Report

Evaluation of Digital Competences for Romanian SMEs' Employees, Users of IT Technologies

Project
Strengthening SME capacity to engage

in Industry 4.0

Introduction (1)

This report, the result of **an exploratory research**, aims to present the relevant characteristics and trends of the need to develop digital competences among employees in Romanian SMEs, a topic that generated the need to start and, implicitly, operationalize such a study.

Therefore, in the configuration of the research process, there were no strict rules. Specifically, people who are not IT users (do not have access to digital technologies, do not have digital competences at any level) were excluded from the sample.

Thus, the research was planned to be an assessment, from a qualitative perspective, of the level of digital competences of employees in Romanian SMEs, users of IT technologies, in their current professional activity, having at least a beginner level.

Study details:

1. **Subject**: "*Evaluation of Digital Competences of Romanian SME Employees, Users of IT Technologies*";

2. **General objective**: understanding the development needs of digital competences of employees in Romanian SMEs, identification and evaluation *dimensions/variables specific to the digital competences of the employees of the Romanian SMEs, users of the IT technologies, transposed as areas of competences (1. Information and data literacy; 2. Communication and collaboration; 3. Creation of digital content; 4. Security 5. Problem solving)*;

3. **Working hypothesis:** employees who can complete an online questionnaire have at least beginner digital competences;

4. **Sample**: 232 respondents;

5. **Substantiation of the exploratory investigation**: by calling on primary and secondary bibliographic resources, as well as by consulting with IT experts;

6. **Conducting the actual research**: online questionnaire, collection of resulting data and recording of information;

7. **Interpretation of results**: processing the implications of the data obtained;

8. **Presentation of the resulting information**: research report.

Introduction (2)

9. The format of the questionnaire was as follows:

- 5 areas of competence targeted;

- Completion time: 10-15 minutes;

- Closed questions, with one option or multiple-choice answers, scales etc.;

- Data collection methods: online questionnaire and invitations sent to SME employees via e-mail and social media posts;

- Possibility of downloading an anonymized individual report at the end of completing the questionnaire;

- Questionnaire completion period: July-August 2021.

10. The analysis of the results was performed by:

- Individual work;
- Group discussions, led by project team members;
- Workshop with the stakeholders (SME representatives, public administration decision makers, IT experts etc.).

Evaluation of Digital Competences for Romanian SMEs' Employees, Users of IT Technologies

Executive summary

⇒ **Between July and August 2021,** the exploratory study on the level of digital competences of employees in Romanian SMEs, users of IT technologies, in the current activity was carried out.

⇒ **The objective of the study**: understanding the development needs of digital competences of employees in Romanian SMEs, identification and evaluation *dimensions/variables specific to the digital competences of the employees of the Romanian SMEs, users of the IT technologies, transposed as areas of competences (1. Information and data literacy; 2. Communication and collaboration; 3. Creation of digital content; 4. Security 5. Problem solving)*.

⇒ **The number of respondents**: 232.

⇒ The resulting data confirms that respondents are people who already have basic digital competences, given that this study was completed online; the final results demonstrate **an average level of these digital skills** in almost all areas: i*nformation and data literacy; communication and collaboration; security problem solving*.

⇒ The competence area that requires **the most attention** for development by employees and, implicitly, SME administrators, is the one related to **the creation of digital content**.

⇒ The concern to transfer digital knowledge to others is not a common behavior. Therefore, employees with digital competences can be encouraged to become **digital learning agents** in SMEs themselves.

⇒ Study conducted using the questionnaire and the platform developed by Factory 4.0 with the support of the National Council of Small and Medium Sized Private Enterprises of Romania (**NCSMSPER**).

Project Description

Main objective:

Preparing SMEs for the Industrial Revolution 4.0.

Secondary objectives:

1. Adapting to the challenges that the Industrial Revolution 4.0 brings to entrepreneurs, managers, SME employees;

2. Improving public policy instruments that support SMEs in their technological, organizational and cultural transformation.

Phase 1 - Implementation (August 2019 - July 2022)

1. **August 2019 – March 2020** (Understanding the development needs of SMEs regarding I4.0);

2. **February 2020 – October 2020** (Analysis of existing I4.0 public policies at national level);

3. **August 2020 – July 2022** (Action plan to improve existing public policies).

Phase 2 (Monitoring: August 2022 - July 2023)

Demographic data on respondents (1)

The data analysis involved the investigation, based on an online questionnaire, of a number of 232 respondents, from all branches of activity, representatives of both genders, of all age categories (ranging from 16 to over 54 years old), as well as of all the development regions of Romania, constituting, in this way, a representative sample for the specific objective of our research.

1.1 Structure of gender sample

Male 49,57%

Female 50,43%

Moreover, with regard to the distribution of the sample by sex, as shown in *Chart 1.1.*, it should be added that this is close to the general structure of the population, evenly distributed between women and men.

This variable is relevant and constituted, in equal measure, by reference to another variable, measured in the present research: the age structure of Romanian SME employees, highlighted in *Chart* 1.2.

Therefore, by age groups, respondents aged between 35 and 44 and between 45 and 54 are those who have already developed basic digital competences, followed by those aged between 25 and 34 years, at the opposite pole being the respondents with ages related to the levels 16 - 24 years and, respectively, over 54 years.

It is interesting to note that, among the respondents, there were very few young people interested in self-assessment of their digital competences.

1.2 Structure of age ranges sample

16-24 years 3,45%

Over 54 years 12,93%

35-44 years 35,34%

25-34 years 21,12%

45-54 years 27,16%
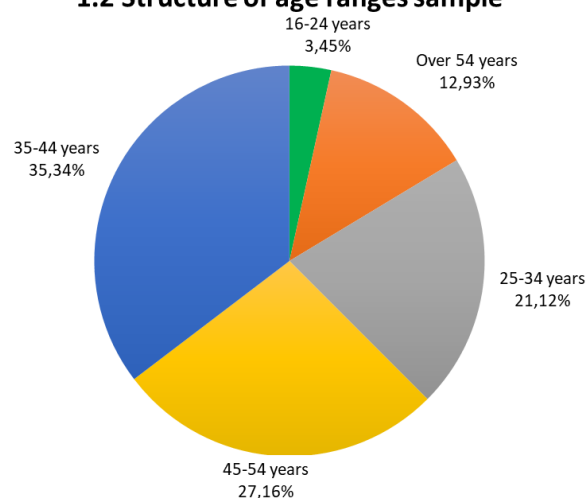
*the data are expressed in percentage, actual figures or average

Demographic data on respondents (2)

According to the results obtained for the variable distribution of respondents by development regions, shown in *Chart 1.3.*, the greatest interest for this survey was shown by respondents from the regions South - Muntenia and Bucharest - Ilfov, at the opposite pole being the respondents from the West Region.

1.3 Structure of regions sample
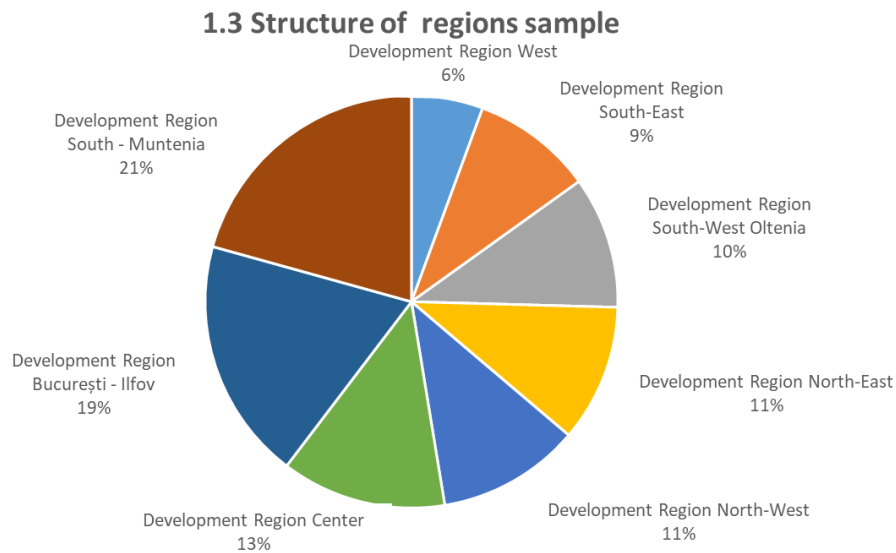
From the point of view of the studies carried out by the respondents, most of them, as it results from *Chart 1.4.*, have university training, followed by high school graduates, only 5 of the total respondents holding the title of doctor.

In conclusion, the topic of our research was of great interest for the higher education segment, while showing interest in the development of digital competences.

1.4 Structure of studies range sample

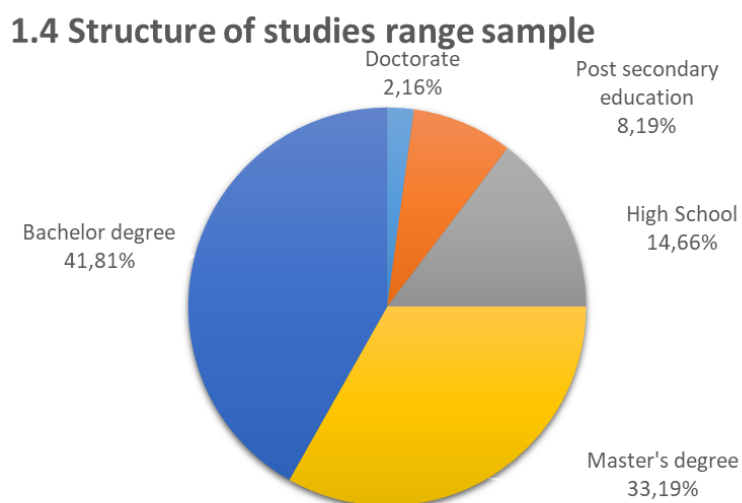***the data are expressed in percentage, actual figures or average**

The Digital Competence Framework 2.0

DigComp (digital-competence.eu)

DigComp 2.0 identifies the key components of digital competence in 5 areas which can be summarised as below:

1) Information and data literacy: To articulate information needs, to locate and retrieve digital data, information and content. To judge the relevance of the source and its content. To store, manage and organise digital data, information and content.

2) Communication and collaboration: To interact, communicate and collaborate through digital technologies while being aware of cultural and generational diversity. To participate in society through public and private digital services and participatory citizenship. To manage one's digital identity and reputation.

3) Digital content creation: To create and edit digital content. To improve and integrate information and content into an existing body of knowledge while understanding how copyright and licences are to be applied. To know how to give understandable instructions for a computer system.

4) Safety: To protect devices, content, personal data and privacy in digital environments. To protect physical and psychological health and to be aware of digital technologies for social well-being and social inclusion. To be aware of the environmental impact of digital technologies and their use.

5) Problem solving: To identify needs and problems and to resolve conceptual problems and problem situations in digital environments. To use digital tools to innovate processes and products. To keep up-to-date with the digital evolution.

Competence areas (1)

1. Information and data literacy

1.1 Browsing, searching and filtering data, information and digital content

To articulate information needs, to search for data, information and content in digital environments, to access them and to navigate between them. To create and update personal search strategies.

1.2 Evaluating data, information and digital content

To analyse, compare and critically evaluate the credibility and reliability of sources of data, information and digital content. To analyse, interpret and critically evaluate the data, information and digital content.

1.3 Managing data, information and digital content

To organise, store and retrieve data, information and content in digital environments. To organise and process them in a structured environment.

2. Communication and collaboration

2.1 Interacting through digital technologies

To interact through a variety of digital technologies and to understand appropriate digital communication means for a given context.

2.2 Sharing through digital technologies

To share data, information and digital content with others through appropriate digital technologies. To act as an intermediary, to know about referencing and attribution practices.

2.3 Engaging in citizenship through digital technologies

To participate in society through the use of public and private digital services. To seek opportunities for self-empowerment and for participatory citizenship through appropriate digital technologies.

2.4 Collaborating through digital technologies

To use digital tools and technologies for collaborative processes and for co-construction and co-creation of resources and knowledge.

2.5 Netiquette

To be aware of behavioural norms and know-how while using digital technologies and interacting in digital environments. To adapt communication strategies to the specific audience and to be aware of cultural and generational diversity in digital environments.

2.6 Managing digital identity

To create and manage one or multiple digital identities, to be able to protect one's own reputation, to deal with the data that one produces through several digital tools, environments and services.

Competence areas (2)

3. Digital content creation

3.1 Developing digital content

To create and edit digital content in different formats, to express oneself through digital means.

3.2 Integrating and re-elaborating digital content

To modify, refine, improve and integrate information and content into an existing body of knowledge to create new, original and relevant content and knowledge.

3.3 Copyright and licences

To understand how copyright and licences apply to data, information and digital content.

3.4 Programming

To plan and develop a sequence of understandable instructions for a computing system to solve a given problem or perform a specific task.

4. Safety

4.1 Protecting devices

To protect devices and digital content and to understand risks and threats in digital environments. To know about safety and security measures and to have due regard to reliability and privacy.

4.2 Protecting personal data and privacy

To protect personal data and privacy in digital environments. To understand how to use and share personally identifiable information while being able to protect oneself and others from damages. To understand that digital services use a "Privacy policy" to inform how personal data is used.

4.3 Protecting health and well-being

To be able to avoid health-risks and threats to physical and psychological well-being while using digital technologies. To be able to protect oneself and others from possible dangers in digital environments (e.g. cyber bullying). To be aware of digital technologies for social well-being and social inclusion.

4.4 Protecting the environment

To be aware of the environmental impact of digital technologies and their use.

Competence areas (3)

5. Problem solving

5.1 Solving technical problems

To identify technical problems when operating devices and using digital environments, and to solve them (from trouble-shooting to solving more complex problems).

5.2 Identifying needs and technological responses

To assess needs and to identify, evaluate, select and use digital tools and possible technological responses to solve them. To adjust and customise digital environments to personal needs (e.g. accessibility).

5.3 Creatively using digital technologies

To use digital tools and technologies to create knowledge and to innovate processes and products. To engage individually and collectively in cognitive processing to understand and resolve conceptual problems and problem situations in digital environments.

5.4 Identifying digital competence gaps

To understand where one's own digital competence needs to be improved or updated. To be able to support others with their digital competence development. To seek opportunities for self-development and to keep up-to-date with the digital evolution.

Synthesis of the research results

The resulting data:

- confirms that respondents have digital competences in the field of information and data literacy, as well as in the field of communication and collaboration;

- in general, we notice that the area of competence, which requires the greatest attention from employees, in order to develop, is the one related to the creation of digital content;

- in practical terms, this implies a better knowledge of digital tools, but just as important is the quality of the digital content delivered with these tools.

General areas of competence
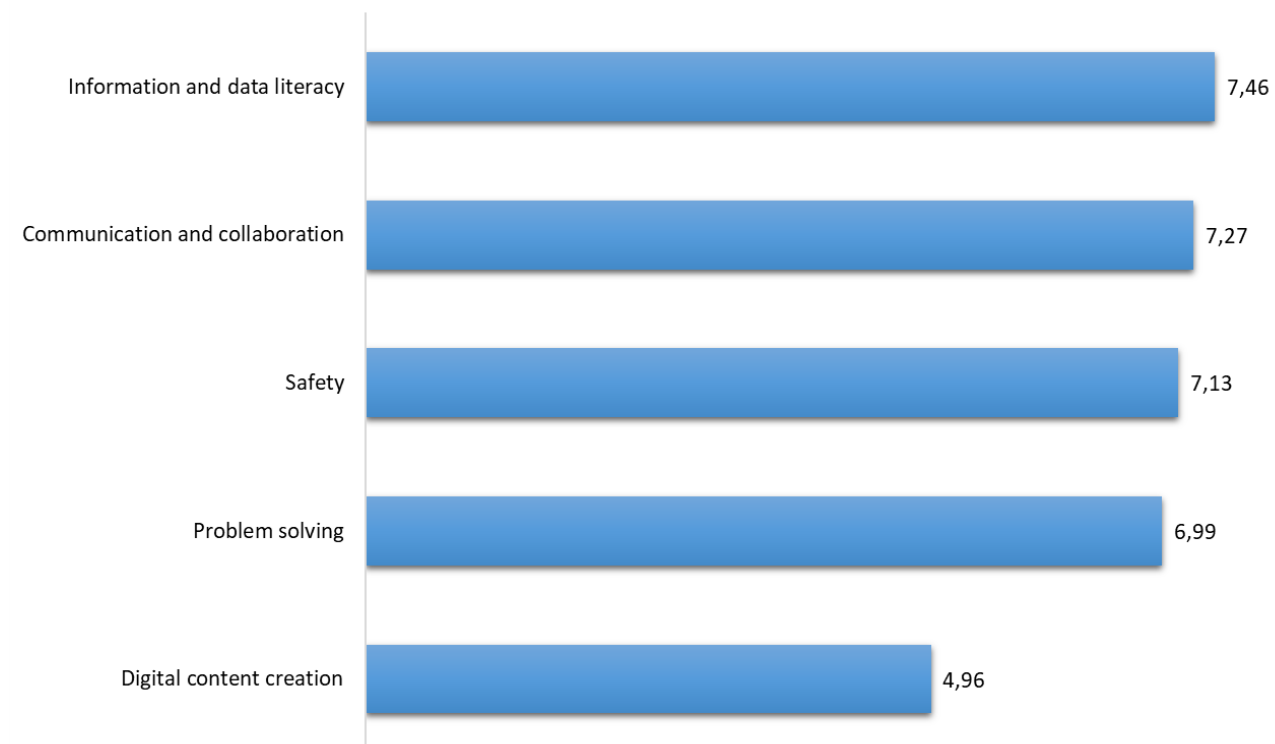
Area	Value
Information and data literacy	7,46
Communication and collaboration	7,27
Safety	7,13
Problem solving	6,99
Digital content creation	4,96

*the data are expressed in percentage, actual figures or average

Evaluation of Digital Competences for Romanian SMEs' Employees, Users of IT Technologies

Results

1.1 Browsing, searching and filtering data, information and digital content

1.2 Evaluating data, information and digital content

1.3 Managing data, information and digital content

According to the results obtained:

- respondents know and use search engines, but only at a basic level;

- although there are people who use specialized search engines or an advanced search mode, their number is mostly small.

1.1.1 What do you do to find and access the information you need?
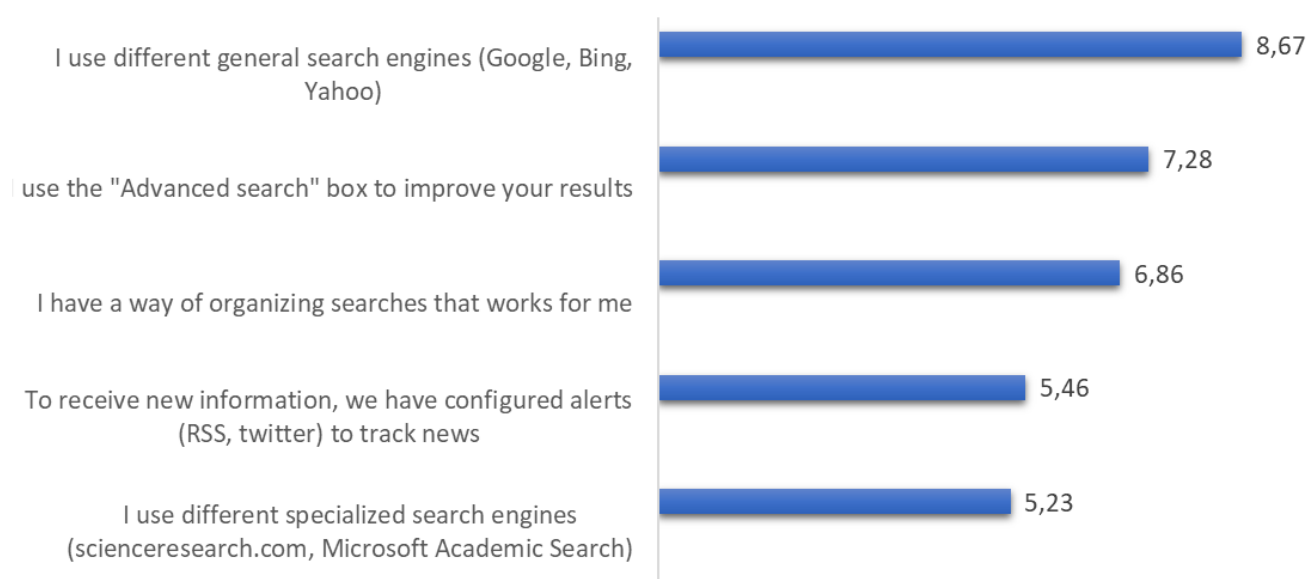
I use different general search engines (Google, Bing, Yahoo)	8,67
I use the "Advanced search" box to improve your results	7,28
I have a way of organizing searches that works for me	6,86
To receive new information, we have configured alerts (RSS, twitter) to track news	5,46
I use different specialized search engines (scienceresearch.com, Microsoft Academic Search)	5,23

*the data are expressed in percentage, actual figures or average

Evaluation of Digital Competences for Romanian SMEs' Employees, Users of IT Technologies

13

1.1 Browsing, searching and filtering data, information and digital content

1.2 Evaluating data, information and digital content

1.3 Managing data, information and digital content

- online information is filtered mainly by keywords and synonyms;

- knowledge of other information filtering techniques is low (for example, using quotation marks to search for accurate information, searching for a website using the Site, using the advanced search box).

1.1.2 How do you filter your results to find the information you're interested in?

Category	Value
I'm looking for keywords and synonyms	8,44
I use a combination of different keywords in the same search	7,91
I'm looking in multiple languages	7,53
I'm a regular user of the advanced search box	6,57
I usually limit my search by dates	6,61
Use quotation marks to look for accurate results	5,99
I know how to search for a website using the Site: or a file type using Filetype:	5,81
I know how to reduce the results of a search using the plus (+) and minus (-) signs	4,94

*the data are expressed in percentage, actual figures or average

Results

1.1 Browsing, searching and filtering data, information and digital content

1.2 Evaluating data, information and digital content

1.3 Managing data, information and digital content

Following the results obtained:

- respondents consider information to be true if it is issued by experts and professionals;

- an assessment of the information by means of their own knowledge or by means of the tools at hand is not preferred by the respondents participating in the survey;

- the very low score of the item "*I teach others to critically evaluate the information they access*" draws attention to the fact that employees with digital competences can themselves be agents of digital learning.

1.2.1 How do you know if the information you find on the Internet is true?
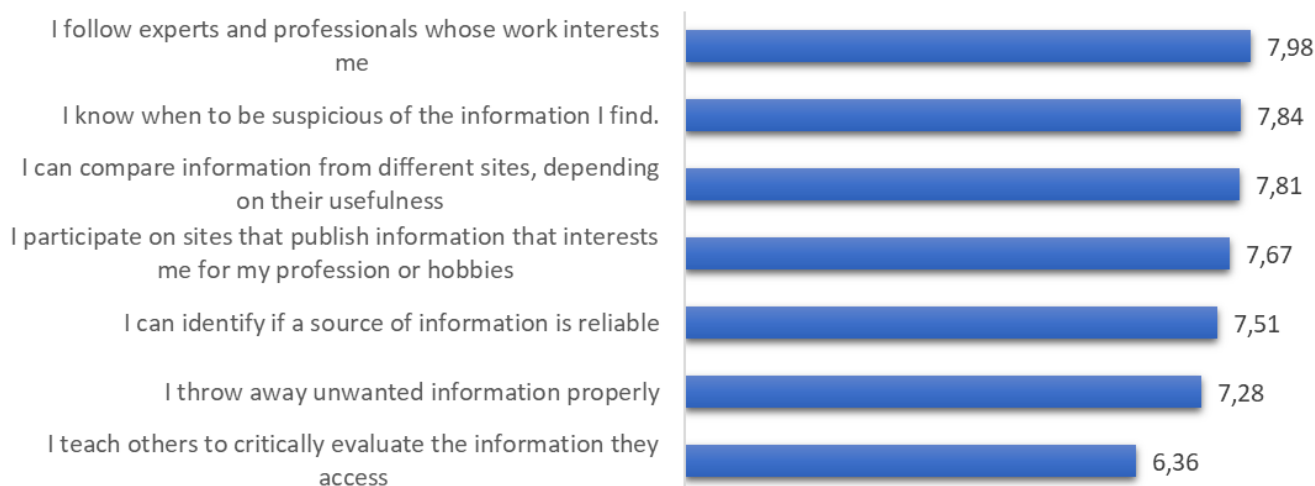
I follow experts and professionals whose work interests me	7,98
I know when to be suspicious of the information I find.	7,84
I can compare information from different sites, depending on their usefulness	7,81
I participate on sites that publish information that interests me for my profession or hobbies	7,67
I can identify if a source of information is reliable	7,51
I throw away unwanted information properly	7,28
I teach others to critically evaluate the information they access	6,36

*the data are expressed in percentage, actual figures or average

Results

1.1 Browsing, searching and filtering data, information and digital content
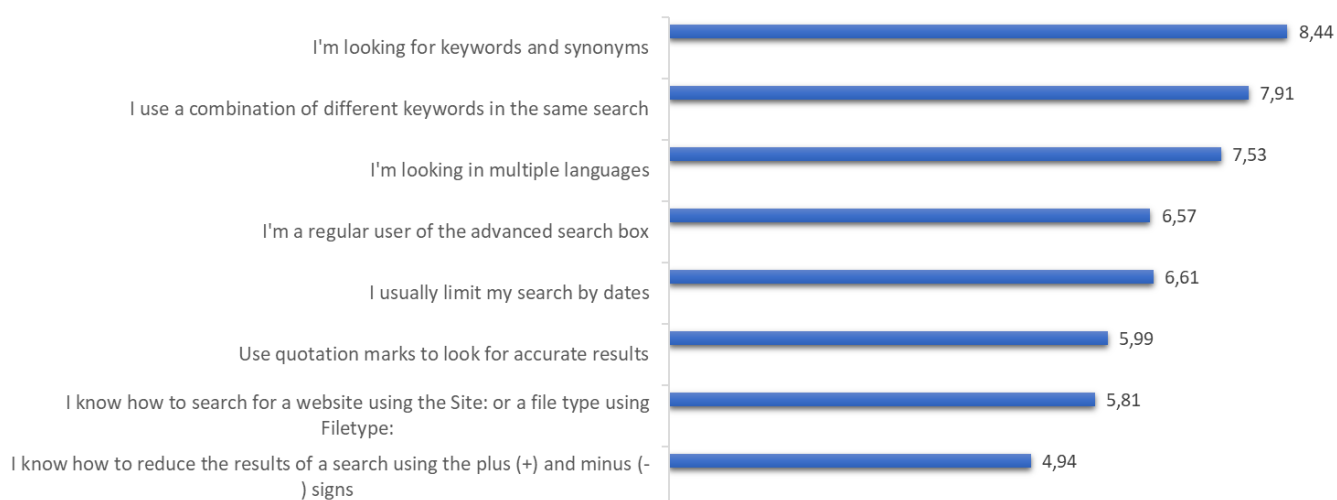
1.2 Evaluating data, information and digital content

1.3 Managing data, information and digital content

The most important conclusions are the following:

- respondents are aware of multiple solutions for managing data, information and digital content;

- the most used solutions are those on external support, directly managed by the user: memory card, USB, CD, hard disk.

1.3.1 To save your documents and files what activities do you do?
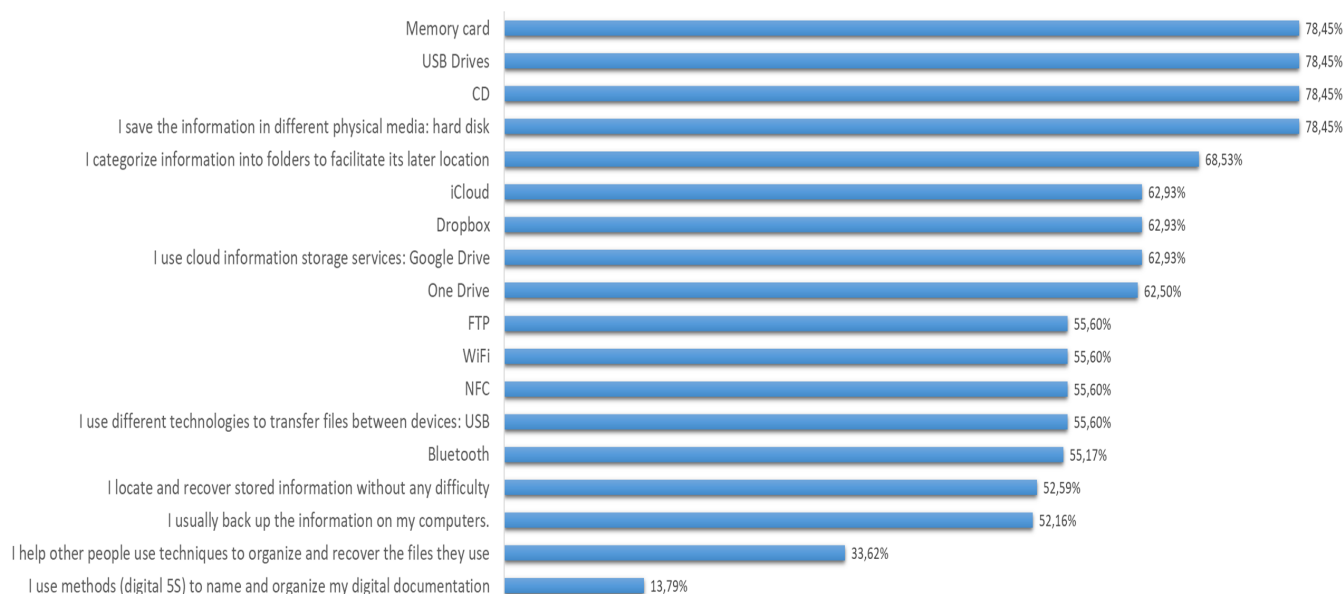
Activity	Percentage
Memory card	78,45%
USB Drives	78,45%
CD	78,45%
I save the information in different physical media: hard disk	78,45%
I categorize information into folders to facilitate its later location	68,53%
iCloud	62,93%
Dropbox	62,93%
I use cloud information storage services: Google Drive	62,93%
One Drive	62,50%
FTP	55,60%
WiFi	55,60%
NFC	55,60%
I use different technologies to transfer files between devices: USB	55,60%
Bluetooth	55,17%
I locate and recover stored information without any difficulty	52,59%
I usually back up the information on my computers.	52,16%
I help other people use techniques to organize and recover the files they use	33,62%
I use methods (digital 5S) to name and organize my digital documentation	13,79%

*the data are expressed in percentage, actual figures or average

Results

2.1 Interacting through digital technologies

2.2 Sharing through digital technologies

2.3 Engaging in citizenship through digital technologies

2.4 Collaborating through digital technologies

2.5 Netiquette

2.6 Managing digital identity

The following is observed:

- the overwhelming presence of digital competences that facilitate the creation of virtual connections;

- respondents say they use various messaging tools, e-mail, SMS, social networks, video conferencing applications.

2.1.1 To connect with others:

	NO	YES
I use messaging tools: Whatsapp, Telegram, Skype, …	11	221
Send emails	12	220
Send and receive SMS via mobile phone	14	218
I participate in social networks: Facebook, Twitter, Snapchap, LinkedIn, Instagram …	34	198
I encourage and teach other people to connect through technologies	42	190
I use videoconferencing to do telemeeting: Zoom, Teams, Skype, Webex, …	56	176
I consult and participate in forums, blogs, wikis, etc.	88	144

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Evaluation of Digital Competences for Romanian SMEs' Employees, Users of IT Technologies

Results

2.1 Interacting through digital technologies

2.2 Sharing through digital technologies

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2.5 Netiquette

2.6 Managing digital identity

Regarding the distribution of information and digital content to others in the virtual environment, the results show that respondents:

- know other functions of e-mail besides the basic one (sending messages), managing with its help to share digital content;

- encourages and helps others use digital tools to exchange information and content;

- claim to run a blog on which they constantly post content;

- claim to use online tools to share content (Share Point, Google Drive).

2.2.1 How do you share information and digital content with others?

Category	NO	YES
I use email to share digital content: documents, photos, videos, etc.	11	221
I use online tools to share those contents: SharePoint, Google Drive, Scribd, Slideshare, Instagram, Flickr …	45	187
I participate in social networks and online forums to share knowledgeÎi încurajez și îi învăț pe alții să folosească…	58	174
I participate in social networks and online forums to share knowledge	99	133
Through the Internet, I collaborate with other people in my educational or professional field (my personal learning…	100	132
I use wikis to share my content and access content developed by others	161	71
I maintain a blog where I publish my content and receive comments from readers	172	60

*the data are expressed in percentage, actual figures or average

Results

2.1 Interacting through digital technologies

2.2 Sharing through digital technologies

2.3 Engaging in citizenship through digital technologies

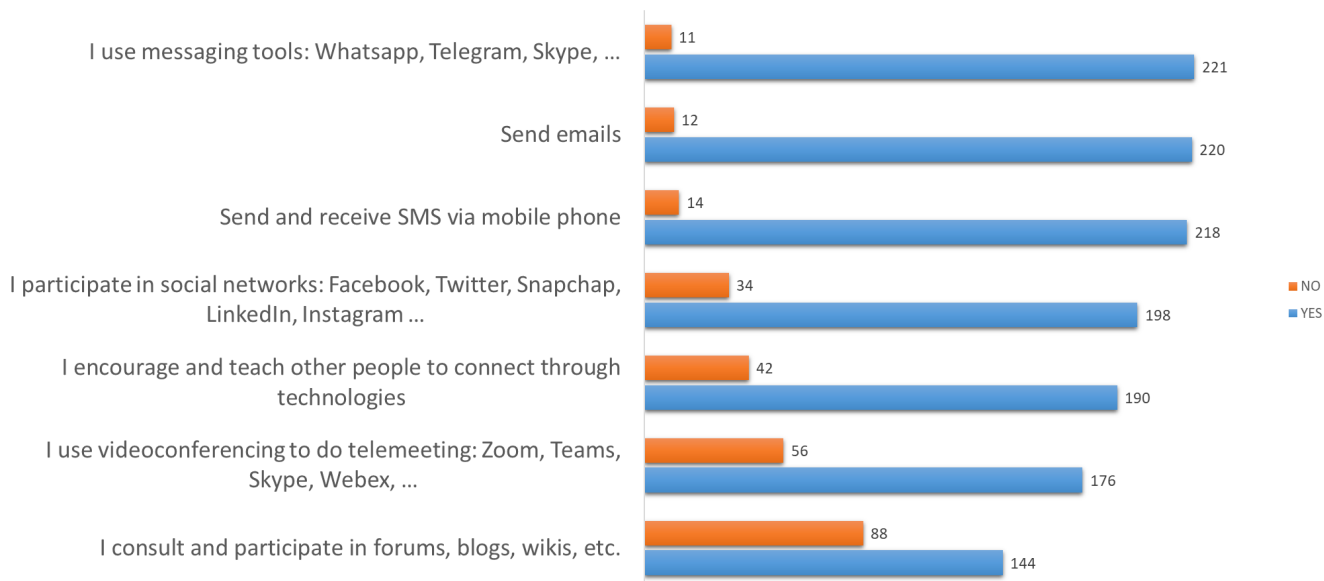2.4 Collaborating through digital technologies

2.5 Netiquette

2.6 Managing digital identity

The resulting data demonstrate a clear trend of social involvement of respondents via the Internet, as follows:

- use NGO websites to generate ideas and proposals for solving social or political problems;

- participates in citizen consultations or online surveys;

- use the internet to report situations or make complaints to a public administration;

- access the websites of public organizations;

- they contacted and discussed with a representative or a political party.

2.3.1 Do you carry out these social activities through the Internet?
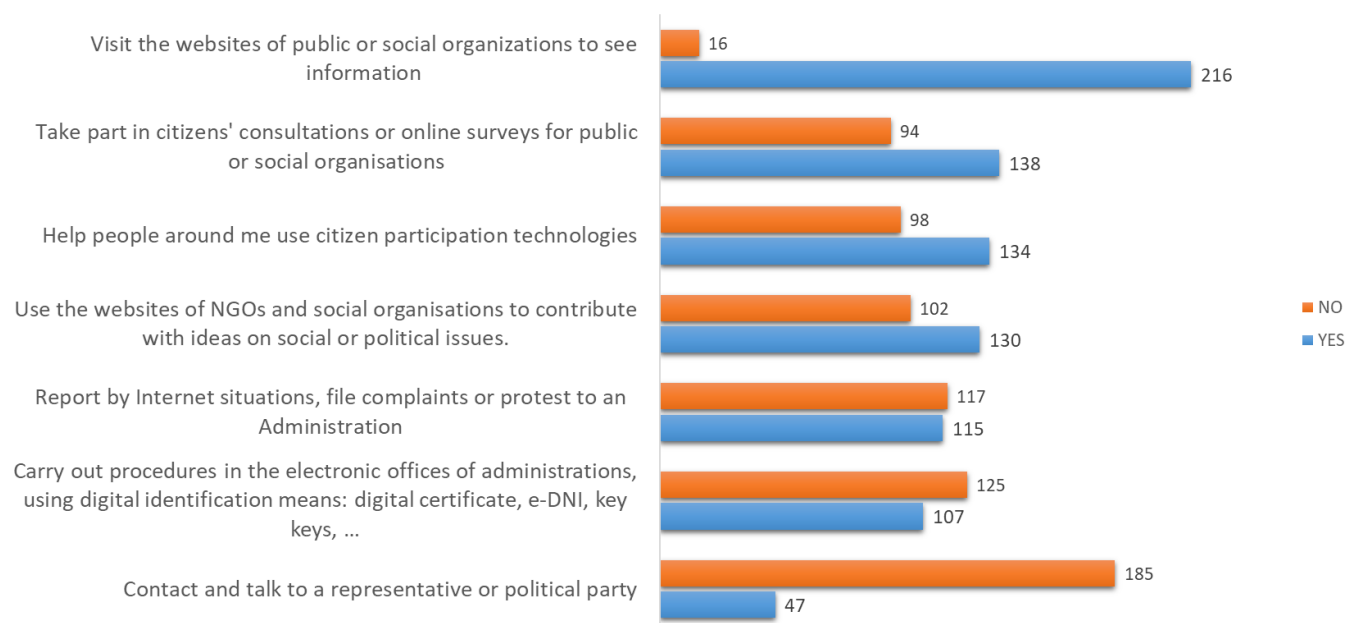
Activity	NO	YES
Visit the websites of public or social organizations to see information	16	216
Take part in citizens' consultations or online surveys for public or social organisations	94	138
Help people around me use citizen participation technologies	98	134
Use the websites of NGOs and social organisations to contribute with ideas on social or political issues.	102	130
Report by Internet situations, file complaints or protest to an Administration	117	115
Carry out procedures in the electronic offices of administrations, using digital identification means: digital certificate, e-DNI, key keys, …	125	107
Contact and talk to a representative or political party	185	47

*the data are expressed in percentage, actual figures or average

Results

2.1 Interacting through digital technologies

2.2 Sharing through digital technologies

2.3 Engaging in citizenship through digital technologies

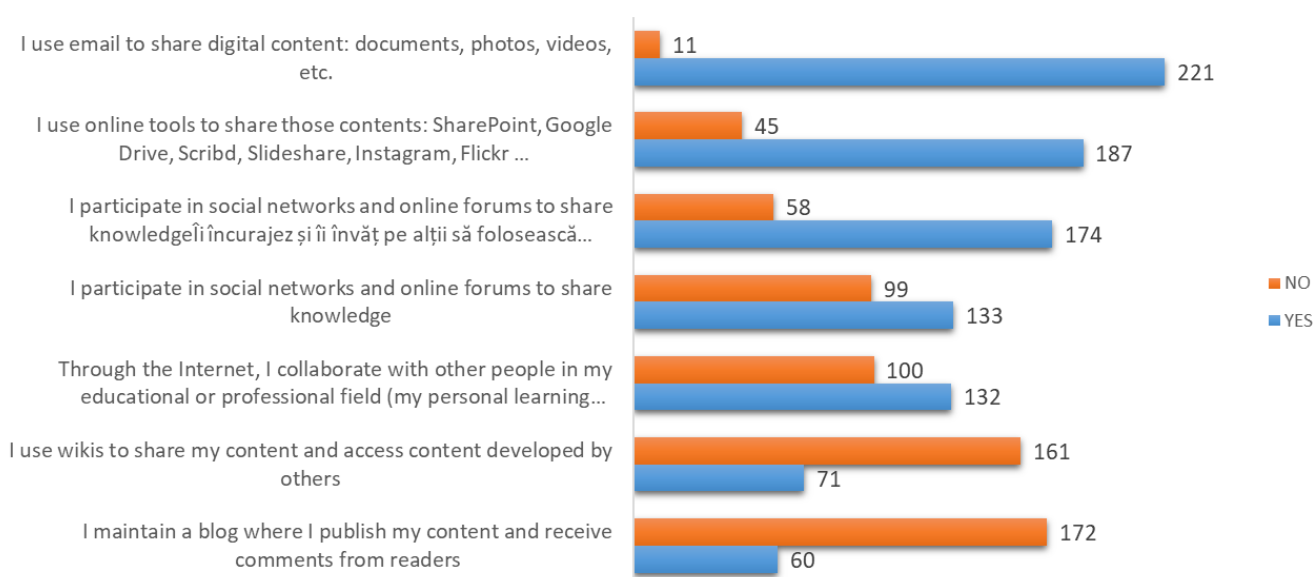**2.4 Collaborating through digital technologies**

2.5 Netiquette

2.6 Managing digital identity

The results show that:

- for interaction with other people in the virtual environment, various digital tools are relatively well known; of these, frequently used are platforms such as Zoom Teams, Skype.

2.4.1 To collaborate with others:

Statement	Value
I use tools like Zoom, Teams, Skype, Webex, … to conduct remote meetings with others	7,68
I use collaboration tools to plan, make, and track projects (Google Drive, Dropbox, SharePoint, etc.)	6,73
I participate in learning activities such as MOOCs, webinars, streaming … through collaborative environments: Moodle, WebCT, …	5,75
I promote and organize online collaboration projects between people from my work, educational and / or personal environmental	5,70
I use collaboration and co-working spaces	5,36

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Evaluation of Digital Competences for Romanian SMEs' Employees, Users of IT Technologies

Results

2.1 Interacting through digital technologies

2.2 Sharing through digital technologies

2.3 Engaging in citizenship through digital technologies

2.4 Collaborating through digital technologies

2.5 Netiquette

2.6 Managing digital identity

Although the term *Netiquette* is relatively new,

- respondents have shown that they know the rules and mechanisms;

- it integrates in the digital professional activity the rules of good conduct, the respect for the other internet users, the practices of using the internet.

2.5.1 When interacting with other people on the Internet
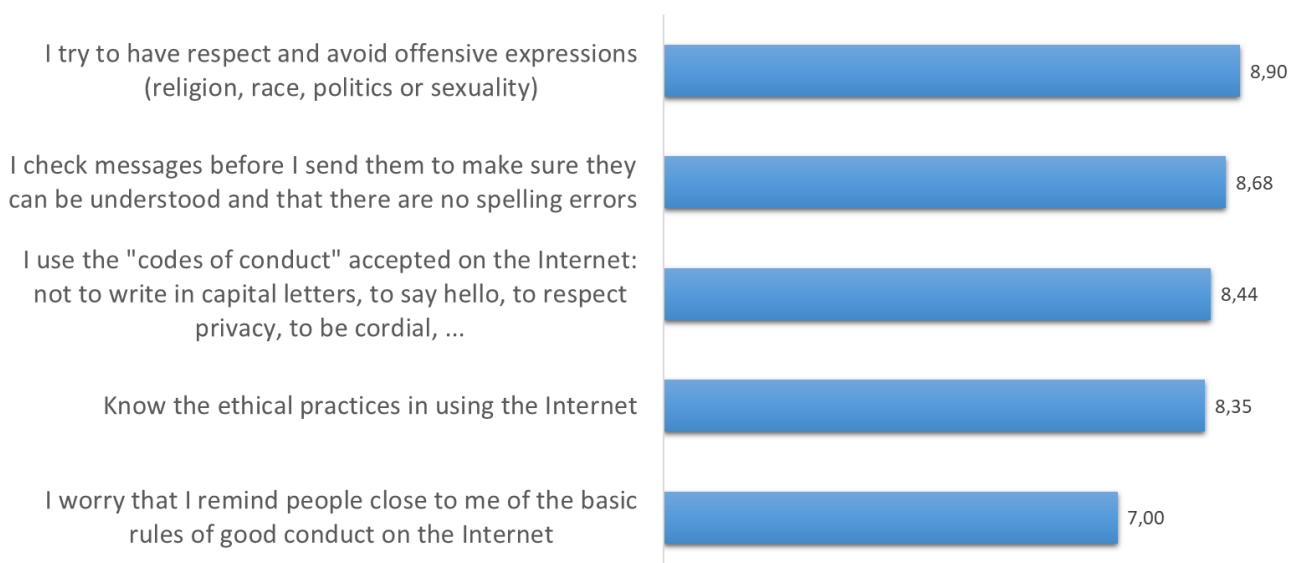
I try to have respect and avoid offensive expressions (religion, race, politics or sexuality)	8,90
I check messages before I send them to make sure they can be understood and that there are no spelling errors	8,68
I use the "codes of conduct" accepted on the Internet: not to write in capital letters, to say hello, to respect privacy, to be cordial, ...	8,44
Know the ethical practices in using the Internet	8,35
I worry that I remind people close to me of the basic rules of good conduct on the Internet	7,00

*the data are expressed in percentage, actual figures or average

Results

2.1 Interacting through digital technologies

2.2 Sharing through digital technologies

2.3 Engaging in citizenship through digital technologies
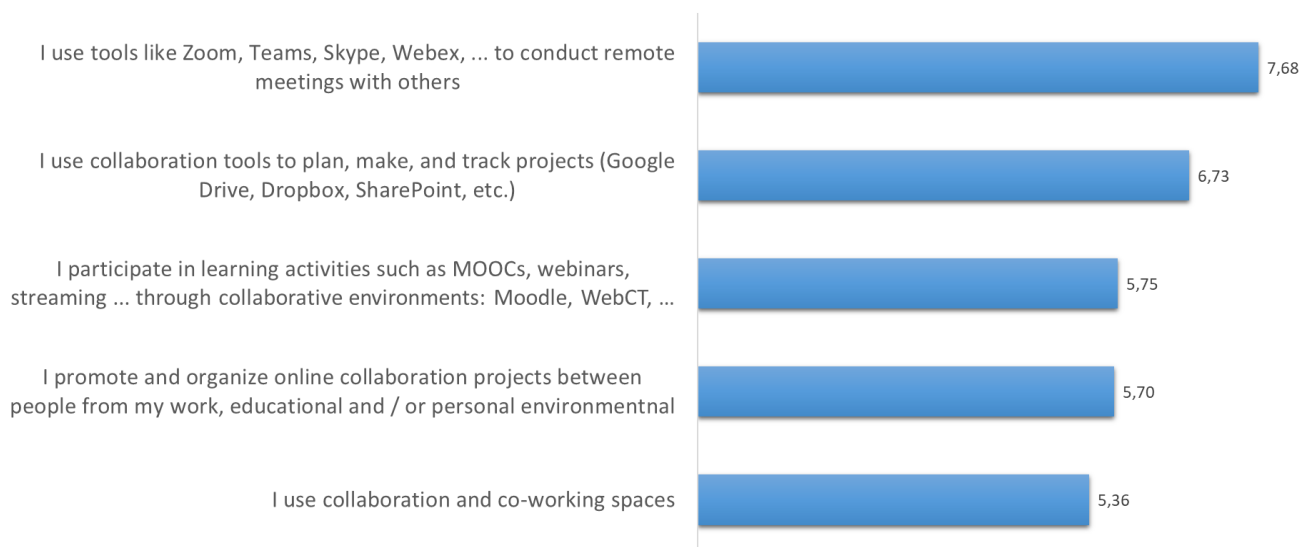
2.4 Collaborating through digital technologies

2.5 Netiquette

2.6 Managing digital identity

Persons in the selected sample:

- attaches great importance to "*the information it publishes in order to protect its digital reputation*";

- respondents state that they do not need more than one identity to interact with other people on the internet.

2.6 Digital identity management

I am careful with the information I publish to protect my "digital reputation" and mine (what is said about you on the internet, the comments and opinions of others)	8,11
I know how to generate a personal or professional profile on social networks, taking care of the details I want to convey (how you represent yourself, how you describe yourself)	7,97
I know how to keep an eye on "my footprint" (all the activity of your network)	7,50
I know how to act and who to turn to when there are problems with my digital identity (harassment, etc.)	7,07
The image that other internet users have of me is conditioned by what I publish on social networks	7,00
I may have more than one "digital identity" depending on the objective or context (what we are for others on the net)	6,01

*the data are expressed in percentage, actual figures or average

Results

3.1 Developing digital content

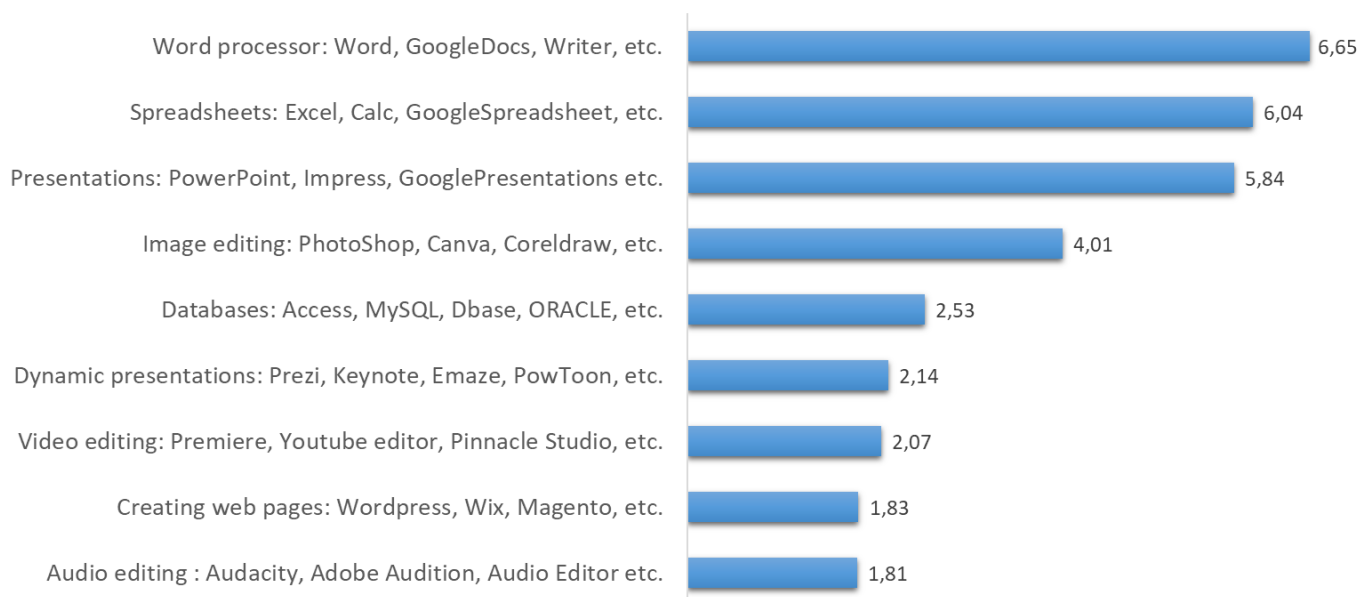3.2 Integrating and re-elaborating digital content

3.3 Copyright and licences

3.4 Programming

Following the questionnaire:

- we notice an acute lack of competences in the area of digital content development, more precisely: skills for creating web pages, audio editing, video editing, databases or dynamic presentations are worryingly few;

- nor are the competences in the field of text editors, Power Point presentation or Excel spreadsheets very well developed, with low scores and a clear need for further development.

3.1.1 Digital content development

Word processor: Word, GoogleDocs, Writer, etc.	6,65
Spreadsheets: Excel, Calc, GoogleSpreadsheet, etc.	6,04
Presentations: PowerPoint, Impress, GooglePresentations etc.	5,84
Image editing: PhotoShop, Canva, Coreldraw, etc.	4,01
Databases: Access, MySQL, Dbase, ORACLE, etc.	2,53
Dynamic presentations: Prezi, Keynote, Emaze, PowToon, etc.	2,14
Video editing: Premiere, Youtube editor, Pinnacle Studio, etc.	2,07
Creating web pages: Wordpress, Wix, Magento, etc.	1,83
Audio editing : Audacity, Adobe Audition, Audio Editor etc.	1,81

*the data are expressed in percentage, actual figures or average

Results

3.1 Developing digital content

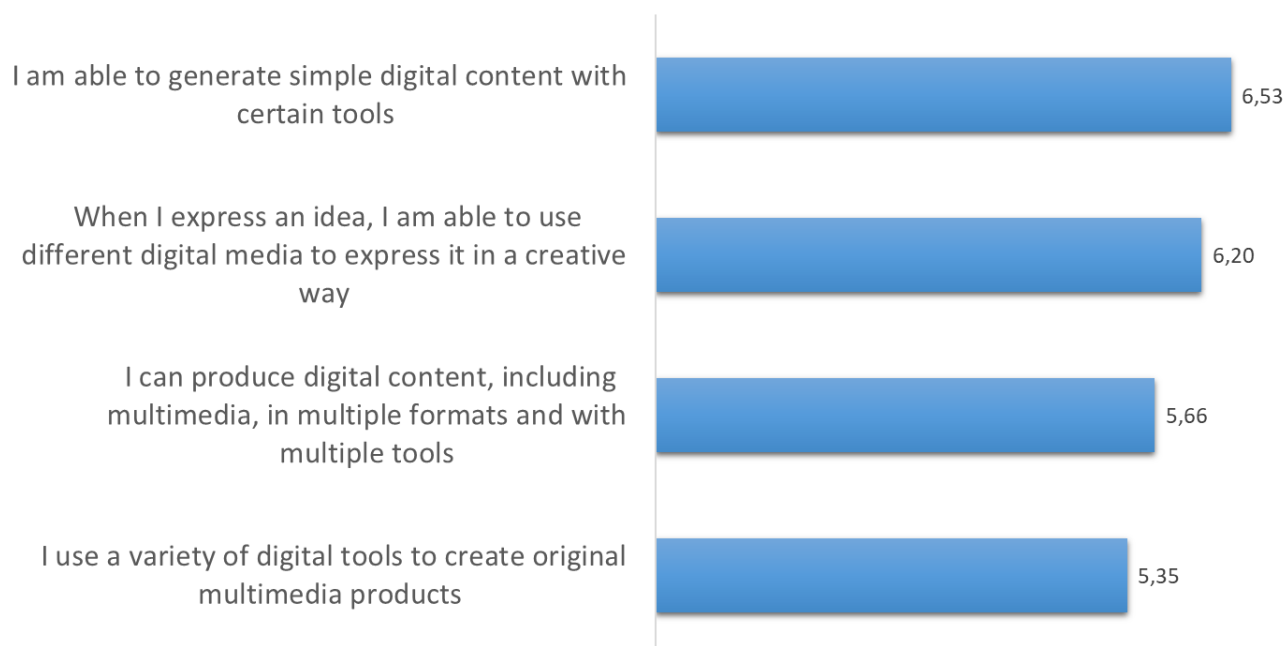**3.2 Integrating and re-elaborating digital content**

3.3 Copyright and licences

3.4 Programming

Regarding the experience in creating digital content of the respondents, the results show:

- an average level of competence already existing in the area of simple digital content;

- the fact that the investment in the development of this competence proves to be still necessary and useful.

3.2.1 Relating to your experience of creating digital content:

I am able to generate simple digital content with certain tools	6,53
When I express an idea, I am able to use different digital media to express it in a creative way	6,20
I can produce digital content, including multimedia, in multiple formats and with multiple tools	5,66
I use a variety of digital tools to create original multimedia products	5,35

*the data are expressed in percentage, actual figures or average

Results

3.1 Developing digital content

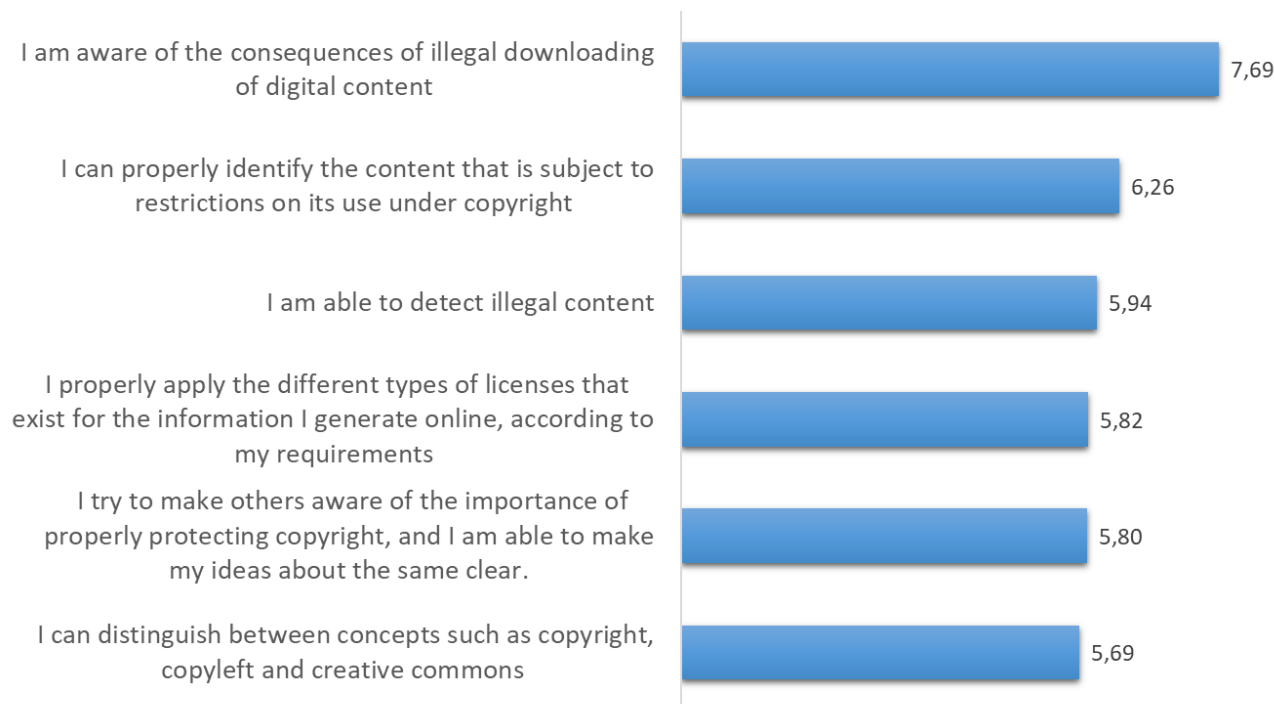3.2 Integrating and re-elaborating digital content

3.3 Copyright and licences

3.4 Programming

Despite the fact that users are aware of the consequences of illegal downloading of digital content, they:

- does not attach much importance to issues related to the proper application of different types of licenses;

- they cannot easily identify content that is subject to copyright restrictions. In conclusion, this area needs in-depth attention, given the potential legal risks for SMEs.

- respondents obtained an average score on the item that measures the ability to detect illegal content, as well as on the item by which they express their intention to draw the attention of acquaintances on issues related to copyright protection.

3.3.1 Related to user's copyright and licenses:

I am aware of the consequences of illegal downloading of digital content	7,69
I can properly identify the content that is subject to restrictions on its use under copyright	6,26
I am able to detect illegal content	5,94
I properly apply the different types of licenses that exist for the information I generate online, according to my requirements	5,82
I try to make others aware of the importance of properly protecting copyright, and I am able to make my ideas about the same clear.	5,80
I can distinguish between concepts such as copyright, copyleft and creative commons	5,69

*the data are expressed in percentage, actual figures or average

Evaluation of Digital Competences for Romanian SMEs' Employees, Users of IT Technologies

Results

3.1 Developing digital content

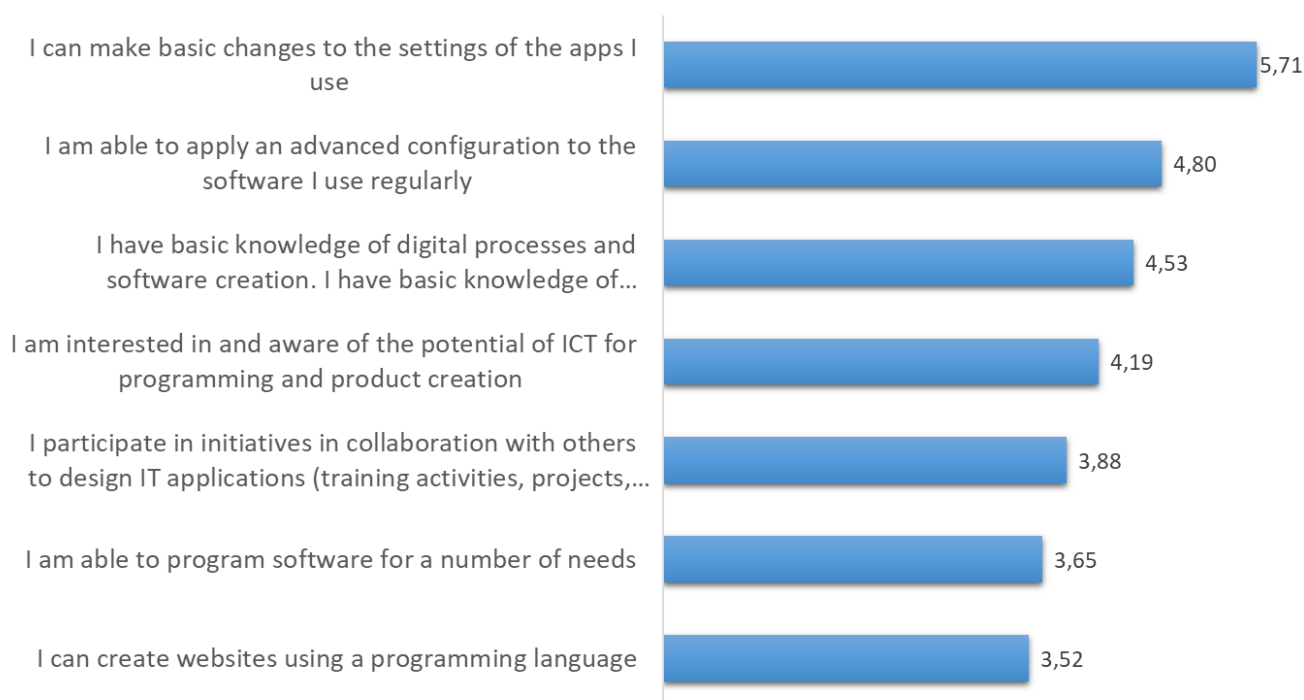3.2 Integrating and re-elaborating digital content

3.3 Copyright and licences

3.4 Programming

According to the answers given by the people in the sample:

- knowledge of software programming and application settings is low, with the highest score being the item "*I can make basic changes to the settings off the apps I use*";

- knowledge of creating websites in programming languages and software programming scored low, highlighting the lack of skills in this area;

- this skills gap is a direct consequence of the lack of training, the respondents giving, in fact, low scores and items that refer to this issue: "*I am interested in and aware of the potential of ICT*", "*I participate in initiatives in collaboration with others to design IT applications*".

3.4.1 related to software programming and application settings:

I can make basic changes to the settings of the apps I use	5,71
I am able to apply an advanced configuration to the software I use regularly	4,80
I have basic knowledge of digital processes and software creation. I have basic knowledge of…	4,53
I am interested in and aware of the potential of ICT for programming and product creation	4,19
I participate in initiatives in collaboration with others to design IT applications (training activities, projects,…	3,88
I am able to program software for a number of needs	3,65
I can create websites using a programming language	3,52

*the data are expressed in percentage, actual figures or average

Results

4.1 Protecting devices

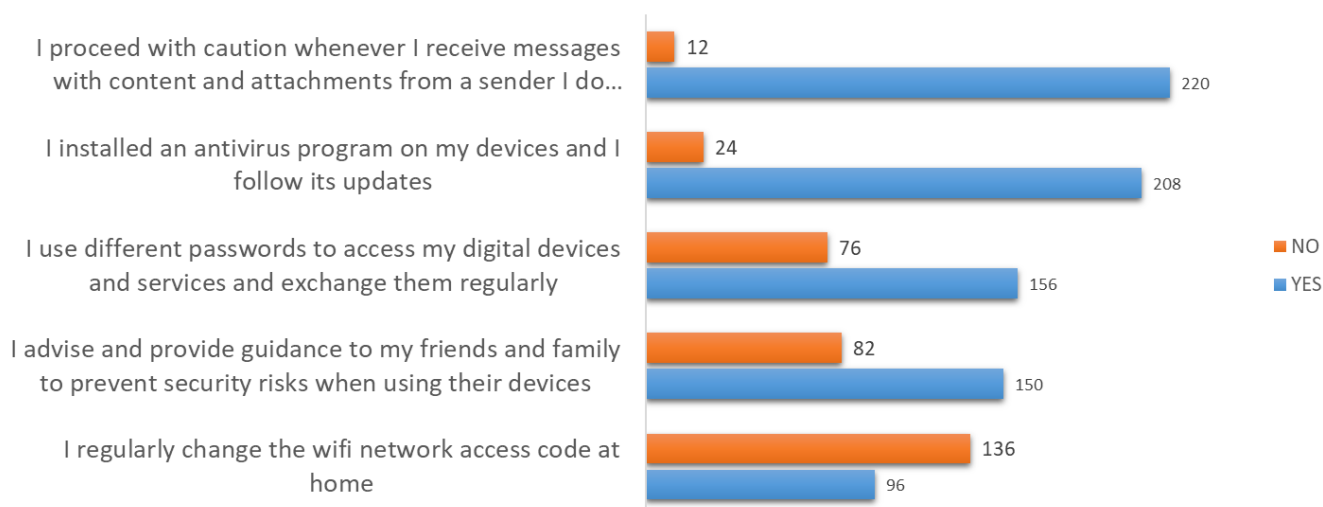4.2 Protecting personal data and privacy

4.3 Protecting health and well-being

4.4 Protecting the environment

The conclusion of the graph below indicates the clear tendency of respondents to use digital devices safely. More exactly:

- they pay higher attention to SPAM messages;
- they pay attention to internet security and say they use passwords to access their digital devices and services;
- they have antivirus installed on work devices;
- they regularly change the access code of home Wi-Fi network;
- they advise their family and friends about security risks.

4.1.1 Which of the following statements apply to you related to the safe use of your digital online devices ?

Statement	NO	YES
I proceed with caution whenever I receive messages with content and attachments from a sender I do...	12	220
I installed an antivirus program on my devices and I follow its updates	24	208
I use different passwords to access my digital devices and services and exchange them regularly	76	156
I advise and provide guidance to my friends and family to prevent security risks when using their devices	82	150
I regularly change the wifi network access code at home	136	96

*the data are expressed in percentage, actual figures or average

Evaluation of Digital Competences for Romanian SMEs' Employees, Users of IT Technologies

Results

4.1 Protecting devices

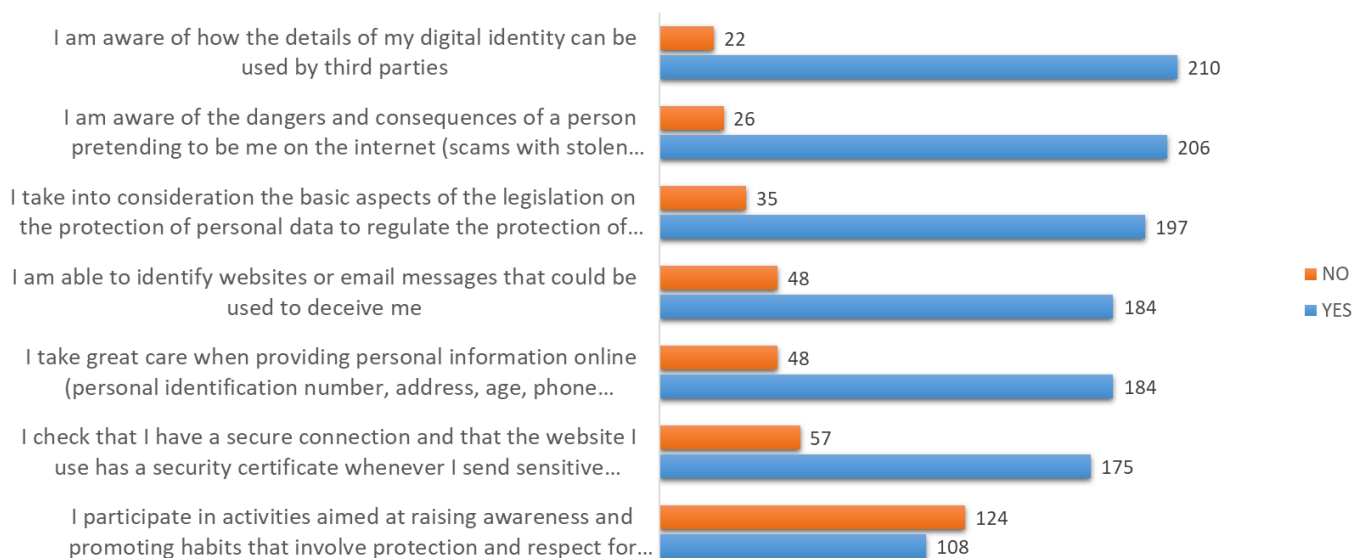**4.2 Protecting personal data and privacy**

4.3 Protecting health and well-being

4.4 Protecting the environment

The large number of respondents who say they know how to protect their personal data online is gratifying. Therefore:

- they are aware of the dangers and consequences of scams involving stolen identities on the internet;

- they are careful when providing personal information online;

- they are aware of how digital identity details can be used by third parties;

- they check that the website they access has a security certificate;

- they declare themselves capable of identifying websites or messages that are aimed at fraud.

4.2.1 Related to your online personal data:

Statement	NO	YES
I am aware of how the details of my digital identity can be used by third parties	22	210
I am aware of the dangers and consequences of a person pretending to be me on the internet (scams with stolen…)	26	206
I take into consideration the basic aspects of the legislation on the protection of personal data to regulate the protection of…	35	197
I am able to identify websites or email messages that could be used to deceive me	48	184
I take great care when providing personal information online (personal identification number, address, age, phone…)	48	184
I check that I have a secure connection and that the website I use has a security certificate whenever I send sensitive…	57	175
I participate in activities aimed at raising awareness and promoting habits that involve protection and respect for…	124	108

*the data are expressed in percentage, actual figures or average

Results

4.1 Protecting devices

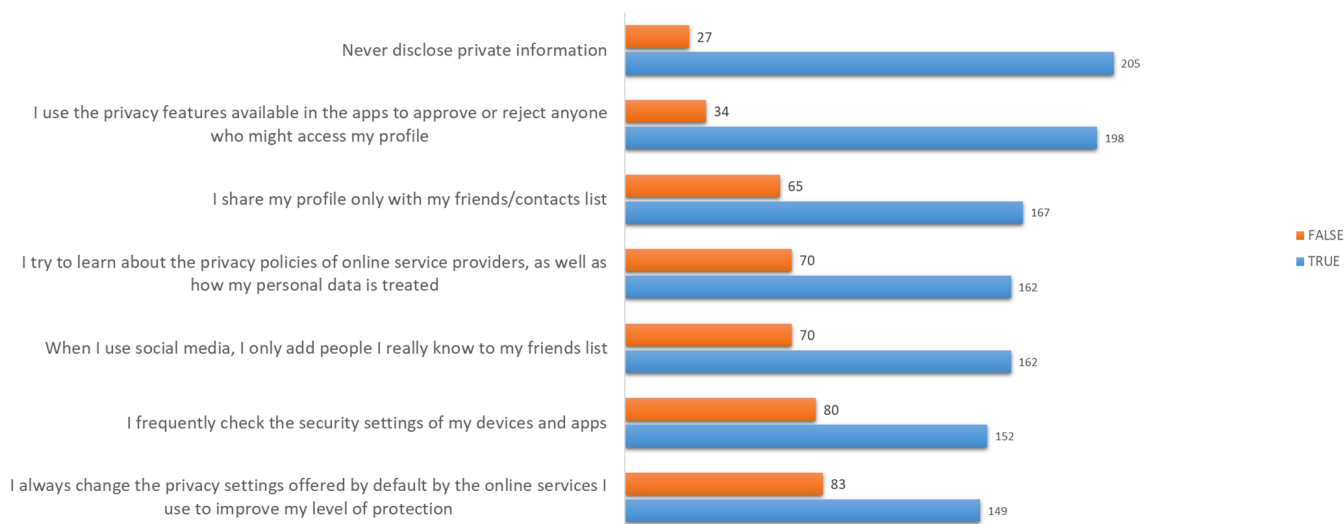**4.2 Protecting personal data and privacy**

4.3 Protecting health and well-being

4.4 Protecting the environment

Once again, it is confirmed by the large number of respondents that they take into account basic security measures when interacting on social networks. Therefore:

- they use privacy features available in applications to approve or reject anyone who might access their profile;

- they distribute their profile only to their friends / contacts list;

- they never disclose private information online;

- they see the importance of privacy policies offered by online service providers;

- they change privacy settings to improve the level of protection;

- they add to the list of friends on social networks only the people they really know.

4.2.2 Keep in mind basic security measures when interacting on social networks or other online services?

*the data are expressed in percentage, actual figures or average

Evaluation of Digital Competences for Romanian SMEs' Employees, Users of IT Technologies

Results

4.1 Protecting devices

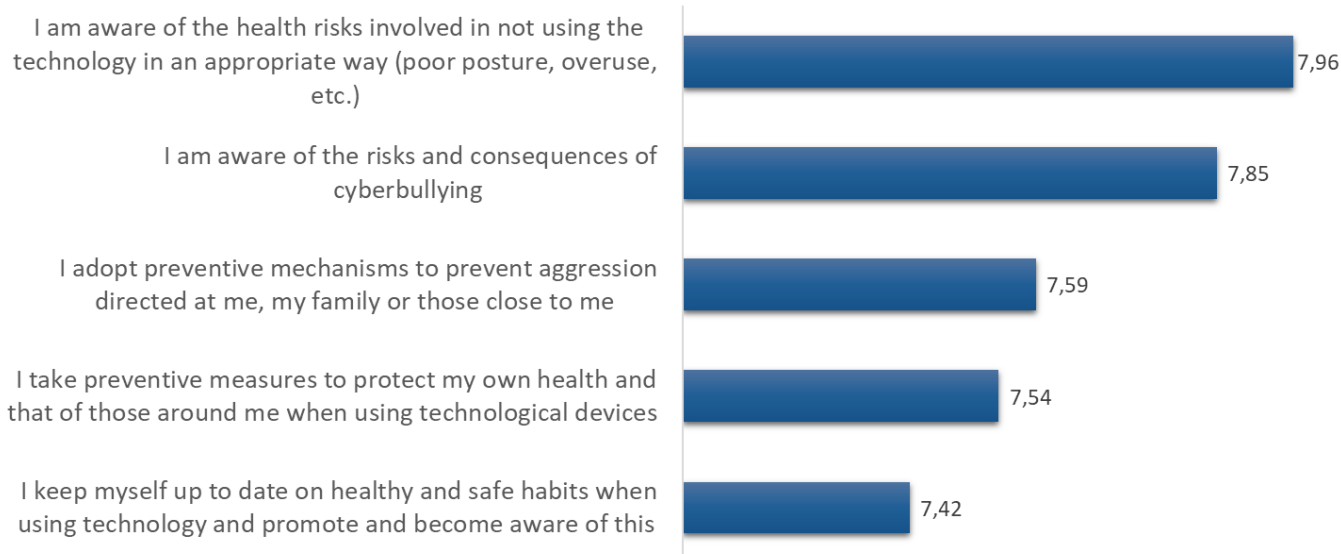4.2 Protecting personal data and privacy

4.3 Protecting health and well-being

4.4 Protecting the environment

In terms of security caution, the data show that:

- most respondents attach great importance to it;

- all items that measure attention to security issues scored high;

- respondents are aware of the risks and consequences of cyber aggression, that they adopt prevention mechanisms and are constantly aware of healthy and safe habits when using technology.

4.3.1 Describe your attitude and behavior when using ITCs, taking into account the repercussions they may have on your health:

I am aware of the health risks involved in not using the technology in an appropriate way (poor posture, overuse, etc.)	7,96
I am aware of the risks and consequences of cyberbullying	7,85
I adopt preventive mechanisms to prevent aggression directed at me, my family or those close to me	7,59
I take preventive measures to protect my own health and that of those around me when using technological devices	7,54
I keep myself up to date on healthy and safe habits when using technology and promote and become aware of this	7,42

*the data are expressed in percentage, actual figures or average

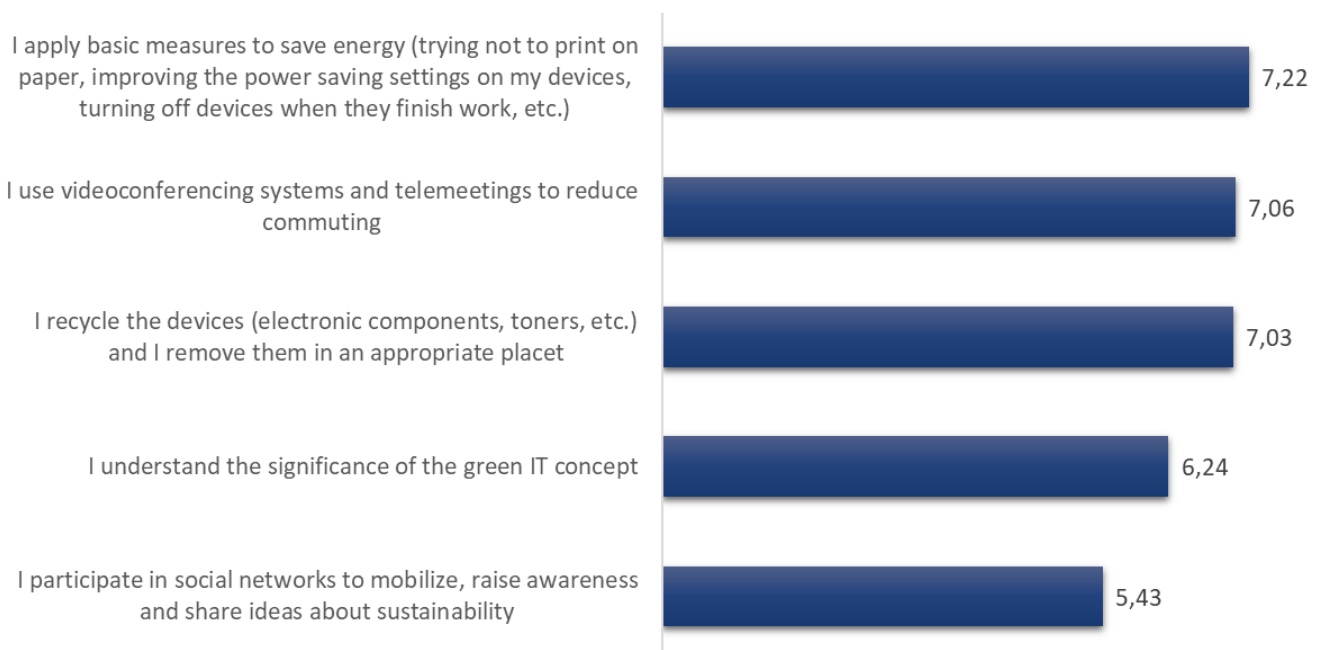**Evaluation of Digital Competences for Romanian SMEs' Employees, Users of IT Technologies**

Results

4.1 Protecting devices

4.2 Protecting personal data and privacy

4.3 Protecting health and well-being

4.4 Protecting the environment

Although they pay attention to issues related to energy saving measures (energy saving, trying not to print on paper):

- respondents give lower scores to recycling or mobilization on social media to encourage green behavior;

- the concept of *green IT* is not very well known to those who participated in this questionnaire, the item obtaining a small score.

4.4.1 Indicate how "green" your behavior is when using technology

I apply basic measures to save energy (trying not to print on paper, improving the power saving settings on my devices, turning off devices when they finish work, etc.)	7,22
I use videoconferencing systems and telemeetings to reduce commuting	7,06
I recycle the devices (electronic components, toners, etc.) and I remove them in an appropriate placet	7,03
I understand the significance of the green IT concept	6,24
I participate in social networks to mobilize, raise awareness and share ideas about sustainability	5,43

*the data are expressed in percentage, actual figures or average

Evaluation of Digital Competences for Romanian SMEs' Employees, Users of IT Technologies

Results

5.1 Solving technical problems

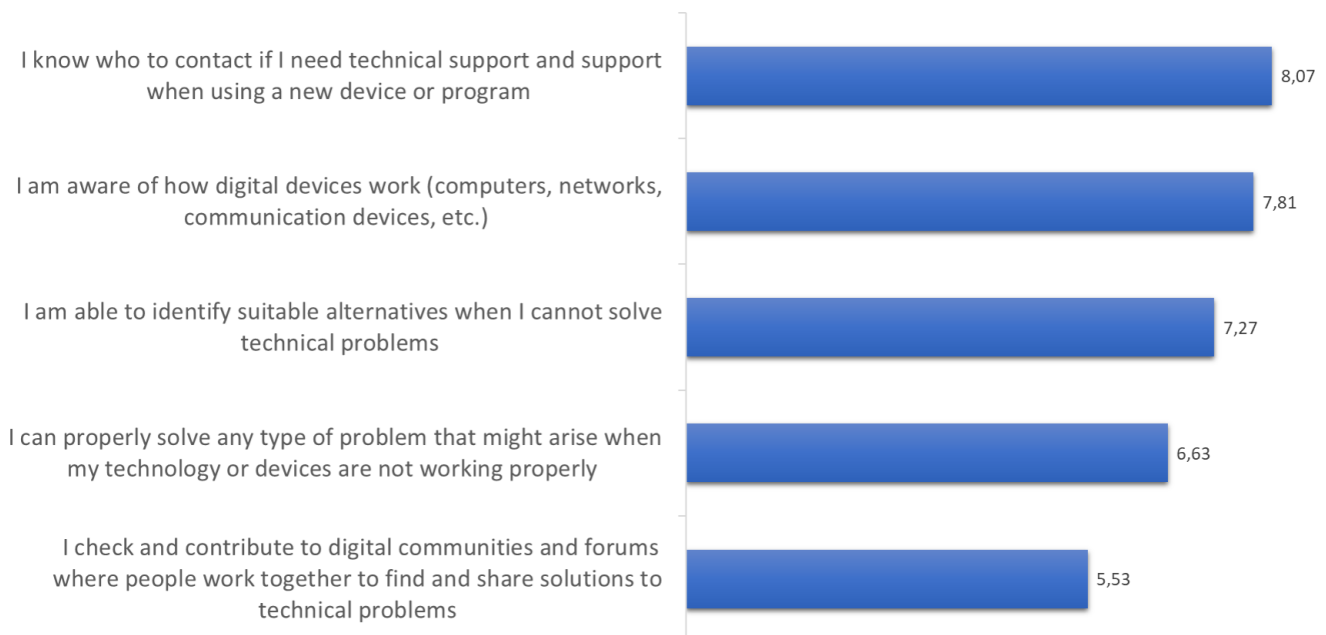5.2 Identifying needs and technological responses

5.3 Creatively using digital technologies

5.4 Identifying digital competence gaps

Competence in solving technical problems is well represented, because:

- when problems arise with the use of digital devices, respondents stated that they can solve any technological problem or that they know who to turn to for technical assistance;

- the aspect most ignored by respondents is involvement in digital communities and forums to provide information to others.

5.1.1 Whenever problems arise when using digital devices

I know who to contact if I need technical support and support when using a new device or program	8,07
I am aware of how digital devices work (computers, networks, communication devices, etc.)	7,81
I am able to identify suitable alternatives when I cannot solve technical problems	7,27
I can properly solve any type of problem that might arise when my technology or devices are not working properly	6,63
I check and contribute to digital communities and forums where people work together to find and share solutions to technical problems	5,53

*the data are expressed in percentage, actual figures or average

Results

5.1 Solving technical problems
5.2 Identifying needs and technological responses
5.3 Creatively using digital technologies
5.4 Identifying digital competence gaps

Respondents participating in the study:

- are aware of the potential and limitations of digital devices and can evaluate and select a tool or device correctly;

- they expressed a clear interest in finding out the latest information in the field of technology;

- don't attach much importance to the aspect of offering help to other people who want information in this area.

5.2.1 Which of these statements apply to you related to your selection criteria for technology?

Statement	Value
I am aware of the potential and limitations of digital devices and whether they are useful for my projects	7,50
I can correctly evaluate and select a tool, device or service to perform my tasks	7,55
I keep myself updated on new developments and the latest technologies	6,96
I use virtual collaboration spaces where the needs related to my work are analyzed and the solutions are disseminated and proposed	6,30
I help people in my environment decide and select the technology that best suits their needs	6,25

*the data are expressed in percentage, actual figures or average

Results

5.1 Solving technical problems
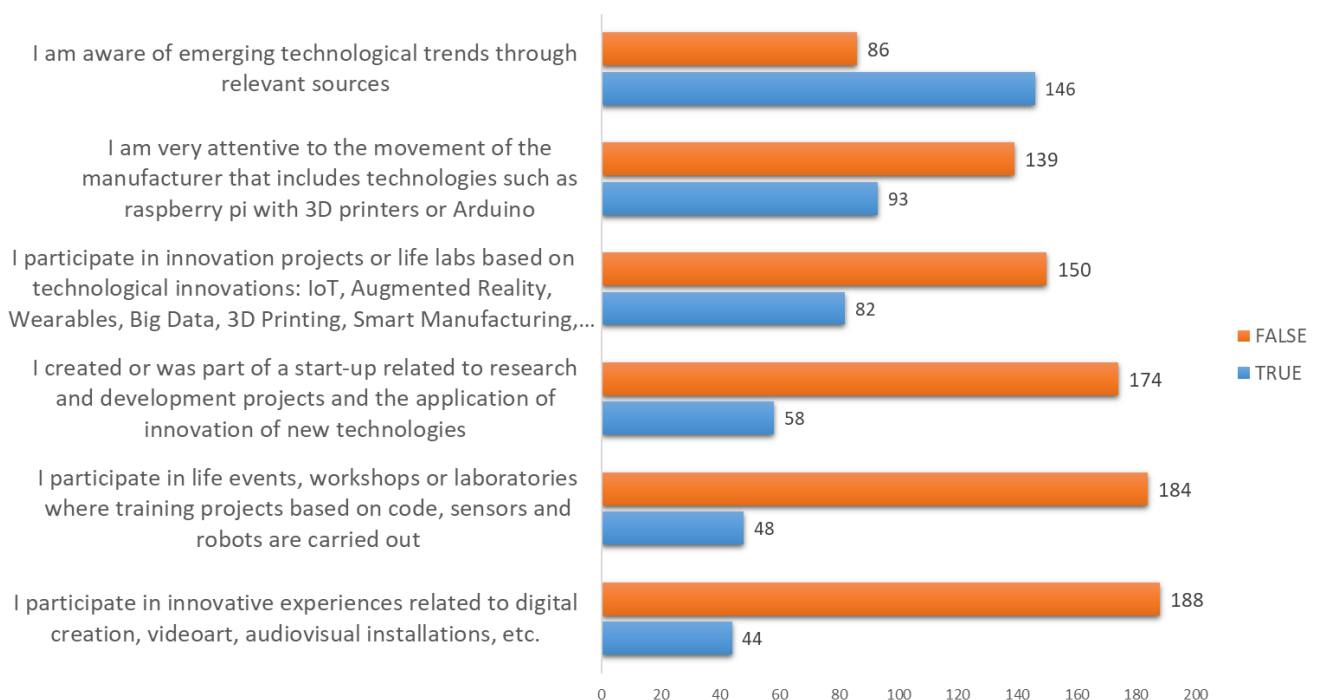
5.2 Identifying needs and technological responses

5.3 Creatively using digital technologies

5.4 Identifying digital competence gaps

Respondents are interested in updating information on technology innovation. Thus:

- they pay attention to the manufacturer's movement, which includes technologies such as the Raspberry Pi;

- they are always up to date with emerging technological trends;

- they participate in innovation projects or life laboratories, based on technological innovations: IoT, Augmented Reality, Wearables, big Data, 3D Printing, Intelligent Manufacturing; they are up to date with general trends in new digital environments;

- they participate in events, workshops or laboratories, where training projects based on code, sensors and robots are carried out.

5.3.1 Please indicate if the statements about creativity and technology are true in your case:

Statement	FALSE	TRUE
I am aware of emerging technological trends through relevant sources	86	146
I am very attentive to the movement of the manufacturer that includes technologies such as raspberry pi with 3D printers or Arduino	139	93
I participate in innovation projects or life labs based on technological innovations: IoT, Augmented Reality, Wearables, Big Data, 3D Printing, Smart Manufacturing,…	150	82
I created or was part of a start-up related to research and development projects and the application of innovation of new technologies	174	58
I participate in life events, workshops or laboratories where training projects based on code, sensors and robots are carried out	184	48
I participate in innovative experiences related to digital creation, videoart, audiovisual installations, etc.	188	44

*the data are expressed in percentage, actual figures or average

Results

5.1 Solving technical problems

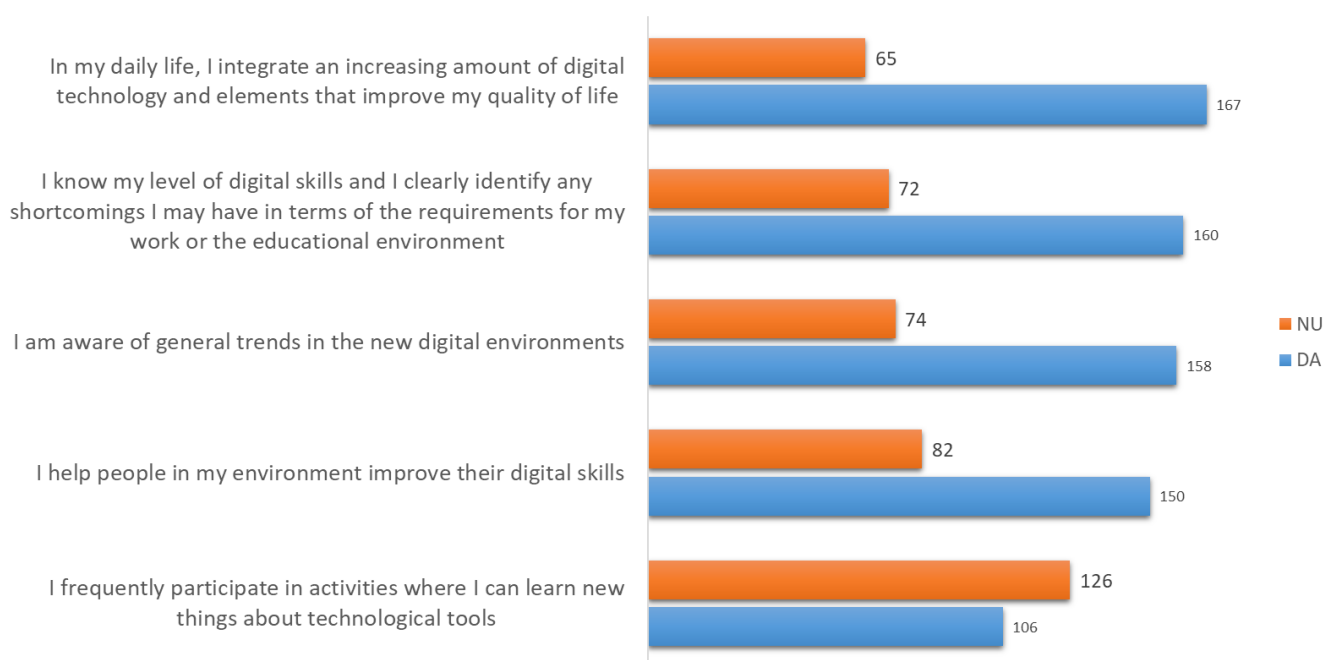5.2 Identifying needs and technological responses

5.3 Creatively using digital technologies

5.4 Identifying digital competence gaps

The message of the respondents is positive, favorable to the continuous, accelerated development of digital competences as a necessity of the new reality, *the digital reality*. Specifically, the respondents:

- are using digital technology more and more and it is improving their lives;

- they know their level of digital knowledge and competences and can identify the deficiencies they have;

- are always up to date with general trends in new digital environments;

- they offer their help to the people around them so that they can improve their digital competences;

5.4.1 Please indicate how you maintain your ITC skill levels:

	NU	DA
In my daily life, I integrate an increasing amount of digital technology and elements that improve my quality of life	65	167
I know my level of digital skills and I clearly identify any shortcomings I may have in terms of the requirements for my work or the educational environment	72	160
I am aware of general trends in the new digital environments	74	158
I help people in my environment improve their digital skills	82	150
I frequently participate in activities where I can learn new things about technological tools	126	106

*the data are expressed in percentage, actual figures or average

Conclusions (1)

⇒ The resulting data confirms that respondents are people who already have basic digital competences, given that this study was completed online; the final results nuance the level of these digital competences, considered to be "**Medium Level**", in almost all areas: *information and data literacy; communication and collaboration; security; problem solving.*

⇒ The area of competence that requires **the most attention** for the development of employees and, implicitly, SME managers, is the one that implies **creating digital content.**

⇒ Regarding the competence framework of *Information and data literacy*:
- specialized search engines or an advanced search mode are used, but the number of those who can do so is predominantly small;
- filtering information online is done predominantly by keywords and synonyms;
- information is taken for granted if it is issued by experts and professionals;
- multiple variants of solutions for managing data, information and digital content are known, the most used being those on external support, directly managed by the user: memory card, USB, CD, hard disk.

⇒ Regarding the competence framework of *Communication and collaboration*:
- virtual connections are created relatively easily, through the easy use of tools such as: messaging, e-mail, SMS, social networks, video conferencing applications;
- online tools are widely used to distribute digital content such as documents, pictures, videos (e-mail, Share Point, Google Drive etc.);
- social involvement using the virtual environment is increasing, by accessing the websites of NGOs, political parties, public administrations;
- the term *Netiquette (Internet etiquette)* is known and integrated in the digital professional activity by the fact that rules of good conduct are put into practice and respect is shown for other internet users;
- the terms *Digital Identity* and *Digital Reputation* are known and given proper attention.

⇒ Regarding the competence framework of *Digital content creation:*
- the skills of professional presentations, Excel, web page creation, audio editing, video editing, databases or dynamic presentations, software programming are worryingly few and left only to the specialists;
- people realise the consequences of illegal downloading of digital content, but without much emphasis on licensing and copyright issues.

Conclusions (2)

⇒ Regarding the competence framework of *Safety*:

- there is a clear tendency to take safety precautions in the use of digital devices, in the protection of personal data in the online environment, in the security of oneself and one's family and in the energy saving.

⇒ Regarding the competence framework of *Problem solving*:

- there is a good level of understanding of how the technology used constantly works and the possibility of solving minor technical malfunctions, but also the clear delimitation of complex situations that require the use of an IT specialist;
- people realise the speed of technology evolution and, consequently, the concern for innovation, for updating new information in the field, according to needs.

⇒ The concern **to transfer digital knowledge** to others is not a common behavior, therefore, employees with digital skills can be encouraged to become **digital learning agents** in SMEs themselves.

⇒ In the current context, SMEs are interested in directing their active resources in the area of competitiveness and exploration of the new normal, through the use of digital tools. In other words, the possible tendency of some SMEs towards non-action, at this moment, proves to be counterproductive in waiting for the return to the old reality.

⇒ The only correct direction for SMEs, validated by the results of the current study, is towards digital normality. Moreover, in the data-based economy, human resources are once again the most important resource of an enterprise.

⇒ In addition, the concept that access to technology is itself a barrier no longer proves its applicability.

⇒ A significant role, in the sphere of a company's competitiveness, will have the level of skills of the employees and their availability to develop permanently, to constantly improve their skills.

⇒ Therefore, in the field of SMEs, their success lies in the level of training and in the level of skills, especially digital ones, of employees.

⇒ From the same point of view, of human capital as a certain resource of a company, the area that will bring **added value to companies**, according to the results of our study, is **the area of creating digital content** (making presentations, setting up an online store, creating web pages). Easy to understand, given the fact that, in the absence of this component or a weak presence of companies in the digital productive space, the effect generated will be the increasingly limited access of companies to operational activities.

⇒ In the competition context, doubled by the pandemic, the cost problems faced by companies until recently are canceled thanks to the democratization of access to technology and allow much easier access for SMEs to digital tools.

⇒ A real chance for the evolution of SMEs in the current context of accelerated digitalisation is the willingness of employees to permanently develop their professional skills, in general, but in

⇒ In the context of this report, the **suggestions from the National Council of Small and Medium Sized Private Enterprises of Romania (NCSMSPER)** are also worth mentioning, **in order to improve public policy instruments** that support SMEs in their technological, organizational and cultural transformation; these suggestions resulted from the implementation of the ROMANIA TECH NATION Program:

- **Supporting at least 500 start-ups with digital component in each county,** in total being supported at least 20.500 start-ups: providing a grant of 50.000 euros/start-up; compulsory inclusion of the education, training and mentoring component; providing a place in the makerspace, business incubator or local accelerator;
- **Women in tech:** supporting women to open business in the field of technology;
- **Starter kit:** providing support for the transformation/transfer of companies in the digital age; Granting digitization vouchers;
- **Establishment of at least one robotics and makerspace laboratory in each county,** in which training programs to start, grow and develop a company in the digital field is provided;
- **Tech Tour Trucks:** campaigns to promote tech education in communities;
- **Tech Capital of the Year:** program that designates a city as the capital of technology, following a competition in which entrepreneurs or local administrations that use/implement/carry out activities in the latest fields of technology and science participate;
- **Cloud first policy:** strategy aimed at adopting cloud solutions for public authorities, respectively equipping them with the tools and knowledge needed to move to the cloud;
- **National plan for digitization of public institutions**: Single sign on; Digitization of public administration, so that a significant number of administrative procedures and the stages of a standard interaction with public administration can be carried out entirely online; Generalization of the use of electronic means for communication with the beneficiaries of public services, including the possibility of downloading / completing / transmitting forms online; Generalization of electronic payments and electronic methods of real-time communication between the tax administration, credit institutions and taxpayers; Generalization of electronic data transfer between institutions and implementation of the principle of submission of documents and information "only once".

Study conducted using the questionnaire and the platform

developed by

with the support of

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https://www.oirbi.ro/category/strengthening-sme-capacity-to-engage-in-industry-4-0/

https://www.interregeurope.eu/40ready/

Evaluation of Digital Competences for Romanian SMEs' Employees, Users of IT Technologies