreb.hr. Further potential includes extension towards other topics as well as implementation via website MojZagreb web and a mobile platform.

Relevant actors

The City of Zagreb, Zagreb Holding, Technology Park Zagreb, Development Agency Zagreb, app development partners

Benefit

- Better understanding of citizens’ needs
- High-level quality e-services for citizens and businesses
- Personalized experience based on real data insights

References

- Gartner Technology Megatrends – AI Everywhere
- EY – Future of Smart
- City of Zagreb IT Development Strategy – Digital Transformation



What current problem is the project trying to solve

Citizens expect and demand that the City, state institutions, local and regional governments provide new types of services. They expect new and modern ways of communication with the state and local authorities; similar to communication they have with their friends.

They also expect real-time highly personalized type of communication.

zAgl would offer:

- Virtual private City Officer – private assistant which may be used any time, any place and from any type of device
- Increased level of satisfaction with city operations
- Higher level of inclusion in everyday decision-making process

Related indicators	Related action fields	Related impact factors
<ul style="list-style-type: none"> • Number of unique zAgl users • Average time to address citizens' issues/questions • Public perception indicators (FB, general media, etc.) 	<ul style="list-style-type: none"> • City of Zagreb Development Strategy – ZagrebPlan • City of Zagreb IT Development Strategy – Digital Transformation 	<ul style="list-style-type: none"> • City of Zagreb to be recognized as e-services leader in Croatia and the region

DNA of Project

Job to get done (Goal)	Core value	Consortium
<p>The goal of this project is to utilize different existing and new data sources through modern technology solutions, such as artificial intelligence by developing zAgl - Virtual City Officer.</p>	<p>Ensure city service 24/7 for all citizens and business in the City of Zagreb.</p> <p>Drive citizens participation in everyday city life.</p> <p>Drive modern technology adoption within Local governments.</p> <p>Be a role model for local governments in Croatia and the region.</p>	<p>City of Zagreb – City Office for Strategic Planning and Development of the City</p> <ul style="list-style-type: none"> • Define business cases and user scenarios <p>City of Zagreb – IT Department</p> <ul style="list-style-type: none"> • Define technology model for developing zAgl • Manage project development activities • Manage internal and external resources <p>Zagreb Holding Company – Marketing Department</p> <ul style="list-style-type: none"> • Additional input for business cases <p>Technology Park Zagreb/ Development Agency Zagreb</p> <ul style="list-style-type: none"> • Ensure R&D capabilities and resources for developing zAgl <p>App Development partners</p> <ul style="list-style-type: none"> • Consulting/development of zAgl

Minimum Viable Project

Must have
Proof of Artificial Intelligence concept for Smart Cities for, at least, one scenario (e.g. employment), implemented via www.zagreb.hr
Should have
<p>Additional scenarios covered with a clearly defined plan for further extensions towards:</p> <ul style="list-style-type: none"> • Zagreb Holding Company website (www.zgh.hr) • MojZagreb web portal (moj.zagreb.hr) • MojZagreb mobile app



Could have

Solution could serve as a personal assistant not only for the citizens and businesses of the City of Zagreb but also for tourists.

In addition, solution could be white labeled so it could be utilized across Croatia and the region.

Process

Activities to deliver the project goal	Technologies
<ul style="list-style-type: none"> • Well-defined scope • Operational / actionable intelligence over data at rest, as well as over-changing data in real-time • Implement word processing models based on “machine learning” concepts • Define visual presentation layer • Training BOT 	<p>Microsoft Azure Bot Service</p> <p>Cognitive services:</p> <ul style="list-style-type: none"> • Vision • Language • Speech • Search

References

Similar projects	Products and tools
<p>Since we are applying leading-edge technologies in Smart Cities concepts (BOT, Artificial Intelligence, etc.), there are very few references which could be utilized.</p> <p>We should provide more reference to great technology trends as seen by technology trend-setters and analysts and applying them into real-life scenarios.</p>	<ul style="list-style-type: none"> • Microsoft Azure • Microsoft Azure Bot Service • Microsoft Visual Studio • iOS and Android development tools

Financing and investment

Project costs	
Staff	IT sector and key stakeholders from Zagreb Holding Company Process owners, process managers and process users
Equipment	Existing Azure capabilities
Licenses	Existing + new licenses
Other costs	Contracting of consultants Contracting of developers with adequate knowledge and skills



Financing (EUR)			
	2018	2019	2020
Staff	16 000	16 000	16 000
Equipment	-	-	-
Licenses	1 400	2 700	5 400
Other costs	11 000	22 000	22 000
Total	28 400	40 700	43 400

Financing: Horizon 2020, EU Structural Funds, key technologies, vendor's investment in initial Proof-of-Concept

Expected Outcomes

Measuring success	City vision	Beyond the city
<ul style="list-style-type: none"> Create BOT service which will cover 3 most searched terms from the City of Zagreb's web Get at least 1000 unique users of BOT within first 6 months of implementation Offload at least 10% of search queries within the given BOT topics from web to BOT 	<p>Proof of usage of AI in city-driven processes.</p> <p>Build new BOT scenarios based on initial outcomes of zAgl project.</p>	<p>Position the City of Zagreb as a regional leader in creating the innovation culture.</p> <p>Help other users, even outside local and regional government institutions to leverage advanced technologies.</p>

5.7 Process improvement of management portfolio services of Zagreb Holding

	Transfer	
	New concept/solution	X
	Other	

Project Overview

Short description of the problem you try to solve

Analyzing the current situation, it has been determined that subsidiaries, companies, and institutions of Zagreb Holding use IT systems that have been developed on various technologies and databases that are up to 30 years old. This, in many cases, outdated technology often does not allow efficient data processing or new system improvements, as well as integration and data exchange with other systems. Furthermore, an exceptional heterogeneity of existing IT systems has been identified, which is confirmed by the fact that there are 30 IT systems and a very large number of databases including user data (personal data), based on different processing. The systems are not linked, and data are different from system to system and are often entered for the same customer/user.

An analysis of the current situation shows the need for a systematic approach to the service management issue, data consolidation and communication to users/payers/customers, i.e. the establishment of a unique Platform, but it also identified necessary preconditions for the establishment of the above-mentioned Platform. Firstly, they are the MDM (master data management) and application and system integration, which provide data exchange and enable a more effective process and data stream.

Short description of project / measure

The Zagreb Holding group (hereinafter ZGH) provides a wide range of services on a daily basis to citizens, entrepreneurs, and visitors of Zagreb – the users of Zagreb Holding services. Encouraged by actual trends and ever-increasing opportunities for development and improvement of services and the existing bad state of the IT system, it is evidently necessary to initiate a project to improve the service portfolio management process, master data, as well to improve existing IT systems and build the so-called unique Platform.

The Unique platform of Zagreb Holding will be the new central IT service management platform and service user system, and it will serve for the development of new digital communication channels for data presentations and interactive communication to all users of utility, energy and other services of the ZGH group, considering existing e-Systems and portals that are already developed in individual members of the Group or the City of Zagreb.

Potential

Zagreb Holding will achieve more efficient work by eliminating the need for long-term accomplishment of operational tasks and focusing on the development and realization of strategic goals. Focusing the Group on developing the City of Zagreb by making decisions based on timely and high-quality information.

Relevant actors

- The Zagreb Holding group – subsidiaries, companies and institution
- Local governments bodies
- Users / citizens and business users of the service



Benefit	References
<p>For users/customers of Zagreb Holding, a unique Platform would primarily ensure:</p> <ul style="list-style-type: none"> • Digital communication to service users • Overview of all necessary information about services that are provided by the Zagreb Holding Group (subsidiaries and affiliated companies in one place) • Activation and deactivation of certain services (where applicable) • Overview of all services and payment of debt due using modern digital technology and channels • Central registry of master data management and a faster transaction system 	<ul style="list-style-type: none"> • Introducing a Document management system • Introducing of unique Human resources management and payroll statement software • Register and Single pay slip (JUP)/ Single Utility Bill • Featured Capital Infrastructure projects – Construction of a fiber optic distribution network in Zagreb in city block Vrbani III

What current problem is the project trying to solve
<ol style="list-style-type: none"> 1. Exceptional heterogeneity of business activities and IT systems – portfolio of 52 activities and the outdatedness of IT system 2. Unevenly focusing on the user/payer/customer – thus far in the development of the IT system, the focus was on the facility/measuring point, which means that the same person was registered as a customer several times and would receive several invoices for several facilities (e.g. for a garage and an apartment). On the one hand, this is a consequence of technological limitations, and on the other hand, of focusing on the measuring point as a central object rather than on the user/payer/customer. 3. Saturation with many uncoordinated projects related to technological changes with no visible results and progress – interviews identified saturation with various attempts related to data cleaning, establishing of a single registry, Single Utility Bill, and numerous other projects from the past that are more or less related to the area which is the subject of the unique Platform study. 4. IT systems are not very well connected, making working difficult – Call Centre employees use 10 different IT systems to provide information to customers. 5. The lack and dispersion of information - information about the actual situation in the City of Zagreb, published on the website sada.zgh.hr, are collected by searching the websites of subsidiaries and companies or by copying received notifications from e-mails and faxes without the establishment of standardized exchange information processes and their publication. 6. Incompatibility and decentralization of communications channels. 7. Incompatibility and non-standardization in planning and managing of IT systems – each subsidiary and affiliated company plans and procures IT solutions separately, without prior coordination and ensuring of interoperability. 8. Very bad quality of master data – the established common Register of master data, is not a real register because there are data i.e. subjects / objects (3 subjects) and data about the users in the Register are only partially integrated, and the rest of the master data occur in over 30 IT systems. Furthermore, systematic management of master data has not been established – procedures and rules for editing master data (entry, modification, deleting), but each subsidiaries and affiliated company collects and processes data in their own way. This causes the problem of data quality, redundancy and incomplete data. 9. GDPR – customer master data/customers are located in dozens of databases, which represent more spending time on updating the same data and a large financial and regulatory RISK from the aspect of the GDPR regulation, i.e. identification, classification, and protection of personal data.

Related indicators	Related action fields	Related impact factors
<ul style="list-style-type: none"> • Data transparency • Rationalization of operating costs • Reduction of time spent on analysis • Faster information flow 	<ul style="list-style-type: none"> • Zagreb Urban Agglomeration Development Strategy • Zagreb City Development Strategy • E-Croatia 2020 Strategy • Croatian Strategy for the Development of Public Administration for the period from 2015 to 2020 	<ul style="list-style-type: none"> • European Interoperability Framework (EIF); COM (2017)134 • Croatian Strategy for the Development of Public Administration for the period from 2015 to 2020 (OG 70/15)

DNA of Project

Job to get done (Goal)	Core value	Consortium
<p><u>Development and introduction of e-Platform through phases:</u></p> <p>Phase 0 – Data cleaning – a necessary pre-phase or precondition for the success of the unique Platform project. The estimated duration is at least 6 months before the beginning of the project and at least 6 months in the first phase of the project.</p> <p>Phase 1 – Development and implementation of MDM system and registries – this is the key phase of the overall implementation of the platform, because the establishment of MDMs and unique registers is the base of all future systems. The estimated duration is 12 months.</p> <p>Phase 2 – Development and implementation of the portal My ZGH – includes development of a public portal with information about all services of the Zagreb Holding group and a User portal which can be accessed after login through the NIAS system and which allows users access to all contracted services. It also includes submitting of counter status, complaints, submitting requests for master data changes, and enables communication with Zagreb holding through the user inbox. The estimated duration is 9 months, starting at 3 months after the beginning of Phase 1.</p>	<ul style="list-style-type: none"> • Provides citizen and economic operators information about all available services of Zagreb Holding through one central place • It represents a central communication place for all digital communication channels, which are centered around the user and, not Zagreb Holding organizational structures; • It represents a central place for collecting and accessing master data, in which all other systems of Zagreb Holding Group are integrated as well, and which use master data of users, subjects, and services; • It represents a central place of checking debit, payments, and enforcements related to a single user and all connected facilities; • Allows total payment of invoices and on-line payment; • Includes web and mobile application; • Allows identification and authorization through the NIAS system; • Integrating business and information systems and enabling integrated view of all services to citizen; • Exchanging data with systems from the environment; • Modular design and scalability; 	<p>Zagreb Holding Group:</p> <ul style="list-style-type: none"> • Management Board of Zagreb Holding – sponsor • IT department of Management - project holder, project coordinator • Subsidiaries, companies, institution – IT department, other ancillary offices (for public procurement, finance, etc.) • Consultant



<p>Phase 3 – Development and implementation of on-line payments – the final phase of platform development in the first development stage, during which the platform should be integrated with the IPG system and enable the user to generate a HUB 3 payment document with a 2d bar code, with selection of items which the customer wants to pay, and on-line card payment, with a minimum choice of 4 banks which are providing the above-mentioned service in Republic of Croatia. The estimated duration is 6 months, starting at 6 months after the beginning of Phase 2</p>	<ul style="list-style-type: none"> • It assumes clear ownership and management of all platform elements and implemented services; • Use of standards, which enables secure and precise data exchange between systems. 	
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Minimum Viable Project

<p>Must have</p>
<ul style="list-style-type: none"> • Strong support from top management in the implementation of changes, which is propagated in all organizational units and refers changing obsolete practices and methods of work with new ones - integration and standardization. • It is necessary to systematically clean data and define standards and data management processes so that it could be possible to access the implementation of any system, including platforms. Cleared and standardized processes are the basis for all business improvement projects. • Cleaning data without having a central system that will manage the data and ensuring that processes are implemented in standardized way will not lead to the wanted results. Therefore, it is necessary to implement the processes and MDM system into all Zagreb Holding subjects and central registers of key elements – customers, subjects, and services so that it could be easy to see all information for a single customer at one place at the level of Zagreb Holding. • A phased approach to project realization which includes implementation of the platform from basic to advanced functionality and a set of services, depending on their complexity. • Defining authority and availability of information to everyone in the chain. • Human resources. • Respecting deadlines. • Establishing a unique master data register of customers, subjects, and services to which all other IT systems in whole Zagreb Holding Group are connected. • Established safety standards.
<p>Should have</p>
<p>Unique information system of Zagreb Holding and all related subsidiaries and companies Connectivity to national systems:</p> <ul style="list-style-type: none"> • Central State Portal System (Gov.hr) • National Identification and Authentication System (NIAS) • Personal User Inbox System
<p>Could have</p>
<p>Connectivity to European systems in areas of work.</p>



Process

Activities to deliver the project goal	Technologies
<p>Phase 0 – Data cleaning – a necessary pre-phase or precondition for the success of the unique Platform project. The estimated duration is at least 6 months before the beginning of the project and at least 6 months in the first phase of the project.</p> <p>Phase 1 – Development and implementation of MDM system and registries – this is the key phase of the overall implementation of the platform, because the establishment of MDMs and unique registers is the base of all future systems. The estimated duration is 12 months.</p> <p>Phase 2 – Development and implementation of the portal My ZGH – includes development of a public portal with information about all services of the Zagreb Holding group and a User portal which can be accessed after login through the NIAS system and which allows users access to all contracted services. It also includes submitting of counter status, complaints, submitting requests for master data changes, and enables communication with Zagreb holding through the user inbox. The estimated duration is 9 months, starting at 3 months after the beginning of Phase 1.</p> <p>Phase 3 – Development and implementation of on-line payments – the final phase of platform development in the first development stage, during which the platform should be integrated with the IPG system and enable the user to generate a HUB 3 payment document with a 2d bar code, with selection of items which the customer wants to pay, and on-line card payment, with a minimum choice of 4 banks which are providing the above-mentioned service in Republic of Croatia. The estimated duration is 6 months, starting at 6 months after the beginning of Phase 2.</p>	<ul style="list-style-type: none"> • MDM system • ESB – enterprise service bus based on SOA architecture • XML (engl. Extensible Markup Language) • Web Services • HTTP, HTTPS, Mail, File system, FTP, Message queue • The used technology supports all types of integration through APIs and/or services. Technology (HW, SW, Infrastructure) is not limited to manufacturers but with its functions and specifications (openness, integration, interoperability, support, etc.) • HW equipment

References

Similar projects	Products and tools
<ul style="list-style-type: none"> • My account of City Gasworks - Supplies • My VIO of Water supply • JUP – Single Pay Slip (JUP)/ Single Utility Bill – obtaining the Single utility bill in electronic form • Web platform sada.zgh.hr https://sada.zgh.hr/ • Mobile application “My Zagreb” • Zagreb Holding call centre • Zagreb Holding mobile centre • E-Citizen Project of the Croatian Government for faster communication between citizens and public administration bodies 	<ul style="list-style-type: none"> • Data Governance Management • Development Tools • Infrastructure management - ITIL guidelines



Financing and investment

Financing (EUR)
1. Investment plan for 2018 – 470 000 EUR Investment plan for 2019 – 670 000 EUR The aforementioned investment refers to licenses + custom development
2. Procurement of hardware equipment: estimated at 670 000 – 1 070 000 EUR (server + publishing application portal) 3. Working hours of Zagreb Holding employees are estimated at 670 000 EUR (for 2 years)
Financing: The cost is planned from own funds/loans and potentially from ESI funds, CEF DIGITAL (CEF TELECOM), Horizon 2020

Expected Outcomes

Measuring success	City vision	Beyond the city
<ul style="list-style-type: none"> Establishment of a unique source of data at the level of the Zagreb Holding Group – consolidated recapitulation of service – all in one place Reduction of requests of personal contact because everything will be available online – reduction of processing costs Increase of collected payments Shorter data access time 	The vision of a Smart city is achieved through smart e-Management. The goal is to minimize the need for using paper documentation and turn to electronic communication with users. Make Zagreb Holding a reliable digital location so that users can fully trust it.	Smart management i.e. e-government shall achieve more efficient planning of own resources for all stakeholders accomplished through key economic, social, and ecological aspects. Improvement of communication between Zagreb Holding and market organizations interested in creating sustainable market solutions for social and environmental challenges. Cooperation on a formal and informal strategy of mutual engagement.



5.8 Development of new smart city models within the Energy Atlas

	Transfer	
	New concept/solution	X
	Other	

Project Overview

Short description of the problem you try to solve	
Lack of information for sustainable management of natural resources and energy for improving spatial quality and function of the City and enhancing the Development management system. It will focus on developing smart solutions, cost-effective energy services for different customer groups and energy consumers.	
Short description of project / measure	Potential
The Energy Atlas (EA) is an interactive tool that connects the spatial characteristics of energy consumption and visually displays them on the city level. Those displays show energy infrastructure (heating, gas, electricity) and energy consumption centers which enable energy distributors and infrastructure owners better planning of the construction of the required capacity. According to the spatial planning aspect, the energy atlas enables identification of objects and city districts that are suitable for energy renovation or urban areas which provide the option for using renewable energy sources.	The data available through the energy atlas will enable the city administration to better coordinate and meet its obligations to monitor energy consumption and improve energy efficiency in the city of Zagreb. The established system will provide the ability to easily report on the implementation of the activities as defined in the initiatives and documents, i.e. help to meet the requirements and reporting.
Relevant actors	
City Office for Economy, Energy and Environmental Protection, City Office for Strategic Planning and Development, City Office for Physical Planning, Construction of the City, Utility Services and Transport, City Office for Cadastre and Geodetic activities, Hrvatska elektroprivreda (HEP Group), Zagreb City Gasworks Zagreb, Zagreb Holding, Energy Institute Hrvoje Požar, IT departments and partners	
Benefit	References
EA is one of the tools for implementing energy transition. It contributes to the achievement of three of the six strategic development goals defined in City of Zagreb development strategy for the period up to 2020: <ul style="list-style-type: none"> - C3 Environmental protection and sustainable management of natural resources and energy - C4 Improving Spatial Quality and City Functions - C6 Improving the development management system 	Amsterdam, Netherlands: https://maps.amsterdam.nl/ Vienna, Austria: https://www.wien.gv.at/umweltgut/public/ Los Angeles, USA: http://www.energyatlas.ucla.edu/ Vermont, USA: http://www.vtenergydashboard.org/energy-atlas



What current problem is the project trying to solve		
<ul style="list-style-type: none"> planning the development of electrical, gas, heat and water distribution networks efficient CO2 emissions monitoring planning and implementing measures to reduce CO2 emissions throughout the city 		
Related indicators	Related action fields	Related impact factors
<ul style="list-style-type: none"> Database of consumption of energy sources and water that are connected to the spatial unit Spatial units which contain key data such as number of apartments in the building, number of household members etc. Use of energy consumption by purpose <p>Energy Efficiency indicators</p> <ul style="list-style-type: none"> total annual energy savings total annual CO2 reduction 	<ul style="list-style-type: none"> IAP project: SmartLighting project Other Smart city initiatives Energy Efficiency projects 	<p>Collecting data about networked power sources and water consumption with a spatial setting at the lowest spatial level that guarantees privacy protection. Through the project, it will be necessary to modify a unique space that can be a building, block/complex of buildings, city neighborhood or city district.</p> <p>Infrastructure - the project represents a tremendous change in the existing infrastructure; infrastructure solutions that haven't been produced or used.</p>

DNA of Project

Job to get done (Goal)	Core value	Consortium
<ul style="list-style-type: none"> Creation of a database of specific consumption of cross-linked energy sources and water with a spatial reference (at the lowest spatial level) Collecting data and establishing a database on the consumption of cross-linked energy sources with a spatial reference Creation of database with key features of individual facilities (household sector, services, industry) Creation of database of energy consumption in traffic Defining a data record for geographic display of available data Collecting data and establishing a database on the consumption of cross-linked non-energy sources with a spatial reference Defining and verification of questionnaire and energy consumption logs Carried out initial analyzes of respondents and all devices placed 	<p>The main objectives of the project are achieved by an analysis of collected data, their interpretation and placing them in a temporal, economic and spatial context. Total energy consumption forecast will be generated by the projection of a consumption model for a period up to 2050 including spatial, economic, and social development indicators. Scenario analysis or results and indicators of energy consumption will be compared and modified with the projected consumption that is presented in the network development plans for the power, gas, and heating in the area of the City of Zagreb, which have been created independently by the energy companies.</p> <p>Planned analyzes are the basis for planning and decision making in spatial planning and urban development of the city.</p>	<p>City Office for Economy, Energy and Environmental Protection, City Office for Cadastre and Geodetic activities, Energy Institute Hrvoje Požar</p>



Minimum Viable Project

Must have
Defining an optimal model for the Energy Atlas of the City of Zagreb, on the consumption of cross-linked energy sources and water at the lowest possible spatial level, which guarantees the protection of data privacy.
Should have
Forecast of total energy consumption in Zagreb by using a consumption projection model taking into account spatial, economic and social development guidelines for the period until 2050.
Defining optimal model for the Energy Atlas that includes implementation of additional smart services to optimize energy consumption.
Could have
Analysis of energy consumption in the transport sector.
Identifying key energy consumption bearers and their structured grouping in accordance with requirements of internationally recognized models.

Process

Activities to deliver the project goal	Technologies
<ol style="list-style-type: none"> Establishing a spatial database on energy consumption Collection of available data is needed for the implementation phase of the project and it establishes communication with relevant stakeholders and interested parties. It is primarily related to the collection of databases on consumption of electricity, natural gas, heat, and water from relevant business entities, energy performance data, energy efficiency projects or various statistical sources of data, as well as the planned demographic and economic development data of the City of Zagreb and other collectible data. Research and projection of energy consumption In this phase of the project, a household energy consumption survey will be conducted on a sample size of 3,000 households and a survey on energy consumption in the service sector on a sample size of 1,000 business entities. The survey will contain about eighty questions that cover issues related to the characteristics of residential buildings, household appliances, ways of energy use (heating, cooking, hot water) and socio-economic aspects of living. Consumption characteristics will be analyzed using two methodological approaches. The first approach will provide a detailed analysis of each household, owned appliances and types of heating. An electricity meter reading and keeping an energy diary will be conducted at weekly intervals. The second approach will provide an electricity meter reading set in selected households and business entities. In both cases, consumption will be measured for a period of one year. 	<p>Instruments for measuring energy consumption in households and business entities with the ability to create energy consumption logs in these facilities and a list of characteristics of the participants in the research.</p>



<p>3. An analysis of energy consumption in transportation</p> <p>In order to provide a detailed presentation of energy consumption and emission of air pollution from transport, traffic will be counted on some specific streets. In addition, energy consumption as well as vehicle structure will be determined. A model of consumption by vehicle category and spatial energy consumption in traffic will be created.</p> <ul style="list-style-type: none"> • Development of spatial database and information system • Design and implementation of measurement, modeling and analysis tools • The use of EA outputs for research and forecasting of energy consumption 	
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References

Similar projects	Products and tools
<ul style="list-style-type: none"> • Amsterdam, Netherland: https://maps.amsterdam.nl/ • Vienna, Austria: https://www.wien.gv.at/umweltgut/public/ • Los Angeles, USA: http://www.energyatlas.ucla.edu/ • Vermont, USA : http://www.vtenergydashboard.org/energy-atlas <p>The creation of the Energy Atlas of City of Zagreb in synergy with numerous domestic and international projects such as:</p> <ul style="list-style-type: none"> • i-Scope (solar atlas and noise atlas); • Urban Learning (integrated spatial and energy planning); • Ele.C.Tra (electric car charging); • ZagEE (energy efficiency measures and renewable energy sources projects in the City of Zagreb) • IAP SmartLighting Project 	<p>Spatial database with energy data Energy Information System (EIS) Geoportal of Zagreb Spatial Data Infrastructure Information system with monitoring, analysis and forecasting functionality Infrastructural elements, smart technology products (system, sensors...)</p>

Financing and investment

Project costs
<p>The total cost of all EIHP preparatory activities from the city budget is EUR 2 million with 20 % financed by EIHP via its scientific infrastructure (tools, methodology, equipment etc.)</p> <p>Duration of the project: 2 years through three developing phases.</p>

Financing
<p>City budget, Energy Institute Hrvoje Požar using scientific infrastructure (tools, methodology, equipment etc.), European structural and investment funds, European Commission programmes (Horizon 2020 etc.)</p>

Expected Outcomes

Measuring success	City vision	Beyond the city
<ul style="list-style-type: none"> • Spatial database of the Energy atlas • Contribution to the achievement of targets set in City strategy: <ul style="list-style-type: none"> • greenhouse gas reduction by 40% by 2030 • 27% of RES in energy consumption • 27% of energy savings compared with consumption without application of measures (defined by the Energy Efficiency Act and the City of Zagreb Development Strategy for the period up to 2020) 	<p>The data available through the energy atlas is related to fulfillment of requirements and reporting under the Covenant of Mayors, according to activities specified in the Action Plan for Sustainable Development of the City of Zagreb. The project is connected with the City of Zagreb Development Strategy and Strategy Framework for the smart city which is being drafted. The EA project as a part of the IAP, one of the instruments for implementation and energy transitions, will contribute to the vision of an innovative and smart city of Zagreb and to contribute to the achievement of the strategic development goals defined in the City of Zagreb Development Strategy, such as: environmental protection and sustainable management of natural resources and energy, improving spatial quality and function of the City and enhancing the Development management system. It will focus on developing smart solutions, cost-effective energy services for different customer groups and energy consumers.</p>	<p>The project helps to raise awareness of the need of implementing measures related to energy efficiency, but also related to the implementation of Smart city initiatives. It has a high replication potential in other parts of the country. This project can be used as a model for other similar projects (application and development of advanced technologies and solutions that haven't been used).</p>



5.9 Digital Stream Zagreb

	Transfer	
	New concept/ solution	X
	Other	

Project Overview

Short description of the problem you try to solve	
User-centered open innovation ecosystem that will foster collaborative and inclusive intersectional innovation procurement and the development of complete product and services solutions with and for SMEs and citizens.	
Short description of project / measure	Potential
DIGITAL STREAM ZAGREB, a user-centered open innovation ecosystem that will foster collaborative and inclusive intersectional innovation procurement and the development of complete product and services solutions with and for SMEs and citizens. It acts as an urban incubator and accelerator for commercialization of innovation. Digital Stream Zagreb (DSZ) as a smart urban value chain connects local government authorities and public entities with scientific and research institutions, academia, SMEs, large enterprises, NGOs and citizens at the center of co-creation process.	Innovation activities, concerned with identifying opportunities for digitalization, and developing and validating innovative solutions based on cutting-edge technology; Business development, concerned with helping companies to apply their solutions, assess the business implications, and manage the resultant changes; and Skills creation, concerned with building innovation capacity through enriching human capital.
	Relevant actors
	The City of Zagreb, Development Agency Zagreb – TPZ d.o.o., S&R institutions, Large companies and SMEs, Academia & RTOs (Research and Technology Organisations) and Citizens.
Benefit	References
Digitalization as a city-wide transformation process that enables the City not just to identify technical and technological solutions, but to directly finance and nurture the innovations ecosystem to a level that they may actually be implemented within the city and contribute to improved competitiveness and better quality of life for the citizens.	<ul style="list-style-type: none"> Supporting the development of network of BSOs – ERDF HAMAG-BICRO (2017/11-2018/11) OP Competiveness and Cohesion - Development of business infrastructure (BRI) (2017/6-2019/6)



What current problem is the project trying to solve

Encourage cooperation and flow of knowledge between business, the public, and the scientific and research sector.

Strengthening human resources for innovation and helping create an appealing environment for researchers, entrepreneurs and citizens.

Related indicators	Related action fields	Related impact factors
The Innovation Output Indicator (IOI) TEA index representing the number of entrepreneurially active people	<p>Activities:</p> <ul style="list-style-type: none"> Expansion of Technology park Zagreb Formalizing Digital Stream Zagreb consortium Building human capacities within DSZ Application and full membership participation within European Network of Living Labs (ENoLL) and Smart Cities and Communities (EIP-SCC) <p>Projects:</p> <ul style="list-style-type: none"> Supporting the development of network of BSOs – ERDF; some funds will be ensured from HAMAG-BICRO Croatian Agency for SMEs, Innovations and Investments (2017/11-2018/11) 2.09 mil € are ensured from OP Competiveness and Cohesion - Development of business infrastructure (BRI) for building and maintaining the infrastructure, acquiring machines and equipment, and employment of qualified personnel. (2017/6-2019/6) 	<p>Digital Agenda for Europe 2020</p> <p>e-CROATIA 2020 STRATEGY</p> <p>The Strategy for innovation encouragement of Croatia 2014-2020</p> <p>Regional Development Strategy of the Republic of Croatia for the period until the end of 2020</p> <p>Croatian Strategy for the Development of Public Administration for the period from 2015 to 2020</p> <p>Croatian National Social Welfare Strategy for the Elderly 2017-2020</p>

DNA of Project

Job to get done (Goal)	Core value	Consortium
<p>Our vision is to create a central hub for innovative solutions, and enable faster development i.e. co-development between different players in selected industry segments.</p> <p>DSZ as a user-centered open innovation ecosystem that will foster collaborative and inclusive intersectional innovation procurement and the development of complete product and services solutions with and for customers.</p>	<p>DSZ operations are focused on the wider agglomeration area of the City of Zagreb and specialized on the well-being and healthcare for the elderly, development of smart mobility solutions and services, usage of smart contracts and distributed ledger technology and other similar KET based solutions in digitizing procedures of innovation procurement, creation and development of IoT open data cross-fertilization platform and market fit digital forensics and cyber security solutions and services. We are targeting at least 100 SMEs and 1000 people through educational programs within 3 y. plan through various programs such as our smart city “no equity” pre-acceleration program SFZGB. Also, we already have a commitment from large Croatian enterprises for cross-industry innovation contracted R&I schemes.</p>	<ul style="list-style-type: none"> The City of Zagreb Development Agency Zagreb – TPZ d.o.o. Zagreb University of Applied Sciences -TVZ BICRO-BIOCENRE Ltd. Ruder Innovations Ltd. Ericsson Nikola Tesla d.d. Cooperative for Ethical Financing - eBank



Minimum Viable Project

Must have
The greatest challenges as we see them are: bringing together all relevant stakeholders in high-tech (especially in bio-based technology and healthcare) industries and create a physical and virtual HUB that will encourage cooperation. Ensuring support for early stage product development and profile for better acceptance from of end-users, thus creating an essential eco-system from the beginning of idea development. Such a setup would also enable faster industrialization of such developed solutions by close interaction between all involved parties in the consortium.
Should have
We expect capacity strengthening of our consortium in creation of financing models of intersectoral solutions, development of supported services of innovative companies, incubator support services, expertise in scaling up innovative start-ups, internationalization, trend analysis, co-creation modelling, value-chain creation, innovation management, addressing public awareness, and the social dimension around digital technologies.
Could have
Digital Stream Zagreb (DSZ) could be a cornerstone of smart national value chain connecting central government and public entities with scientific and research institutions, academia, SMEs, large enterprises, NGOs and citizens at the center of the co-creation process. Cooperation with consortium partners to open additional specialized labs for R&D&I.

Process

Activities to deliver the project goal	Technologies
<p>2018 Preparatory talks with consortium partners, set to define a Consortium agreement.</p> <p>2019 Establish a digital and physical collaborative innovative space based on current projects in the partners' portfolio; an online platform for mapping and creating a database with profiles of all relevant stakeholders through targeted sectors in the region with additional relevant content and networking tools. DIGITAL STREAM ZAGREB application for active membership in ENOLL (Spring 2019) and in Smart Cities and Communities (EIP-SCC).</p> <p>Within 3 years: OPEN DATA PLATFORM - smart sensor deployment through test beds, thus fostering smart city solutions, DIGITAL FORENSICS AND CYBER SECURITY - development and testing of various services such as digital signage, smart contracts, etc., Virtual incubation services in the Technology park Zagreb – i.e. webinars, MOOCs, podcasts, development of crowdsourcing platform, Establishment of SEED VC Equity fund - funding innovative SMEs, PATENT4FREE - structured educational, mentoring and funding program for commercialization of innovation.</p> <p>Within 5 years: DIGITAL STREAM 2.0, Development of e-Skills training courses for public administration, PARTNERSHIP FOR INNOVATION. Within 5 years we plan to set up various models, such as: DIGITAL STREAM 2.0, an intersectional open innovation ecosystem based on synergy between cultural and creative industries (such as the gaming industry) with the</p>	<p>We are in the public procurement procedure phase, equipping following prototyping and product development labs (FAB LABs): IoT lab, Digital Forensics lab, Eco (chemical) lab, Additive technologies lab (industrial 3d printer/scanner), Electronics lab and CNC lab (for wood and metal).</p> <p>Our consortium partners also have various prototyping labs, such as Zagreb University of Applied Sciences: PLC automation lab, Mechatronics lab, Concrete testing lab, Infrared technology industry applications; Ericsson Nikola Tesla d.d. is running a corporate incubator (Ericsson Garage Croatia) lab facilities for prototyping and testing new products and solutions.</p>



ICT industry (i.e. development of chatbots, distributed ledger tech, etc.) as a scale-up of the Startup Factory Zagreb smart city pre-acceleration startup program in context of product/service development and end user engagement, Development of e-Skills training courses for public administration; PARTNERSHIP FOR INNOVATION - creation of distributed ledger technology (DLTs) and/or similar KETs based platform for innovative public procurement procedures.	
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References

Similar projects	Products and tools
<ul style="list-style-type: none"> I4MS - http://i4ms.eu/index.php CREATIVE RING - www.creativering.eu SILVER VALLEY - http://www.silvervalley.fr/English-version 	We are experienced at all levels of digital maturity, including offering low-tech transfer to companies lower down the maturity curve. Within the Technology park we already provide necessary skills build-up, from technical training at various levels and needs, to coaching and mentoring the workforce and SMEs on how to deal efficiently with the newly digitized products, processes and businesses. Our consortium partners will ensure additional resources needed for the development of Digital Stream Zagreb.

Financing and investment

Financing (EUR)				
	2018	2019	2020	Total
Staff	110 000	110 000	110 000	330 000
Equipment/	-	-	-	
Procurement	-	2 055 598	29 417	2 085 015
Subcontracting	-	45 000	20 000	65 000
Licenses	-	73 800	36 900	110 700
Other costs	-	25 000	15 000	40 000
Total	110 000	2 309 398	211 317	2 630 715

Financing
As for the structure of funds, 2.09 mil € are ensured from OP Competiveness and Cohesion - Development of business infrastructure (BRI) for building and maintaining the infrastructure, acquiring machines and equipment, and employment of qualified personnel. The total cost of the project is 2.6 mil €, and additional public funding from the City of Zagreb is also needed and has been ensured for employment of additional personnel, and to engage user and supplier companies into specific experimentation projects.
Additionally, approx. 100 000 € will be ensured from the Croatian Agency for SMEs, Innovation and Investments – HAMAG-BICRO within ERDF program: Supporting the development of network of BSOs.
On the business model side, we envisioned the following: membership fees, training, contract R&I, testing, and service brokerage are all potential revenue streams. As for other funding sources we expect to come from: H2020, ESIF and participatory budget of the City of Zagreb.



Expected Outcomes

Measuring success	City vision	Beyond the city
<ul style="list-style-type: none"> the Innovation output indicator BERD business enterprise expenditure on R&D TEA index representing the number of entrepreneurially active people 	<p>Our vision is to create a central hub for creating innovative solutions and enable faster development i.e. co-development between different players in selected industry segments. Such a setup would also enable faster industrialization of such developed solutions by close interaction between the involved parties in consortium. Within strategic framework:</p> <ul style="list-style-type: none"> City of Zagreb development strategy for the period up to 2020 Strategy for innovation encouragement of the Republic of Croatia 2014-2020 – building innovation infrastructure, developing financial mechanisms oriented towards innovations, strengthening human capital through e-skills (linked with the eCroatia Strategy 2016-2020), Croatian National Social Welfare Strategy for the Elderly 2017-2020. 	<p>Sectors are in relation with priority objectives of the Smart Specialization Strategy: Capacity enhancement for research, development and innovation for reaching scientific excellence and to complete economic needs; Overcoming the fragmentation in innovation value chain and the gap between research and business sector; modernization and diversification of Croatian economy through an increase of private research and development; improvement of position in global value chains and internationalization of Croatian economy; establishment of a cooperative relationship regarding social challenges; smart skills build-up – enhancement of existing and new labor force for smart specialization.</p>

5.10 Development of new business models for public lighting reconstruction project

	Transfer	
	New concept/solution	X
	Other	

Project Overview

Short description of the problem you try to solve

Establish model for new public lighting system in order to reduce light pollution and CO2 emission, to improve visibility and safety, to actively participate in the implementation of the Zagreb City Strategy and EU 2020 strategy.

Short description of project / measure	Potential
<p>Reconstruction of public lighting in the City of Zagreb includes modernization of the public lighting system, implementation of energy efficiency measures, new energy efficient light sources and power regulation systems, as well as modernization of other existing public lighting parts like poles, cables etc. According to the abovementioned, it is necessary to define compatible solutions related to the results of the performed energy audits and the latest available technology.</p> <p>The main points of this project include defining models and needs for implementation of a new ecological and energy efficient system that should be upgraded by implementation of light management system – a type of a centralized dashboard which is used to control and reduce energy consumption of a town's public lighting system and can be combined with various types of services (pollution sensors, noise sensors, parking availability sensors, cameras etc.).</p>	<p>The project has a high replication potential, especially in Croatia. It will contribute to a significant increase in expenditure in priority energy efficiency activities in urban areas.</p> <p>The market replication potential of the project is considerable. The project is using an innovative concept for implementation of energy efficiency measures in street lighting. It is expected that lessons learned from carrying out the project in the City of Zagreb will allow other Croatian municipalities to follow a similar path.</p>
	Relevant actors
	<p>Regional level: citizens, ESCOs, regional banks and funding bodies, local and regional authorities/administrations</p> <p>National and European levels: associations of ESCOs, national and European funding bodies, the lighting industry, national and European administrations, IT companies, Start-up companies</p>
Benefit	References
<p>Reduction of light pollution and CO2 emission, electrical energy savings, cost savings, improved level of visibility by using various types of information and services through one system, improved maintenance efficiency.</p>	<ul style="list-style-type: none"> Tallinn – Smart street project Copenhagen – public lighting renovation Barcelona – public lighting modernization Eindhoven

What current problem is the project trying to solve

- Outdated public lighting system
- High maintenance costs
- High level of light pollution
- High level of CO2 emission
- Negative impact on the environment, health and safety

Related indicators	Related action fields	Related impact factors
<ul style="list-style-type: none"> Savings in energy consumption up to 65% Savings in public lighting system maintenance up to 75% Total operating cost savings of approximately EUR 5 million per year 	<p>ZagEE – Zagreb Energy Efficient City project - implemented as part of the IEE program for technical assistance 2012.</p>	<ul style="list-style-type: none"> Strategy Europe 2020 Partnership agreement between Croatia and European Commission Operational programme Competitiveness and Cohesion Third National Energy Efficiency Action Plan City of Zagreb development strategy for the period up to 2020



DNA of Project

Job to get done (Goal)	Core value	Consortium
<p>Preparation and launch of project documentation for reconstruction and modernization of the public lighting system in City of Zagreb in order to achieve savings (electrical energy and maintenance) and increase security and standard for citizens of Zagreb.</p> <p>Realization of preparatory activities necessary for the implementation of new solutions such as energy audit activities, analysis of the current situation of the public lighting system and costs, calculation of future needs, preparation of feasibility studies, preparation of the necessary tender documentation for reconstruction and modernization of the public lighting system.</p> <p>All preparatory activities are directed to achieve detailed technical, legal and economic framework for realization of the public lighting reconstruction project and to analyze applicability and justification of certain models of realization of public lighting reconstruction.</p>	<p>Reduction of negative impact on the environment, health and safety of citizens of Zagreb and increase of standard for citizens by developing and implementing solutions according to the specific needs and characteristics of the city (financial benefits, improved security, more communicative city).</p>	<ul style="list-style-type: none"> • City of Zagreb, • City Office for Physical Planning, Construction of the City, Utility Services and Transport, • City Office for Financing, • Public Procurement Office, • City office for economy, energetics and environment protection; • City Office for EU programs and projects, • City Office for Legal-Property Relations and the City's assets, • The Mayor's Office • REGEA • Private partners • External experts

Minimum Viable Project

Must have
<p>Defined model for new public lighting system in order to reduce light pollution and CO2 emission, to improve visibility and safety, to actively participate in the implementation of the Zagreb City Strategy and EU 2020 strategy with its 5 targets: employment, research and innovation, climate change and energy, education, combating poverty.</p>
Should have
<p>Defined optimal model for smart public lighting system that would relate to improvements in communication, real-time information flow, collecting data and solving detected problems.</p>
Could have
<p>Defined optimal model for smart public lighting system that would include implementation of various types of services in one system: pollution and noise sensors, Internet access, video protection, parking availability sensors – according to the analysis of the city's needs.</p>



Process

Activities to deliver the project goal	Technologies
<ol style="list-style-type: none"> 1. Development of City Action plan and a ten-year public lighting development plan (according to the obligation prescribed by the Law on protection from Light Pollution) 2. Preparation of the main project of public lighting reconstruction – planned for at least 30% of the public lighting system 3. Preparation of tender documentation 4. Preparation and realization of the public procurement procedure (through an optimal model of realization – loan, contracting of energy service or model of public private partnership with analysis of the availability of financial assistance from EU Structural Funds - Operational Programme Competitiveness and Cohesion) <p>Through preparatory and planned activities, all available models of realization of public lighting reconstruction will be analyzed</p>	<ul style="list-style-type: none"> • LED lights; • Street light control system <p>Various types of connected services through lighting system:</p> <ul style="list-style-type: none"> • video protection, • pollution and noise sensors, • Wi-Fi access, • parking availability sensors, • charging of electric vehicles

References

Similar projects	Products and tools
<p><u>Copenhagen</u> - reconstruction project contains changing 20 000 lighting fixtures. The reconstruction project will result in a 57% electricity saving in street lighting.</p> <p><u>Tallinn</u> - implementation of smart lighting system which allows to adjust the brightness of the lighting in the range of 10-100% according to the customer's choice. Consequently, good energy efficiency and need-based lighting is achieved. For example, at night lights work only at 20 percent capacity. A street is also divided into different lighting groups according to the traffic load. Light traffic luminaires are equipped with motion detectors for extra energy efficiency - lights lit up at the road section where they are needed.</p> <p><u>Barcelona</u> - Street lamps are equipped with LED technology to reduce cost and pollution. Lamps include sensors that process environmental information and detect presence, temperature, humidity, noise, and pollution. These lights are connected to a street lighting cabinet that centralizes all communications and services and sends the information to a central control center.</p>	<p>Infrastructural elements: LED lamps, poles, cables</p> <p>Smart technology products: control system, dashboard, various types of sensors</p> <p>IT products and solutions</p>

Financing and investment

Project costs
<p>Total cost of all preparatory activities – EUR 2 million</p> <p>Amount co-financed by the ELENA program (90%) – EUR 1.8 million</p> <p>Amount from the city budget (10%) – EUR 0.2 million (or EUR 66 670 per year)</p>



Financing
Loan/grant (EIB) combined with City budget sources Project duration: 2018 – 2021, 36 months after signing the ELENA Technical Assistance Contract Risks: delays in preparation of documentation, impossibility of finding appropriate solution for implementation

Expected Outcomes

Measuring success	City vision	Beyond the city
<ul style="list-style-type: none"> Reconstruction of at least 90 000 lamps (70% of the total number of lamps) Implementation of a public lighting management system Savings in energy consumption of up to 65% Savings in public lighting system maintenance costs of up to 75% Total operating cost savings (electricity and maintenance) of approximately EUR 5 million per year 	Project Public lighting reconstruction is a part of strategic goal C3 of City of Zagreb development strategy for the period up to 2020. The C3 goal refers to environmental protection and sustainable management of natural resources and energy. One of the measures of this goal is Increasing energy efficiency in energy production, sectors of industry, building construction industry, traffic and public lighting (C3.P2-M2). The City of Zagreb development strategy for the period up to 2020 prescribes projects and activities that will contribute to the achievement of the C3 goal. One of the projects defined in the Strategy is modernization and reconstruction of the public lighting system which plays an important role in the development of Zagreb and increase of the living standard for citizens.	The project helps to raise awareness of the need to implement measures related to energy efficiency. It has a high replication potential in other parts of country. This project serves as a role-model for other projects of the same kind (technology and solutions that still haven't been used). The project has impact on various groups in Croatia and abroad: other municipalities in Croatia, private investors, IT sector, ESCOs, Start-up companies and foreign companies.



5.11 Financing and public procurement of innovative solutions

	Transfer	
	New concept/solution	X
	Other	

Project Overview

Short description of the problem you try to solve	
Building a strategic Framework for Financing and Public procurement of innovative solutions in The City of Zagreb.	
Short description of project / measure	Potential
Building a strategic framework for financing and public procurement of innovative solutions in the City of Zagreb that will enable the City not just to identify technical solutions, but to finance and nurture innovations to a level in which they may actually be implemented within the city and contribute to improved competitiveness and better quality of life for the citizens.	<ul style="list-style-type: none"> Reduction of R&D cost/risk for the public procurers Easier access for SMEs to loans, guarantees, counter-guarantees, hybrid, mezzanine and equity finance to grow their business in view of wider commercialization of innovative solutions.
Relevant actors	
The City of Zagreb - City administrative bodies (City Office for Public Procurement), Development Agency Zagreb, Zagreb Holding d.o.o., Croatian Agency for SMEs, Innovations and Investments – HAMAG-BICRO, SMEs and large companies, S&R institutions, academia & RTOs	
Benefit	References
Defining a framework and pilot implementation of a strategy for capacity building to boost usage of public procurement of innovative solutions with a cost-benefit analysis for the public and private sector.	Innovation ecosystem creation – implementation phase <ul style="list-style-type: none"> OP Competiveness and Cohesion - Development of Business infrastructure (BRI) (2017-2019) PCP - Pre-Commercial Procurement – preparatory talks <ul style="list-style-type: none"> H2020 ICT-34-2018-2019

What current problem is the project trying to solve

Bring innovative solutions to the market with the quality and price needed for mass market deployment, engaging public sector to use its purchasing power to act as early adopter of innovative solutions which are not yet available on large scale commercial basis.



Related indicators	Related action fields	Related impact factors
<ul style="list-style-type: none"> Compliance testing - activity to determine, directly or indirectly, that a process, product or service meets relevant technical standards and fulfills relevant requirements The Innovation Output Indicator Cost-Benefit Analysis Number of innovative procurements 	<p>Activities:</p> <ul style="list-style-type: none"> Ensuring support from The City of Zagreb, Office for public procurement for PPI activities Expansion of Technology park Zagreb Continuation of Startup Factory Zagreb – pre-acceleration program Formalization of Digital Stream Zagreb consortium Attract private funds through a Public-Private Partnership (PPP) – Equity fund <p>Projects:</p> <ul style="list-style-type: none"> START-UP FACTORY – ensured 2.09 mil € from the OP Competiveness and Cohesion - Development of business infrastructure (BRI) for building and maintaining the infrastructure, acquiring machines and equipment, and employment of qualified personnel. (2017/6-2019/6) 	<p>Ability to ensure a critical mass of purchasing power on the demand side, to conduct:</p> <ul style="list-style-type: none"> pre-commercial procurement (PCP) to steer the development of solutions towards concrete public sector needs, whilst comparing/validating alternative solution approaches from various vendors. actual public procurement of the innovative solutions (PPI) through one of the existing public procurement procedures (e.g. open/negotiated procedure, competitive dialogue etc.)

DNA of Project

Job to get done (Goal)	Core value	Consortium
<p>Our vision is to create a central hub for creating innovative solutions and enable faster development and implementation of innovative solutions.</p> <p>Incentivize industry providers, SMEs, academia and public authorities to collaborate in order to scale up the production of innovative market solutions with the price and quality requirements for large scale deployment.</p>	<ul style="list-style-type: none"> Create new integrated business models with innovative local partnerships (Local Ecosystem) and adapted procurement procedure; Support the replicability of these solutions; Stimulate an open market across Europe for investments in ICT solutions 	<ul style="list-style-type: none"> The City of Zagreb - City administrative bodies (Office for Public Procurement) Development Agency Zagreb <ul style="list-style-type: none"> As facilitator of the Open Innovation Ecosystem As potential public procurer of innovative solutions Zagreb Holding d.o.o. Croatian Agency for SMEs, Innovations and Investments – HAMAG-BICRO SMEs and large companies S&R institutions Academia & RTOs

Minimum Viable Project

Must have
<ul style="list-style-type: none"> Provide a large enough demand to incentivize industry to invest in wide commercialization to bring innovative solutions to the market with the quality and price needed for mass market deployment. Procurement of R&D services (from PCP to PPI activities)

Should have
<ul style="list-style-type: none"> Follow-up of suppliers and validation of results PCP: Validation/comparison of the performance of competing PCP solutions against jointly defined criteria in real-life operational conditions Competition management – market stimulation - SME involvement in PCP, transparent and non-discriminatory contract management and IPR protection through a flexible PCP process can secure both a learning process and an example of good practice for business cases even for SMEs. Public Procurement of Innovative Solutions (PPI) acting as launching a customer/early adopter/first buyer of innovative commercial end-solutions newly arriving on the market. Developed concepts and guidelines for combined funding models for pilot projects (e.g. SET plan, Horizon 2020, EIB and ESIF loans plus private funding to complement)
Could have
<ul style="list-style-type: none"> Mobilize public funding resources from European, national, regional and local level for smart city solutions More systematic stakeholder involvement & user-driven innovation Ensure interoperability for sustainability and user acceptance of the systems

Process

Activities to deliver the project goal	Technologies
<ul style="list-style-type: none"> Select application context for public procurement Ensure political support Develop required competencies Create innovation friendly environment Create incentives for the supply and demand side Involve users 	<p>DAZ is in the public procurement procedure phase, equipping prototyping and product development labs such as IoT lab, Digital Forensics lab, Eco (chemical) lab, Additive technologies lab (industrial 3d printer/scanner) and Electronics lab.</p> <p>The public procurement of the innovative solutions through one of the existing public procurement procedures are to be defined by the City of Zagreb in 2018.</p>

References

Similar projects	Products and tools
<p><u>LIVE INCITE</u> - Consortium of healthcare procurers that will challenge industry to develop smart ICT solutions that enable lifestyle interventions in the perioperative process through digital care. The aim is to influence patients in a personalized way to take necessary actions both prior and after surgery in their life style to optimize the health care outcome.</p> <p><u>CHARM</u> - Consortium of road management authorities that conducts a PCP to improve traffic throughput, road safety, CO2 footprint and reduce the costs of traffic management by moving to an open modular architecture for Traffic Management Centers equipped with advanced traffic management, traffic prediction and cooperative systems.</p> <p><u>SELECTforcities</u> – A consortium of cities that aims to conduct a PCP focusing on a standardized, open, data-driven, service-oriented & user-centric platform enabling large scale co-creation, testing & validation of IoE services for Cities.</p>	<ul style="list-style-type: none"> Explore and exploit the new possibilities foreseen in the revised EU Public procurement directives in Articles 9 10, in particular: i) the new criterion on the ‘Most Economically Advantageous Tender (MEAT)’, which allows for full life cycle costing; ii) the “innovation partnerships”, which enable a public authority to enter into a structured partnership with a supplier with the objective of developing an innovative product, service or work, with the subsequent purchase of the outcome.



<p>BABLE – a digital marketplace for Smart Cities designed to accelerate and facilitate investments into successful smart city solutions across Europe, supporting cities in procuring smart city solutions and planning the smart city project, providing a platform for companies to sell their own products and solutions to smart cities, helping cities and companies to solve urban challenges through innovation.</p> <p>PPI2Innovate - Interreg CE project PPI2Innovate targets directly public procurers on all administrative levels in central Europe with the aim to build regional capacities in PPI, to change attitude towards PPI, to strengthen linkages among relevant stakeholders in regional innovation systems and to finally boost usage of PPI.</p>	<ul style="list-style-type: none"> • Information (education) to get smart institutional buyers, e.g. characteristics for position of Chief Technology and Sustainability officer to be created in cities administration; • Deploy training set according to Article 11 for procurement professionals on handling challenges (e.g. mobility, housing, data handling) and promotion of good practice according to Articles 12 and 13 for EU added value.
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Financing and investment

Financing (EUR)				
	2018	2019	2020	Total
Staff	-	14 000	14 000	28 000
Equipment/	-	-	-	-
Procurement	-	-	-	-
Licenses	-	-	-	-
Other costs	-	-	-	-
Total	-	14 000	14 000	28 000

Financing and investment projections are to be defined since the City of Zagreb has a centralized public procurement. The City administrative bodies and the office for public procurement in 2018 will define the needs of The City and the procedures for procuring innovative solutions.

Financing: Utilization of H2020 program i.e. – ICT34 for PCP, H2020 - RIA, CSA, IA and PPI actions (i.e. DTH-05) in combination with ESIF.

Expected Outcomes

Measuring success	City vision	Beyond the city
<ul style="list-style-type: none"> • Number of innovative procurements • Total amount of innovation procurement contracts awarded by The City / Total procurement from the Office for public procurement • The Innovation Output Indicator 	<ul style="list-style-type: none"> • First commercial procurement of goods/services; and diffusion by procurement of innovative goods/ services only recently available at the market • Procurement of goods/services newly developed for the procuring entity: i.e. newly developed for the needs of your organization, including R&D services and excluding standard expert reports/ investigations. • Diffusion of innovative goods/ services: i.e. procurement of goods/services already supplied to the market but new for the City <p>Within strategic frameworks:</p> <ul style="list-style-type: none"> • Strategy for innovation encouragement of the Republic of Croatia 2014-2020 - building innovation infrastructure, developing financial mechanisms oriented towards innovations, strengthening human capital through e-skills (linked with eCroatia Strategy 2016-2020) • Digital Agenda for Europe 2020 • Croatian Strategy for the Development of Public Administration for the period from 2015 to 2020 • e-CROATIA 2020 STRATEGY • Regional Development Strategy of the Republic of Croatia for the period until the end of 2020 	<ul style="list-style-type: none"> • Structured dialogue between the value chain and cities to develop a ‘technology tool box’ for challenges; • Public-private cooperation in establishing EU wide criteria for tenders and terms of reference; • De-risk investments by long term planning and criteria; • Develop innovative financial mechanisms (e.g. purpose bonds, crowd funding, smart bonds, etc.) as alternatives to loans. • Stimulating development related to RIS3 goals within priority objectives: Capacity enhancement for research, development and innovation for reaching scientific excellence and to complete economic needs; Overcoming the fragmentation in innovation value chain and the gap between research and business sector; Modernization and diversification of the Croatian economy through increase of private research and development; Improvement of position in global value chains and internationalization of Croatian economy; Establishment of cooperative relationship regarding social challenges.



6 Glossary

Term	Abbreviation	Definition
An energy service company		An energy service company (ESCO) is a commercial or non-profit business providing a broad range of energy solutions including designs and implementation of energy savings projects, retrofitting, energy conservation, energy infrastructure outsourcing, power generation and energy supply, and risk management.
Android		Android is the mobile operating system developed by Google.
Architecture of Integrated Information Systems	ARIS	Architecture of Integrated Information Systems - tools and methodologies for establishing a unique business process repository, measurement, monitoring, analysis and business process management.
ARIS Value Engineering	AVE	A comprehensive methodology for Business Process Management, based on the ARIS technological platform, integrating strategy, design, implementation and control of business processes.
AS-IS processes	AS-IS	An AS-IS business process defines the current state of the business process in an organization.
Azure		Azure is a comprehensive set of cloud services that developers and IT professionals use to build, deploy, and manage applications through a global network of datacenters.
Balanced Scorecard	BSC	Balanced Scorecard is a management system that through the implementation of strategic planning is used to match business activities with the organization's vision and strategy, enhance internal and external communication, and oversee the organization's performance through strategic goals.
Business Process Management	BPM	BPM is a knowledge area that combines business processes and information technology through the use of various methods and techniques for creating, managing and analyzing processes that involve people, organizations, applications, documents, and various other information as components of a business process.
Business Segment Matrix	BSM	Business segment matrix defines services of an organization and connects them to the markets on which the organization offers them. Matrix also defines the size of each of the selected segments of the market.
Critical Success Factors	CSF	Critical success factors are the key success factors in which there is a significant difference between the current state and the desired state, or the state relative to the competition.
Customer Experience Management	CEM or CXM	Customer Experience Management is the collection of processes a company uses to track, oversee and organize every interaction between a customer and the organization throughout the customer lifecycle. The goal of CEM is to optimize interactions from the customer's perspective and foster customer loyalty.

Data dashboard		An information management tool that visually tracks, analyzes, and displays key performance indicators, metrics and key data points to monitor the health of a business, department or specific process.
ELENA		A joint initiative by the EIB and the European Commission under the Horizon 2020 program. ELENA provides grants for technical assistance focused on the implementation of energy efficiency, distributed renewable energy and urban transport projects and programs.
Emission of carbon dioxide	CO2 emission	In addition to total emissions, sectoral CO2 emissions can be considered. The typical sectors for which CO2 emissions/removals are estimated are energy, industrial processes, agriculture, waste, and the use and conversion of real property and forestry.
Energy audit		A systematic analysis of energy use and energy consumption within a defined energy audit scope, in order to identify, quantify, and report on the opportunities for improved energy performance.
Energy efficiency		A set of planned measures and procedures aiming to use the least possible amount of energy, while retaining the level of comfort and production rate.
Ernst & Young	EY	EY refers to the global organization, and may refer to one or more of the member firms of Ernst & Young Global Limited.
European Investment Bank	EIB	The European Investment Bank provides funding for projects that help to achieve EU aims, both within and outside the EU. Founded in 1958 and based in Luxembourg.
Event-Driven Process Chain Diagram	EPC	The Event-Driven Process Chain Diagram defines business subprocesses in an organization. It is used to describe the processes in their chronological sequence.
Feasibility study		An analysis and evaluation of a proposed project to determine if it is technically feasible, feasible within the estimated cost, and profitable.
Intelligent street lighting		Public street lighting that adapts to movement by pedestrians, cyclists and cars.
International Organization for Standardization	ISO	The International Organization for Standardization defines and establishes methodologies for a set of indicators to steer and measure the performance of city services and quality of life.
International Organization for Standardization	ISO 27001	An information security standard published by the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC).
Internet of things	IoT	Internet of things is the network of physical devices, vehicles, home appliances and other items embedded with electronics, software, sensors, actuators, and connectivity which enables these objects to connect and exchange data.
iOs	iOS	iOS is the mobile operating system created and developed by Apple Inc.



Key Performance Indicator Diagram	KPI	The Diagram of Key Performance Indicators is used to show hierarchically the structure of key performance indicators by measuring the implementation of strategic initiatives.
Key Success Factors	KSF	Key success factors are used for the placement of services in a specific market.
Law on protection from light pollution		Act that regulates the protection from light pollution; protection principles; entities that carry out protection; manner of establishing management standards to reduce consumption of electricity and other energy; manners of clarifying the mandatory; the degree of protection from excessive illumination; restrictions and prohibitions related to light pollution; planning; construction; maintenance and reconstruction of illumination; and other issues in this regard.
LED lamps		An electric light or light bulb for use in light fixtures that produces light using light-emitting diodes (LEDs). LED is a highly energy efficient lighting technology.
Light pollution		Also known as photo pollution - the presence of anthropogenic light in the night environment. It is exacerbated by excessive, misdirected or obtrusive uses of light.
Lighting management system		An intelligent network that incorporates communication between various system inputs and outputs related to lighting control with the use of one or more central computing devices.
Networking and Information Security (NIS) Directive	NIS	NIS Directive is part of the EU's cyber security strategy. It tackles network and security incidents and risks by imposing security and reporting obligations on financial services.
Product/Service Tree	PST	The Product/Service Tree defines the hierarchy of service structure. Services may be internal or external.
Public private partnership		A mechanism for government to procure and implement public infrastructure and/or services using the resources and expertise of the private sector. Where governments are facing ageing or lack of infrastructure and require more efficient services, a partnership with the private sector can help foster new solutions and bring finance.
REGEA		The North-west Croatia Regional Energy Agency. It has been established in 2008 by the Zagreb County, Karlovac County, Krapina-Zagorje County and City of Zagreb under the framework of the Intelligent Energy Europe program.
Service oriented architecture	SOA	Service oriented architecture is a style of software design where services are provided to the other components by application components.
TO-BE processes	TO-BE	A TO-BE business process defines the future state of a business process in an organization.
Value-Added Chain Diagram	VACD	The Value-Added Chain Diagram defines the highest level of business processes in an organization.
Web robot	BOT	BOT, also known as web robot is a software application that runs automated tasks over the Internet.



<p>City of Zagreb project coordinator Mirjana Zubak Office for EU Programs and Projects T: +385 1 658 5041 E: mirjana.zubak@zagreb.hr</p>	<p>City of Zagreb Local Group coordinator Anka Đurić The Mayor's Office T: +385 1 610 1065 E: anka.duric@zagreb.hr</p>
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<p>URBACT Local Group (ULG) actors</p> <ol style="list-style-type: none"> 1. Frane Šesnić, deputy Local Group Co-ordinator, Development Agency Zagreb TPZ Ltd. 2. Hrvoje Kalčiček, The Mayor's Office 3. Renata Arar, Office of International Relations and Human Rights 4. Ana Magdić, City Office for the Strategic Planning and Development of the City 5. Nikolina Obradović, City Office for Physical Planning, Construction of the City, Utility Services and Transport 6. Dubravka Mendeš Poljak, Professional Service of the Mayor 7. Nera Pavić, City Office for Economy, Energetics and Environment Protection 8. Kristian Ravić, Development Agency Zagreb TPZ Ltd. 9. Mirela Bartolec, Zagreb Holding

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<p>https://smartimpact-project.eu/</p>
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7 Annex







URBACT III

URBACT facilitates the sharing of knowledge and good practice between cities and other levels of government. The purpose is to promote integrated sustainable development and improve the effectiveness of regional and cohesion policy.

URBACT's mission is to enable cities to work together and develop integrated solutions to common urban challenges, by networking, learning from one another's experiences, drawing lessons and identifying good practices to improve urban policies.

URBACT III (2014-2020) has been developed to continue to promote sustainable integrated urban development and contribute to the delivery of the Europe 2020 strategy.

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The aim is to promote Smart, sustainable urban development, helping to make cities more livable with the support of technology.

<https://smartimpact-project.eu/>

