



**Strategic Research and Innovation Partnership
(SRIP)
Smart Cities and Communities**

**Key orientations – Focus areas of
Horizontal ICT network**



Introduction

Organizationally, the ICT horizontal network (IKT_Hm) belongs under SRIP Smart Cities and Communities. It is defined as a set of enabling technologies and serves as support for all SRIP Smart Cities and Communities and SRIP verticals. IKT_Hm follows the **vision** of the Government of the Republic of Slovenia of making Slovenia a **green reference country in digital Europe**. The said referentiality is realized through an **exemplary model** of collaboration between the **business sector, science** and the **government** in the introduction of modern digital solutions into people's lives.

Objectives

There are two groups of objectives for IKT_Hm. First and foremost, the objectives will be aligned with achieving the targets of SRIP verticals' focus areas and towards synergies with the other stakeholders to meet the global S4 objectives:

- To increase the **share** of high-tech **intensive products** in the export: a rise from 22.3% to a EU-wide **average level** amounting to 26.5% as of 2015;
- To increase the **share** of exported **services** with a high knowledge content in the total export: from 21.4% to 33%, ie. **halving** the gap to the EU average;
- The rise of total **entrepreneurial activity** from 11% at least to the EU **average level** of 12.8%;
- To **connect** the stakeholders - business entities, educational and research system, NGOs, government and individuals into value chains according to the economy of closed material loops. To develop **new business models among industries** for the transition to the digital economy, in this way entirely reflecting the mission and purpose of IKT_Hm;

The second group of objectives covers the realization of developmental ambitions and the definition and execution of development in IKT_Hm focus fields:

- **At least 3 digital innovations** with mutual innovations in the business operations and technologies
- Developing **at least one product** in each of the 6 IKT_Hm fields
- Selling **at least 5 solutions/products** on the target markets

Horizontal ICT network strategy

The basic objective of IKT_Hm according to the S4 strategy is **providing support to the developmental activities** of all SRIPs in the field of ICT, above all in the preparation of foundations for the use and integration of ICT as **enabling technologies**. The digital transformation as a key paradigm of modern development and human progress removes the gap between ICT as a technology and different processes (industrial, business, citizen ...). Active collaboration between IKT_Hm and the other SRIP Smart Cities and Communities verticals and SRIPs shall therefore be its key task. In scope of IKT_Hm, we are going to focus on the development and implementation of **integrated** systems/platforms, and at the same time use our competence and solutions to support the developmental activities in the focus fields of individual SRIPs and SRIP Smart Cities and Communities verticals. Therefore, we are going to form intense relations with all the SRIPs, get involved in the value chains and participate in the development.

IKT_hm is going to actively support its members and new value chains in the **penetration** into foreign markets.

Focus fields of Horizontal ICT network

1. Digital transformation

The Digital transformation field focuses on the co-creation of digital solutions together with the SRIPs in their value-added chains, so that they will have a better opportunity to address the real needs of digital users, to be integrated with new digital business models, and to be tested and verified in a business laboratory before launching on the market; all this for a successful preparation and execution of the whole digital transformation project.

Objective:

To qualify the organisations for efficient adaptation, re-engineering, establishment and innovation of business models for the digital transformation. The objective is to form a supportive environment for efficient knowledge transfer in the field of re-engineering, establishment and innovation of digital business models.

Areas of joint development:

1.1 New business models and promoting entrepreneurship related to the digital transformation

Establishing the organization, processes, concepts, methodologies and services for efficient innovating and experimenting with the business models for the digital transformation of companies. The services also include transfer of best practices and competence, consulting, as well as creating and linking environments for innovating and experimenting with digital business models, processes and services. In digital business innovation, one needs to focus on understanding the customer's needs and habits in relation to the capability of digital technologies to fulfil such needs, all this with the end goal of adding more value and reaching a more sustainable competitiveness. Establishing a national network of FabLab-s to serve as a supporting environment for the development activities of all SRIPs, above all with preparing prototypes and pilot projects.

2. IoT (Internet-of-Things, embedded systems and sensors)

IOT is a global infrastructure, using advanced communication technologies to connect various devices and sensors (physical and virtual) to the Internet, and enabling advanced Internet services. These are the new technologies and business models, which are crucial to the development: improved communication capabilities, new management tools, security (IoT security, cyber security), data storage and analysis, including cloud-based architectures and machine learning, as well as a higher impact of open data models.

Objective:

To prepare the platforms for connectivity (wireless, mobile, 5G, new technologies), sensor technologies, distributed smart modules, smart buildings, adaptations and applications; and link them up in new ICT/IoT solutions for all fields via R&D and innovation.

Areas of joint development:

2.1 IoT and communications for public safety

A convergent and secure system of public and dedicated 4G/5G communications for demanding and critical environments, enabling heterogeneous access technologies and international integration, while operating in concord with the existing TETRA and DMR systems.

2.2 IoT open sensor platform

Development and deployment of a large sensor platform to monitor the city parameters, including and linking various sensors and making it possible to monitor the quality of the living environment over time. The data will be accessible via an interactive website and open program interfaces, enabling the development of new applications by third parties and open innovation.

2.3 IoT security

The Internet of Things is exposing new, specific or different security challenges. This focus field will address the specific aspect of security in IoT as a part of a wider cyber security framework. Telematics includes the handling of end devices and sensor systems, the aspects of network communication for IT, and the security of cloud solutions.

2.4 Blockchains in the IoT

Using the blockchain technology to support decentralized trusted IoT solutions. Blockchains can be used for transparent and irrevocable automated electronic transactions between people and machines, or for trusted distributed data storage with no central authority.

2.5 IoT energy efficient and smart home

Developing and implementing a platform for home management and multimedia support, based on the new building automation elements and multimedia devices in the scope of Internet of Things. In this way, the end user obtains full and personalised control over the home environment for improved living comfort, energy awareness and safety.

2.6 IoT for smart food production

Development and establishment of a demonstration platform for new technologies in food production, plant watering, spraying of plant protection products, and crop growth and quality monitoring as important factors for efficient and sustainable plant production. Advanced technologies and sensor systems make it possible to rationalise these agro-technical measures, and thereby boost the crops and mitigate the health problems of cultivated plants, in turn also reducing the environmental burden.

2.7 IoT for health and active living

Development of dedicated business solutions for smart health involving the IoT, combining a healthy and active lifestyle of individuals, families and employees.

2.8 IoT for the communication solutions for smart environments

Designing a decentralized architectural model and setting up demo infrastructure to support location-specific and time-critical services in smart environments (cities, factories, buildings, energy networks, traffic etc.) with data processing via edge computing capabilities and support for interoperability.

2.9 IoT for smart factories

Developing and establishing a platform for controlling and managing the production equipment, manufacturing processes/lines, optimisation and planning based on the IoT elements – data collected from various sources and using predictive analytics is processed in different ways using artificial intelligence (AI) and machine learning (ML). Full digitalization and electronic data exchange is instrumental both internally in companies and between the companies, accelerating the formation and management of intra-company value chains.

3. IoS (Internet of services, platforms)

In this focus field, a comprehensive service platform for IoS will be developed, enabling the organisations to transition from the traditional multi-layered architectures to the cloud architecture, providing for efficient

development of new digital services by all involved actors. Next to the technical aspects, the platform will also include a set of horizontal value-added IoS services, useful as building blocks for solutions in the individual verticals and other projects.

Objective:

The key objectives in scope of the IoS - Internet services and platforms focus field are as follows: (1) to raise and significantly reinforce the technological level of Slovenian companies for a competitive development of modern digital solutions and services and for mastering the third platform and other technologies; (2) to design, develop and deploy innovative services and to build around them innovative business models, based on cloud Internet of Services applications, APIs and other technological measures, and to apply them in the scope of modern digital solutions; (3) to establish new value chains of stakeholders, linking new and disruptive actors and traditional companies to shape new niches and address the target consumer groups in new, innovative ways;

Areas of joint development:

3.1 Innovative horizontal services IoS

The Innovative horizontal services IoS focus field targets the usability, innovation ability and suitability of services provided, such as paperless business services, regulatory aspect services, payment services and APIs, e-document processing services, language technology solutions, remote data capture services, data handling services, modelling and interactive visualisation of multi-variate data flows.

3.2 Business process innovation and digital business models related to the IoS

The focus fields in the Business process innovation and digital business models package are solutions for advanced call centre management, supporting services for the customs clearance processes and shipment tracking, solutions for process simulation in Industry 4.0, solutions for assessing the feasibility of business models and business entities, as well as solutions for the analytics, business reporting and data mining.

3.3 Technologies related to the development and establishment of a comprehensive service platform ie. the third platform

The software platform field will focus on adapting the areas capable of raising the technological level and leading to global breakthroughs in focus (niche) fields such as solutions for cloud-native platforms, microservices, setting-up, monitoring and optimal utilization of cloud services, solutions for API management, integration with back-office systems and IoT devices, safety aspects of IoS applications, QoS and SLA assurance, open data and open APIs.

3.4 Innovative IoS services related to the Blockchain technology

In the package titled Innovative IoS services related to the Blockchain technology, the focus fields are the development of services for storing personal and sensor data and for decentralised data management, solutions for management and safe long-term storage of data and documents, as well as solutions for detecting the characteristics of crowds using the crowd-sensing concepts.

4. Cyber security

The development of ICT Horizontal network cyber security field (Hm ICT CS) aims for products and services for comprehensive management of cyber risks in the business and public sector in the phases of development and operational use of ICT services through implementation of a high level of cyber maturity, which is necessary to successfully meet the objectives of digital transformation in the business and public sector.

Objective:

The cyber security field will offer easily embeddable products and services, supporting the latest safety standards. We will address the tools for monitoring and controlling events in the information systems, the event analytics for threat and anomaly detection, tools to support the assessment of countermeasure effectiveness, identity management, authorization and access control, trust assurance, transparency of evidence, storage and management of digital transactions, blockchain technology, anonymity, secure data storage, secure communications and data blending in networks, privacy and confidentiality protection and management tools for data warehouses, tools for secure processing of big data and spatial data, tools for security data analytics, embedding artificial intelligence into security products, security as support in digitalization and in the Internet of Things.

Areas of joint development:

4.1 Development of security products and services

This focus field is dedicated to developing the safety products and services which make it possible to develop and provide services in SRIP Smart Cities and Communities verticals and horizontals and in other SRIPs in a secure and reliable way. The security products are suitable for the city IoT ecosystems, as well as for cloud or edge systems. The development is planned to encompass products directly providing for security and privacy, as well as products for operative security and privacy.

4.2 Cyber security of vertical and horizontal products through their whole life cycle

Cyber security is tasked to protect the data, information, systems, services and users. Cyber security must be embedded in every component of a digital service: hardware, communication equipment, sensors, operating systems, databases, communications, platforms, applications, service operators, users. Tools and mechanisms are necessary to establish and support security in all phases of the life cycle, from design, development and testing to implementation, enhancements and finally the retirement of all of the above.

5. HPC & Big Data

HPC (high-performance computing) and **Big Data** are two related fields, offering high-performing analysis of big and complex datasets in various fields: from biology, physics, complex social phenomena to advanced manufacturing (simulations, product development, process optimization ...).

Objective:

To place HPC and Big Data into value chains based on the High Performance Computing infrastructure (HPC), and on the other hand make the foundations for a number of applied fields, which are already generating large quantities of data and may offer breakthrough and innovative services and new knowledge when combined with suitable analytics.

Areas of joint development:

5.1 High performance computing

High-performance computing accelerates the progress of industry, supporting it in faster and more efficient product and service innovation through the use of superfast computers, modelling and simulation tools, and provides extra momentum to branches offering services and products.

5.2 Big data

The "Big Data" field offers approaches and technologies for management, data analytics and support in decision making. The quantities of data dealt with can vary from small to very large requiring special high-performance cloud infrastructure, HPC or HTC. The data sources can be static and written in databases, or acquired in real time from sensor or web sources for continuous processing.

6. GIS-T

The GIS-T field delivers the enabling technologies for using time and location information in advanced big data analyses and innovative user services. GIS-T therefore focuses on the development of an integral spatial information infrastructure, enabling the blending of spatial data with data from terrestrial observations to raise the value added of information products and user applications and services.

Objective:

To prepare and deploy technologies for using time and location information and data from terrestrial observations in advanced big data analyses and innovative user services. This field focuses on the whole flow from the source of spatial data through an integration spatial platform to location-supported services integrated in the business processes.

Areas of joint development:

6.1 Integrated data acquisition systems

Integrated data acquisition systems will be capable of providing current information about the location, space geometry and the status of the environment, e.g. temperature, air pollution, weather data and other data from the terrestrial observations. The key development technologies in this field are the multispectral cameras, integrated sensor systems for terrestrial observations and terrestrial stations for mission control, data collection and processing.

6.2 Advanced platforms for the creation of data products

Advanced platforms for creating data products will be capable of integrating domain-specific datatypes, structuring them into integrated information layers (data sets). These include platforms for managing the BIM information models of artificial structures, satellite image processing, 3D aerial images, location tracking for vehicles and mobile objects, as well as other sensor data flows and open (crowdsourcing) platforms.

6.3 Integration platforms

Integration platforms are capable of creating added value in data products through blending and linking of information layers, acquired from specialised or open third party platforms, such as the national and local/city spatial infrastructure and the BIM models of infrastructural facilities. The usage and co-creation of standards in this field is instrumental (ISO, OGC, Inspire, CIM ...)

6.4 Advanced applications and location services

In order to focus the stakeholders' R&D activities, we are planning application packages originating from integrated platforms and open web services, such as applications for spatial analyses, forecasting the development of events and spatial optimisations in the phase of intervention planning, applications for process control including spatially-dependent tracking of process development, detection of critical conditions, and autonomous responding or support in decision making.

