

## IS THE INNOVATIVE APPROACH OF DESIGN THINKING ALREADY BEING USED IN EDUCATION, IT AND BANKING?

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### **Abstract:**

All organizations encounter problems. All organizations are, at some point, in extreme situations, without knowing how to react. All organizations are looking for innovation and want to come up with something ingenious. But, actually, how can these problems be identified, defined and properly solved? Certainly, through design thinking. As a highly effective problem-solving approach, design thinking follows five significant steps, each one being presented in detail in the paper. This method can generate boundless success, yet it can also have no impact, if not exploited accordingly. Thus, in the current research paper, design thinking was linked to three different fields in Romania – education, IT and banking. The choice of education, IT and banking was made precisely due to the discrepancies between these sine-qua-non areas that cannot be excluded from the quotidian and that actively contribute to improving the quality of life. Altogether, the aim was to scrutinize how contrasting organizations consciously or unconsciously apply this innovative technique. Through a quantitative method of research, the degree of acceptability of the design thinking method was observed, but also the organizations' effective ways for innovation. In this paper, it is identified to which extent solutions lead to or involve aspects of digitalization. Coronavirus pandemic led organizations to shift their processes into the online environment. In fact, during this period of time, organizations faced unprecedented problems that might be solved with the help of digitalization. In this regard, interconnecting digitalization with design thinking might be of real help, under the idea of innovation. The research outcomes reveal an accurate overview of the method use.

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## **1. Introduction**

Design thinking, as a human-centred and collaborative approach, can be successfully used in any field of activity. In other words, it has applicability in product and service design, business model or even in strategy design. However, this problem-solving method starts with empathy and understanding of end users through investigation.

Consequently, the present research paper – *IS THE INNOVATIVE APPROACH OF DESIGN THINKING ALREADY BEING USED IN EDUCATION, IT AND BANKING?* – analyze the way in which the IT field, the banking system and the educational system identify and solve the problems encountered. The main research question is – *What is the way to identify and solve problems in IT companies, in the banking system and in the educational system and how close is it to design thinking?*

Thus, a market-research was conducted, through a questionnaire, which did not discuss the concept of design thinking, but the questions were extensive, to increase impartiality. One element of originality is that the concept of design thinking was not mentioned in the inquiry questions. In addition, the questions were expressed and particularized according to each DT step. Regarding the representativeness of the sample, the respondents of the study were chosen from the three fields of activity – education, IT and banking. There was a total of 121 answers, distributed as 36.4% bank employees, 30.6% education employees, 32.2% IT employees and 0.8% from a different industry (answer that was excluded, because on the fact that it was not relevant for the research). The respondents consist of 82 female (67.8%) and 39 male (32.2%), who graduated from high school (4 respondents, 3.3%), university (47 respondents, 38.8%), master (66 respondents, 54.5%) and doctoral studies (4 respondents, 3.3%). The majority of the respondents are aged between 36 – 45 (39.7%) and 26 – 35 (33.1%), while the others are aged between 18 – 25 (9.9%), 46 – 55 (13.2%) and 56 – 65 (4.1%). 28.1% out of the total are managers, while 72.7% work in different departments.

In order to answer the research question, the following layout of the research paper was chosen – an introduction that summarizes the main idea of the whole research paper, followed by an overview of the method of design

thinking and a brief literature review. Further, section three presents in detail each and every stage of design thinking. Each step is then being analyzed in a practical way, through the questionnaire (section four – general information about the chosen quantitative analysis; sections five to nine – the results of the questionnaire related to each DT step applied on the chosen fields). Finally, in section ten, the particularities driving from the detailed analysis of the questionnaire are presented. The conclusions point out the major findings of the research paper and the essential information scrutinized. Moreover, this is intended to be the beginning of an extensive research regarding the DT relevance in education, IT and banking fields. More valuable information is expected to be acquired through a more detailed future inquiry.

## **2. Overview of design thinking**

A methodology through which the process of innovation and, then, development of products, services and mechanisms can be reached, design thinking starts from the idea of approaching the novelty as a designer. Design philosophy is known to be at the core of design thinking (Zheng, 2018), while international firms are applying this method in order to create and launch new products and services, according to the customer needs. (Nakata, Hwang, 2020)

Absolutely, design thinking has emerged as a methodology through innovative designers, who have detached themselves from others with a different mentality and approach. A good designer defines himself by not acting like the others – not identifying the problem, coming up with ideas, analyzing them and choosing one, believing that it is the right one. They are one step ahead. Professional designers enjoy ambiguity, they accept positive feedback, but they also appreciate constructive feedback, presenting sustainable solutions for different matters. In this regard, there are some key competencies that designers must have – user-centeredness, mindfulness, experimental, resilience-ambiguity tolerant, holistic view, tolerance for risk. (Lahiri, Cormican, Sampaio, 2021) In addition, the concept of leadership can be discussed in this context, as it turns to be a successful combination of a manager’s clear vision, strategy and communication in a business climate.

Presenting the indisputable characteristics of iteration (Brown, 2008), design thinking may lead to problem solving, through the help of innovative ideas, interests and values, that are incorporated in the process. (Brown, Katz, 2011) Based on this, design thinking may be applied in a multitude of areas –

engineering, economic sciences, education, chemistry, philosophy, psychology, anthropology and many more. As it may seem, common project management mechanisms are not fulfilling the customer needs and demands. (Cooke-Davies, 2002) This may be due to the negligence of project managers to truly understand customers and empathize with them. Most of the time, they focus on cost and productivity, which may be successful at the moment, but it is not sustainable in the long run.

Customers, the environment, the requirements are constantly changing, so what is current today, can already be outdated tomorrow. Design thinking is the future, as it focuses on the human being – the most important actor of every community. Today's society is characterized by uniqueness, creativity and adaptation. Therefore, companies need to relate to these three elements. Thus, this research paper presents, in particular, the interaction of education, banking system and IT companies with the design thinking method.

### **3. Five stage process – Empathize, Define, Ideate, Prototype, Test**

Design Thinking has become more and more popular in different fields of activity, such as IT, education and banking. Apparently, people follow unconsciously the five design thinking stages that were mentioned when dealing with problems. These situations can reveal creative and innovative solutions, but it also can show that different problems in different fields of activity follow the same solving stages: empathize, define, ideate, prototype, test.

When referring to design thinking, some authors distinguish seven steps (Ambrose, Harris, 2010): define, research, ideate, prototyping, selection, implementation and learning, while others suggest a six-stage process which includes understand, observe, define, ideate, prototype and test. (Plattner et al., 2009) In this paper, the attention is paid to the five stages that were mentioned before.

#### **a. Empathize**

During this stage we discover the challenge, explore the problems and empathize with the users. Starting with the diagnosis of the needs and expectations of the users (Wolniak, 2017) should be important when applying innovative methods, such as design thinking. Important detailed information about the user's needs can be provided during this stage if appropriate questions are used. That is the reason why the questions should be about

present or past experiences. They also should look for user's real opinion, not for interviewer's own opinion validation.

**b. Define**

This stage draws attention to the user's point of view. It is also called the sensemaking stage (Albay, Eisma, 2021). During this phase, the challenge from the user's point of view is defined. There are found meanings, connections, types of people, opportunities. What is also important is that the design thinking challenge statement should be expressed in a human-centered manner. Some helpful tools can also be used, such as user poster, empathy map, user journey, opportunity map, point of view, the person/ character.

**c. Ideate**

We reframe the problem and ideate. This stage focuses on idea generation, trying to find innovative solutions for the stated challenge. Ideation is an individual activity and many ideas can bring the great idea. During this stage, there will be a switch from ideation to concept.

**d. Prototype**

Prototyping is a very important design thinking stage because it encourages organizations to test solutions in real situations while learning more from customers and continuously improving the services provided (Lewrick et al., 2018). Prototypes help companies get feedback quickly and cheaply. Prototypes are continuously revised during the iteration process (He, Ortiz, 2021). During this stage, a product or a tangible experience is created.

**e. Test**

During the test stage, the product will be evaluated. The concepts and the prototypes are tested, the design thinking team learns how they work and improves them. The feedback is incorporated. Here, the previous stages can be reviewed, the challenge statement can be redefined. The users can interact with the product, the design thinking team should listen and learn everything about the user's insights. A set of tools should be noted: user testing, market tests, experiments. Therefore, the design thinking process is iterative, non-linear, flexible, and focused on effective collaboration between the users and the design team (Albay, Eisma, 2021). However, it is not a linear model, but a network model in which the connections are real and interact under a feedback mechanism (He, Ortiz, 2021). Valuable feedback helps design thinking process bring innovation in organizations.

#### **4. Qualitative research – questionnaire**

The present research paper starts from the premise that many industries use the design thinking method, without being aware of it. Compared to other innovation methods, design thinking focuses on the end user. This is the reason why the product or the service is in accordance with his wishes. Based on this information, a questionnaire was performed, carried out in four phases:

- *Literature review* – First of all, a literature review was conducted, in order to identify the stage of research. Through this phase, the team decided on the research question (*What is the way to identify and solve problems in IT companies, in the banking system and in the educational system and how close is it to design thinking?*) and elaborated a set of objectives. The originality comes from the connection of these three fields. Education is the basis of the future human resources from the labour market, including IT and banking. In the end, the findings were synthesized. The main assumption is that various business areas use design thinking method, without even being aware of it.

- *Questionnaire development* – The questionnaire consists of 23 questions, of which four socio-demographic ones. 22 questions had multiple-choice answers, while only one was an open-ended question. 11 out of the 22 multiple-choice questions were rating scales, including frequency answers (never, rarely, sometimes, often, frequently). On the other hand, the team decided not to include the concept of design thinking in the questions so that the respondents' answers would be as objective as possible. There were also excluded words – empathize, define, ideate, prototype, test. Each question refers to a stage of the design thinking method, but the idea was to mix the questions, in order for respondents not to suspect a relation with design thinking. Objective and spontaneous responses were intended.

- *Distribution of the questionnaire* – The areas to which the team turned its attention were education, IT and banking, as these are the areas in which each member works. Therefore, the questionnaire was distributed to employees in the field of education (preschool education, primary education, trainers), banks in Romania (both front-office and back-office employees) and IT companies located in Romania. Finally, the answers were balanced, out of the 121 of answers, 36.4% come from bank employees, 30.6% from education and 32.2% from IT. 0.8% (meaning 1 answer) remains from the industry, the answer was not taken into consideration, as it does not fall within the analyzed field. The respondents consist of 82 female (67.8%) and 39 male (32.2%), who

graduated from high school (4 respondents, 3.3%), university (47 respondents, 38.8%), master (66 respondents, 54.5%) and doctoral studies (4 respondents, 3.3%). The majority of the respondents are aged between 36 – 45 (39.7%) and 26 – 35 (33.1%), while the others are aged between 18 – 25 (9.9%), 46 – 55 (13.2%) and 56 – 65 (4.1%). 28.1% out of the total are managers, while 72.7% work in different departments.

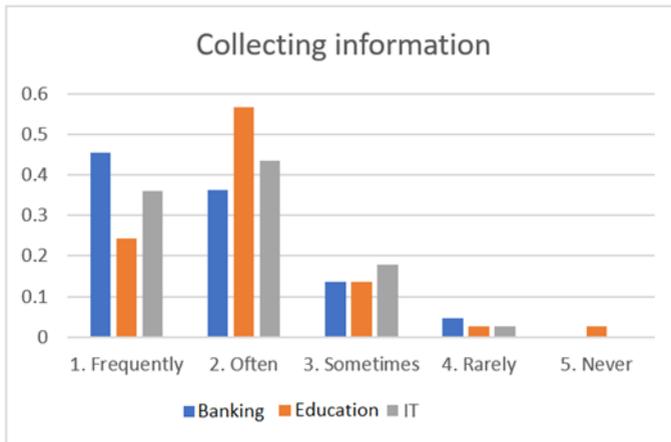
- *Analysis and interpretation of the results* – In order for the analysis to be detailed, correlations were made between questions. It was wanted to develop visual graphics as impactful as possible, so that the research result is relevant. In the data analysis, SPSS was used for getting valid data, while Excel was the software used for creating the graphics. Finally, the hypothesis was confirmed, and numerous elements of design thinking were adopted by the three areas analyzed, with or without intention.

### **5. Empathize – stage applied in education, IT companies and banking**

The ability to understand and feel a person's emotions and thoughts, empathy is the first step in the design thinking process, a step that leads to awareness of the needs and desires of others. Empathy has no boundaries in terms of areas of applicability. Indeed, empathetic people see easily beyond everything. These people can imagine exactly how that person should feel even if they have never been through exactly the same situation.

In this research paper, two questions were asked referring to empathy, without specifying this term – *To what extent do you try to collect information about your user's needs, wishes and emotion?* and *What are the methods you use in order to understand the problems you are trying to solve?* The visual representations of the questions and answers may be observed below, in Figure 1 and in Figure 2. The environment of IT companies, education institutions and bank branches does not have anything in common one to another. In Figure 1, there was made a correlation between the fields of activity and the way in which information is collected. What can be seen and it is not a surprise, it is the fact that the IT field does not excel in attention to the end user's feelings. It is not unexpected because the IT field does not interact directly or maybe not at all with the end user. Even so, only in education there are people who never collect information regarding this matter, thus meaning that it is not characterized by empathy. However, the main positive answers come from the field of education.

**Figure 1: To what extent do you try to collect information about your user’s needs, wishes and emotion**



Source: Authors' construction

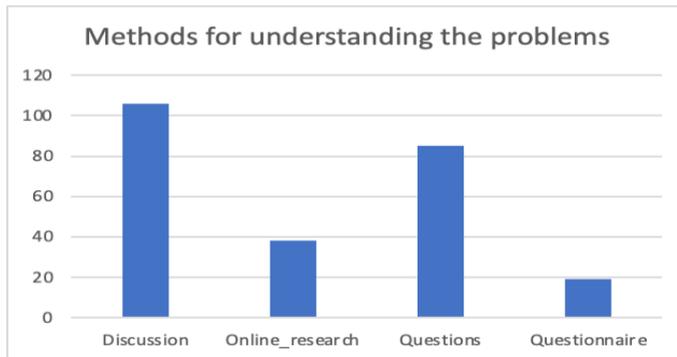
Teams in IT, banks and education know that in order to permanently solve certain problems, they must identify their root causes, being focused on empathic exploratory methods. Thus, in the first step of the design thinking method, it is expected to understand the clients, how they feel and what they feel. It is necessary to return to the clear image of the end users, of the expected target market. Basically, it is a must to understand the needs that are at the basis of what a business aims to achieve.

Based on the questionnaire (Figure 2), it was intended to observe if there are certain specific methods that the three domains use so as to understand the problems they face. The question was answered with several options, and most chosen was discussions. Being a human-centered method, each individual has the ability to engage in a cognitive process, understanding the problem and finding a solution. Discussions facilitate this step. The second most chosen technique is questions. Empathy questions are the cornerstone of design thinking. It is about active listening. Thus, one can understand the choices the others make, their behavioural traits and their needs. In this way, IT, banks and education are assisted in creating and innovating products and/or services for their specific target markets. In the context of the COVID-

19 pandemic, online research has probably become a more popular method than before.

A limitation of the questionnaire in this regard is the fact that no analysis was made on the online research degree of use before the pandemic, compared to during the pandemic. Online research opens up new horizons for those who analyze, as broad links can be created, and understanding the problems can bring new knowledge. But there is a downside as well – moving away from the subject. It takes a long time to spread the information, so it is possible that the person trying to identify the problem will be overwhelmed by the multitude of information. Finally, the questionnaire is the least used method. This may be due to the lack of patience of the respondents, who may not answer all the questions.

**Figure 2: What are the methods you use in order to understand the problems you are trying to solve?**



Source: Authors' construction

## **6. Define - stage applied in education, IT companies and banking**

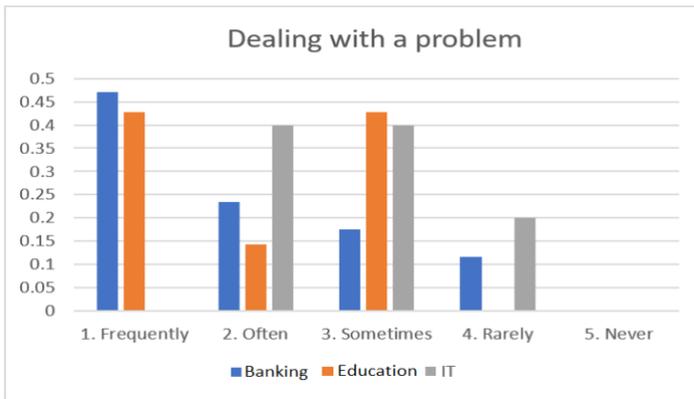
The second DT stage emphasizes the importance of user's point of view (POV). When defining the problem, the Design Thinking team tries to detect the real user's POV. Empathy is also important even at this stage. That is the reason why it is essential in DT to put oneself in the user's shoes, to understand their needs, their real expectations, their challenges. Empathizing with your user brings you closer to authentic understanding. The character is

also important at this stage. The DT team tries to discover or to create characters, features, profiles in order to understand the user’s needs.

In this paper, the questions *When dealing with a problem, do you try to put yourself in your user’s shoes?* and *Do you try to define the impacted types of people when looking for solutions?* refer to Define stage, without mentioning any words or expressions related to DT stages, such as define, user’s point of view, the person or the character.

Figure 3 refers to the openness of respondents to put themselves in their user’s shoes when dealing with a problem. This aspect can be successfully connected with the outward mindset, too. The answers reveal that more than half of the respondents are empathetic and try to put themselves in their user’s shoes. It is important to notice that all the respondents show empathy and try to discover the user’s point of view to a certain degree. There is no negative answer. Though, banking and education are the fields of activity with the highest degree of interest in user’s point of view, IT companies being moderate, but positive.

**Figure 3: When dealing with a problem, do you try to put yourself in your user’s shoes?**

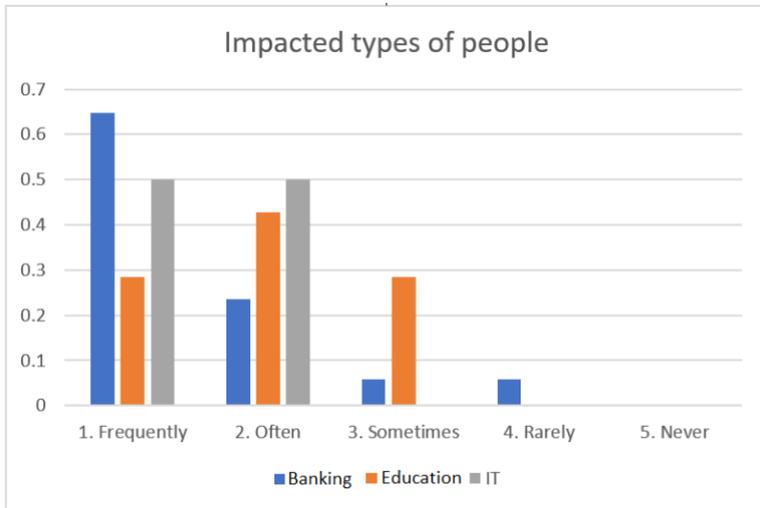


Source: Authors’ construction

The next figure (Figure 4) considers defining the impacted types of people. The question suggests the DT define tool when trying to create the person or the character with their own features, needs, challenges and expectations. The results disclose high interest in defining the impacted people

in all these three fields of activity, IT companies showing the highest concern. There aren't any negative answers, all the respondents being interested in defining the character when dealing with a problem.

**Figure 4: Do you try to define the impacted types of people when looking for solutions?**



Source: Authors' construction

### **7. Ideate - stage applied in education, IT companies and banking**

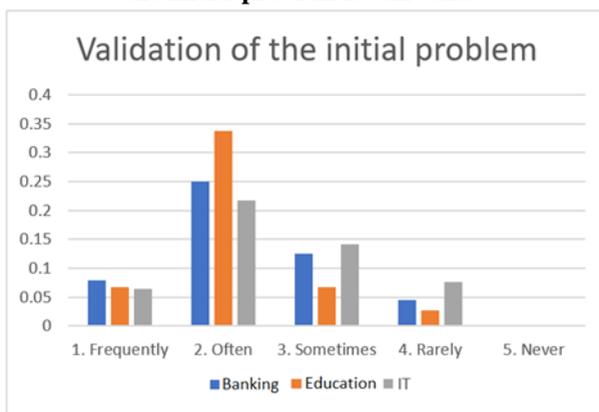
At this stage, that of Ideation, design thinkers become more and more creative. They come with new questions, but also with solutions and, at the same time, reanalyze the initial problems. Brainstorming can be pointed out here, being a group technique that helps to generate ideas and stimulate creative thinking. It is useful when old patterns must be avoided, developing new ways of looking at different things. Brainstorming sessions can get out of control, because there are generated diverse, related and creative ideas. Thus, brainstorming is considered to be a successful way to generate as many ideas as possible, from a group of people.

Through the questionnaire, it was observed that the brainstorming method is the most appreciated – 101 answers were related to it. Other mentioned methods are workshops, ideathon, online research, individual discussions, face to face meetings and discussions with group of colleagues.

Workshops (49 answers) and online research (59 answers) were the next most popular, while ideathon received only 7 answers. One reason that brainstorming is popular is the ease of application. There is no need for a large space, it can be done online and the meeting is not organized in a formal setting. In the case of the analyzed fields (IT, education and banking), brainstorming is an ideal solution, as it can be done even during the work schedule. These answers can also be correlated with the fact that 38% of respondents form a work team. Teamwork leads the whole team one step closer to success. More ideas, more minds can be beneficial in a creative process.

A key element of the Ideation step is revalidation. The reason for different problems is found in misinterpretation. Regarding IT, education and banking, it is suggested to make sure that everyone has interpreted a particular task the same way. For instance, people may even repeat what they understood about the task and their role. As there can be clearly seen in Figure 5 (After understanding the user’s needs, how often do you analyze again if the initial problem is still valid?), all three domains revalidate the initial problem, after understanding the needs of the user. Fortunately, no field avoids this important step, as the initial problem can be lost along the way. In that case, the whole method would be a failure, and the results would no longer be relevant.

**Figure 5: After understanding the user’s needs, how often do you analyze again if the initial problem is still valid?**



Source: Authors’ construction

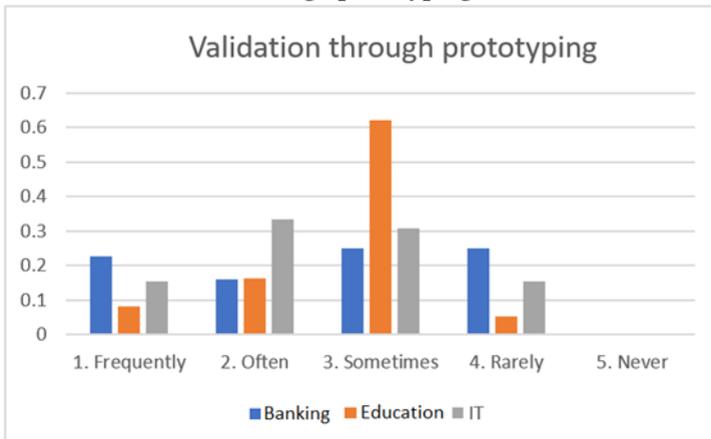
### 8. Prototype - stage applied in education, IT companies and banking

Prototyping helps organizations test products and services while learning from customers. The valuable customers' feedback helps organizations adapt and continuously improve their services.

In this market research, the question *When choosing a possible problem solution, do you first try to validate through prototyping?* reveals information about applying the DT stage consciously or unconsciously in the three fields of activity observed.

As the Figure 6 reveals, prototyping is a DT stage that is not so popular among respondents. A low percentage of respondents use validation through prototyping, the DT stage being the less used in education. IT companies seem to use more prototyping, but it is still a low percentage.

**Figure 6: When choosing a possible problem solution, do you first try to validate through prototyping?**



Source: Authors' construction

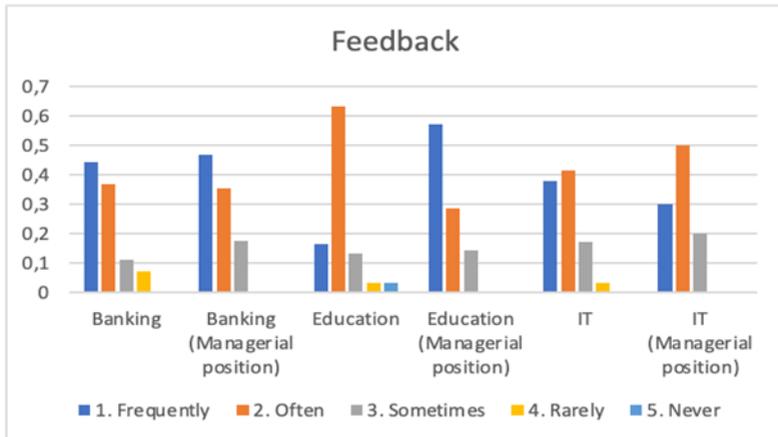
### 9. Test - stage applied in education, IT companies and banking

Prototypes are tested with end users. Based on their feedback, either new prototypes or new ideas are iterated. A direct connection with the end user is important, in order to know his real perception. Also, the whole process may not focus on the end user, the sentimental component may be involved, so that the result does not match the requirements. As design thinking is one of the most successful methods that can be applied in uncertain conditions, the

testing stage is crucial in the decision to launch a product or service or to make an organizational change. It is a long way from an idea to something tangible, so it must be rigorously tested before being launched on the market. In this way, costs can be reduced.

In this questionnaire, *Do you offer and ask users for feedback related to the solutions you have for their problems?* was the one that make a connection with the testing stage. As it may be observed in Figure 7, a correlation was made between the managerial function of the respondents, their field of activity and the idea of feedback. In the field of banking, it is common to ask for and provide feedback, regardless of whether or not the employee holds a management position. One can also connect with the principle of the four eyes, a fundamental principle that is often applied in banking. Thus, employees are accustomed to feedback, being an action that they do not hesitate to perform. In education, it seems that those who do not hold a managerial position seek to provide and receive feedback often, while those who hold a managerial position frequently do so. In terms of IT, the results are surprising. Both those who are managers and those who are not, have responded with “sometimes”, which may reflect either that they receive and frequently provide feedback, or that they do not.

**Figure 7: Do you offer and ask users for feedback related to the solutions you have for their problems?**



Source: Authors' construction

It should be mentioned that, in general, applicable in the three areas analyzed and not only, in order to give constructive feedback, any employee must understand the reason why he offers it. As it is a business environment, feedback must not be a purely subjective opinion, unjustifiably given and imposed on others from a higher hierarchical position, but instead, it must be justified through a certain context.

### **10. Particularities**

Finally, a common idea of the three fields – IT, banking and education – is the fact that elements of design thinking are applied involuntarily in everyday activity. Thus, the initial assumption was validated. Moreover, as seen in Figure 8, it often happens to organize teams in order to solve problems (in education and IT) and only sometimes in the banking field. Here, this answer is contradictory with the rest of the answers in the questionnaire. However, there may not be a clear definition of the team, of organizing a team for this specific purpose.

#### **Figure 8: Do you build/create a team in order to solve a problem?**

Source: Authors' construction

It is also worth mentioning that a large part of the respondents has the possibility to get involved in the process of solving a problem, although most do not hold a managerial position (72.2% do not hold one, while 28.1% are

managers). Thus, 28.1% frequently get involved in the decision-making process, 37.2% often and 28.1% sometimes.

According to the existing literature, the human-centered method is known for understanding questionable needs, in terms of innovation. (Liedtka, 2015) This general idea was also observed after the research. Various methods were used to solve unanswered problems, methods that are part of the design thinking sphere, without realizing it.

Regarding digitalization and digitization, because it is a very common phenomenon, especially in the last year marked by the COVID-19 pandemic, a question was introduced in the research that refers to it – *When trying to find solutions to problems, do you use digital tools or software applications?* It was observed that more than 67% of respondents use the digital environment frequently or often. Digital is no longer an option now. All companies, all business environments need to use it. In a world that is moving vigorously towards a digital economy, each entity must adapt to the new reality. In particular, the educational system has faced an unprecedented stage, so that online courses have become a normality. Likewise, in banks, online banking platforms are more and more efficient, having an increasing number of users. Also, employees communicate more online in virtual meetings, than offline. In terms of IT companies, digital has always be present there, but with the rapidly evolution, new and creative things can be achieved. However, this question related to digitalization can be correlated with the socio-demographic question regarding the age category in which the respondents may be included. Thus, 39.7% come from the age group 36 – 45, while 33.1% from 26 -35.

## **11. Conclusions and future research perspectives**

Education, IT companies and the banking system play a crucial role in the economy of any state. In Romania, these systems have developed massively in the last year. Thus, taken by surprise, they had to act quickly and as efficiently as possible. The use of different methods, tools and mechanisms facilitated the whole process. This includes the design thinking method. Designers have been around for years, but their influence in all areas has been stronger in recent times. In a crossroads situation, creativity and a strong team are needed. Strictly following the steps of the design thinking method, positive results cannot be slowed. Indeed, each stage is guided by specific tools that help the

team approach the objectives by being pragmatic, user-focused and well-organized.

In order for the design thinking method to be easy to apply, a systemic way of thinking is required. Of course, the team needs to look at the problem as a whole, in order to understand it better and to be creative. It often happens that the solution to the problem is even in the deep understanding of the problem. In the last year, the year marked by the COVID-19 pandemic, all industries had to be reinvented, in order to remain of interest on the market. Everything was sudden, quick ideas were needed, but design thinking was a vigorous helping hand.

As it was observed in the present research paper, the banking system, as well as the IT companies and the educational system, applied certain steps of the design thinking method. Being a human-centered mechanism, with increased attention to the end-user, the three areas of activity have adapted to the new requirements of the market and have taken more than ever into account the needs of customers or users. It was an interesting research exercise to observe the degree of belonging to design thinking, without mentioning the concept itself. This was intended so as not to impact the answers. It had been possible for respondents to look for information about design thinking, and for their answers to be influenced by what they have read. In fact, everything was objective, an overview of the business approach.

Categorically, it is recommended for all the analyzed fields to use with confidence the design thinking method in case of any problem encountered. This method will not go out of style, instead it will probably only grow in popularity.

Finally, it is required to make a more detailed analysis of this matter, in order to have a wider overview. The future research may include more fields of activity or even international companies. However, a more extensive future research comparing managers and other department employees is intended to be conducted. Also, another research can be completed, analyzing the way people worked before, during and after the COVID-19 pandemic.

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