The 5 areas of the internet of things that are changing our lives the most

Smart homes, smart cities with connected vehicles and smart infrastructure, smart factories, medicine and agriculture: these are the areas in which digitisation and connection to the internet are leading to the greatest amount of changes, new solutions and business opportunities.

In the next ten years, the European market in solutions afforded by the internet of things will be worth EUR 80 billion, according to the latest study by the A. T. Kearney consulting firm. These solutions are expected to increase productivity in the EU by EUR 430 billion, and user purchasing power by EUR 300 billion.

6.4

billion devices will be connected to the internet in 2016, which is 30 percent higher than in 2015, according to forecasts from the research and advisory firm Gartner.

20.8

billion devices will be connected to the internet by 2020 according to Gartner forecasts, while according to Business Insider forecasts this figure will be 34 billion.

€ 5,500

billion will be spent for IoT solutions until 2020.

5.5

million new devices will be connected to the internet every day this year, according to Gartner forecasts.

€ 215

billion will be invested this year in services in the area of the internet of things, which is 22 percent higher than last year.

What is the internet of things? It is a network which in addition to phones, monitors and computers, also links billions of sensors, machines, household products and cars. Connection to the internet and algorithms that are able to process huge databases allow the development of smart solutions for smart living and work. According to the optimistic scenario, the internet of things (IoT) will enable a bigger advance for humanity than we can even imagine right now. A few examples: smart grids will allow more efficient coordination of supply and demand during peak times, which will make the supply of electricity more reliable and cheaper. According to some calculations, smart grids around the world will save EUR 426 billion by 2020, and reduce carbon dioxide emissions by several million tons. Smart traffic infrastructure will make driving safer, cheaper and cleaner. According to some studies, smart traffic solutions could save the USA EUR 110 billion due to fewer accidents and fewer traffic jams. Connected cars will change business models in the car industry. In the future we will probably buy fewer cars and more rides, and algorithms will connect drivers with potential passengers and lead to the development of new models of joint use or sharing. The digitisation of factories is changing manufacturing systems, and the IoT is also expanding into supply chains, distribution systems and sales.

Manufacturers and IT specialists are continually developing more products and solutions for smart living, more efficient use of urban space, transport, health, agriculture, etc. In the area of consumer products, the fastest growth and progress is occurring in the market of active and healthy lifestyle products, says Tomaž Vidonja of the ICT Institute for Technology Networks, which holds an annual conference called Living Bits and Things. 'The internet of things doesn't enter our lives with great fanfare; it is a gradual but steady process,' says Vidonja.

Revenues from new products and solutions based on the internet of things
worth billions of euros
Source: Statista

Prihodki novih izdelkov in rešitev na podlagi interneta stvari
v milijardah evrov
Vir: Statista
1.570 — 2019
841 — 2016
167 — 2009
ocena

1. Smart homes

Smart lighting, thermostats, refrigerators, apps for monitoring pets with room cameras connected to smart phones – all of these are solutions that are making our homes smarter. At this year's CES electronics show in Las Vegas, where technological trends in electronics are established, the biggest hit was the Amazon Echo. To date, more than ten companies have stated that their products will be able to be voice-controlled via the device, and the security firms Alarm.com and Vivint have also announced that they will be cooperating in the project. Echo allows you to control the lighting in your home, obtain weather information, etc. Ford has announced that their car software will be able to link to Echo, which means that drivers will be able to voice-control things like their home lighting from their cars. Last year, the biggest hit at the CES show in the area of smart home appliances was Google's Nest digital thermostat. This year, Whirlpool presented connected kitchen appliances, which can be controlled either by Nest or IBM's Watson. In practice this means that Whirlpool's washing machines will be able to detect when we are not at home, and start the wash at that time. Also appearing at CES was a smart laundry start-up called Marathon Laundry, which presented a washing machine that collects large amounts of user data, and is expected to create a revolution in the washing machine industry similar to what Tesla has achieved in the car industry. The Slovenian company Gorenje is also developing smart devices. As in other areas, there are still a lot of questions about communication standards for connected homes, which means that in practice some devices will not be fully interconnectable. There are also uncertainties about the ownership of the data: it is not completely clear how much the corporations which sell us these devices will monitor the data on our habits and private lives. Of all of the main obstacles to the spread of smart home devices, the biggest is still how complicated they are to operate. There are also bigger risks: can we afford to have our thermostat not working because we lost our internet connection or because hackers broke in to the system?

3 SLOVENIAN EXAMPLES

Smart cubes predict storms
The CBSR company, owned by Aleš Špetič, Nejc Kodrič, Marko Mrdjenović, Damijan Merlak and Rok Zalar, has already developed the second generation of smart cubesensors, which are filled with sensors for measuring temperature, pressure and humidity, and has added new functions such as storm warnings.

Chipolo for finding objects

The Hrastnik start-up Chipolo has developed smart keychains, which are connected to smart phones via Bluetooth. The keychains allow you to search for your keys or other objects using your smart phone.

ViaApp for building management

The start-up ViaApp has developed an app for managing smart buildings and energy systems which allows for the efficient monitoring of temperature, lighting, air-conditioning systems and ventilation in buildings.

2.Smart cities and regions

Due to the thousands of sensors connected to the internet, it will be easier to park in cities, and it will be possible to check the loads on buildings, bridges and cultural monuments, we will be able to avoid traffic jams, smart lighting will automatically adjust to weather and other conditions, we will be able to monitor how full rubbish bins are, and waste haulage companies will thus be able to optimise their routes. The information systems on smart motorways will warn us about weather conditions, accidents and other extraordinary events. Digitisation is also expanding into energy supply and water management, and connected systems will allow us to control municipal infrastructures more easily and use our resources more rationally. Sensors will warn us about unauthorised entries into secure areas, floods in warehouses or factories, and measure radiation in the vicinity of nuclear facilities. We will also be able to detect gas and other leaks faster in the vicinity of industrial complexes.

6 SLOVENIAN EXAMPLES

Symvaro for managing urban infrastructure

Symvaro is the most successful start-up from the first round of start-ups at the Ljubljana incubator ABC; they develop solutions for managing cities and urban infrastructure, primarily for managing water supply networks and waste management systems.

Taxi Metro is like Uber

A little over a year ago the Metro 1 company, which operates the Taxi Metro taxi service, together with the IT company Net Informatika, developed an app called Net Cab, which operates in the same way as Uber. Users can use the app to call the nearest cab, and then track the taxi on a map as it approaches them. 'For the time being we are the only company in Slovenia with such an app, and Net Informatika is already selling it to other companies in the region. This year we will also introduce paying for rides via the app,' says Enco Metro, the owner of Metro 1.

Arrival displays at bus stops

As part of the Civitas Elan project, LPP together with Telargo installed the first bus arrival displays in 2010. They introduced wireless communication between vehicles and bus stops, and equipped buses with smart units which enable the positioning of the vehicle and the transfer of the data to a control centre. Bus arrivals can also be monitored via the app. We have been waiting for a while for an upgrade to the Urbana city card system, which will make it easier to check how much money you have on your card and to fill it via your phone.

Digital cargo flows

At BTC, in cooperation with IBM, the Faculty of Economics, Telekom Slovenija and the City of Ljubljana, all data on cargo flows will be collected digitally. Later the system will also include the cities of Rijeka, Zagreb, Vienna and Graz. The goal is to use linked data on cargo flows so that cargo transport will flow more efficiently and with lower emissions.

Facility for hotel management

Facility is a hotel management app which is expected to be used by 300 hotels by the end of this year. Using this app will allow hotel managers to manage processes and staff faster and more efficiently.

Storesense analyses customer behaviour

The Storesense company has developed a solution for analysing customer behaviour in stores, and store managers and event organisers can use this data to optimise sales or improve the efficiency of promotional activities.

Translation of the picture below:

How the internet of things will affect the GDP
in 28 EU Member States, in EUR billion

(from left to right:)
Transportation
Healthcare
Homes and accommodations
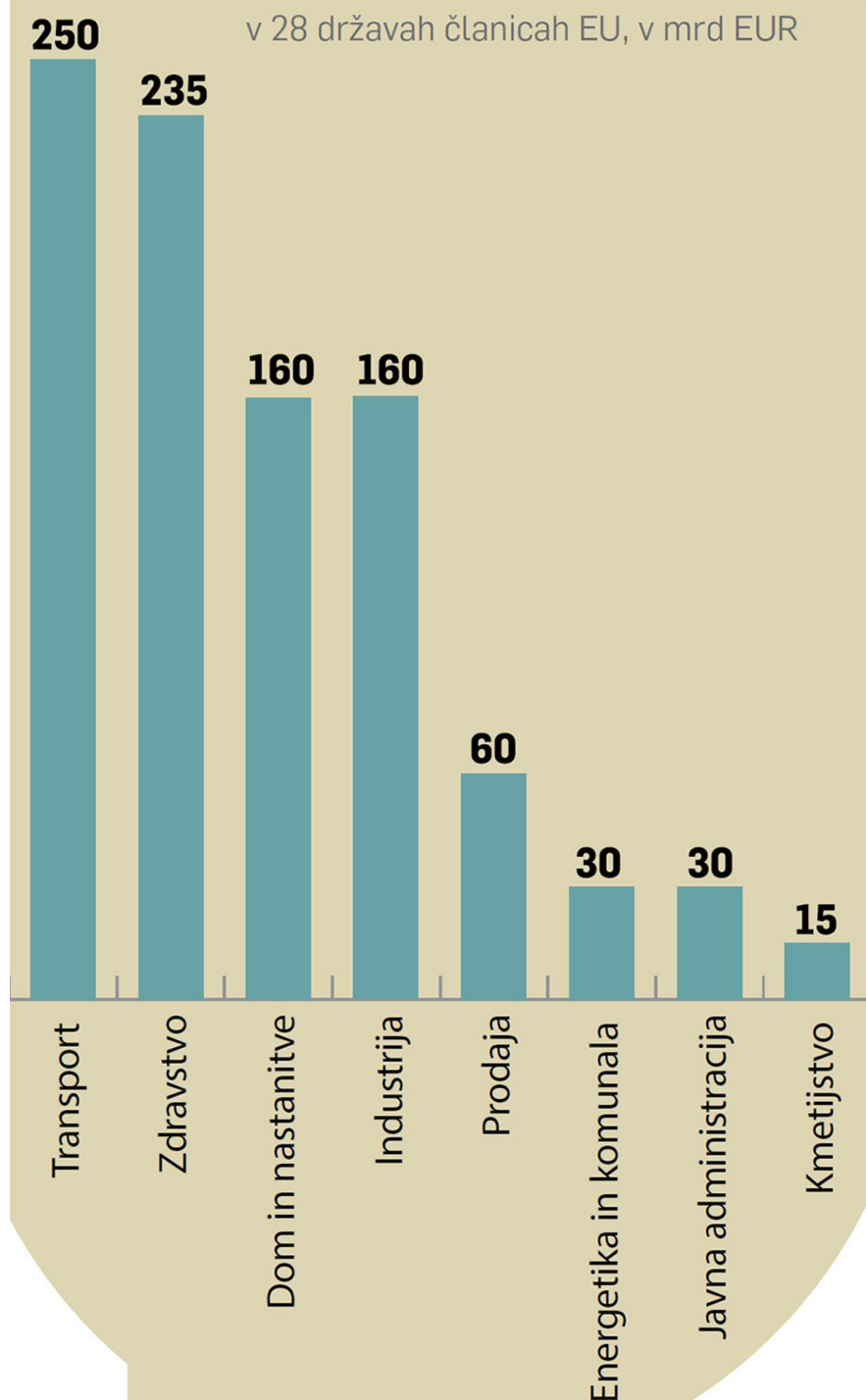Industry
Sales
Energy and utilities
Public administration
Agriculture

Source: A. T. Kearney

Tako naj bi internet stvari vplival na BDP

v 28 državah članicah EU, v mrd EUR

Kategorija	Vrednost
Transport	250
Zdravstvo	235
Dom in nastanitve	160
Industrija	160
Prodaja	60
Energetika in komunala	30
Javna administracija	30
Kmetijstvo	15

Vir: A. T. Kearney

940

billion euros – the potential impact of the internet of things on the EU GDP over the next 10 years.

3. Health and recreation

The global market in digital healthcare is expected to be worth EUR 23 billion by 2017, and new technologies could allow savings of EUR 99 billion in the EU alone. Due to new digital devices that will monitor our life functions, we will be warned in advance of any changes in health status. Several start-ups are developing solutions in the area of m-health; this means the use of mobile phones, displays, sensors and applications for measuring vital signs and activities, as well as blood pressure, blood sugar and perspiration. The field of m-health also includes apps that make it easier to navigate among information sources, and that provide help for doctors in decision-making or automatic transfer of measurement results to digital patient files.

4 SLOVENIAN EXAMPLES

Rehabilitation with Kinestica

The start-up Kinestica has developed a rehabilitation tool which uses sensors to encourage patients to do their rehab exercises, and connects them to virtual reality games. Healthcare personnel can monitor patients' progress and create personalised plans.

Bellabeat, health for mothers and expecting mothers

The start-up Bellabeat has developed a wearable device for monitoring life activities – from sleep to recreation – for mothers and expecting mothers. The device uses the collected data to make recommendations for a healthier lifestyle. This week, co-founder Urška Sršen was added to the Forbes list of young Europeans who are changing the world.
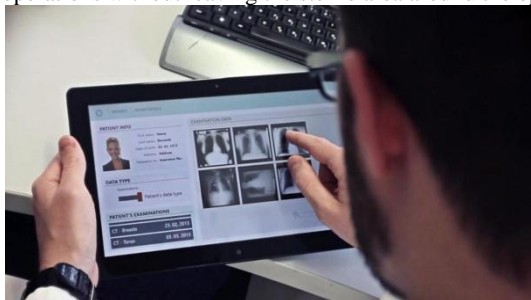

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Azumio for measuring physiological functions and recreation

The Azumio company was founded in California by Bojan Boštjančič and Peter Kuhar, and develops apps for measuring heart rate, calorie consumption and sleep. The app recommends a series of recreational activities and nutrition based on the collected data, and is one of the leading products in its field in terms of number of users.

Adora with a smart screen for surgeons

The Maribor start-up Adora has developed a smart screen on which surgeons can use manual and voice commands to view patient data during operations without leaving the sterile area around the operating table. This saves time and money and reduces patient suffering.

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Amazon's Echo device can be purchased online for a little over 160 euros. Why was it such a hit at the electronics show in Las Vegas? You can listen to music or audio books, adjust your home lighting and other smart devices, it is connectable to systems in cars and alarm systems, and other electronics manufacturers have announced that their products will be compatible with it. It also responds to voice commands.

4. Smart factories and supply chains

Machines and production lines at smart factories are equipped with sensors that automatically diagnose breakdowns and report the correction required. The products know which phase of the production process they are in, and the production lines are connected to a warehousing system which reports which parts have to be delivered to a certain workplace. This is a new kind of manufacturing, known as the fourth industrial revolution, or "Industry 4.0". The warehouse information systems are connected to the suppliers' information systems, and supply and distribution chains are increasingly becoming more digitised and coordinated.

Factories are installing more and more automated systems, which learn continuously and improve manufacturing processes, and increasing numbers of production and logistical processes are equipped with machine reading.

3 SLOVENIAN EXAMPLES
Digitisation of processes at Iskra Mehanizmi

'In my estimation, smart factories are not just robots and cameras, but the digitisation of all processes,' says Marjan Pogačnik of Iskra Mehanizmi. They started digitising two years ago, and set themselves the goal of uploading all of their production processes by 2018. As early as two years ago they established communication between the production line and the products. 'We also have prototypes for how products could communicate with customers – for instance, they could send a message to a mobile phone telling them where the nearest service station is, but we have not managed to get it onto the market yet. We are carrying out a project of digitisation of production and logistics, in which all of the processes are carried out with bar codes and RFID (radiofrequency identification) technology. We have digitised the collection of information on finished pieces, and the data is sent in real time to our SAP information system. Since January of this year we have been automatically collecting data on job attendance and what employees do during that time, and we enter this data into the payment calculation system,' says Pogačnik.

Scanners in production

The largest demand for the digitisation of processes comes from the car industry, where the suppliers have to label their products thoroughly and deliver them using the just-in-time system, says Tone Stanovnik of Špica International. 'The employees on the assembly lines at Revoz have for instance a ring on their finger which they use to scan all of the codes. Before, they would only scan the vital parts, like the motor and the transmission, now they scan every wire harness. Car industry suppliers are also introducing more and more solutions for electronic data exchange,' says Stanovnik. All of these systems support the automatic restocking of spare parts inventories, flexible production of various products pursuant to orders and full traceability along the supply chain, which among other things makes it easier to eliminate errors.

Traceability in the food processing industry

The start-up Prospeh has developed a system for tracking items in the food supply chains called OriginTrail, which they introduced last year at the Celeia Dairy, the Ptuj Poultry Company and ETA Kamnik. End users can use the app to check for instance which farm supplied the milk for their store-bought yogurt.

5. Agriculture

By 2050, there will be 9.6 billion people on the planet. Productivity in agriculture will have to be increased by 70 percent, without exhausting our natural resources. One of the possibilities for producing more and better food is smart agriculture, also called precision agriculture. Agriculture companies and agencies are already collecting large quantities of information about the cultivation of individual varieties, digitising fields, monitoring fertiliser consumption, weather data and livestock health. In agriculture as well, the eventual ownership of various databases is not clear. Stockbreeders can use sensors to detect early development of disease or identify individual phases of reproduction. The sensors monitor body temperature, heart rate and tissue immunity, and location and movement using GPS. Breeders can receive SMS messages for pre-determined events, such as when a cow is ready for insemination. EU has to date funded several digitisation projects in agriculture, and funds are also available under Horizon 2020. A special project has been tendered called Smart Farming for Europe EU-PLF (http://www.eu-plf.eu/), in order to introduce tested tools from laboratories onto farms. In agriculture and viticulture they are installing sensors and collecting data on soil and air quality, and monitoring plant growth. Manufacturers of agricultural machinery such as John Deere, CNH Global, Class and others are developing connectable machines and tools.

4 SLOVENIAN EXAMPLES
What's caught in the trap?

Datalab has developed a tool called Pantheon Farming for monitoring and analysing farm work, work in vineyards and orchards and for monitoring all data on livestock. They have expanded its applicability in cooperation with the Postojna company Efos, whose application TrapView allows the monitoring of harmful organisms in fields, orchards or vineyards. It therefore makes it possible to check what's caught in the traps in real time.

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Have the tomatoes grown yet?

The Paradajz company, which cultivates Lušt brand tomatoes, uses computers to control the temperature and humidity in the greenhouse, and the watering is also computer-controlled. The automation and informatisation of agriculture means less manual labour, and the system is more reliable.

Has the wine turned to must yet?

The Brežice start-up Enolyse is perfecting smart sensors for measuring sugar and temperature levels of must and wine in wine cellars, which makes it easier for winemakers to keep records and make better decisions.

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Are the trunks wide enough yet?

Tajfun has developed a digital device for measuring the thickness of tree trunks, which allows the data to be transferred to any mobile device in the middle of the forest, as well as data collection and processing.