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Identification and verification of the key methodology elements of measuring digital competences of ICT companies' customers.

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Abstract

The intensive development of technology, also in the areas of supporting management processes in the organization, forces the need to raise the level of knowledge and technological skills by users. The aim of the article is to identify and characterize important dimensions verifying digital competences of ICT companies' customers. In the study, the author used individual in-depth interviews conducted with selected specialists of companies designing and implementing IT software. The analysis of the information collected during the research showed that the dimensions of customers' digital competences proposed on the basis of the literature on the subject were considered useful by managers of ICT companies. Moreover, on the basis of the opinions collected during the survey, the scope of measuring digital competences in an organization has been partially modified and the subject defined more precisely. Thanks to this, the article also gained a practical dimension in the area of competency management.

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1. Introduction

According to the latest research, intensive development and easier access to information technology not

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only improve but also increase the efficiency of work [1]. However, the use of information technology requires increasing digital competences from its participants at the organizational level. It was noticed that there is a significant disproportion between the knowledge and skills of specialists as suppliers of technological products and their customers [7,10].

When researching ICT (Information Communication Technologies) enterprises, especially in the areas of Customer Knowledge Management (CKM), and the use of social media functions to interact with the customer (communication, co-creation, cooperation), the author noticed that the role of the customer in relations with ICT companies is passive and often objective. The owners and managers of IT companies emphasized in the interviews that their customer has low knowledge and limited digital skills. Hence, products resulting from the work of IT companies are often an emanation of knowledge of employees of these companies with little participation of the customer.

Bearing in mind, on the one hand, the lack of knowledge and technical skills of the customer, and on the other, their need to be treated subjectively with understanding and attention in the process of purchasing and implementing IT software, the author postulates in her research the need to link the customer's experience with the level of their digital competences (DC). Hence, this article focuses on the need to research digital competences of customers of ICT sector companies as an important element of customer experience management.

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2. The importance of digital competences for the development of a company

In the context of the digital society of the 21st century, digital competences represent the set of knowledge, skills and attitudes that are required when using IT and digital media to perform tasks, solve problems, communicate, collaborate and manage information [6]. Understanding the competencies of IT users is also important for organizations that should benefit from IT investments [8,13,14]. Hence, IT user competencies have been defined as "the user's potential to apply technology to its fullest possible extent so as to maximize performance of specific job tasks" or "correctly exploit the appropriate capabilities of software in the most relevant circumstances" [10,2].

For the needs of the development and improvement of digital competences, the following division was made Ecorys [4]:

- basic - ensuring the ability to live in the environment of information and communication technology (ICT) solutions, e.g. using applications to communicate and search Internet resources, and in the field of cybersecurity;
- employee-related (intermediate, for employees of non-technological industries) - including basic skills and additional competences needed at work, mainly related to the use of applications;
- key (for ICT professionals) - basic and employee-related skills as well as competences necessary to work in a diverse ICT sector, e.g. creating new solutions, products and services.

The competences of employees and professionals are now particularly important from the point of view of the company. In this approach, they rely on the ability to adopt and use new or existing information technology to analyse, select and critically evaluate digital information in order to research and solve work-related problems as well as develop shared knowledge while engaging in organizational activities [4]. The definition quoted above was chosen by the author for the purposes of further considerations and the designed and implemented qualitative research.

The numerous published research reports show that organizations with digital competences are more inclined to accept innovations. Moreover, IT knowledge and skills are necessary to determine the demand for IT systems that meet the needs of the organization and enable effective cooperation with IT suppliers [9].

Shortages of digital competences negatively affect the development plans of companies. The research carried out in this area indicates that:

- more than half of organizations believe that the competency deficiencies slow down the implementation of digital transformation programs and cause a loss of competitive advantage [7],
- more than one third (36%) of entrepreneurs who found digital literacy deficiencies in their organizations admitted that they had a negative impact on the company's operations, as they reduce productivity or limit sales [12],
- most of the organizations surveyed by IDC (International Data Corporation) indicated the need to slow down the pace of introducing new products and services to the market due to the lack of digital competences in the organization [7].

According to the research of the European Commission and Eurostat data, Poland has been placing very low in the European rankings of digital competences for years (similarly to Bulgaria and Romania). Polish companies use cloud computing services (4 times) less frequently than European. Only 28% of Polish SMEs use CRM or ERP, while in the EU15 - 45%. Every fifth Polish SME uses social media, while in the EU15 almost half of them - 42%. Every twentieth Polish company uses cloud computing services - while in the EU countries it is over four times more [12]. Polish companies are characterized by one of the highest percentage of people with low digital competences in the EU countries [7]. Low digitization of human capital becomes a barrier to the development of digital competences, especially in relation to SMEs [12].

3. Identification and proposals for measuring the level of digital competences in an organization

Digital competences are not the result of simple elements of skills or instrumental knowledge, but rather complex integration between cognitive processes and dimensions, as well as methodological and ethical awareness. While examining digital competences of teaching staff, Calvani emphasized the coexistence of knowledge and skills dimensions at the technological, cognitive, and ethical levels, as well as their integration [3]:

- technological dimension: the possibility to flexibly carry out research on problems and new technological contexts as well as tackling them;
- cognitive dimension: the ability to read, select, interpret and evaluate data and information, taking into account its relevance and credibility;
- ethical dimension: the ability to constructively interact with other people with a sense of responsibility using the available technologies;
- integration between the three dimensions: understanding the potential offered by technologies that enable individuals to share information and build new knowledge together.

In order to test the digital competences of teachers, Calvani used Instant DCA instrument with a broad scope for application that is sensitive to different types of knowledge (linguistic and conceptual skills), which can be assessed with a structured test [3].

Other researchers, using the Calvani framework, developed a theoretical model for the assessment of digital competences in an organizational context, based on three basic dimensions and the fourth one acting as an integrator [15]:

- technological dimension: the ability to deal with work-related tasks using new or existing IT in an effective and efficient manner;
- cognitive dimension: the ability to read, select, interpret and evaluate information, taking into account its usefulness and reliability at work in a specific organizational context;
- organizational culture dimension: the ability to interact with other people using the available IT, in accordance with the existing standards and values of the organization's activities;

- integration across three dimensions: illustrates the understanding of the benefits of IT that make it easier for members of the organization to retain, transfer and share information, as well as build new knowledge bases together.

The researchers, using a partially structured questionnaire, measured digital competences both at the organizational and employee level, and took into account the cultural differences of the surveyed companies.

The Digital Skills Indicator proposes to measure skills within digital competences in four key areas [7]:

- Information, including but not limited to: copying and moving files and folders, finding information about products and services;
- Communication, including but not limited to: video conferencing via the Internet, uploading self-created content to websites for sharing, participation in social networks;
- Troubleshooting, including but not limited to: installing software, changing the settings of computer programs, including operating programs ensuring security;
- Creating content and software, including but not limited to: creating presentations or documents integrating text, photos, tables and charts, using advanced functions of the implemented software.

Europas proposes Digital competence - Self-assessment grid, which identifies both competence areas and the level of advancement. The key areas include: Information processing, Communication, Content creation, Safety, Problem solving. The advancement levels are defined as: Basic User, Independent User, Proficient User [5].

It should also be mentioned that the literature on the subject describes the characteristics of an employee with digital competences [15]:

- Ability to build reliable information from various digital sources ;
- Search skills enhanced by critical thinking to make informed judgments about retrieved information, while being careful about the validity and completeness of online sources;
- Ability to read and understand non-sequential and dynamic material;
- Awareness of "networks" as sources of advice and help;
- Knowledge of filters and agents for managing incoming information;
- Ability to publish, communicate, and access information.

The author of the article refers to the previously presented definition of digital competences of employees and specialists in an organization. The author linked the theoretical model of researching digital competences and the scope of digital skills described above, creating a set of statements describing the digital competences of employees using IT software in the organization under the assigned authorizations.

4. Methodology and research results

In order to determine the significance of the proposed sentences verifying the digital competences of customers of IT companies, in-depth individual interviews were conducted with managers responsible for cooperation with customers during the full cycle of purchasing the selected IT software (pre-sale, sale, implementation and post-sale stages).

Six in-depth individual interviews with representatives of companies offering IT software design and implementation services were carried out. Each of the respondents assessed the validity of a given sentence for the verification of digital competences on the basis of weights (from 1 to 7), as well as commented, supplemented or changed the presented proposals. The main objective of the study was to collect managers' opinions on the significance of prepared responses verifying digital competences of ICT companies' customers.

The list of weights assigned by specialists for individual sentences verifying digital competences is included in the second column of Table 1. Column 3 of the table below lists the expert-modified versions of DC's verification statements.

Table 1. Summary of test results.

| Digital Competence level verification sentences | Weights awarded by specialists: | | | | | | Digital Competence level verification sentences |
|---|---------------------------------|----|----|----|----|----|---|
| Pre-test version | S1 | S2 | S3 | S4 | S5 | S6 | Version agreed with specialists |
| Technological dimension of digital competences | | | | | | | |
| 1. I can solve almost all problems that arise when using information technology. | 4 | 5 | 5 | 4 | 4 | 7 | I can solve all problems that arise when using the software available in the organization. |
| 2. I can choose the right tool, device, application (software) to carry out each new task. | 4 | 6 | 6 | 6 | 4 | 7 | I can choose the right application and software for each new task |
| 3. I am interested in new technological solutions. I understand how new technologies work. | 4 | 4 | 6 | 4 | 4 | 5 | I am interested in software novelties that may facilitate my work. |
| The cognitive dimension of digital competences | | | | | | | |
| 4. I can use advanced search tools (e.g. using search operators, e.g. in Google "" (quotation marks), * (asterisk), - (minus) etc.) to find the necessary information on the Internet | 6 | 7 | 7 | 7 | 5 | 7 | I can use advanced search tools (I use search operators, e.g. in google: "" quotation marks), (* asterisk), (-minus) etc.) to find the necessary information on the Internet |
| 5. I can use cloud file storage services. | 7 | 7 | 7 | 6 | 6 | 7 | I can use services of information cloud storage . |
| 6. I can use advanced functions of communication tools (e.g. when using Skype, Zoom - sharing: files, desktop, presentation, etc.). | 7 | 7 | 7 | 6 | 6 | 7 | I can use advanced functions of communication tools (e.g. when using MSTeams, Zoom - sharing: files, desktop, presentation, etc.). |
| The dimension of digital competence organization culture | | | | | | | |
| 7. IT tools help employees follow work procedures. | 4 | 4 | 5 | 4 | 6 | 5 | Properly selected software supports the organization of work in the company |
| 8. IT tools negatively affect the ability to cooperate between | 6 | 3 | 4 | 4 | 2 | 3 | I cannot imagine cooperation without the possibility of |

| | | | | | | | | |
|--|---|---|---|---|---|---|--|---|
| employees. | | | | | | | | electronic communication |
| 9. IT tools are indispensable for organizing work and mutual assistance. | 4 | 4 | 6 | 7 | 6 | 7 | | IT tools accelerate and facilitate team work. |

Source: own elaboration

The specialists participating in the study assessed the usefulness of individual sentences used to assess the digital competences of ICT sector customers as relatively high. With regard to the technological dimension of digital competences, specialists noticed the excessive level of generalization of sentence 1. Interview participants emphasized that such a wording may lead to a free interpretation of the meaning by the respondents. Specialists 1, 2, 4 proposed replacing the term "information technologies" with the phrase "software available in the organization". This made it possible to define the place and object of the activity. In their statements, specialists 4 and 5 noted that the respondents may associate "IT technologies" more with IT hardware than with software used in the company. The average weight of sentence 1 was estimated at 4.8. Based on the collected opinions, sentence 1 has been modified (Table 1).

In the same technological dimension, sentence 2 was assessed at a weight level of 5.5. All specialists suggested removing the word "device", referring to the arguments given above. Regarding sentence 3 which was the last in this group, specialists noticed that the phrase "new technological solutions" may be misleading because, from their experience, customers more often understand this as "new hardware" (specialist 4, 5). Therefore, a change was made in the sentence verifying digital competences to "interest in software novelties". Sentence 3 received an average weight of 4.5.

Specialists' opinions in relation to the cognitive dimension of digital competences were positive and all sentences (no. 4, 5, 6) were given weight over 6. Specialists considered precision and specific nomenclature focused on both IT technologies and the ability to use specific functionalities to be of particular value. Minor changes were made to the content of the sentences, e.g. the name Skype messenger in sentence 6 was deleted and replaced with MsTeams instead. All specialists agreed that the MSTeams platform is more recognizable among the employees of the organization.

The dimension of digital competences related to the organizational culture turned out to be the most difficult to verify by specialists. The assigned average weights oscillated above 4. On the one hand, the interview participants considered the verification sentences formulated in this dimension important, and on the other, they had a problem with understanding the correctness of their content. Each of the specialists presented their own suggestions. Then, based on the analysis of the content of the text, the author refined the wording, which, after consulting with specialists, has been included in Table 1.

Interview participants paid special attention to the appropriate, dynamic (I use, I apply, I choose) way of specifying skills in the verifying sentence. Specialists 2, 3, 6 emphasized that customers often possess knowledge but are unable to use it in practice.

5. Research conclusions

The surveyed managers confirmed that testing customers' digital competences is an important aspect of the process of adapting IT software to the customer's needs. They noted that there is no uniform way to assess the digital competence of IT company customers. Therefore, they positively assessed the author's proposal of measuring digital competences. They considered the description of digital competences in three different dimensions (technological, cognitive, organization culture) as particularly valuable.

During the interviews, managers were engaged in sharing their opinions on the importance of a given sentence describing digital competences. Their main remarks concerned, first of all, the precision and relevance of the wording. They believed that words that build ambiguous associations should not be used. Everyone agreed that naming the skills accurately will make it easier for the participants to evaluate them.

6. Summary and recommendations

Taking into account the statistical data describing the low level of digital competences of organizations as well as the low index of digitization of human capital in Poland, it seems justified to focus on improving this situation, and companies from the ICT sector should be actively involved. Therefore, the identification of the customer's competency level should IT company at the beginning of cooperation assesses primarily the technical needs of the customer, rarely verifying the level of digital competences of employees or the organization's readiness to implement modern technological solutions.

Moreover, the advanced level of digital competences of IT companies and the pursuit of more and more perfect products do not facilitate establishing cooperation and customer involvement at the appropriate level of activity. During the interviews, the specialists themselves expressed the opinion that many IT companies prepare software containing functionalities unnecessary from the customer's point of view. Such an approach is not conducive to increasing the digital competences of companies in the role of customers; on the contrary, it arouses reluctance among employees and deepens discontent on the part of managers.

Researching digital competences using the Calvani model may additionally positively influence the sharing of knowledge between employees. Calvani notes that the fourth dimension of the digital competences assessment model is 'integration'. Employees' understanding of the benefits of using IT systems in management should increase the efficiency of managing the organization at the level of acquiring and sharing knowledge.

As the research conducted by the author shows, the proposed method of assessing the level of digital competences of customers in the technical, cognitive and organizational dimensions has been accepted by representatives of IT companies. The respondents agreed that determining the appropriate level of knowledge and digital skills of the customer should, consequently, provide more value in the entire process of purchasing, implementing and using the purchased product.

According to the author, it is worth extending the research in the field of measuring changes in customer expectations, needs and preferences when gaining knowledge and experience by customers in the process of purchasing IT software, and then examining the impact of these components on the level of customer experience. It is also worth paying attention to the impact of digital competences on the level and quality of gathering customer knowledge.

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