

Thematic areas and sub-areas Innovation Strategy for Smart Specialization (IS3) 2021-2027

1. The following priority sub-areas are included within the "Informatics and ICT" thematic area:

- ICT-based services and systems; ICT approaches in mechanical engineering, medicine and recreative industries, circular and bio-based economy, tourism (in relation to the other thematic areas), incl. digitization of cultural and historical heritage, entertainment and educational games, tele-medicine and tele-care and "embedded technologies";
- 3D digitization, visualization and prototyping;
- Internet of Things (IoT);
- Artificial intelligence and increasing the industrial and technological capacity in the assimilation of artificial intelligence;
- Big/connected data, geospatial data, data analysis, data processing (Data processing, Small data science), data toolkit, sharing, exchange, use and reuse of data, cloud computing (Big Data, Grid and Cloud Technologies), data-driven predictive models; simulation, modeling and digital twins;
- Communication networks, including wireless sensor networks and wireless communication/control;
- Cyber-physical systems and digital counterparts; cyber security;
- Blockchain technologies;
- Systems and services in the field of fintech;
- Technologies for human-machine interaction (Interaction technologies);
- Internet services; software as a service, innovation-as-a-service and everything-as-a-service (SaaS, IaaS and XaaS) and service architecture; web, hybrid and "native" applications, web-based applications for creating and exploiting new services and products;
- Productions, including Fables, especially of products, devices and systems created in Bulgaria.

2. The following priority sub-areas are included within the "Mechatronics and Microelectronics" thematic area:

Production of basic elements, details, units and equipment, incorporated as part of a mechatronic unit or independently constituting such unit;

- Mechanical engineering and equipment engineering, incl. parts, components and systems, with an emphasis on general purpose, specialized, special/cyber/ and service robotics;
- Development and production of electronic and electromechanical components and modules;
- Engineering, reengineering and continuation of the life cycle of industrial machines, devices and systems based on the "Industry 4.0" platform and digitization and digital transformation of industrial production;

- Design, development and production of robotic systems for automation, including and those with artificial intelligence; Encouraging the launch of serial production of Bulgarian autonomous robots and systems; increased implementation of robots and autonomous technologies in Bulgarian industry; use of robots in sectors with a long-term shortage of personnel such as: agriculture, hygiene activities, manual repetitive operations and others;
- Development, research and application of systems for technological robotics, with an emphasis on heavy processes and aggressive environments (welding processes, casting systems, servicing and maintenance of aggressive and dangerous processes, etc.);
- Design and production of high-tech and export-oriented mechatronic products with high added value incl. in the aerospace industry and participation in supra-national production chains; Hybrid validation of mechatronic systems through virtual and physical prototypes; Automotive and aero-mechatronics;
- Intelligent systems and appliances, incl. using artificial intelligence; 3-D modeling, design and validation of components and systems; 3-D printing for industry needs;
- Biomechatronics; Bioelectronics – modeling and characterization of charge transfer and signal processing in bioobjects such as proteins, DNA, etc. to develop building blocks and create prototypes of integrated devices and sensors;
- Systems and technologies for the development of the Blue Economy;
- Mobility and location based systems and technologies;
- Photonics and imaging technologies;
- Modeling (device modeling) of semiconductor elements and components, as well as circuits and systems containing conventional and unconventional submicron and nanosized devices - compact models, physical models, behavioral models, logical models, system models; Circuit design (ECAD), topological (layout) design (ECAD), technological design (TCAD) and development of integrated circuits and systems - digital, analog, mixed signal, RF; Design, development, research, prototyping and qualification of specialized analog and digital-to-analog integrated circuits (ASICs), including EMC and ESD protection-on-chip; Verification and testing of semiconductor integrated circuits in the development process and in the production process;
- Virtual technologies for the development of new products and processes, virtual prototyping and optimization;
- Design, development, characterization and prototyping of MEMS devices and structures for sensors, RF, biomedical, industrial, agricultural, pharmacology, etc. applications;
- Assembly and packaging of semiconductor chips;
- Failure analysis in integrated circuits, systems, devices, modules; Development of software for embedded systems, as well as software design solutions (EDA), incl. open source;
- Synthesis and characterization of new materials with applications in micro- and nanoelectronics;

- Design, development and production of devices, equipment and systems with application in semiconductor production; Pilot lines for experimentation, development and testing of innovative processes, facilities and technologies;
 - Modelling, characterization, design and development of processes and technologies for conversion of collected energy (energy harvesting), as well as design, prototyping and production of such devices;
 - Develop, refine and adapt approaches, technologies to accelerate the development of quantum chips.
3. The following priority sub-areas are included within the **"Industry for healthy living, bioeconomy and biotechnologies" thematic area:**
- Methods for clean production, storage, processing and reaching the end user of specific Bulgarian ingredients, means and products (including yogurt, honey and bee products, bread, wine, dairy and meat products, essential oils, beer, herbs and herbal products , cosmetics and products);
 - Production of instruments, equipment, consumables for medical and dental diagnostics and therapy and/or participation in a supra-national production chain;
 - Personal medicine, diagnostics and individual therapy, medicinal and medicinal forms and means;
 - Medical and healing tourism with an emphasis on the possibilities for personalization (non-mass, but personal tourism);
 - Biotechnologies with direct application for a healthy lifestyle;
 - Introduction of innovative methods in agriculture and fish farming, without the use of chemical preparations for pest control and fertilization;
 - Application of new methods and technologies in the sustainable use of river and sea resources;
 - Blue and green bio-based economy;
 - Industrial biotechnology;
 - ICT with application in the thematic area;
 - In vitro, tissue engineering and regenerative medicine;
 - Photonics and imaging technologies, screens and display technologies.
4. The following priority sub-areas are included within **"New technologies in the creative and recreational industries" the thematic area:**
- Cultural and creative industries, incl. digitization (according to the EC definition: architecture, archival and librarianship, arts and crafts, audio-visual forms (film, TV, video games and multimedia), cultural heritage, design, including fashion design, festivals, music, performing and visual arts , publishing, radio);
 - Computer and mobile applications and games of an educational, marketing and/or entertainment nature;
 - Production of goods and equipment with direct application in these areas (e.g. national (regional) costumes, bicycles, climbing walls, etc. goods and services for

alternative and extreme sports and tourism, costumes, sets, materials for historical reenactments, specialized equipment and equipment, printed publications).

5. The following priority sub-areas are included within the **"Clean technologies, circular and low-carbon economy" thematic area:**

- Innovations in the field of production, storage, saving, efficient distribution and consumption of energy, incl. from various renewable energy sources;
- Creation of modern information complexes for autonomous energy systems;
- Hydrogen - based technologies: production of hydrogen with emphasis on green hydrogen, storage, transport and use of hydrogen in industry, energy, transport and household;
- Developing innovative sustainable technologies to integrate hydrogen into industrial processes, especially those that are more difficult to decarbonize, such as steel, cement and glass;
- Development and implementation of technologies related to sustainable mobility (battery and hydrogen), based on hydrogen and other alternative fuels, related infrastructure and eco-mobility;
- Technologies for efficient use of resources, to reduce the content of hazardous substances, to use alternative raw materials and materials, to extend the life of products and their use in other productions and services;
- Waste-free technologies and methods for incorporating waste products and materials from production into other productions and services.