

Ministry of Education and Science of Ukraine

*Odessa National Academy
of Food Technologies*



International Competition of Student Scientific Works

BLACK SEA SCIENCE 2020

Information Technology, Automation and Robotics

Proceedings

Odessa, ONAFT 2020

Editorial board:

Prof. B. Iegorov, D.Sc., Rector of the Odessa National Academy of Food Technologies, Editor-in-chief

Prof. M. Mardar, D.Sc., Vice-Rector for Scientific and Pedagogical Work and International Relations, Editor-in-chief

Dr. S. Kotlyk, Ph.D., Assoc. Prof., Director of the P.M. Platonov Educational-Scientific Institute of Computer Systems and Technologies “Industry 4.0”, Editor-in-chief

O. Sokolova – Senior Lecturer of the Department of Advanced and Applied Mathematics, ONAFT, Technical Editor

Black Sea Science 2020: Proceedings of the International Competition of Student Scientific Works. Information Technology, Automation and Robotics. / Odessa National Academy of Food Technologies; B.Yegorov, M. Mardar, S.Kotlyk (editors-in-chief.) [*et al.*]. – Odessa: ONAFT, 2020. – 365 p.

These materials of International Competition of Student Scientific Works «Black Sea Science 2020» contain the works of the contest participants in the section «Information technologies, automation and robotics» (not winners).

The author of the work is responsible for the accuracy of the information.

Odessa National Academy of Food Technologies, 2020.

Organizing committee:

Prof. Bogdan Iegorov, D.Sc., Rector of Odessa National Academy of Food Technologies, Head of the Committee

Prof. Maryna Mardar, D.Sc., Vice-Rector for Scientific and Pedagogical Work and International Relations of Odessa National Academy of Food Technologies, Deputy Head of the Committee

Prof. Stefan Dragoev, D.Sc., Vice-Rector for Scientific Work and Business Partnerships of University of Food Technologies (Bulgaria)

Prof. Baurzhan Nurakhmetov, D.Sc., First Vice-Rector of Almaty Technological University (Kazakhstan)

Prof. Mircea Bernic, Dr. habil., Vice-Rector for Scientific Work of Technical University of Moldova (Moldova)

Prof. Jacek Wrobel, Dr. habil., Rector of West Pomeranian University of Technology (Poland)

Prof. Michael Zinigrad, D.Sc., Rector of Ariel University (Israel)

Dr. Mei Lehe, Ph.D., Vice-President of Ningbo Institute of Technology, Zhejiang University (China)

Prof. Plamen Kangalov, Ph.D., Vice-Rector for Academic Affairs of “Angel Kanchev” University of Ruse (Bulgaria)

Dr. Alexander Sychev, Ph.D., Assoc. Professor of Sukhoi State Technical University of Gomel (Belarus)

Dr. Hanna Lilishentseva, Ph.D., Assoc. Professor, Head of the Department of Merchandise of Foodstuff of Belarus State Economic University (Belarus)

Prof. Heinz Leuenberger, Ph.D., Professor of the Institute of Ecopreneurship of University of Applied Sciences and Arts (Switzerland)

Prof. Edward Pospiech, Dr. habil., Professor of the Institute of Meat Technology of Poznan University of Life Sciences (Poland)

Prof. Lali Elanidze, Ph.D., Professor of the Faculty of Agrarian Sciences of Iakob Gogebashvili Telavi State University (Georgia)

Dr. V. Kozhevnikova, Ph.D., Senior Lecturer of the Department of Hotel and Catering Business of Odessa National Academy of Food Technologies, Secretary of the Committee

The jury for the section «Information technologies, automation and robotics»

Head of the jury:

Serhiy Kotlyk – Ph.D., Associate Professor, Director of the P.M. Platonov Educational-Scientific Institute of Computer Systems and Technologies “Industry 4.0” of Odessa National Academy of Food Technologies

Members of the jury:

Francisco Augusto – Dr., International Relations Manager of Higher Institute of Information and Communication Technologies (Angola)

Andrey Kuprijanov – Ph.D., Associate Professor of the Department of Software for Computers and Automated Systems of Belarusian National Technical University (Belarus)

Simon Milbert – Vice-President of Xtra Information Management, Inc. (USA)

Ivan Palov – D.Sc., Professor of University of Ruse “Angel Kanchev” (Bulgaria)

Gerard H. Degla – Communications and Training Manager of “MAPCOM solutions informatiques” company group (Benin)

Viktor Khobin – D.Sc., Professor, Head of the Department of Technological Processes Automation and Robotic Systems of Odessa National Academy of Food Technologies

Valerii Levinskyi – Ph.D., Associate Professor of the Department of Technological Processes Automation and Robotic Systems of Odessa National Academy of Food Technologies

Viktor Yehorov – Ph.D., Supervisor of the Laboratory of Mechatronics and Robotics of Odessa National Academy of Food Technologies

Valeriy Plotnikov – D.Sc., Professor, Head of the Department of Information Technology and Cybersecurity of Odessa National Academy of Food Technologies

Pavlo Lomovtsev – Ph.D., Associate Professor of the Department of Information Technology and Cybersecurity of Odessa National Academy of Food Technologies

Yurii Kornienko – Ph.D., Associate Professor of the Department of Information Technology and Cybersecurity of Odessa National Academy of Food Technologies

Sergii Artemenko – D.Sc., Professor, Head of the Department of Computer Engineering of Odessa National Academy of Food Technologies

Serhii Shestopalov – Ph.D., Associate Professor of the Department of Computer Engineering of Odessa National Academy of Food Technologies

Secretary of the jury:

Oksana Sokolova – Senior Lecturer of the Department of Advanced and Applied Mathematics of Odessa National Academy of Food Technologies

INTELLIGENT AGENT OF ACCESS MANAGEMENT AND CONTROL SYSTEM Author: Denys Vysoven Supervisor: Artem Kovalchuk	251
EMPLOYEES NOTIFICATION SYSTEMS IN THE EVENT OF EMERGENCY SITUATIONS THROUGH PUBLIC WIRELESS ACCESS POINTS Authors: Oleksii Patlaichuk, Hlib Serbulov Supervisor: Sergii Bozhatkin, Victoryia Guseva-Bozhatkina	259
MONITORING AND CONTROLLING AGENT OF MICROGRID CLUSTER Author: Tetiana Pyrohovska Supervisor: Artem Kovalchuk	270
HEAT LOSS MONITORING OF MULTI-STORY BUILDINGS USING MULTI-AGENT APPROACH Author: Iryna Simakova Supervisor: Ivan Burlachenko	276
STATUS AND PROSPECTS FOR THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGY IN GERMANY Author: Yevheniia Norenko Supervisor: Liudmyla Dybkova	285
ROBOTIC SEARCH SYSTEM FOR PEOPLE Authors: Dmitry Derman, Anna Derman Supervisor: Sergiy Tereshchuk	294
IMPLEMENTATION OF ROBOTICS FOR OCEANS AND SEAS CLEANING Author: Anna Pereederii Supervisor: Iryna Muntian	299
DEVELOPMENT OF MODELS AND SOFTWARE SOLUTION For THE PROBLEM OF DIAGNOSTIC OF FINANCIAL STATES OF IT-ENTERPRISE Author: Dariia Tkachenko Supervisor: Oleksandr Goloskokov	305
DEVELOPMENT OF A PROTOTYPE OF AN ACTIVE TRACTION PROSTHESIS Author: Nataliia Panha Supervisors: Yevgen Mykhaylov, Oleksandr Kniukh	317
SYSTEM FOR STORING AND ANALYZING DATA OF THE WATER HEATERS PLANT Author: Kyryl Nebyvailov Supervisor: Helen Bodul	328
DEVELOPMENT OF A MONITORING SYSTEM SEYSMOAKTYVNOSTI CONSTRUCTION WORKS Author: Andrii Tsobenko Supervisor: Denis Popkov	337
MODELLING OF THREATS OF ECONOMY DIGITALIZATION Author: Sergi Rudyk Supervisor: Iryna Nikolina	346

12. Burlachenko, I., Zhuravska, I., Musiyenko M. Devising a method for the active coordination of video cameras in optical navigation based on multi-agent approach. Eastern-European Journal of Enterprise Technologie. Vol. 1, no. 9(85), P. 17–25. (2017).

STATUS AND PROSPECTS FOR THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGY IN GERMANY

Author: Yevheniia Norenko

Supervisor: Liudmyla Dybkova

V. Hetman National Economic University of Kiev (Ukraine)

Abstract. *This research reveals the topic of the use of information and communication technology in Germany. The degree of involvement in country life and the main modern trends in application of this technology in different industries and community governing are reviewed. Germany is the country which has shifted its focus on digitalization as the main direction in its economic and social advancement. The government engages specialized institutions, leading universities, legislative and expert groups in developing policies, strategies and measures aimed at improving this area. The research provides a general overview and analyses of German large-scale IT projects which impact business and society. Extensive use of information and communication technology has some drawbacks, one of which is lack of security. The wider IT intrusion in life is, the more opportunities for cybercrime arise. This issue and other problems connected with the field under investigation are mentioned in our work.*

Key words: *information and communication technology, digitalization, innovation technologies, digital Germany, Industry 4.0.*

I. Introduction

Nowadays the dramatic rise and convergence of emerging new information technology causes rapidly and radically transforming in all spheres of society's life. The Internet has become increasingly important to users in their everyday lives. It creates new ways for citizens to congregate, store, transmit and retrieve the data and to communicate and share information with others. Ability to work with different computer programs is the skills that are increasingly important for everyone living in the digital age. New mobile and Internet technologies lead to the digitization of the economy and the emergence of new jobs based on the use of technologies such as artificial intelligence, virtual and augmented reality, biotechnology, Internet of things, cloud computing. Therefore, further development of information technology is inevitable.

II. Literature Review

The issue of country digitalization is one of the most vital in modern society. On the one hand, it needs to be studied in order to manifest the outcome of this process implementation, statistic reports, as well as follow the development and progress. On the other hand, exploration of this sphere is necessary to prepare a clear vision of prospects, follow trends, predict changes which might happen in future due to the use of information and communication technologies (ICT) in various fields. Use of ICT in business, science,

education, medicine and different industries is the subject to investigate for many professionals. As to ICT in Germany, researchers frequently pay close attention to overall digitalization of the country, its application in the industries which determine country's international specialization [3], [1] All of them emphasize.

Concerning digitalization, our time is considered to be the period of Industry 4.0. In his article on Germany digitization, Christian Fuchs reviews the main characteristics of the 4th industrial revolution and claims Industry 4.0 to be the new, digital German ideology. It is based on the idea of wide spread of all the Internet technology, big data, social media, cloud computing sensors, Artificial Intelligence, robotics, and the combination of these things into the production, distribution and use of goods on B2B and B2C levels [4].

Control over internal and international ITC market is one of the priorities for a country which set digital technology as the core for development. In order to ensure the effective functioning of the ICT market, it is necessary to constantly improve the digital policy of the country. European Digital Policy Officer Torben David and Head of Brussels Office Benjamin Ledwon conducted the research the results of which were published in an article by the German IT Association BITKOM *"Five measures for better policy-making in a digital Europe"* [2]. The authors note that EU countries must use five main measures to improve the regulation of digital processes.

There are other valuable resources which provide up-to-date information on the topic such as official reports and statistics websites, for example, Global Competitiveness Report [5], Market Monitor ICT Germany [13], the Directive on open data of the European Council [14], Eurostat [15] etc.

III. Object, subject and methodology of research

Information and communication technologies make up the *object* of this research.

The *subject* of this research is the degree of involving information and communication technology in business, economic and social areas in Germany.

To conduct this research, such methods have been used: study and critical analyses of scientific articles, statistic, regulatory and legislation sources. The search and study of local and international big projects within IT sphere in Germany were held. Based on the results of the analysis, the conclusions on the benefits from use of ICT in the Germans' daily lives and the technological development at country level were made.

IV. Results

These days, Germany is a world leader of innovation in business, private and public sectors. German scientists have taken the first place in the number of Nobel Prizes won in the world over the last century. Undoubtedly, their research works still rank among the best in the world. There is a large number of leading universities and research institutes in the country that ensure the steady development of information and communication technologies. The government policy of Germany focuses on developing digital infrastructure, digital economy, digital jobs, innovative public administration, and supporting digital environment in society, education, science, culture and media.

Germany has one of the world's largest information and communication technology (ICT) markets. According to the statistics, there are about 90 thousand IT-companies in the country with more than 1 mln people employed in IT industry [13]. In 2018, the ICT market of the country was \$221.8 billion worth According to the German Association of Information Technology BITKOM, the market size of the sub-sectors in 2018 (in USD

billion) was the following: IT equipment – 30.2, software – 28.8, IT services – 47.1, consumer electronics – 11.2, telecommunications devices – 12.6 and telecommunications infrastructure – 8.3 [6].

Regarding the dynamics of the German ICT market, it performs the rising trend over the last years, despite losing general positions in the world in ICT adoption in 2019.

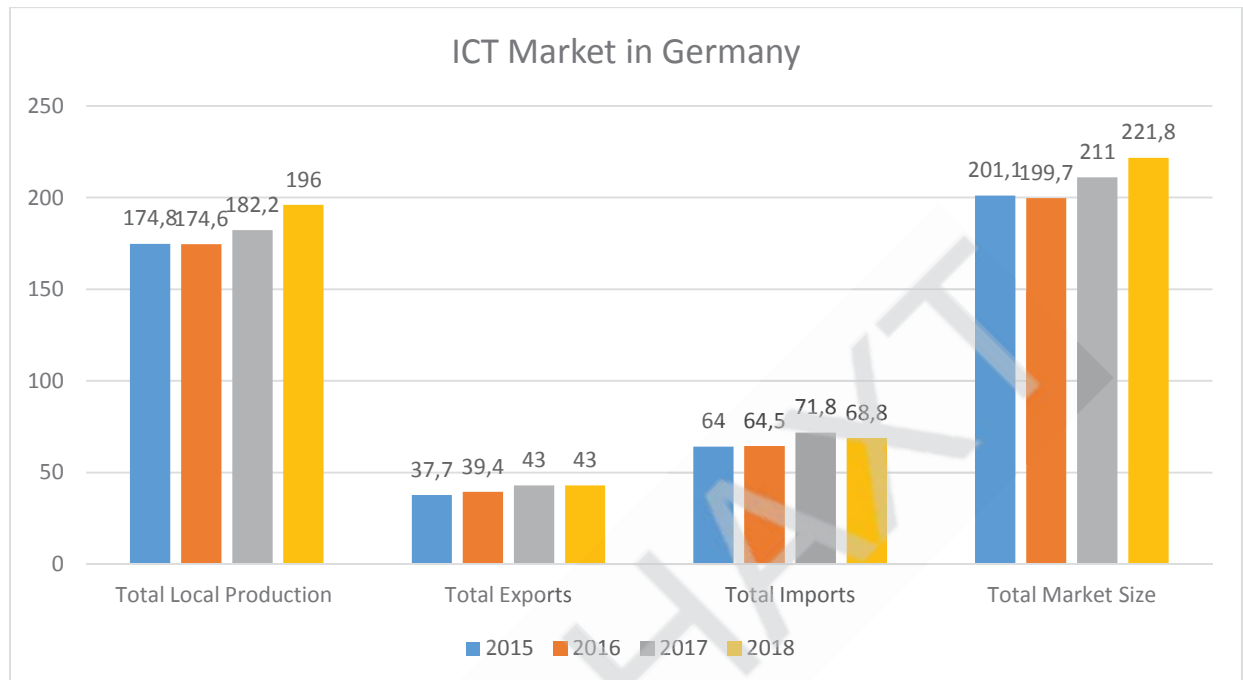


Fig. 1. ICT Market in Germany

Source: based on <https://www.trade.gov/knowledge-product/germany-information-and-communications-technology>

The main areas of ICT development in Germany are: IT security; healthcare IT; Artificial Intelligence; smart platforms for social business; equipment, infrastructure, services, technologies, databases and analytics; enterprise resource planning.

Online Shopping

According to the study e-commerce Market Germany 2019, amazon.de, otto.de and zalando.de are among the leading online shops in Germany. In 2018, amazon.de generated e-commerce sales of around US\$11.0 billion, leading the ranking of the 100 largest online shops in Germany. Otto.de and zalando.de followed by a wide margin: the two German stores generated sales of around US\$3.8 and US\$1.7 billion, respectively [7].

Online shopping is one of hugely widespread applications of ICT worldwide. In some countries with highly developed digitalization, citizens can hardly remember the time queueing to pay for electronic goods, apparel, food supplements, beauty products, tickets etc. Germany is one of them. It became possible due to development of the Internet platforms which enable different kinds of selling and buying activities.

The e-commerce Market Germany 2019 study argues that the platforms <https://www.amazon.de/>, <https://www.otto.de/> and https://en.zalando.de/?_rfl=de present the leading online shops in Germany. The 2018 sales of <https://www.amazon.de/> reached about US\$11 billion. It took the leading position in the ranking of the 100 largest online

shops in the country. Otto.de and zalando.de stores together generated sales of around US\$3.8 and US\$1.7 billion, respectively [7].

People in Germany can easily buy any kinds of goods and services. The most popular ones are household goods, clothes and sportswear, tickets for events, books and magazines, electronic equipment. According to Eurostat, the largest number of online orders in Germany goes to clothes or sports goods (67% of population) and the least to electronic equipment (25% of population). Moreover, the largest part of transport tickets sales is performed through digital services available on the Internet.



Fig. 2. Online shopping

Sources: based on <https://ec.europa.eu/eurostat/en/web/products-eurostat-news/-/EDN-20191129-1>

Use of ICT at work and activities performed

The biggest international companies use ICT in all their departments. This significantly minimizes labor costs. Eurostat has provided statistics showing that the highest percentage of ICT use at work belongs to individuals who use computers, laptops, smartphones, tablets, other portable devices or other computerized equipment or machinery such as those used in production lines, transportation or other services at work (54% of all employees) and the smallest percentage belongs to individuals who develop or maintain IT systems or software in their work (5% of all employees).

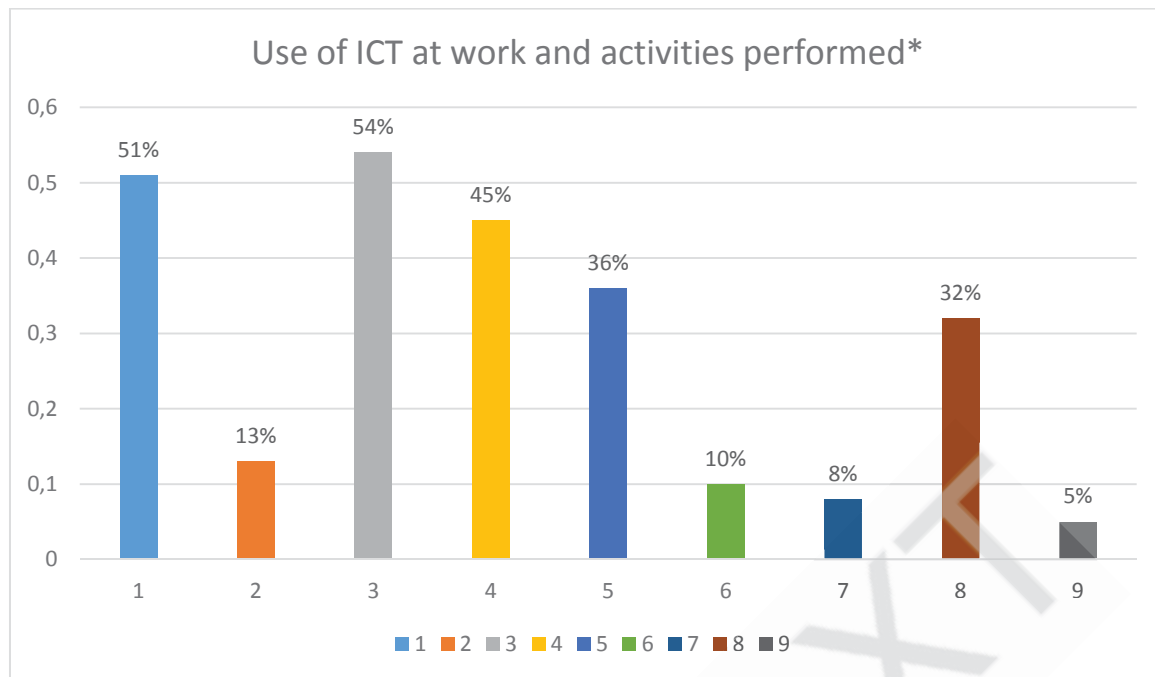


Fig 3. Use of ICT at work and activities performed

Source: based on

https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=isoc_iw_ap&lang=en

* 1– Individuals used computers, laptops, smartphones, tablets or other portable devices at work.

2 – Individuals used other computerized equipment or machinery such as those used in production lines, transportation or other services at work.

3 – Individuals used computers, laptops, smartphones, tablets, other portable devices or other computerized equipment or machinery such as those used in production lines, transportation or other services at work.

4 – Individuals exchanged emails or entered data in databases in their work.

5 – Individuals created or edited electronic documents in their work.

6 – Individuals used social media for their work.

7 – Individuals used applications to receive tasks or instructions in their work.

8 – Individuals used occupational specific software in their work.

9 – Individuals developed or maintained IT systems or software in their work.

ICT security

With the development of ICT, the risk of using them is increasing. Every day, hundreds of people are subject to theft of their data from the Internet. Many countries suffer from cyber infringements and, therefore, they are committed to developing cybersecurity to ensure the comfortable existence of the ICT market and consumers in general. In Germany alone, cybercrime causes nearly € 55 billion damage every year.

According to Eurostat, Germany also uses security measures in ICT- market.

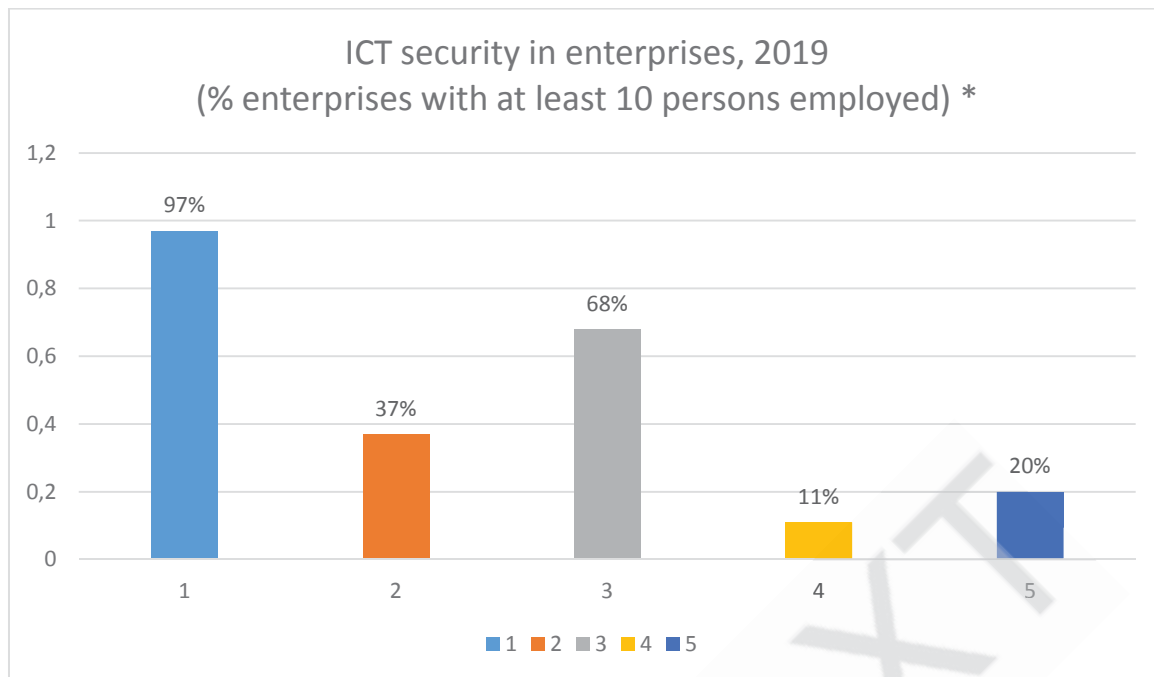


Fig. 4. ICT security in enterprises in 2019

Source: based on <https://ec.europa.eu/eurostat/documents/2995521/10335060/9-13012020-BP-EN.pdf/f1060f2b-b141-b250-7f51-85c9704a5a5f>

* 1 – Use at least one ICT security measure.

2 – Have documents on measures, practices or procedures on ICT security.

3 – Make persons employed aware of their obligations in ICT security.

4 – Experienced at least once problems due to ICT related security incidents in 2018.

5 – Have insurance against ICT related incidents.

IT industry in Germany is strictly regulated by the government. There are laws and legislative acts according to which the issue of security is maintained. One of the main documents is the IT Security Law reinforced in April 2017 [14]. In order to ensure security on the Internet, the German Government uses certain measures to limit or eliminate the activities of citizens in order to avoid Internet threats.

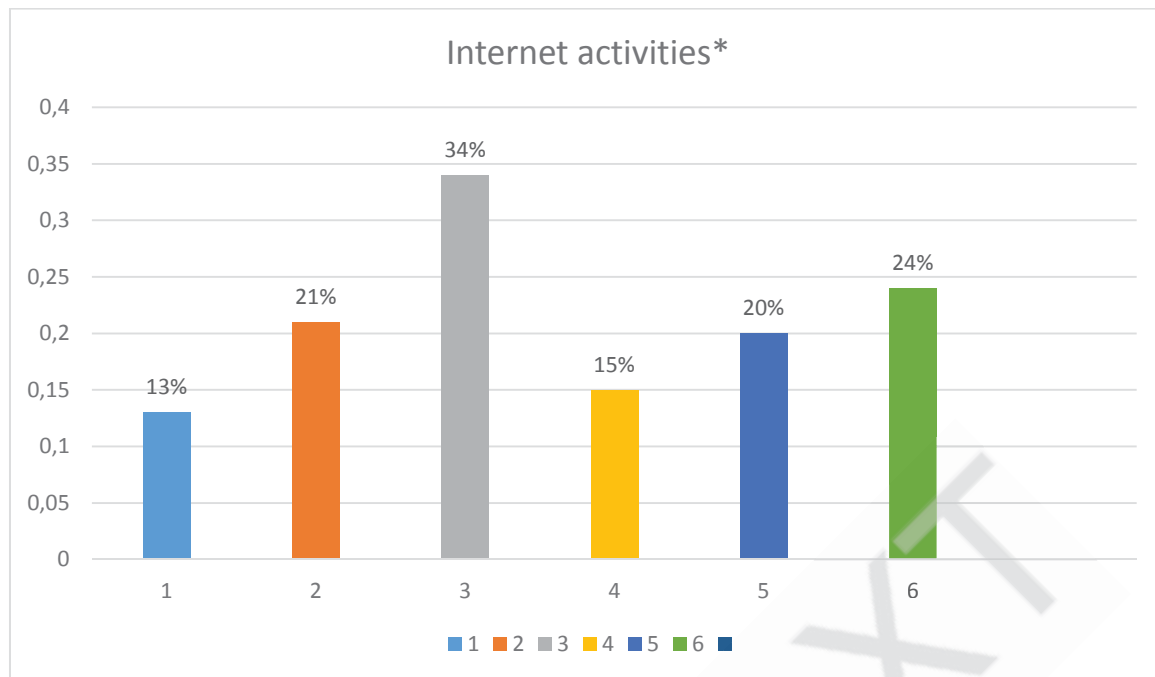


Fig. 5. Internet activities which were limited or avoided due to security concerns in the last 12 months (% of individuals aged 16-74, 2019).

Source: <https://ec.europa.eu/eurostat/documents/2995521/10335072/9-16012020-BP-EN.pdf/30431c3f-cbce-6d2d-e9d1-4cf6b084b6af>

* 1 – Ordering or buying goods or services.

2 – Internet banking.

3 – Providing personal information to social or professional networking services.

4 – Communicating with public services or administrations.

5 – Downloading software, apps, music, video files, games or other data files.

6 – Using the Internet via public WiFi.

Digital Europe Programme and ICT Proposers' Days

Germany is actively involved in international programs to improve Digital-Europe. Digital Europe Programme is a program developed by the EU for 2021 – 2027. Targeted consultation on the direction of the program development took place from July 25 to October 25, 2019. [8]. The total number of respondents was 960, the largest number was from Germany 125 (13%). The results of the consultation show that Europe is highly interested in using digital technology to create a clean planet (70.5% consider it very important) and increasing Internet security (54.9% very important).

The program also provides advice from other activities. For example, ICT Proposers' Days in Helsinki play an important role in establishing the program. This event was created for the international exchange of knowledge in the ICT field. Participants can be representatives of companies, universities and research institutes related to information and communication technologies. ICT Proposers' Days are held once a year to discuss trends in information and communication technology to make our lives easier. The last meeting was held on September 19-20, 2019.

The dynamics of the number of countries participating in the ICT Proposers' Day are presented in the bar-chart below.

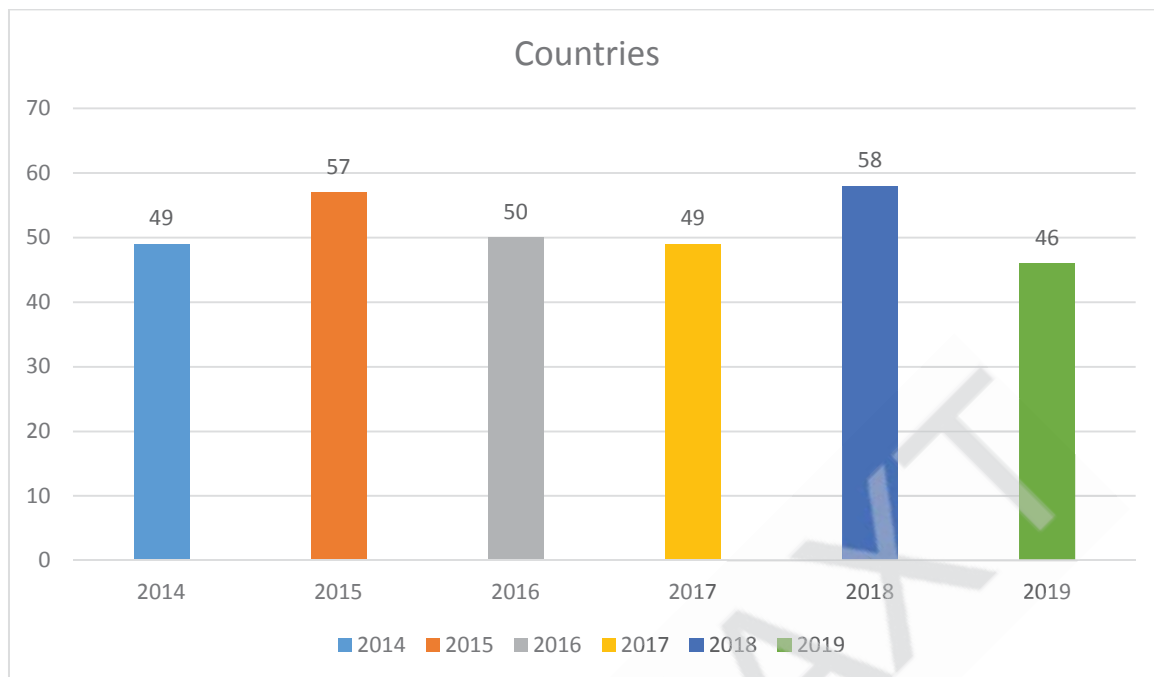


Fig. 6. Number of participants-countries of ICT Proposers' Day

Source: based on <https://ict2019.ideal-ist.eu/home>

Local and international ICT projects in Germany

Germany coordinates many ICT projects which are financed by the EU and supported by leading universities and research institutions in Europe. For the last years, the following large-scale projects have been the most important for the country.

The ***Flexnet*** project is an online platform called '*FlexNet Education and Training*' that provides information on lectures and courses, as well as the activities of the university/research institute in the industry. New materials, devices and systems are being developed to help make Europe a world leader in flexible, organic and large-scale electronics.

Another major German ICT project is ***SMErobotics***. The main activity is to develop a new type of production robot that is simple and intuitive to use, without the need for complex programming and with the ability to adapt to changes in production processes. The intellectual system does not rigidly adhere to a particular computer program, but "learns" as a result of interaction with a human employee.

The ***Diamond Project*** focuses on the development of technologies capable of creating materials at the level of single atoms. The focus is on the use of diamonds through their unique optical and magnetic properties, which allows one atom to be placed simultaneously in the diamond grid with nanoscale accuracy. This, in turn, can lead to the miniaturization of electronic devices to the size of individual molecules.

Whatever it is, a major public infrastructure project or a proposal for new legislation, citizens should be able to communicate their ideas to politicians easily and effectively. The ***Life + Gov*** project aims to create mobile *electronic government* ensure that policy makers and civil servants have realistic understanding of current societal issues

[9].

The *M-ECO* project deals with data mining, communication with citizens and social networks. Within its boundaries, researchers work on an advanced system of epidemic analysis and medical data to prevent epidemics. Initiators believe that the only way to limit a pandemic is to detect early signals and respond quickly.

The future of ICT in Germany

ICT is developing rapidly in Germany. Highly skilled workers in the ICT industry ensure the country's status as a world leader in the ICT sector. Experts predict that the ICT market will increase to 25% of the entire European market. In 2020, it will become the largest ICT market in Europe. The country's government supports security technologies through the High-Tech Strategy for various projects [10].

Germany government has prepared "A Digital Strategy 2025". It describes 10 steps toward the digital-future of Germany [11].

Problems and Further Prospects

Despite the fact that Germany is one of the leading countries in developing ICT and providing IT solutions for business and finance, it has lost its leading position in the world in ICT adoption in recent years. According to Global Competitiveness Report 2019, the country has the 36th place in the world's ranking, where the leader is South Korea [5]. ICT adoption consists of such subcategories as mobile-cellular telephone subscriptions; mobile-broadband subscriptions; fixed-broadband Internet subscriptions; fiber internet subscriptions, all of them per 100 pop. While developing data-mining and analytical part of IT industry can be efficient, losing world position in ICT adoption can affect the country negatively. To overcome problems which can arise from this, government professionals and experts in related industries are constantly developing new ways to improve the situation.

V. Conclusion.

New Internet and mobile technologies tend to change the economic and social space of each country, become the driving force in shifting the essence of the basic professional activity infrastructures, promote the emergence of new and modifications of existing jobs, expand the scope of scientific research and development of each citizen's personality.

Through scientific research we noticed the rapid entry of ICT into the lives of the Germans. Information and communication technologies help Germany citizen in different areas, such as health industry, education, business, government policies and others. Despite general success of the country in this field, a range of problematic issues requiring effective solving still exist. For this reason, a number of professionals work on finding solutions. The information mentioned above leads to the conclusion that ICT development and implementation in various spheres of German life has huge potential.

VI. References.

1. Belitz, H., Clemens, M., Gornig M. Germany's Technological Specialization Assures Growth Opportunities. *Weekly Report* [<https://ideas.repec.org/a/diw/diwwrp/wr5-16.html>].
2. David, T., Ledwon. B. Five Measures For Better Policy-Making In Digital Europe. *BITKOM*. [https://www.bitkom.org/sites/default/files/2019-02/20190225_Five%20measures%20for%20better%20policy-making%20in%20a%20digital%20Europe_fina....pdf]. 15

3. Erkan, B., Bozduman, T. A Research On Comparative Advantages In Germany's Technology-Intensive Exports. *Reter Lang* [https://www.researchgate.net/publication/328637829_A_RESEARCH_ON_COMPARATIVE_ADVANTAGES_IN_GERMANY'S_TECHNOLOGY-INTENSIVE_EXPORTS].
4. Fuchs, Ch., Industry 4.0: The Digital German Ideology. *TripleC* [https://www.researchgate.net/publication/323677944_Industry_40_The_Digital_German_Ideology].
5. Electronic resource: [https://www.weforum.org/reports/global-competitiveness-report-2019].
6. Electronic resource [https://www.trade.gov/knowledge-product/germany-information-and-communications-technology]
7. Electronic resource [https://www.statista.com/statistics/794070/germany-top-online-stores-germany-ecommercedb/]
8. Electronic resource [https://ec.europa.eu/digital-single-market/en/news/digital-europe-programme-summary-report-targeted-consultation-future-investment-europes-digital]
9. Electronic resource [https://cordis.europa.eu/projects].
10. Electronic resource [https://germanyworks.com/branch/ict/#downloads].
11. Electronic resource [https://www.de.digital/DIGITAL/Redaktion/EN/Publikation/digital-strategy-2025.pdf?__blob=publicationFile&v=9].
12. Electronic resource [https://uk.practicallaw.thomsonreuters.com/w-008-4095?transitionType=Default&contextData=(sc.Default)&firstPage=true&bhcp=1].
13. Electronic resource [https://group.atradius.com/publications/market-monitor-ict-germany-2019.html].
14. Electronic resource [https://ec.europa.eu/digital-single-market/en/european-legislation-reuse-public-sector-information].
15. Electronic resource [https://ec.europa.eu/eurostat/web/microdata/community-statistics-on-information-society].

ROBOTIC SEARCH SYSTEM FOR PEOPLE

Authors: Dmitry Derman, Anna Derman

Supervisor: Sergiy Tereshchuk

Pavel Tychyna Uman State Pedagogical University (Ukraine)

The robotic platform is designed to detect people in buildings during emergencies.

Introduction

In an era of man-made development, humanity is exposed to harmful or life-threatening factors. In the last decade, a number of man-made and natural hazards have come to terms with people, demanding new methods of detected casualties. It prompted us to prototype a work platform that would be able to reach a large, don't accessible or hazardous area, where there are victims and give for basic medical care. The basis is taken a 4x4 wheel platform (fig.1) .