IoTXchange
CONNECTING CITIES FOR BETTER LIFE

KEŽMAROK
MODERNÝ • DYNAMICKÝ • HISTORICKÝ

CITY OF KEŽMAROK
INTEGRATED ACTION PLAN

European Union
European Regional Development Fund

URBACT
Driving change for better cities

September 2019 – August 2022

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URBACT

For over 15 years, the URBACT programme has been the European Territorial Cooperation programme aiming to foster sustainable integrated urban development in cities across Europe. It is an instrument of the Cohesion Policy, co-financed by the European Regional Development Fund, the 28 Member States, Norway & Switzerland.
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.

CONNECTING CITIES FOR BETTER LIFE

Internet of Things as a policy instrument for the city change. It encourages the creation of a network of European partners committed to the design of digitalization plans based on Internet of Things (IoT) solutions to increase the quality of life in small and medium sized EU cities. URBACT methodology based on transnational cooperation between cities and engagement of local groups offer to our network of 9 cities the conditions to each develop an Integrated Action Plan that will guide us through a new age of digital transformation.
The IotXchange network is made of 8 European partners: the cities of **Fundão** (Portugal - Lead Partner), **Razlog** (Bulgaria), **Dodoni** (Greece), **Nevers** (France), **Jelgava** (Latvia), Ånge (Sweden), **Kežmarok** (Slovakia) and the **Åbo Akademi University** (Finland). It was built around the Internet of Things as a policy instrument for the city change.

https://urbact.eu/
https://urbact.eu/iotxchange

Câmara Municipal FUNDÃO
JELGAVA LOCAL MUNICIPALITY FOR A SUSTAINABLE FUTURE
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РАЗЛОГ
nevers AGGLOMÉRATION
Ånge kommun
Åbo Akademi University

FOREWORD BY THE MAYOR OF KEŽMAROK

Today brings new technologies every day and the vision of our city Kežmarok is to gradually build a modern and dynamic city by introducing new as well as improving the already provided services of the city. For cities, it is not a question of whether, but when, they will become a reality of technological progress. Growing populations, climate change, energy intensity, environmental pressures or collapsing traffic are just some of the challenges that cities face.

At the beginning and at the end of our endeavor, there must be a man and a vision. Optimal harmonization of the latest technologies that make up the city's body is important for the smart label. Our goal is to bring efficiency and simplify living in the city. We need such an interconnection of intelligent systems that can optimize resources, use infrastructure with society so that the smart city makes maximum use of technologies to improve the quality of life of the population.

Already in 2015, Kežmarok embarked on the path of an intelligent city. For example, we have implemented a unified economy for city organizations, an integrated Open data operating system, prepared energy audits of buildings, partially replaced public lighting, made an SOS application available, introduced a city card, parking ramps and cameras monitored by the City Police Operations Center, smart benches ... The basis was the launch of the optical Internet in 2015.

We turn ideas, set visions and defined goals of the city into reality for our citizens as one team, so that they feel comfortable in the city and have the most modern technologies at their disposal. It is necessary to draw new inspiration in all areas of technology. Therefore, we participated in the URBACT IoTXchange project, which offers us answers to the possibilities of IoT implementation in the town of Kežmarok.

PhDr. Mgr. Ján Ferenčák, MBA
mayor of Kežmarok

1. CONTEXT & PROCESS

1.1 INTRODUCTION

The city is a dynamically developing technological center of the sub-Tatra region. It does not lag behind in the implementation of modern technology into city life. Through its data infrastructure, Kežmarok aims to provide services that will increase the quality of life, either in the form of increased security, prevention, early warning of danger or support of information flows for better management and information sharing in public administration, utilities, energy management, transport, waste, services, advertising, culture, tourism and leisure and education to make people's lives easier and healthier. The aim of this document is to define appropriate directions of development in the field of introducing IoT into the daily life of residents and decision-making processes in the management of the city administration of Kežmarok.

The rich experience of the town of Kežmarok is also evidenced by the strategy of the town "Smart Green City Kežmarok", thanks to which the town won the title ENVIROMESTO 2019 in the second year of the competition announced by the Ministry of the Environment of the Slovak Republic. The aim of the competition is to support the cities that pay the most attention to the climate and the environment and to the efforts of their administration in the fight against climate change and for improving the quality of life of their citizens. In addition, the strategy seeks to make the most of modern technology and bring new opportunities to the city to introduce modern "smart" technologies, devices and solutions that create a more pleasant, modern environment for residents and visitors to Kežmarok. The dynamics, growth rate of the global digital economy and the mentioned attributes motivated the local government to join the "IoTXChange" action planning network, thanks to which the city of Kežmarok would like to expand and deepen the mentioned city strategy.

1.2 CITY PROFILE OF KEŽMAROK

Population statistics and demography
Total population: 15 552 (31.12.2020)
Men: 7,542 (48.5%)
Women: 8,010 (51.5%)

Age groups
Pre-productive age (0-14 years): 2,276 (14.63%)
Productive age (15-64 years): 10,681 (68.68%)
Post-productive age (65 and over): 2,595 (16.69%)

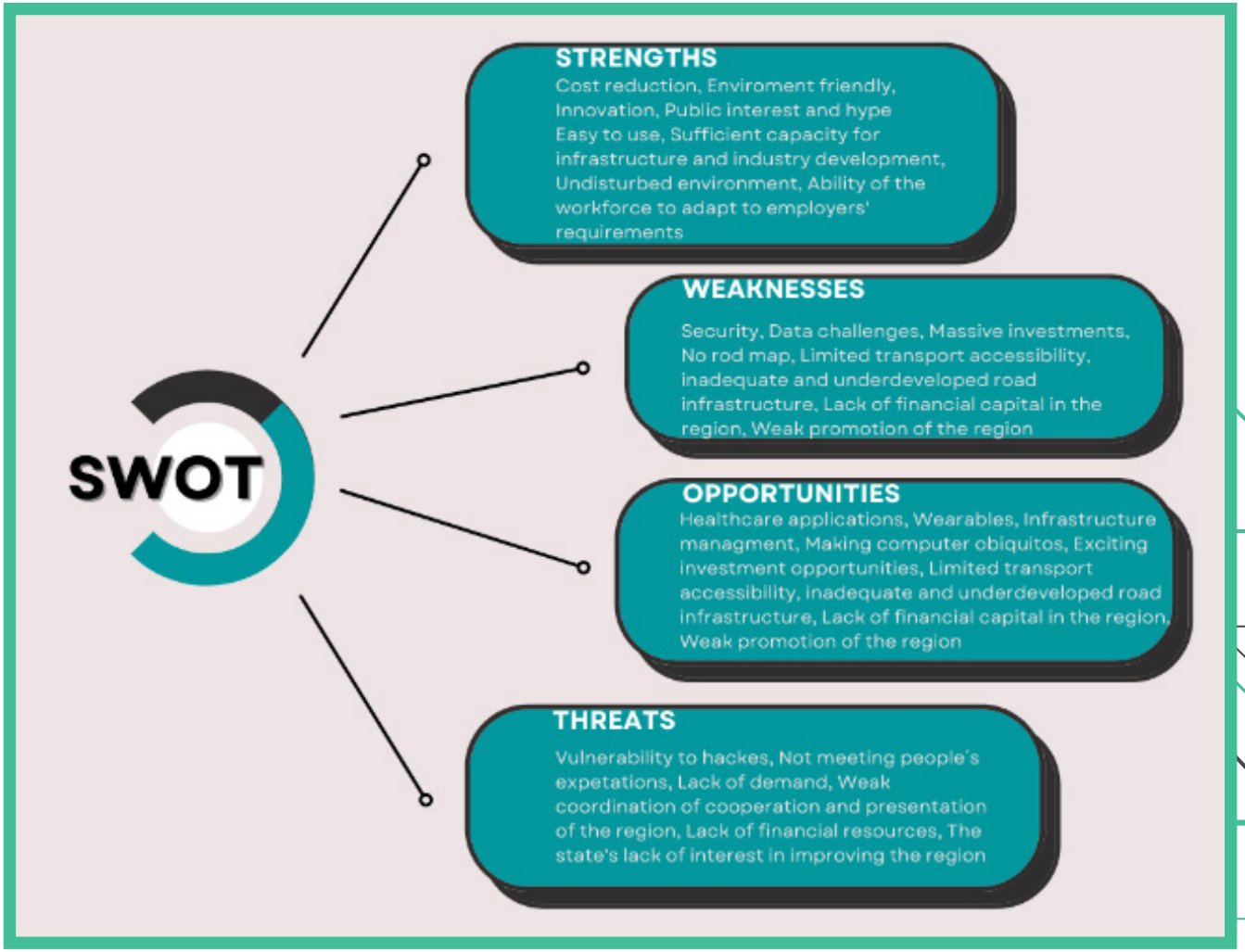
Marital status
Single: 6,713 (43.16%)
Married: 6,341 (40.77%)
Divorced: 1,412 (9.08%)
Widow: 1,070 (6.88%)
Not found: 16 (0.1%)

Education
Without completed education - persons aged 0-14: 1,613 (10.37%)
Basic education: 2,120 (13.63%)
Secondary vocational (apprenticeship) education (without GCSE): 2,963 (19.05%)
Complete secondary education (with GCSE): 4,216 (27.11%)
Higher vocational education: 986 (6.34%)
Higher education: 2,846 (18.3%)
Without school education - persons aged 15 and over: 34 (0.22%)
Not found: 774 (4.98%)

LOCATION, TERRITORIAL CONTEXT

The town is located in the Podtatranská kotlina, in the northern part of the Popradská kotlina, in the valley of the river Poprad. To the west lie the High Tatras and the Kežmarok Uplands, to the east of Kežmarok the Levočské hills rise. The railway line 185 and the road I / 67, resp. road I / 66, which is crossed here by road II / 536. Other district towns in the area are Poprad, 14 km southwest, Levoča, 27 km southeast, Spišská Nová Ves, 28 km southeast, and Stará Ľubovňa, 34 km northeast. The nearest neighboring town is 7 km north of Spišská Belá. Starý Smokovec - the administrative center of the High Tatras, is 19 km to the west. The nearest border crossings are Podspády, 33 km away, and Lysá Poľana, 36 km away, connecting Slovakia with Poland.
Kežmarok lies in the rain shadow of the High Tatras and Levočské vrchy. The climate is mild with cold winters. The subsoil consists mainly of loess, Quaternary sediments of the floodplains of the rivers Poprad and Ľubica, sandstones. The predominant soil types are medium-heavy loam soils, alluvial soils and floodplain soils. There are deposits of sandstone under the Jerusalem Hill (Jerusalem) and brick clay in the area of the Kežmarská Biela voda stream.

1.3 SWOT ANALYSIS - IOT SYSTEM



1.4 VISION

ECONOMIC AND SOCIAL DEVELOPMENT PROGRAM OF THE TOWN OF KEŽMAROK

Strategic planning for each entity represents a system of coordinated decision-making processes triggered by the adopted strategy. It is an essential part of the activity of every subject and focuses on the future of the subject as it implements the adopted strategy into the life of the subject.

Regional development represents a permanent growth of the economic potential and social potential of the region, which increases its economic level, performance, competitiveness and the living standards of its inhabitants.

The development program is based on cities and municipalities based on a qualified analysis of development needs and opportunities. It takes into account the needs of the population, public and private as well as non-profit sector in the area.

In terms of the development program and the Smart green city concept of the city of Kežmarok development and advancement through modern and IoT technologies, which is a high effort to implement. Improving the quality of life not only of residents but also visitors and tourists is a long-term priority of the city management. Kežmarok is a tourist town visited by tourists from all over Slovakia, Poland, Hungary, the Czech Republic, Ukraine and other countries.

Smarte technologies help to improve the services provided to city residents and tourists, while improving the city's safety, traffic situation. The city's vision is to implement smart technologies in all possible areas of the city, which is very demanding from a technical, financial and time point of view.

The first important pillar is the public services that we want to focus on in the near future. With the prepared projects financed from the resources of the European Union and the Slovak Republic, we will focus on 7 areas of Public Services, namely Smart management of public lighting, Pedestrian crossings, Parking system, CCTV system, Smart municipal waste management, Information System. For a small town like Kežmarok, this will be a challenge that it is determined to meet.

Strategic planning is a set of procedures and tools for making effective decisions that will lead to the achievement of set goals. The strategic planning process is designed to help share responsibility for the future, build consensus on the future and design forward-looking strategies.

Adopted and valid document ,, Program of economic and social development of the city of Kežmarok, which update for the next period of 7 years is in preparation and will include areas of smart technologies for the public services sector.

1.5 URBACT LOCAL GROUP

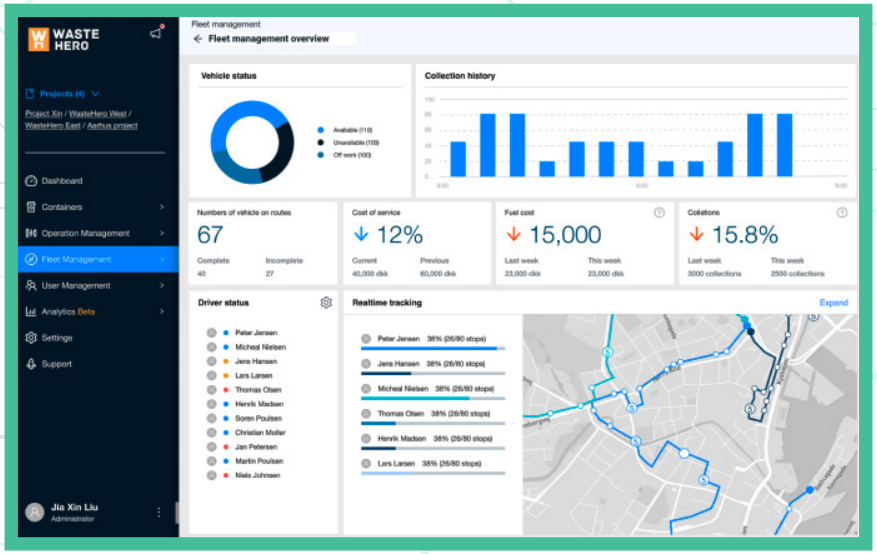
URBACT LOCAL GROUP is a group of people assembled by the project team of the city of Kežmarok, who participate in ULG meetings and participated in the preparation of the SMALL SCALE ACTION and in the preparation of the INTEGRATED ACTION PLAN for the city of Kežmarok. The group consists of 7 members, of which 1 member is from the national contact point for URBACT in Slovakia, which is a very positive benefit for the group and one member is from the private sector. During the project, 1 member resigned and subsequently 1 new member was invited to the group.

MEMBERS:

- Mgr. Marta Markočiová / City of Kežmarok / ULG coordinator / public
- Mgr. Dávid Cintula / City of Kežmarok / project manager / public
- Ing. Dana Skupinová / City of Kežmarok / IT specialist / public
- Ing. Peter Justh / City of Kežmarok / / preparation and investment department / public
- Ing. Eduard káčik / Lightech / CEO / private
- Ing. Matúš Žák / Slovak contact point for the URBACT Operational Program / Ministry of Transport and Construction of the Slovak Republic / public
- Ing. Matúš Madeja / City of Kežmarok / / preparation and investment department / public
- Ing. Peter Gaži / Public services of the city of Kežmarok /public

1.6 SMALL SCALE ACTION

The Small Scale Actions are pilots that enable cities to experiment new innovative solutions, while engaging the local stakeholders on effective ideas. The aim is to test at least one action per city, contributing to the development of the local Integrated Action Plans, as cities have the chance to see in reality if an action works or doesn't work, before including it in the plan.



Kežmarok focused on waste management in SSA through IoT sensors mounted in waste bins with a volume of 1100 liters. The subject of measurement is fullness
municipal waste bins in the most densely populated area of the city, where the largest amount of municipal waste is collected.

1. Decision of the ULG Implementation Group to measure the filling of waste containers
2. Public procurement of sensors
3. Installation of 22 sensors + web platform
4. Duration of SSA 6 months
5. Evaluation of a small-scale action

The contractor installed 22 waste container filling sensors in two densely populated parts of the city in 6 locations. Due to the fact that the city of Kežmarok does not have coverage of the IoT network, the sensors were connected via the GSM network, which is demanding on the battery life of the sensor and some functions of the sensors were suspended.

After a month of sensor implementation, we found in the platform that the sensors are losing network connectivity. The sensors were restarted and the connection only lasted for a short time - 2-3 days.
The loss of connectivity was consulted with the sensor manufacturer and it was concluded that the sensors came from a series with the wrong firmware. Due to the lack of microchips on the market due to the COVID-19 situation, the sensors had to be sent to the manufacturer for repair and could not be replaced with new pieces. The complaint lasted 2 months, which affected the data collection for SSA.

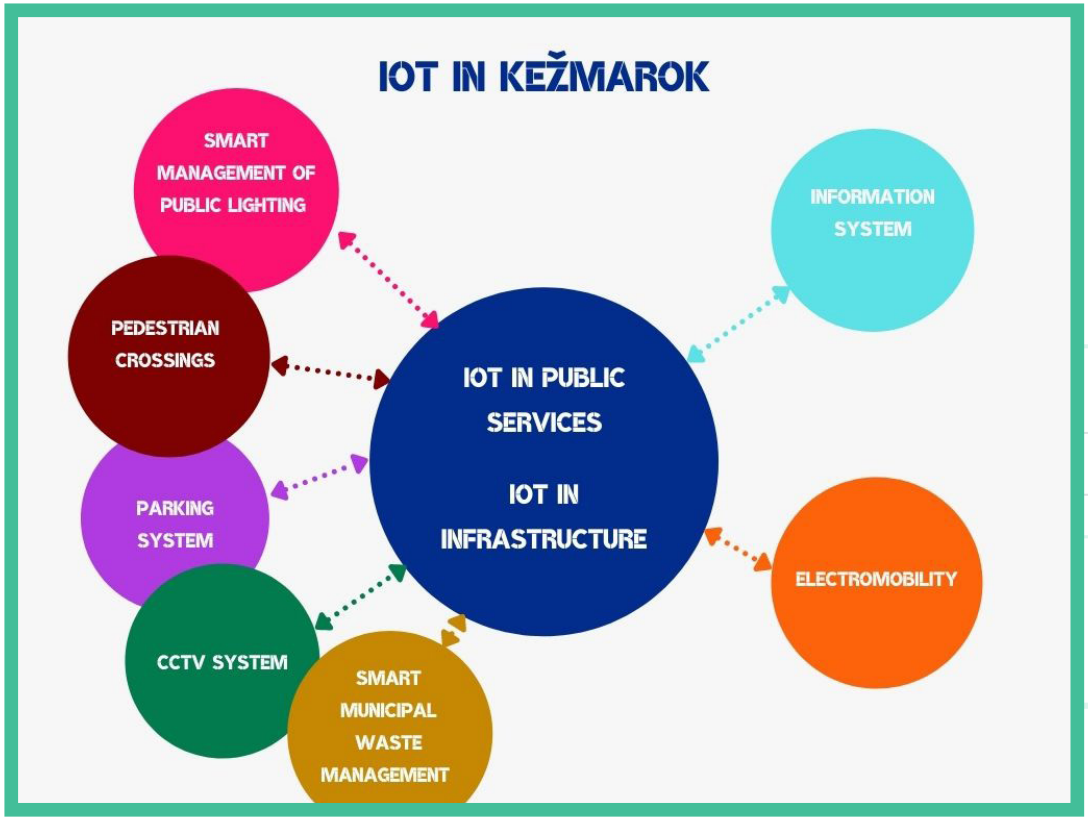
Key SSA experience:

High entry costs for IoT implementation for the whole city
Long-term return on input costs
Failure of ioT equipment
Limited power source
Real-time data overview displayed on the platform
Loss and damage of IoT equipment when used outdoors
Weak technical support from a foreign manufacturer

2. ACTION TABLE

2.1 FOCUS

Strategic documents for cities are key to making good progress. Kežmarok has a document that covers all the basic areas of the city's development, the Smart Green City concept, which determines the green direction and reduction of environmental burdens.
The direction of the integrated action plan sets ambitious goals for the City of Kežmarok, which, once fulfilled, will bring a higher quality of life and services for the inhabitants.
It focuses on two areas in the city that are an essential part of life in Kežmarok:



IOT IN PUBLIC SERVICES

SMART MANAGEMENT OF PUBLIC LIGHTING

Smart management of public lighting allows you to easily set the level of lighting intensity and remotely diagnose it for the entire city, for defined groups of luminaires or for each luminaire separately. Public lighting can be fully controlled from the control center. The system provides all the necessary data for efficient operation and thus reducing costs for the city.

PEDESTRIAN CROSSINGS

The proposed intelligent pedestrian crossings collect data on pedestrian movements in the pedestrian crossing area. In the case of the presence of a pedestrian in the area of the pedestrian crossing at the crossing, the resulting higher safety of the passing pedestrian and at the same time a system of warning the driver that there is a pedestrian at the crossing.The evaluated data on the movement of pedestrians at the crossings are sent to the open API interface for further work with the data. The installation of intelligent pedestrian crossings is the main visibility of pedestrians and the resulting safety of pedestrians when crossing the road. The installation reduces the probability of a possible danger to the life of the pedestrian, because from the lighting of the passage.

PARKING SYSTEM

The proposed parking system envisages the collection of data from cameras that are connected to the local camera system. The data is analyzed and stored in a local database. The advantage of real-time supervision of individual payments directly in the field. The city has 24 hours. Immediate overview of parking fees and parking utilization and the city has the option of checking recidivism, checking the resident or visitor of the city, checking the payment method used and the potential agenda for resolving the violation. Thanks to the installed cameras, the city can manage the vehicle registration number. The public administration information system will inform about the amount of free parking spaces at individual locations.

CCTV SYSTEM

The proposed smart camera systems evaluate alarm situations in the proposed area and alert the operator of the surveillance system only to alarm situations, thus enabling them to respond to, document and resolve violations. The introduction of a smart camera system will be primarily beneficial to improve the functioning of the city police, the situation. The big advantage of smart cameras over outdated analog cameras is the quality and distribution of the image. The intelligent camera system can ensure the detailed implementation of offenses or other criminal activity. The installation of an intelligent camera system is also preventive. The potential perpetrator will refrain from criminal acts, the camera system will also result in an increase in the safety of citizens and visitors to the city.

SMART MUNICIPAL WASTE MANAGEMENT

The basic source of data for the system will be the existing agenda system of self-government, containing all relevant data on payers for municipal waste. Data from this system with unique identifiers. The proposed smart solution is an advantage for the city or municipal municipal company, which in this way can very effectively monitor statistics. It is planned to implement a new method of municipal waste collection based on unambiguous identification of waste generators. Equipping waste containers (including bags) with unique identification elements via RFID chips, QR codes or a combination thereof. Equipping publicly accessible containers with an electronic locking system, preventing the dumping of waste by unauthorized persons. Equipping waste collection vehicles with an automatic waste container identification system. Implementation of an information system for processing statistics with waste collection and its connection with relevant existing implementation systems of the city. Implementation of a mobile application for citizens that communicate with citizens and make payments for municipal waste.

IOT IN INFRASTRUCTURE

INFORMATION SYSTEM

The information system that the city of Kežmarok plans to operate will contain all the data collected by IoT elements and comprehensive information that citizens will view after registration. The system should work on displaying current data in real time. Data will be displayed regarding parking, waste collection, fees paid, transportation, information provided by the city and more.

ELECTROMOBILITY

Electromobility, resp. electric mobility, is a road transport system based on electric vehicles. The central elements of such a transport system are electric vehicles, supplemented by charging infrastructure, appropriate information technologies and legislation. Apart from building the charging infrastructure, electromobility does not require any special interventions in the road infrastructure.

2.2 ACTION TABLE

The application of things to create smart internet services is an example of public sector innovation with IT support that affects all areas of the city, such as administration, transport and healthcare. The ability to transmit contextual data in space and time can improve the efficiency of processes and people, create new ones, improve existing services and improve the delivery of public services and increase citizens' profits. While many examples illustrate the potential benefits of the Internet of Things for local governments, deployment must be done carefully to avoid unforeseen difficulties.

IoT IN PUBLIC SERVICES					
ACTION	**DESCRIPTION AND INTENDED RESULT**	**SOURCING AND FUNDING**	**LEAD ORGANISATION & LEAD PARTNERS**	**TIMESCALE**	**BUDGET**
Smart management of public lighting	Smart management of public lighting allows you to easily set the level of lighting intensity and remotely diagnose it for the entire city, for defined groups of luminaires or for each luminaire separately. Public lighting can be fully controlled from the control center. The system provides all the necessary data for efficient operation and thus reducing costs for the city.	City of Kežmarok IROP	City of Kežmarok Ministry of Investment, Regional Development and Informatization of the Slovak Republic Contractor	2022-2024	395 000 €
Pedestrian crossings	In the case of the presence of a pedestrian in the area of the pedestrian crossing at the crossing, the resulting higher safety of the passing pedestrian and at the same time the system of warning the driver that there is a pedestrian at the crossing. The pedestrian is monitored by a camera system as well as the traffic. When evaluating a dangerous situation, an alert system is triggered to alert all participants to the danger. Increased safety during heavy traffic and night hours.	City of Kežmarok IROP	City of Kežmarok Ministry of Investment, Regional Development and Informatization of the Slovak Republic Contractor	2022-2024	76 000 €
Parking system	The city has 24 hours immediate overview of parking fees and parking utilization and the city has the option of checking recidivism, checking the resident or visitor of the city, checking the payment method used and the potential agenda for resolving the violation. Thanks to the installed cameras, the city can manage the vehicle registration number. The public administration information system will inform about the amount of free parking spaces at individual locations.	City of Kežmarok IROP	City of Kežmarok Ministry of Investment, Regional Development and Informatization of the Slovak Republic Contractor	2022-2024	80 500 €
CCTV system	The intelligent camera system can ensure the detailed implementation of offenses or other criminal activity. The installation of an intelligent camera system is also preventive. The potential perpetrator will refrain from criminal acts, the camera system will also result in an increase in the safety of citizens and visitors to the city.	City of Kežmarok IROP	City of Kežmarok Ministry of Investment, Regional Development and Informatization of the Slovak Republic Contractor	2022-2024	190 000 €
Smart municipal waste management	The basic source of data for the system will be the existing agenda system of self-government, containing all relevant data on payers for municipal waste. Data from this system with unique identifiers. A new method of municipal waste collection based on unambiguous identification of waste generators. Equipping waste containers with unique identification elements via RFID or QR. Equipping publicly accessible containers with an electronic locking system. Implementation of an information system for processing statistics with waste collection. Implementation of a mobile application for citizens who communicate with citizens and make payments for municipal waste.	City of Kežmarok IROP	City of Kežmarok Ministry of Investment, Regional Development and Informatization of the Slovak Republic Contractor	2022-2024	210 000 €

IoT IN INFRASTRUCTURE					
ACTION	**DESCRIPTION AND INTENDED RESULT**	**SOURCING AND FUNDING**	**LEAD ORGANISATION & LEAD PARTNERS**	**TIMESCALE**	**BUDGET**
Information System	The information system that the city of Kežmarok operate contain all the data collected by IoT elements and comprehensive information that citizens will view after registration. The system work on displaying current data in real time. Data will be displayed regarding parking, waste collection, fees paid, transportation, all information provided by the city and more.	City of Kežmarok IROP	City of Kežmarok Ministry of Investment, Regional Development and Informatization of the Slovak Republic Contractor	2022-2027	125 000 €
Electromobility	Electric vehicle infrastructure refers in particular to the charging infrastructure for recharging the electrical energy storage (battery) of an electric vehicle with electricity from the mains or technical solutions that allow the replacement of batteries in electric vehicles. Vehicles with subsequent charging during storage.	City of Kežmarok IROP/OPKŽP	City of Kežmarok Ministry of Investment, Regional Development and Informatization of the Slovak Republic Contractor/ Environmental fund	2022-2030	380 000 €

2.3 KEY PERFORMANCE INDICATORS

"The Key Performance Indicators KPI acronym stands for key performance indicator—it's a metric that measures how projects, s preform in terms of strategic goals and objectives. KPIs are a way for stakeholders to see if they're making progress or if the business is on track".

KEY OBJECTIVES	INDICATORS	ACHIEVED
Saving public resources using intelligent light points monitored and controlled from headquarters	30% of saved public resources / 561 pcs of smart lamps	2025
Increasing safety and reducing accidents on major transport routes	8 intelligent pedestrian crossings	2025
Implemented intelligent parking system for local residents	961 monitored parking spaces	2026
19 new monitored areas	reduction of crime by at least 12%	2025
Implemented smart waste collection system for the home area	Increase of waste sorting by the expected 15% / reduction of the total volume of municipal waste	2025-2026
The overall system of providing all information to the inhabitants of the city	Online platform providing data	2027
Charging station system for electric cars	69 charging stations / reduction of CO2 production by 24%	2030

3. FOLLOW UP

3.1 RISK ANALYSIS

Each project plan should also include a risk plan. The risk plan shall include a definition anticipation, monitoring and mitigation of the consequences of risk events. if we are based on the basic definition of the project using the magic triangle of time, cost and quality, these risk events can affect three areas:

- Time: exceeding the planned time limit for achieving the project result
- osts: exceeding the planned project budget,
- Quality: the result of the project was not realized in the planned quantity or unplanned quality characteristics.

The aim of project risk planning is to minimize the negative consequences risk events. The causes of some of the foreseeable risk events can be influenced, so it is possible in in some cases. Otherwise, each project team should have prepared scenarios for minimizing and managing the negative consequences of risk events. Each project is unique and therefore it is not possible to prepare a universal list of possible ones risk. Projects are also social systems whose success or failure in considerable depends to a large extent on the people who implement them and on their relationships. Therefore from practice it follows that most project risks are related to the human factor.

Successful planning also includes anticipation, monitoring and mitigation occurrence of risk events. The risk plan should specify what precautionary measures are taken necessary to eliminate, respectively. limiting the effects of risk events.

RISKS	LEVEL
Risks related to project financing	high
Risks related to technology failure rate	high
Risks related to the organizational structure of the project	high
Risks related to project management	high
Risks related to the technical support of the project	medium
Risks related to suppliers of works and services	medium
Risks associated with the project outcome	medium
Risks related to network coverage where the technology is implemented	medium
Risks related to setting project objectives	medium
Risks related to non-adoption of new technology for users	low
Risks related to responsible leaves the organization	low

3.2 FINANCIAL RESOURCES

Kežmarok, as a small municipality with a population of up to 17,000, has a limited annual budget. The focus on the development of the city must be directed to all areas and therefore it is necessary to seek sources of funding from external sources. For this purpose, a project and public procurement department was also set up to ensure internal project management capacities.
The department is responsible for finding new and suitable grants in which the city can participate and thus obtain new sources of funding. The projects submitted to the new calls are approved by the Kežmarok City Economic and Social Development Program, which is a binding document adopted by the city.

SOURCE OF FUNDING	
The local program MAS ŠPIŠ	Provider of funds for local governments and the private sector for the development of the region
Operational Program Integrated Infrastructure	It is a programming document of the Slovak Republic on drawing assistance from European Union funds in the transport sector, informatisation of society and support for research, development and innovation for 2014-2020. Its global goal is to support sustainable mobility, economic growth, strengthening research, technological development and innovation and increasing the competitiveness of small and medium-sized enterprises through the development of transport infrastructure, public passenger transport, the information society, support for research, development and innovation capacities and the development of small and medium-sized enterprises.
Integrated Regional Operational Program	The aim is to contribute to improving the quality of the environment and to ensure the provision of public services with an impact on improvement and the territorial development, economy, territorial and social cohesion of regions, cities and municipalities.
Operational Program Technical Assistance	The global goal is high professional and financial support for the management and implementation of the European Structural and Investment Funds by completing the funds of an effective system of regulation of the European Structural and Investment Funds, increasing the quality of effective administrative capacity involved in managing, controlling, auditing and protecting the EU's financial interests to meet the objectives of "Europe 2020 - Strategy for strengthening and efficient public service, in particular improving human resources management and strengthening analytical capacities", as well as the National Reform Program of the Slovak Republic.
Horizont Europe	Excellent Science, Global Challenges and Competitiveness of European Industry, Innovative Europe

3.3 INTEGRATED APPROACH

The implementation of smart and IoT devices affects several areas of life. From the point of view of simplifying life by raising smart technologies in a certain area, we also influence others. Indirect impacts perceived mainly positively, which must be taken into account during implementation.

ACTION	DEPARTMENT	INTEGRATED APPROACH
Smart management of public lighting	economic, technical, environmental	cost savings, easy remote control, smart control, light smog reduction
Pedestrian crossings	transport, security, urban planning, services forcitizens	simplification of the traffic situation in the city, increase of pedestrian safety, new elements in the city, increase of the quality of services for citizens
Parking system	transport, urban planning, services for citizens	increase of the quality of services for citizens, urban planning, security, parking system control, cost savings, collection of parking fees
CCTV system	security and city police, IT, services for citizens	increasing safety in certain localities, control of public spaces, simplification of lung work, cost savings, human resources, increase of the quality of services for citizens
Smart municipal waste management	economic, waste management, human resources, environmental, services for citizens	increase of the quality of services for citizens, saving of population fees, saving of waste sorting and transport costs, environmental protection, human resources
Information System	Economic, transport, waste management, IT, services for citizens	connecting all systems to display information online, increase of the quality of services for citizens, human resources, reducing the agenda for municipal staff, saving time for residents
Electromobility	Environmental, transport, economic, urban planning, Environmental, transport, economic, urban planning, services for citizens	environmental protection, improvement of air quality in the city, income for the city, change of transport, improvement of services

3.4 IMPACTS OF IoT

Cost savings - IoT allows electrical items to be properly connected, saving and saving money and energy. IoT improves the efficiency of our systems by allowing data to be exchanged and transmitted via electronic devices and then translated into the required format.

Access to information - In real time, residents can easily access data and information that is far from your location. This is possible thanks to a platform that allows access to information.

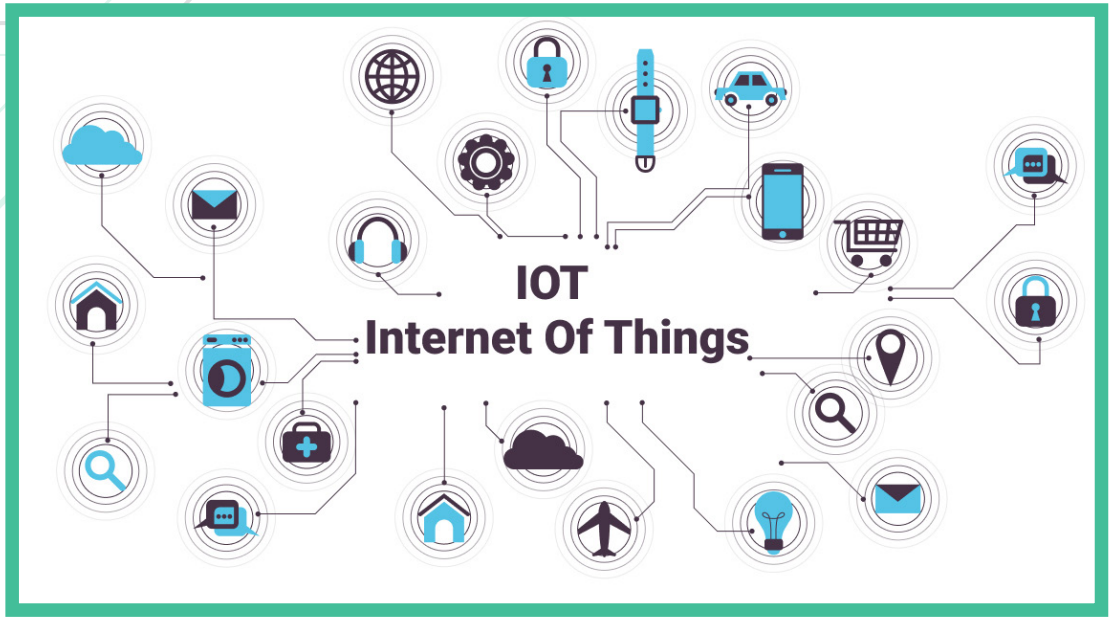
Efficient parking system - The system will ensure easy parking for residents at residential buildings, the stability of parking spaces. Data collected in real time and available to local authorities. Quick solution to system outages.
Pedestrian safety - It is very important to pay attention to the safety of pedestrians during the increasing traffic provided by smart crosswalks.

Smart waste management - increasing the sorting of municipal waste, environmental protection and financial costs, reducing the fees of residents for garbage, work efficiency

Work efficiency - Access to the information provided will significantly increase work efficiency.

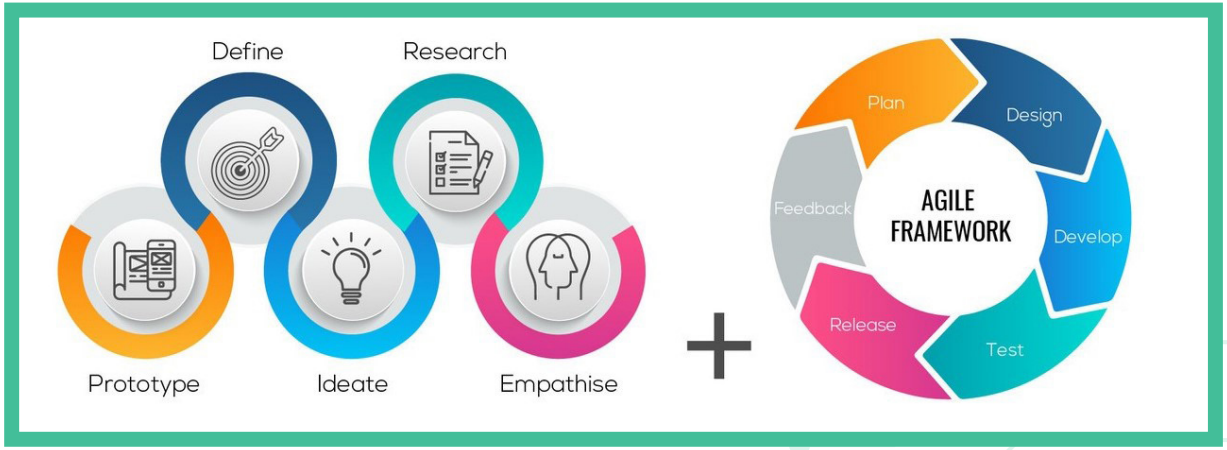
Security and privacy - Internet of Things security includes device security and protection of software applications and network interactions. Redesign the system to increase security.

Reliability and error rate of IoT devices - IoT technologies are advancing every day, but the reliability of functionality is still a weakness that needs to be worked on.



3.5 FRAMEWORK FOR DELIVERY

The implementation of IAP goals consists of several important aspects, which follow each other and the desired result and effect is achieved by a perfect interplay. The processing of documents for public procurement plays a very important role, as the subject will be the introduction of more than 550 elements of IoT technology. There are many small, important steps involved in applying this.



FRAMEWORK FOR DELIVERY				
ACTION	**RESULT**	**FUNDING**	**RESPONSIBLE ORGANIZATION**	**EVALUATION**
Public procurement	Successful tenderer / contractor	Kežmarok	Projects and Public Procurement Department	Project Managing Authority / Public Procurement Office
Project management	Guaranteed project management	Kežmarok	Projects and Public Procurement Department / External IT senior	Project Managing Authority
Analysis and solution design in addition to integration	Project documentation for IoT technologies	Kežmarok / MIRRI	External IT senior	Project Managing Authority / IT External manager
Purchase of HW and SW for the solution	Delivery of IoT technology	Kežmarok / MIRRI	Contractor	Project Managing Authority / IT External manager
Implementation	Total IoT implementation	Kežmarok / MIRRI	Contractor / External IT senior	Project Managing Authority / IT External manager
Testing	Functional system of IoT elements	Kežmarok / MIRRI	Contractor / External IT senior	Project Managing Authority / IT External manager
Deployment	Fully operational system	Kežmarok / MIRRI	Contractor / External IT senior	Project Managing Authority / IT External manager

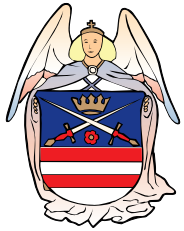
4. CONCLUSIONS

Already in 2015, the city of Kežmarok embarked on the path of a smart and dynamic city, which is an essential part of the direct use of smart technologies for the convenience of society. Participation in the URBACT IoTXchange project gave us the opportunity
elaboration of the Integrated Action Plan for the city of Kežmarok at the international level, which is necessary for the further direction of our city.
We used our knowledge and direct experience, which we gained during the entire duration of the project, in the creation of the Integrated Action Plan. Choosing the right concept is a credit and a benefit that can only be learned by exchanging skills on practical experience, which has allowed us to get involved in the project.

We believe that our efforts and participation have been beneficial for us as well as for the project partners and the IAP will lay the right foundations and show us the next steps we need to take in our endeavors.

"If you want to know something: Open the door or ask"

Marta Markočiová
David Cintula



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