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Concept Mapping and Idiomatic Expressions

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Abstract

One of the most significant characteristics of idiomatic expressions is that they are largely motivated by metaphors. Newspaper articles are inundated with metaphorical language. Idiomatic language is very important because it is fun to learn and use in everyday communication, which significantly contributes to better acquisition of the new vocabulary. Because of their rigid structure and unpredictable meanings, idioms are considered difficult to learn.

The subject of research is the acquisition of idiomatic expressions through the use of concept mapping. The research itself was conducted in a secondary vocational school (Aeronautical Academy) in English classes. The main goal of the research is to determine to what extent the application of concept mapping contributes to a better acquisition of idiomatic expressions compared to the traditional method.

Keywords: Idiomatic Expressions, Concept Mapping, the English Language

1. Introduction

Nowadays, metaphorical usage is far more prevailing than the literal meaning of the word. For example, we all know that farmers plough the field, but in the English language this expression can also be used to mean *to read a long article or novel* (*He spent 5 hours ploughing through that report*). While some believe that most idioms are informal, or as McCarthy (McCarthy, 1992, p. 57) explains, "idioms are colloquial alternatives to their nearest synonymous literal free forms", others believe that idioms can be compared to proverbs. Nevertheless, a proverb usually retains its original form, while idioms cannot be said to be always inalterable (Fernando, 1996, p. 44). A more detailed study of the very structure and formation of idioms can lead to a better understanding of them, and in this way, future users of those expressions will gain greater confidence.

We will pay attention to the very nature of idiomatic expressions. The definition of the term idiom seems to have different interpretations depending on the author. For example, Moon (Moon, 1998, p. 3) describes an idiom as follows, "An idiom is an ambiguous term used in conflicting ways." On the other hand, Curry (Curry 1988) points out that idioms are expressions that are often colloquial and belong to slang that become clichés after excessive use. Fernando (Fernando, 1996, p. 3) points out that "idioms are conventionalized multi-word expressions that are generally accepted". We can notice that idioms are usually formed by combining words that already have their own meanings. The authors Flavell and Flavell (Flavell & Flavell, 2001, p. 6) point out that an idiom is a "new linguistic unit" whose meaning is different from the meaning of individual words in the idiom itself. On the other hand, there are authors, such as Rosamund Moon (Moon, 1998, pp. 72-73), who divide idioms into seven categories depending on the message they convey: action idioms, (e.g. *spill the beans* - give away a secret), event idioms (e.g. *have blood on one's hands* - to be responsible for someone's death), situation idioms (e.g. *to be up a gum tree* - to be in an awkward situation), idioms related to people and objects (e.g. *a lounge lizard* - a person who frequents bars), attribute idioms (e.g. *as green as grass* - of a distinctly green color), evaluation idioms (e.g. *turn back the clock* - go back to your old ways), emotion idioms (e.g. *green with envy* - bursting with envy). When we consider the degree of literalness and metaphoricity of idiomatic expressions, we can divide them into the following categories: transparent (literal idioms), semi-transparent (semi-idioms) and non-transparent metaphors (pure idioms). According to Rosamund Moon (Moon, 1998, pp. 22-23) "a transparent metaphor helps the reader/listener to understand the idiomatic expression more easily" as is the case with the idiom *talk behind someone's back*. In the case of semi-transparent metaphors, idioms will not be understood by everyone, so they will require additional explanation, as is the case with the idiom *throw in the towel* (to give up), for the understanding of which it is necessary to have knowledge in the field of boxing where throwing the towel also means giving up on the battle. Finally, non-transparent metaphors or pure idioms have the characteristic that it is impossible to translate them literally, but it is necessary to know the meaning of the entire idiom, such as the expression *kick the bucket* (die).

There are two models of idiomatic meanings, namely the *direct model* and the *component model*. As for the direct model, (e.g., idiom *by and large* - common) the meaning of the idiom is obtained by understanding the idiom as a whole. This model was perfected by Gibbs (Gibbs, 1984) by proposing that it is possible to completely bypass linguistic processing if the expression is instantly recognized as an idiom. On the other hand, when it comes to the component model, there are expressions whose idiomatic meaning is obtained by jointly combining their literal meaning and allusive content (e.g., the idiom *carry coals to Newcastle* - to do something that is unnecessary). Of course, the meanings of these idioms are not arbitrary as is the case with the direct model. Idioms are understood more quickly in their idiomatic meanings than in their literal ones. This means, as observed by Gibbs (Gibbs, 1980), that the meaning of the idiom *kick the bucket* (to die) is understood more quickly than the literal meaning of kick the bucket. This leads us to the conclusion that the meaning of an idiom can be retrieved from memory without full linguistic processing, assuming that retrieval of the meaning takes less time than standard linguistic processing.

2. Traditional in Contrast to Cognitive Linguistic Understanding of Idiomatic Expressions

Idiomatic expressions, as an integral part of figurative language, were originally characterised by a lack of metaphorical creativity. Idiomatic expressions were so unpopular that an author from the end of the 19th century stated how "idioms are to the language what an epidemic is to our body" (Genung, 1894, p. 32). In addition, Gibbs (Gibbs, 1994) states that there are authors who advocate the thesis that the use of slang is both a sign and a cause of mental atrophy. However, as Gibbs observes in his book *The Poetics of Mind* (Gibbs, 1994), in the past there was also a small number of writers and intellectuals who attributed the epithet of poetry of everyday life to idioms, because they recognized idioms as an ideal tool for pictorial description of our feelings about everyday life and the things that surround us. Nowadays, language contains thousands of idiomatic expressions, in the development of which metaphor undoubtedly plays an important role. For example, most American teenagers use idiomatic expressions for drunkenness. Idioms for drunkenness such as *blasted*, *blitzed*, *bombed*, *shredded*, *tattered* are motivated by metaphorical mapping where drunkenness is understood as destruction.

According to the traditional view, in order to learn the meaning of idioms it is necessary to form arbitrary connections between idioms and their non-literal meaning in order to recognize that *spill the beans* means to tell a secret, *lose your marbles* means to go crazy, etc. Most idioms are syntactic unproductive (frozen). For example, it is impossible to convert the idiomatic expression *kick the bucket* into the passive construction *the bucket was kicked by Frank*. Fortunately, most of the traditional assumptions about idioms are now being challenged thanks to cognitive linguistics. Supporters of the traditional approach to the study of idioms, such as Cacciari and Tabossi (Cacciari & Tabossi, 1993), emphasize the importance of the configurational model of the idiom where the understanding of the idiom itself depends on recognizing the key part of that idiom and then it is possible to understand the figurative meaning. If that key part appears earlier in the sentence, then it is possible to understand the figurative meaning before the literal meaning. On the other hand, Gibbs (Gibbs, 1994), one of the most significant representatives of the cognitive linguistic approach in the study of idiomatic expressions, believes that people have an innate knowledge of the metaphorical basis of a large number of idioms. One way to discover speakers' innate knowledge of the metaphorical basis of idioms is to examine the conceptual images of idioms of the speakers themselves (Gibbs & O'Brien, 1990). The research of these authors is of great importance for the cognitive interpretation of idioms, so more will be said about this topic. Regarding the semantics of idioms, the *prismatic model* is very important. This model was introduced to describe the diversity of the semantic structure of idioms. Otherwise, this model contains all the descriptive dimensions that are necessary for the analysis of the internal semantic relations of any idiomatic expression (Langlotz, 2006). To illustrate this model we will use the idiomatic expression *rock the boat*. The focus will be on the connection between the complex literal meaning of the idiomatic expression as a whole ($A \cap B = C$, where $C = \text{rock the boat}$) and its complex idiomatic meaning ($\alpha \cap \beta = \gamma$, where $\gamma = \text{to ruin a peaceful/comfortable situation}$). Afterwards, attention is directed to the relationship between the literal meaning of the individual parts of the idiom ($A = \text{rock}$) and ($B = \text{boat}$) and the interpretation of these parts within the idiomatic meaning of the expression as a whole ($\alpha = \text{ruin}$, $\beta = \text{easy situation}$). In this way, there is a focus on the mappings between the literal standards (A , B and C) and their figurative target domains (α, β and γ). Therefore, the scene with the literal meaning of the idiom *rock the boat* is projected onto the target meaning of *ruining a satisfactory situation*.

3. Concept Mapping and Idioms in Contrastive Research

In contrast to the traditional view that linguistic meaning is completely separate from our conceptual system (Kövecses, 2010), cognitive linguistics has recognized the superiority of metaphor in everyday language. According to Kövecses, one of the biggest stumbling blocks when it comes to understanding the very nature of idioms when teaching a foreign language is the attitude that idioms are viewed as expressions that are independent of any conceptual system (Kövecses, 2010). The book *Metaphors We Live By* (Lakoff & Johnson, 1980) makes a major contribution to the formation of the theory of conceptual metaphor. This theory pays attention to trying to understand abstract domains of experience (target domains) by looking for connections with concrete domains of experience (source domains). Johnson points out that our conceptual system, regarding how

we think and behave, is metaphorical in nature. Of course, when it comes to idiomatic expressions, the central place rightfully belongs to conceptual metaphor. A conceptual metaphor consists of a source and a target domain and contains a whole series of concept mappings between those domains. The source domains are more concrete and more closely explain the target domains which are more abstract. Conceptual metaphors are manifested in idioms. For example, the idioms being hot under the collar and blowing off steam indicate anger that is associated with heat, so we get the conceptual metaphor ANGER is HEAT. In addition, it should be borne in mind that there are three types of conceptual metaphors, namely: structural, ontological and orientational. In structural metaphors, one concept is structured by another (the target domain of the argument is composed by the domain of war – e.g. He attacked every weak point in my argument). When it comes to ontological metaphors, we understand our experiences with the help of objects, substances that surround us. For example, if we understand the mind as an object and develop a structure for it by using a metaphor for a machine, then it is possible to get the following statement - My mind is rusty this morning. Finally, we also have orientation metaphors that are largely connected with orientation in space, such as: up-down, center-periphery, etc. (VIRTUE is UP - She is an upstanding citizen; LACK OF VIRTUE is DOWN - That was a low-down thing to do).

Recent research within corpus linguistics highlights the growing importance of phraseology. In addition, Ehrman and Warren (Ehrman & Warren, 2000) in their study on the principle of idioms come to the conclusion that more than 50% of languages can be expressed using idiomatic expressions. One should bear in mind the fact that idiomaticity is very difficult for non-native English speakers. This also applies to successful speakers who have mastered grammar but make mistakes when it comes to idioms. It is very important to keep in mind the fact that idioms are not completely arbitrary but are motivated by metaphors. As Lakoff and Johnson have noted: "our conceptual system is metaphorical in nature" (Lakoff and Johnson 1980, p. 4). Therefore, it is very important to motivate teachers to raise students' awareness of conceptual metaphors in order to better understand idiomatic expressions. Cognitive linguistics considers that most idioms are not separate semantic entities, but are motivated and can be analyzed on the basis of metaphors (Gibbs, 1997). When analyzing the relationship between idioms and metaphors, Gibbs's observation is extremely important. He believes that idioms were once metaphorical, but over time they lost their metaphoricity and now exist in our conceptual lexicon as "frozen" lexical entities (Gibbs, 1997). Because of this understanding of idioms, it has long been considered that students can only rely on the context when interpreting idioms and that they can only learn them by heart due to the absence of reliable clues within the idiomatic expressions themselves (Cooper, 1999; Boers, 2000). However, if we analyze the idioms themselves more carefully, we will discover that they are not frozen, but their meanings are, to a large extent, connected with conceptual metaphors. In order to illustrate this adequately, we will use the research of the Chinese author Guo (Guo, 2007), who found in his study that the understanding of idioms is at a higher level among students who have a developed awareness of the presence of metaphors in the idioms themselves. The research was done by comparing two groups of students. In one group, idioms were explained in a traditional way, and in the other, using conceptual metaphors. When the students in the experimental group encountered an idiom, they were willing to analyze the relationship between information from the target domain and the idiomatic meaning based on the metaphorical knowledge they had acquired. These students were far less anxious when learning idioms and they also showed greater motivation, unlike the control group where idioms were learned in an traditional way, by heart. One of the reasons why this method of teaching (raising awareness about the presence of metaphors) is very successful can be found in the fact that the understanding of figurative expression involves active mental participation in order to connect the target and source domains. In this way, students can imagine a picture of a concrete event in their mind, which will be stored in memory together with the verbal form, which will enable even better memorisation and understanding of idiomatic expressions. Furthermore, idioms are motivated by conceptual metonymies (Boers, 2000). For example, the idiom lend a helping hand (to help someone) can be motivated by conceptual metonymy where the hand actually represents an action.

The meaning of most idioms would be completely unmotivated if we did not establish a connection between the meaning of the idiom and our conceptual system made up of conceptual metaphors. We should not lose sight of the fact that a large number of idioms are formed by conceptual metaphor. Furthermore, we should mention the observation made by Irujo (Irujo, 1986), who introduces the term semantic transparency or idiom motivation. It is realized by means of cognitive mechanisms (metaphor, metonymy and fusion) that facilitate the learning and teaching of idioms. In addition, it is noticeable that conceptual metonymy represents another cognitive mechanism relevant to understanding the meaning of idiomatic expressions. The most common relationship between entities is part-whole. This means that a lexeme denoting a part of something is used to refer to the whole to which it belongs. For example, we have the metonymic pattern a hand for a person which underlies the following idiomatic expressions in English: from hand to hand; all hands on deck (everyone should roll up their sleeves and help). The difference between idiom and metaphor is not easy to explain with precision because some authors consider most idioms to be "dead" or "frozen" metaphors.

Our focus will now be on the analysis of several experiments conducted by Gibbs (Gibbs, 1992), which examine the difference between idioms and their literal paraphrases. Furthermore, this research has another goal, which is to show that idioms are not dead metaphors, but that they have more complex interpretations that are motivated by conceptual metaphors connecting idiomatic expressions with their figurative interpretations. Gibbs emphasizes that idioms have complex meanings that are motivated by independent conceptual metaphors that make up our everyday lives. A large number of idioms retain a high degree of metaphoricity. For example, the figurative interpretations of the idioms blow your stack and flip your lid are motivated by two independent concept mappings - MIND is a VESSEL and ANGER is a HEATED LIQUID IN A VESSEL. Metaphorical

understanding of emotional concepts, such as anger, joy, sadness and fear, facilitates the use and understanding of idioms in the discourse itself. Gibbs's main goal is to show that idioms are not equivalent to the meaning of their literal paraphrases. In the first experiment, Gibbs seeks to provide data showing how the figurative meaning of idioms is motivated by conceptual metaphors. The experiment showed that when students imagine the idiomatic expressions *blow your stack* and *flip your lid*, they see them as the result of some internal pressure inside the container. In another experiment, there is an attempt to prove that idioms do not have equivalent meanings to their literal paraphrases. As part of the experiment, participants read stories that describe various events, such as disclosure of secrets, anger, loss of control. At the end of each story, participants are offered either an idiomatic expression (e.g. *spill the beans*) or a literal paraphrase of that idiom (e.g. *reveal the truth*). From the conceptual standpoint of idiomaticity, it is predicted that participants will choose the idiom *spill the beans*, which is more appropriate than the literal paraphrase *reveal the truth*. As a conclusion of this analysis, we can state that our understanding of the meaning of idioms also depends on our understanding of conceptual metaphors that connect idiomatic phrases to their figurative meaning.

We will now pay attention to the relationship between mental images and idiomatic expressions. Firstly, we must explain the term *dual coding*, where a mental image serves as a pathway to remembering an expression. This can be used, and to a great extent, in the process of learning idiomatic expressions because in this way students' awareness of the metaphorical nature of idioms is developed so that they become aware of the specific source domains in which the given expression was originally used. For example, if we take the idiom *show someone the ropes* (show someone how to do a job or a task) and explain it to students by using a scene where an experienced sailor explains to a newbie how to work on a ship, it is almost certain that this scene will form a mental image for this idiom in the student's mind, so that at some future encounter with the idiom *show someone the ropes*, this image will be of great help to the students in understanding the idiomatic expression. Regarding our research that will be presented in this paper, the research of Gibbs and Jennifer O'Brien (Gibbs & O'Brien, 1990) was of great importance, which helped me, to a great extent, to include images together with conceptual metaphor when it comes to the acquisition of idiomatic expressions by English language learners. When it comes to this very important study from 1990, the aforementioned authors started from the hypothesis that people have strong conventional images in their mind for a large number of idiomatic expressions thanks to conceptual metaphors that motivate the figurative meaning of idioms. They conducted an experiment in which subjects were asked to form and describe their mental images for various idiomatic expressions. The subjects were then asked detailed questions about the images they had created. Finally, it was concluded that the respondents showed an extremely high degree of similarities in their responses as well as in the formation of their mental images for idioms that have a similar figurative meaning despite their differences in form (for example, *spill the beans* and *let the cat out of the bag* - to reveal a secret). This experiment confirmed that conceptual metaphors motivate the meaning of idiomatic expressions. Furthermore, the results showed that people have hidden knowledge that is easiest to discover if we examine the mental images of the idiomatic expressions of the speakers themselves. In addition, Gibbs and O'Brien wanted to take advantage of linking idiomatic expressions within thematic units, because they knew that doing so would greatly increase the chance of subjects retaining the newly learned expressions in their active vocabulary. Precisely because of this advantage, they decided to create material for their experiment by choosing 25 idioms, out of which 5 thematic units included 5 idioms with a similar meaning: revealing a secret (*spill the beans*, *let the cat out of the bag*, *blow the whistle*, *blow the lid off*, *loose lips*); anger (*blow your stack*, *hit the ceiling*, *lose your cool*, *foam at the mouth*, *flip your lid*); hiding a secret (*keep it under your hat*, *button your lips*, *hold your tongue*, *behind one's back*, *keep in the dark*); exercising control or influence (*crack the whip*, *lay down the law*, *call the shots*, *wear the pants*, *keep the ball rolling*); madness, loss of reason (*go off your rocker*, *lose your marbles*, *go to pieces*, *lose your grip*, *bounce off the walls*) (Gibbs & O'Brien, 1990; Gibbs, 1990). As for the group of idioms describing anger, they are structured by two basic conceptual metaphors – MIND is CONTAINER and ANGER is HEAT. The first metaphor is part of the general conductor metaphor (Reddy, 1979), while the second metaphor comes from a well-known theory according to which the physiological effects of anger are increased body heat, increased pressure, and anxiety. As anger grows, so do physiological effects. In this way, we use our understanding of the physiological effects of emotion as the source domain from which we construct the target domain, which is the emotion of anger itself.

4. Research Framework

According to the aim of the research, the main hypotheses of this research are as follows:

1) We assume that by using the concept of a cognitive approach based on concept mapping, the acquisition of idiomatic expressions by students in the experimental group will be far more successful compared to students in the control group who acquired idioms in the traditional way - explaining idioms by the teacher and copying idioms from the blackboard by the students.

2) We assume that the use of conceptual metaphors will motivate the meaning of the idiom and that together with the showing of picture (which provide visual support for the given idiom) when explaining the idiom, it will lead to a better and faster acquisition of idiomatic expressions by students, compared to the traditional way of explaining the idiom when students of the control group are given only the translation of idiomatic expressions, and the students are asked to simply memorise those expressions, i.e. learn by heart.

The survey itself includes 20 idiomatic expressions in the English language that are related to food. Food was chosen as the original domain because it was not as represented in research as it is the case with the human body, which according to Aitchison

(Aitchison, 1987) includes the largest number of metaphors, as is shown in the analysis of figurative language in the period from 1675 until 1975. We will now present a list of idiomatic expressions used in the research:

1. Butter sb up
2. Full of beans
3. Bring home the bacon
4. Half-baked
5. In a pickle
6. Spill the beans
7. A nest egg
8. A bad egg
9. Spice sth up
10. A big cheese
11. Sell like hot cakes
12. A hard nut to crack
13. A breadwinner
14. Apple of one's eye
15. Soup up sth
16. Too many cooks spoil the broth
17. A hot potato
18. A couch potato
19. One smart cookie
20. As cool as a cucumber

24 students participated in the research and were divided into two groups (experimental and control) consisting of 12 students each. All participants in this research attend the third year of secondary vocational school (Aeronautical Academy). The English language level of the respondents is intermediate level. Both groups of examinees have a uniform knowledge of the English language, which is also confirmed by their final grades in this subject from the end of the previous school year, which were used to select the examinees. In addition, the idiomatic expressions used in the research were completely unknown to students from both groups. After explaining the idioms in both groups, the students were given the same task in the next lesson within a period of 20 minutes, to complete 20 sentences using the corresponding idiom from the previous lesson:

COMPLETE THE SENTENCES WITH AN APPROPRIATE FOOD IDIOM:

1. My brother works hard during the week but at the weekends he spends most of his time lying on the sofa watching TV. He can be a real _____.
2. This is the new Nintendo football game. We've only got two left in the shop. They've been selling like _____.
3. I'm in a _____. I've got to be at the dentist's in 10 minutes and I'm expecting an important phone call. Could you answer my phone and say I'll be back in about an hour's time?
4. Did you see the way Sandra handled that aggressive customer? She was as cool as a _____.
5. A: A few days before we ask our boss for anything, we start being extra nice to her.
B: We do the same with our boss! We just _____ him _____ a bit. It's never failed yet!
6. When his poor father died, it was the young boy who had to work hard to _____.
7. I've hidden his present in the basement. You mustn't _____ and tell him where it is!
8. It's a really important meeting of the Football Association. All the _____ will be there.
9. He would do anything to make his daughter happy. She is the _____ of his eye.
10. I don't want my little brother hanging around with the bad _____ on the street.
11. The kids were full of _____ after the circus.
12. It was just another _____ plan of his – it was never going to work!
13. I wanted to _____ my office, so I bought some red and gold paint.
14. This assignment is a hard _____ to crack.
15. I'm the _____ of this house.
16. They built up a _____ for their son's college education.
17. Kosovo issue is a hot _____ for many countries.
18. If anyone can make this company succeed, it's Kathy- She's one _____.
19. We are going to _____ this car with a new loud stereo system.
20. Without a conductor, every player had an idea for how the music should go- too many cooks _____.

As for the control group, the procedure was as follows. The students were given 20 idioms written on the board together with their translation into Serbian. However, the traditional method of imparting new knowledge was used for the students of the control group, which is based on the mere memorisation of new vocabulary without any additional explanation or creativity.

When it comes to the experimental group, a completely different approach was applied when explaining idiomatic expressions. In contrast to the traditional approach that was applied to the control group, here the emphasis is placed on the conceptual aspect that is inextricably linked to the experience and environment of the students. Students in the experimental group work in a completely different way. Firstly, idioms are explained to students using the following conceptual metaphors:

1. BETTER IS UP (butter sb up; spice sth up; soup up sth)
2. PEOPLE ARE FOOD (full of beans; a couch potato; a big cheese; as cool as a cucumber; a bad egg; apple of one's eye; one smart cookie)
3. MONEY (PROFIT) IS FOOD (bring home the bacon; a nest egg; a breadwinner: sell like hot cakes)
4. IDEAS ARE FOOD (half-baked; spill the beans)
5. DIFFICULTIES (PROBLEMS) ARE FOOD (in a pickle; a hot potato; a hard nut to crack; too many cooks spoil the broth)

After explaining idioms by using conceptual metaphors, in the second part of the lesson, students are shown pictures for each idiomatic expression (see Attachment 1. at the end of the paper) which should raise the level of success even more in acquiring new idiomatic expressions whose meanings are already motivated by using the abovementioned conceptual metaphors. After the experiment was completed, a discussion was conducted with the respondents from the experimental group with the aim of clarifying the role of images in acquiring idiomatic expressions, as well as finding an answer to the question: to what extent did the images help the respondents in acquiring them?

6. The Results of the Research and Discussion

This section of the paper will be devoted to drawing conclusions related to the set hypotheses.

1) The hypothesis that by using the concept of a cognitive approach based on concept mapping, the acquisition of idiomatic expressions by the students of the experimental group will be far more successful compared to the students in the control group who acquired idioms in the traditional way – accepted.

The results obtained show that the group that attended English language classes, during which the concept mapping was used, achieved better results on the test (see Table 1.). From the analysis of this table, we can conclude the following: Out of the maximum number of correct answers, which is 240 correct answers, the control group had 106, i.e., 44.1%. On the other hand, the experimental group had 167 correct answers, which is 69.5%.

Table 1. The results of the conducted research

Sentence	Number of correct answers	
	Control group	Experimental group
1	11	11
2	4	10
3	5	8
4	9	11
5	4	7
6	4	8
7	4	6
8	4	6
9	7	12
10	7	10
11	9	11
12	3	6
13	3	5

14	7	9
15	2	5
16	4	9
17	8	12
18	4	7
19	1	4
20	6	10
Total	106 (44,1%)	167 (69,5%)

There's a noticeable difference in favor of the experimental group, which has 69.5% of correct answers compared to the control group, whose percentage of success is only 44.1%. Therefore, the experimental group achieved a 25% better result because the idioms were explained to them through conceptual metaphors. It was easier for them to acquire the idioms due to the fact that conceptual metaphors were tied with logical and meaningful connection with the idiomatic expressions themselves. On the other hand, the results achieved by the students of the control group show all the shortcomings of the traditional approach in explaining and acquiring idioms. The acquisition of new idiomatic expressions was much slower in the control group, whose students had great difficulty remembering the idioms even though they did the sentence completion task only one day after the idioms had been explained. As observed by Boers (Boers, 2000), students who get new vocabulary explanations in the traditional way (only through translation into the mother tongue), have far more difficulty in acquiring these new expressions because they do not make any cognitive effort to connect the meaning of the new expression with their personal experience and environment. Compared to the control group, students from the experimental group achieved far better results, which confirms the necessity of introducing conceptual metaphors as a cognitive mechanism in the very process of explaining idiomatic expressions, because as noted by Kövecses (Kövecses, 2010), the biggest mistake made by English language teachers is reflected in the fact that they view idioms as linguistic expressions that are independent of any conceptual system and that they are conceptually separate from each other.

2) The hypothesis that the use of conceptual metaphors will motivate the meaning of the idiom and that together with the showing of pictures, (which provide visual support for the given idiom) when explaining the idiom, it will lead to a better and faster acquisition of idiomatic expressions compared to the traditional way of explaining the idiom – accepted.

Based on the results of the research and discussions with the students from the experimental group, we can draw the conclusion that the use of conceptual metaphors when explaining idioms is of invaluable importance since it brings two domains of our knowledge into direct connection, i.e., the original domain is used to understand a whole series of abstract concepts, i.e. target domains. As a direct consequence of this approach, we have a situation in which students learn idioms faster and are also able to retain them in their memory longer, which is supported by far more successful results achieved by the experimental group. In support of the second hypothesis is the thinking of Kövecses (Kövecses, 2010), who believes that most idioms are actually a product of our conceptual system, and not just an expression with a meaning that is related to the meaning of individual parts of the idiom. It is his belief that idiomatic expressions come from our understanding of the world that surrounds us and that it is deeply rooted in our conceptual system. During the explanation of idiomatic expressions, it was obvious with the students of the experimental group that, encouraged by conceptual metaphors, they began to engage their cognitive capacities and the ideas they had about certain abstract concepts in order to connect them with the original (concrete) domains, and therefore, their results themselves showed how idiomatic expressions are motivated by conceptual metaphors. Furthermore, this approach to the study of idioms proved to be interesting for students, and most importantly, it succeeded in motivating them to use their cognitive abilities when acquiring and understanding idioms. Unlike the experimental group, the students of the control group were indifferent during the lecture because no cognitive effort was required of them, but only simple writing and memorizing, as they often say "new word lists". Their results show all the shortcomings of the traditional approach both in teaching and in the learning process. These students did not have a cognitive mechanism that would help them learn new expressions in an easier and faster way. In addition, after analyzing the results, it can be safely concluded that, in the control group, the meanings of idioms were completely arbitrary, i.e. completely separated from the conceptual system.

Furthermore, if we compare the number of correct answers per sentence, there is only one example where both groups had an identical score, and that is sentence No. 1 in which we have the *couch potato* idiom. In the other 19 sentences, the experimental group achieved significantly better results. In the first sentence, we have an identical number of correct answers because the idiom *couch potato* is very widespread in use, especially in movies and series, which explains the fact that almost all students in the control group knew it. As for the other idioms, the students of the experimental group were far more successful because they had an elaborate cognitive mechanism by which they learned idiomatic expressions faster and more effortlessly, i.e. that mechanism motivated the meaning of the idiom while, for the students of the control group, it was impossible to achieve better results only with the help of memory which as we know fades very quickly if it is not connected to our experience. In this case, mere memorisation could not lead to better results even though the time gap between the idiom explanation and the sentence task was only one day.

Finally, as the second ingredient of a particularly powerful formula for explaining and adopting idiomatic expressions, in addition to the conceptual metaphor, there are also images (downloaded from the internet). After the research, the students from the experimental group were interviewed. The goal of the conversation was to determine the degree of influence of images on students when acquiring idiomatic expressions. During the conversation, I wanted to find out how the students experienced the images in their minds and how they associated them with idioms. In this segment of the research, the research of Gibbs and Jennifer O'Brien (Gibbs & O'Brien, 1990) provided invaluable help. They started from the hypothesis that people have strong conventional images in their minds for a large number of idiomatic expressions due to conceptual metaphors that motivate the figurative meaning of idioms. Indeed, during discussions with students, through their detailed description of the connection between images and idioms, I came to the conclusion that they have almost identical mental images for those idioms. In support of my conclusion, I will now quote some of the students' comments regarding their ideas about images and their connection to idioms:

- Idiom *hot potato* - no one wants to catch a hot potato because it can cause burns. That is, it is a problem that is difficult to solve without negative consequences.
- Idiom *half-baked* - two cookies look with astonishment at the third cookie that is spilled (not baked enough), which is analogous to an idea or a plan that is not elaborated in detail and as such has its own shortcomings.
- Idiom *smart cookie* - a cookie surrounded by books and diplomas that are framed on the wall easily activates the image of a person who is extremely smart.
- Idiom *as cool as a cucumber* - a picture of a cucumber on the beach drinking cold lemonade. Completely relaxed situation, no anxiety, nervousness, tension.
- Idiom *in a pickle* - the image of a person imprisoned in a jar of cucumbers is an analogous example of a prison from which it is difficult to escape. That is, it is a problem from which we can hardly escape.
- Idiom *breadwinner* - bread in the shape of a trophy. It signifies victory because enough money has been earned for the family.
- Idiom *nest egg* - the egg in which the money is kept is in the nest. Since the nest represents security for the birds, the possession of money instills additional security when it comes to the future.
- Idiom *spill the beans* - grains fall out of the bowl uncontrollably, where the bowl represents our mind from which some secret information comes out in the form of grains from the bowl itself.
- Idiom *big cheese* - a piece of cheese with a briefcase in hand and a business suit is associated with an influential person who is highly positioned in society.
- Idiom *a hard nut to crack* - picture of a hard nut and a hammer. A stronger force is needed to crack a nut. This means that a certain problem is so difficult that it is necessary to invest more effort in order to solve it.
- Idiom *couch potato* - a picture of a potato on the couch. Next to it, there is a remote control and a bag of chips. Association with a chubby person who spends most of their time being lazy.
- Idiom *a bad egg* - an egg on which a person with an evil expression was drawn and which is broken in half. We do not benefit from such an egg, that is, such a person can only harm us.
- Idiom *too many cooks spoil the broth* - a picture with several cooks, where each of them wants to prepare the broth in their own way. This is reminiscent of the situation when too many people get involved in a project, but instead of helping, they actually delay and question the realization of the project.
- Idiom *bring home the bacon* - a picture of bacon with money next to it. This directly links bacon to money earned for the family.
- Idiom *apple of one's eye* - a picture of the pupil of the eye with an apple visible inside of it. An analogy with the Serbian equivalent idiom for a dear person (favorite) whom we call the apple of our eye.

The students of the experimental group pointed out that the picture was necessary for them as the last part of the puzzle called "idioms" so that after the conceptual metaphor, which activated their conceptual system and at the same time motivated the meaning of the idiom, they could use the picture for the given idiom to achieve a better understanding of the idiom and to keep it longer in the active vocabulary.

Conclusion

As it is well noted by Gibbs (Gibbs 1992), idioms were seen as dead metaphors or expressions that were once metaphorical but lost their metaphoricity over time. However, the same author believes that a large number of idioms are metaphorically alive and that people understand idioms precisely because of the metaphorical knowledge that motivates the figurative meaning of idiomatic expressions. Furthermore, there are a number of basic conventional metaphors that are sufficiently alive to show how even that which is conventional and inalterable need not be dead (Lakoff & Turner, 1989). Nowadays, idioms are omnipresent and possess inexhaustible possibilities and potentials for all the participants in the language process. In my view, it would be invaluable to introduce a cognitive approach when explaining idiomatic expressions, which was shown by the results of this research as well as the research of a large number of authors who are advocates of this approach. At the same time, both teachers and students should be aware of the presence of conceptual metaphors in everyday life in order for this cognitive mechanism to become a key tool in the process of explaining and acquiring idioms. Naturally, we should take into account the fact that in order to prepare this kind of teaching, much more time is necessary. However, it is undoubtedly a benefit as well as a mutual satisfaction for both teachers and students.

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GDP in the context of Sustainable Development

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Abstract

Gross Domestic Product (GDP) has traditionally been used to measure economic activity and growth. It also became a universal measurement of the quality of life. However, more than 60 years ago, the discussion arose on whether the growth measurement used is obsolete and not only does not include all the aspects of well-being but also promotes unsustainable activities. Primarily, the concern about the degradation of the environment, also valued as the ecosystem assets or natural capital, or the social costs and benefits, have been gaining high interest. In response to the limitations of the GDP, several economic metrics have been developed to convey economic performance in a way that reflects and supports sustainable development. This paper provides a chronological overview of such concepts, from the oldest Measure of Economic Welfare (MEW) to the newest Gross Ecosystem Product (GEP). Generally, these metrics could be divided into three categories; 1) adjusting GDP, 2) replacing GDP, and 3) supplementing GDP. The methodology is developing from a simplistic deduction and addition of certain activities from the GDP (or GNP) to more sophisticated methods using complex modeling systems to summarize the value of ecosystem services. However, if any of these new measures should be successful, it would need to compete with the advantages of the GDP measurement, such as its simplicity, objectivity, and universality. On the other hand, the GDP could continue to be an effective measurement of economic growth when applied in conjunction with the sustainability concept of a circular economy.

Keywords: GDP, Net Economic Welfare (NEW), Gross Ecosystem Product (GEP), sustainable development, natural capital, circular economy.

1. Introduction

Since 1937, when Simon Kuznets developed the Gross Domestic Product (GDP) indicator, it became the most common way to measure economic activity in the world. It has become one of the most important indicators impacting structural and systemic policies. According to Samuelson and Nordhaus, “The growth in output per capita is an important objective of government because it is associated with rising average real incomes and rising living standards.” (2010, p. 502). Economic growth, as such, is deemed to be the most important economic phenomenon, as the growth, or rather its underlying causes, is changing our lifestyles dramatically. Over time it started to be used not only to reflect on how well individual countries are doing but also to measure the level of our standard of living.

However, with time we have realized that sole focus on economic growth benefits our society but is also connected with several drawbacks. With the increased awareness about the environmental and social problems caused by the constantly increasing production and consumption, people are more often questioning whether GDP growth is the right way to measure how well we are doing as a society. Also, with the depletion of natural resources, one could ask whether there will be any economic growth in the future. There are several issues with the GDP of a conceptual and methodological character. Economists argue that GDP cannot properly reflect the true economic production of a country, as it lacks the possibility to capture unpaid work, the underground economy, or the value of leisure. From the conceptual perspective, focusing only on economic growth is becoming obsolete as society transforms rather than pursuing sustainable development.

In this paper, we are searching for an answer to whether the GDP is still a relevant matrix to be used by our society. It provides a relevant literature overview on the commonly highlighted shortcomings of the GDP from the methodological perspective as a measure and also from the conceptual perspective as economic growth is being overridden by sustainable development. The main aim is to provide a comprehensive research guide for the topic. It includes a chronological overview of the proposed solutions to enhance, complement, or completely replace the GDP that are reflecting the current needs to indicate our economic and societal development more realistically.

2. Theoretical Background

Defining economic growth and other related terms might seem unnecessary, as they are widely used in popular literature and our common life. However, this assumption seems to be not accurate, as we often see the terms being misinterpreted. This part of the paper is divided into two thematic sections. The first part reflects on the definition of economic growth, wealth, welfare, and sustainable development. The second part explains the conceptual flows of the GDP as our society shifts focus from economic growth to sustainable development and it also stipulates the related methodological flows of the GDP.

2.1 Economic growth

Economic growth is not an unknown term. Popular literature and media mention this term daily. But how do we exactly define the term economic growth? We might encounter two definitions of the term, one more suitable for the everyday-live understanding and one more technical, macroeconomic way of explaining economic growth. In their textbook on Economics (2010), Samuelson and Nordhaus provide both views on the term. The more simple understanding will define economic growth “as an increase in the total output of a nation over time. Economic growth is usually measured as the annual rate of increase in a nation’s real GDP (or real potential GDP)” (2010, p. 660).

The same textbook also explains economic growth in more technical detail: “economic growth designates the process by which economies accumulate larger quantities of capital equipment, push out the frontiers of technological knowledge, and become steadily more productive. Over the long run of decades and generations, living standards, as measured by output per capita or consumption per household, are primarily determined by aggregate supply and the level of productivity of a country.” (2010, p. 501). The macroeconomic definition of the term has two characteristics:

- i) it is derived from the concept of potential output, that is the output at the maximum of the productive capacity; and
- ii) it considers the long-term period.

Potential output is interchangeably used with the term Potential GDP, which is defined as “high-employment GDP...the maximum level of GDP that can be sustained with a given state of technology and population size without accelerating inflation. [It is considered] equivalent to the level of output nonaccelerating inflation rate of unemployment (NAIRU). Potential output is not necessarily maximum output.” (Samuelson & Nordhaus, 2010, p. 670).

2.1.1 Graphical representation and causes of economic growth

We can represent economic growth as an increase of potential output, graphically represented as the move of the PPF to the right (Figure 1.) or as a shift of the long-run aggregate supply curve to the right (Figure 2.).

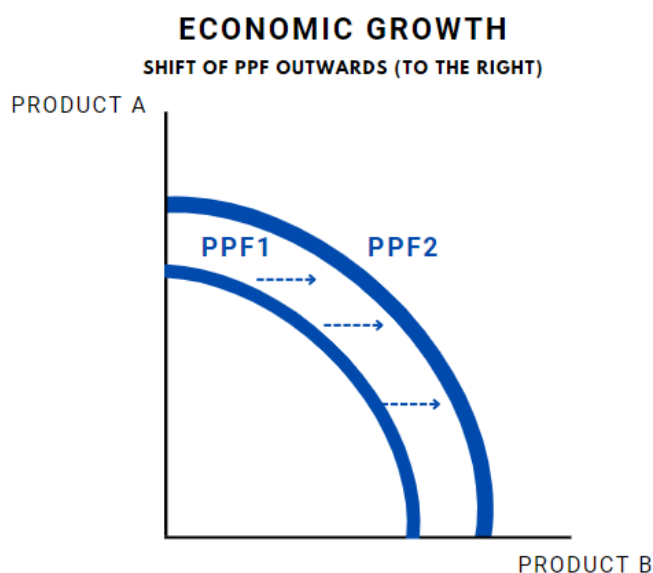


Figure 1: Economic growth – shift of PPF outwards

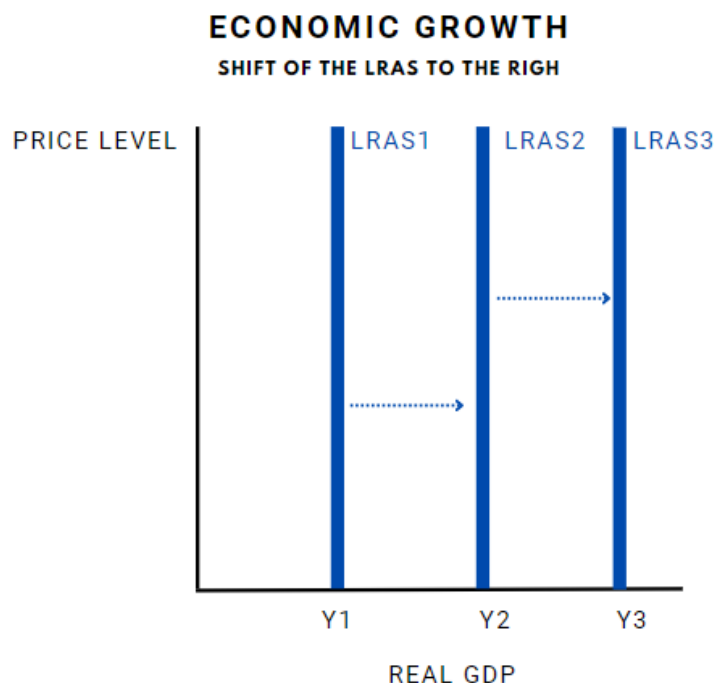


Figure 2: Economic growth – shift of LRAS to the right

Source: adapted from Samuelson & Nordhaus (2010); and Rittenberg & Tregarthen (2009)

The growing economy could also be imagined as an open-ended upward spiral of flows of goods and services and the corresponding monetary flows between firms and households (income and savings). This concept enhances the circular flow model by expanding the spiral between the two periods (Binswanger, 2013). Now a question arises, what is the underlying cause of economic growth? As nicely put by Samuelson and Nordhaus (2010), economic growth is riding on four wheels:

- Labor (human resources - size and quality)
- Natural resources (renewable - solar, water, wind, and thermal energy; and non-renewable such as land, oil, gas, forests - ample, water, and mineral deposits, but also environmental quality)
- Capital (tangible and intangible)
- Technology and entrepreneurship (scientific, technical and managerial knowledge)

There have been several theories developed over the course of history, which are trying to put forward a universal formula of the effective economic growth function. However, we can see that different countries use different combinations of these four factors to achieve success, and they operate with these resources with different levels of efficiency.

2.2 Wealth, Welfare, Well-being, and Standards of living

Wealth is defined by Burda & Wyplosz (2001) as “the sum of inherited assets or debts and the present value of current and future incomes” (p. 545), or by Samuelson and Nordhaus (2010), as “the net value of tangible and financial items owned by a nation or person at a point in time. It equals all assets less all liabilities.”

Welfare, on the other hand, is, according to the Cambridge Dictionary (2023), “the general state of health or degree of success of a person, business, or country.” Therefore, economic welfare could be characterized as a state of economic health and the degree of a country's economic success. It is connected to the branch of economics called Welfare economics, which is, according to Encyclopaedia Britannica (1998), a school of thought that assesses the impacts of political and systemic policies on the population's well-being.

According to Econlib (2018), welfare and well-being are in economics use often as synonyms and refer to an overall condition that reflects happiness and contentment. Therefore, it can also include the standard of living financially or materially. A copyright form

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2.3 Sustainable Development

Sustainable Development is a current trend that is overtaking most human activities. The amounts of “sustainable” products, services, packaging, and buildings started to flood the economy. As not all the presented “sustainable” items are sustainable, we have seen increased litigations related to “greenwashing.” Therefore, it is necessary to understand what Sustainable development means.

The most common definition of SD is from the UN document “World Commission on Environment and Development: Our Common Future” (1987). It is as follows: “Sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” Sustainable development is not negating economic growth, it is just going beyond it. Therefore, economic growth is one of the Sustainable Development Goals (SDGs) created by the UN in 2015. However, this economic growth cannot be uncontrollable. Goal n. 8 is to “Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all” (UN, n.d.). Some of the information are available with the editors and thus those are to be written as xx such as volume number of the journal, page numbers etc. Use either SI (MKS) as primary units.

2.4 Gross Domestic Product

Economist Simon Kuznets developed the Gross Domestic Product (GDP) methodology formulation in 1937. After several years, in 1944, the GDP measure was established as a standard tool for measuring the country’s economy. GDP is defined as the total value of output produced inside a country during a given period of time. The output produced is meant as the final sales of goods and services. GDP is a flow variable. It is usually defined for one year, but it can also be calculated for a quarter, for example. In this case it will be reflecting the short-term business cycles rather than the long term economic growth.

There are two independent theoretical approaches to measuring GDP (Samuelson & Nordhaus, 2010):

- Goods-flow approach
- Earnings-flow or cost approach

In practical terms, the GDP could be represented in three possible ways (Burda & Wyplosz, 2001):

- As the sum of net final sales within a geographical location during a period of time.
- As the sum of value added created within a given geographic location during a period of time.
- As the sum of factor incomes earned from economic activities within a geographic location during a period of time.

The GDP is usually calculated by the national statistical institute of the given country, and it is derived from the country’s system of national accounts. To make sure that the GDP is comparable across countries and that it is possible also to compile the global figures of GDP, there are internationally agreed standards (SNA by UN), setting of recommendations on the related data collection, compilation, and on measures of economic activity. References are important to the reader; therefore, each citation must be complete and correct. References should be readily available publications. List references in alphabetical order as shown in reference section.

3. From Economic growth towards sustainable development

Nowadays, we commonly use GDP, to be more specific the growth of the real GDP, to measure economic growth. Real GDP growth is an important figure for every country, and it determines many economic and non-economic activities and policy decision-making processes. As mentioned by Soubbotina (2004), economic growth has the potential to reduce poverty and solve other social problems. Over the last centuries, we have realized that with economic growth comes an improvement in our living standards. Therefore, it was established as the most critical factor towards which countries should strive. Economic growth has been seen as “a means to fuel progress in societal terms - including increasing well-being and equity - rather than increasing economic output as an objective in itself” (Sen, 2021). It has positively impacted many aspects of our lives, from the increased variety of consumer goods and services, improved medical treatments, technological progress, high-level research in all kinds of areas, improved mobility, and many others.

However, history gave us several examples where this was not quite the case, and economic growth was not followed by greater progress in human development. On the contrary, it was achieved at the cost of greater inequality, unemployment, overconsumption, or depletion of natural resources (Soubbotina, 2004). The following issues are arising connected with the continuous economic growth, such as:

- i) pollution of air, soil, and water caused by the continuously increasing economic activities;
- ii) depletion of natural resources caused by unsustainable continuous usage of unrenovable natural resources; and
- iii) related social issues, such as inequality.

3.1 *Pollution of air, soil, and water*

As Samuelson and Nordhaus mention in their textbook (2010), sometimes society might not be operating effectively due to the prices not reflecting the social priorities, such as environmental degradation caused by air or water pollution. However, now we know that environmental degradation could be so causing even worse problems than economically inefficient societies, such as biodiversity loss and climate change, which is foreseen to have vastly negative impacts on the welfare of our society.

Climate scientists have warned us for several decades that by irresponsible environmental behaviors we are driving our planet to change its climate completely. Scientists had known about carbon's greenhouse properties since 1856 when E.N. Foote published her paper in the American Journal of Science and Arts. She described her finding that carbon dioxide heated more in the sunlight than other examined gasses, such as oxygen and hydrogen. "An atmosphere of that gas [i.e., carbon dioxide] would give to our earth a high temperature; and if, as some suppose, at one period of its history, the air had mixed with it a larger proportion than as present, an increased temperature from its action as well as from increased weight must have necessarily resulted."(Foote, 1856).

At some point, this could lead to very different conditions on the planet that we are used to now and even to the impossibility of further human life on Earth. Therefore, a complete erase of the human race. Economic growth, as we know it now, is most likely not in line with keeping the human race alive.

3.2 *Depletion of natural resources*

The use of natural resources is one of the factors that lead to economic growth for some countries more than for others. However, what will happen to economic growth once one or more non-renewable natural resources are depleted? Would the economies be able to achieve growth in their potential outcome? What impact will it have on society as such? We already know that we can substitute non-renewable sources of energy for renewable sources of energy. However, the infrastructure to do so is still to be developed.

But what will we do if the land becomes infertile and we cannot grow crops? As we mentioned, the growing economy is illustrated as an upward spiral; the complete depletion of a resource that the economic growth relies on would cause the spiral to go downwards. Therefore, the question arises from this issue of how we could achieve economic growth and fulfill our needs while still considering the needs of future generations.

(1)

3.3 *Economic growth and social issues*

As mentioned above, economic growth can improve and solve many social issues due to the economic wealth accumulated when the country is experiencing substantial economic growth. On the other hand, focusing on the policies to reduce poverty by providing incentives (or extensive governmental expenses used for welfare or transfer payments) can lead to decreased economic output of a country. A good example of such a case is a situation explained as a poverty trap. In simple words, higher incentives for the poor will discourage them from working. Also, high levels of taxes could harm the willingness of entrepreneurs to create any enterprises.

Therefore, how do we create a balanced tradeoff between incentives and economic growth? Does economic growth always have to come with a high degree of inequality? Or do we have to accept lower economic growth to pursue a high level of societal equality? Greenlaw and Shapiro suggest in their textbook Principles of Economics (2017) that to achieve a desirable balance, attention needs to be paid to the impact welfare policies have on the economy. For example, free education will help to provide a skillful workforce for the economy in the future. In this case, we can observe that economic growth and equality complement each other.

This example is highly simplified, as educated people in a country with many social issues will just leave the country to search for a more suitable place to live in economic and social terms. We observe a brain drain in many developing countries that provide free education, such as Egypt or India. According to Dodani and LaPorte (2005), "these countries have invested in the education and training of young health professionals. This translates into a loss of considerable resources when these people migrate, with the direct benefit accruing to the recipient states who have not forked out the cost of educating them." The authors focused on the healthcare industry, concluding that countries such as Egypt, India, Pakistan, South Korea, and the Philippines produce more professionals than they can absorb.

The tradeoff between social issues (inequality) and economic growth is very sensitive, and it needs to be handled seriously and with caution. It is very important not only from the perspective of human welfare but also directly impacts the country's security.

Greenlaw and Shapiro (2017) mentioned that “if society does not make some effort toward reducing inequality and poverty, the alternative might be that people would rebel against market forces.” This situation creates two problems:

- i) already sensing such a problem might occur in the future will be reflected as an investment risk that can push foreign direct investments away from the particular party, which will have a negative impact on the economic growth; and
- ii) also the immediate effects of the protests and revolution in the country negatively impact its growth and development.

4. Reinventing the economic growth - impacts on the GDP

Throughout history, the global economy has experienced continuous economic growth. As analyzed above, this development brought many positives but also caused many negative impacts on our society. Economists have been trying to observe the situation and capture it in the form of theoretically and also practically. This part of the paper is focused on the developments in the related economic theory.

We observe two major opinions spreading regarding the possibility of continuous economic growth. One of the opinions claims that our society can't continue the current economic growth without destroying and completely exploiting our planet. We need to decouple economic growth and resources as a measure of the development of our society to enable future generations to function. The two basic ideas are (EEA, 2021):

- De-growth - to slow down production and consumption and focus on other criteria for development than economic growth.
- Post-growth - to decouple economic growth and well-being and become agnostic about economic growth.

Such solutions are proposed at politically high levels, and related initiatives have been pursued, such as the European Green Deal and the UN Sustainable Development Goals. However, scientists have not yet provided a consensus on whether it is possible to return to the 19th-century level of decoupling (EEA, 2021).

The other opinion presents the idea that achieving our current economic growth rate is possible without destroying our living environment. Economists following this thought are called “cornucopians,” “technological optimists”(Samuelson & Nordhaus, 2010, p. 268), or “Ecomodernists” (EEA, 2021), and they believe that the human race and the market economy will cope with any kind of limitations in resources by improving technological and scientific advancements.

They believe that “we are far from exhausting either natural resources or the capabilities of technology. In this optimistic view, we can look forward to continued economic growth and rising living standards, and human ingenuity can cope with any resource limits or environmental problems. If the oil runs out, there is plenty of coal. Rising energy prices will induce innovation in solar, wind, and nuclear power if that doesn't pan out. Cornucopians view technology, economic growth, and market forces as the saviors, not the villains.” (Samuelson & Nordhaus, 2010, p. 268).

One commonly used example of how humanity was saved from unsustainable development is the case of horse and car transportation in the big cities. According to Standage (2021), there were about 300 000 horses in the streets of London and more than 150 000 in New York City by the end of the 1890s. It seemed impossible to grow the cities further as transportation became quite difficult to manage due to the enormous waste the horses produced.

As Standage cited in his article (2021), a New York City newspaper mentioned in 1857 that “with the exception of a very few thoroughfares, all the streets are one mass of reeking, disgusting filth, which in some places is piled to such a height as to render them almost impassable to vehicles.” “Pollution, congestion and noise and also the horses’ foods demand problems was Impossible to solve for the human race back then.” Humanity was facing an unsustainable development at that time. In this case, the problem of unsustainable growth was, however, solved when in 1886 Carl Benz first applied for a patent for his “vehicle powered by a gas engine” - the automobile (Mercedes-Benz, n.d.). This evolution in history confirms what Samuelson’s and Nordhaus’ comment about economic growth being “a race between depletion and invention” (2010, p. 15).

In general, most economists stand somewhere between these two opinions. In general, we have to focus on “sustainable” economic growth and learn to live within the limitations of our scarce natural resources, or we will suffer dire and irreparable consequences.” (Samuelson, 2010, p. 267). Other terms used in this context are “inclusive” or “balanced” growth.

In line with this idea, there have been several conceptual and theoretical solutions proposed, such as a focus on

- “Balanced” (Mennillo et al., 2011), “inclusive” (The Scottish Government. (2022), “green” (OECD, 2011) “sustainable” growth instead of economic growth

- Proper pricing of natural resources
- Effective pricing of environmental damage
- Market regulations targeting environment
- New economic systems, such as circular or donut economy.
- New economic growth theories, such as Welfare economics (Encyclopaedia Britannica, 1998) or the Economy of Well-being (OECD, 2019)

Several projects underway, either in the context of corporate or national accounting, are trying to create a new category of assets that will properly capture natural resources and their value. However, as Samuelson and Nordhaus mentioned in their textbook, “Few would doubt that a healthy and clean environment has a high value, but placing reliable values on the environment, particularly on the nonmarket components, has proved a difficult business.” (Samuelson, 2010, p. 274).

It is a complex matter, and the institutions and groups trying to develop the natural assets class are working in a deep and complex network of multidisciplinary cooperation. Some of the organizations that are developing or pioneering nature as an asset class in their standards or activities on the corporate level are Verra or NYSE and Intrinsic Exchange Group (IEG). In this paper, however, we focus on the developments in this field from the perspective of national accounting (next chapter).

One of the proposed systems claiming that it is possible to achieve continuous economic growth and not destroy our planet is an economic system called the circular economy. It proposes to shift from the current linear model to the model that is regenerative by design (The Circular Economy in Detail, n.d.).

Even though this concept gained great momentum among researchers and the general public, unfortunately, it became so that it started to mean different things to different people. A research paper from 2017 discovered and studied 114 definitions of the circular economy in total (Kirchherr et al., 2017). There is also little evidence that a complete circular economy is possible. “An economy downsized to match the material input it can recycle would be a very slow economy” (Kovacic et al., 2019).

Another idea is a visual framework of sustainable development called the doughnut economy, which is the core of a complex doughnut economy system proposed by Kate Raworth. It focuses on meeting human needs within social and planetary boundaries as illustrated in Figure 3. (Raworth, n.d.).

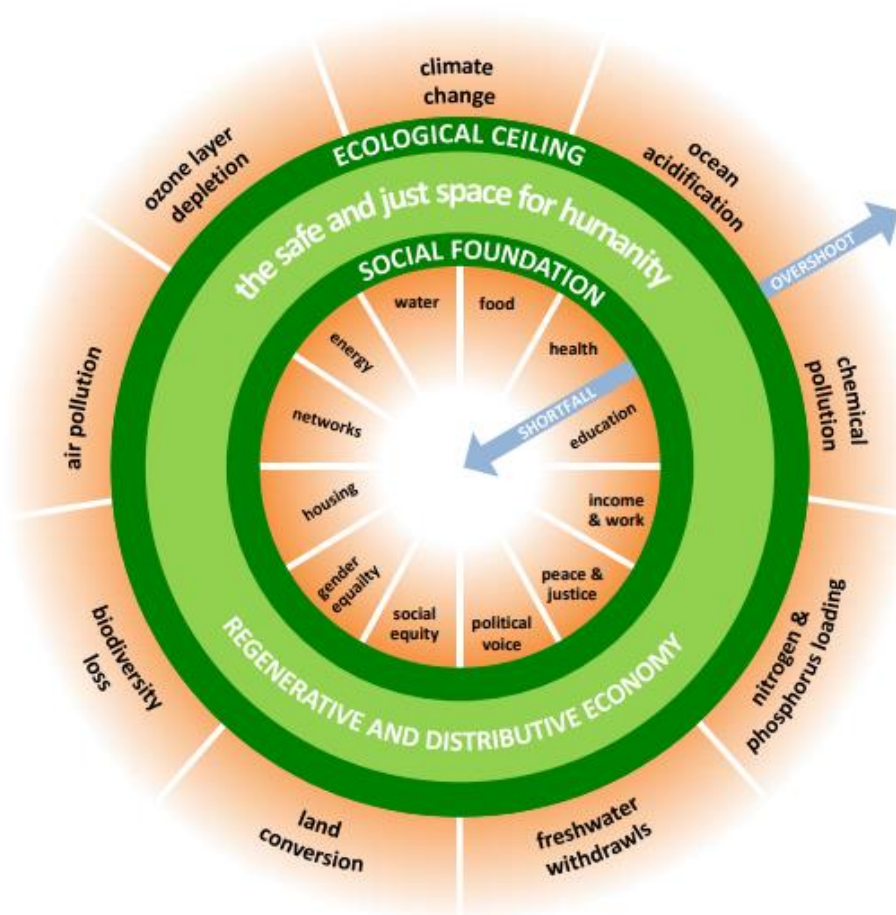


Figure 3. Doughnut economy framework

Source: Kate Raworth, n.d.

5. Analysis of the GDP position in the context of sustainable development

According to the above analysis, the world is starting to focus on a more complex measurement of development, sustainable development, instead of an exclusive focus on economic growth. What is the practical effect of such development? What does that all mean for the measurement of economic growth in practical terms? What would it mean for GDP and its future as a matrix of economic activity and growth? Samuelson (1995, p. 419) states that GDP and even GNP are not perfect measures of genuine economic welfare. It is also not constructed to reflect well-being and living standards, as it is often used for. The first warning regarding GDP not being able to measure the welfare of a country came already in 1959 when Economist Moses Abramovitz stated that “we must be highly skeptical of the view that long-term changes in the rate of growth of welfare can be gauged even roughly from changes in the rate of growth of output” (As cited in Payden & Rygel, 2012).

Also, the purpose of the System of National Accounts (SNA), from which GDP is derived, is clear, as stated by Paul McCarthy P. (2018): “The main purpose of the national accounts framework is to support a statistical approach to the measurement of economic activity by estimating the volume of value added that sums up to the GDP aggregate. SNA states that it is not intended as a framework for measuring welfare (cf. SNA2008 §1.1 and § 1.75), and it does not even need to mention that it is not fit for resource use and environmental sustainability analysis.”

The GDP as an economic growth measure is generally adopted and well-accepted due to its simplicity and objectivity. However, it also has several shortcomings when we assess it from the perspective of shifting toward sustainable development. We can look at the shortcomings from two perspectives, a methodological perspective, and a conceptual perspective.

The methodological shortcomings are as follows:

- Not reflecting the activities produced by the underground economy and unpaid work
- Not reflecting the value of leisure
- Not reflecting on how nature (ecosystem) is contributing to the economic activity

The conceptual shortcomings are as follows:

- Ignoring depletion of the environment
- Including activities that are damaging the environment
- Not reflecting other factors of societal development and well-being
- Includes activities that are not aligned with societal development (such as weapons' trading, war activities, crime activities boosting consumption of certain goods, etc.)
- Not reflecting the distribution of the income
- Not reflecting accurately new trends in the economic development, such as the value of social media

The connection of the GDP and the material footprint the world economics is producing is evident from the chart below, reflecting on the relative change in main global economic and environmental indicators from 1970 to 2018 (Figure 4.).

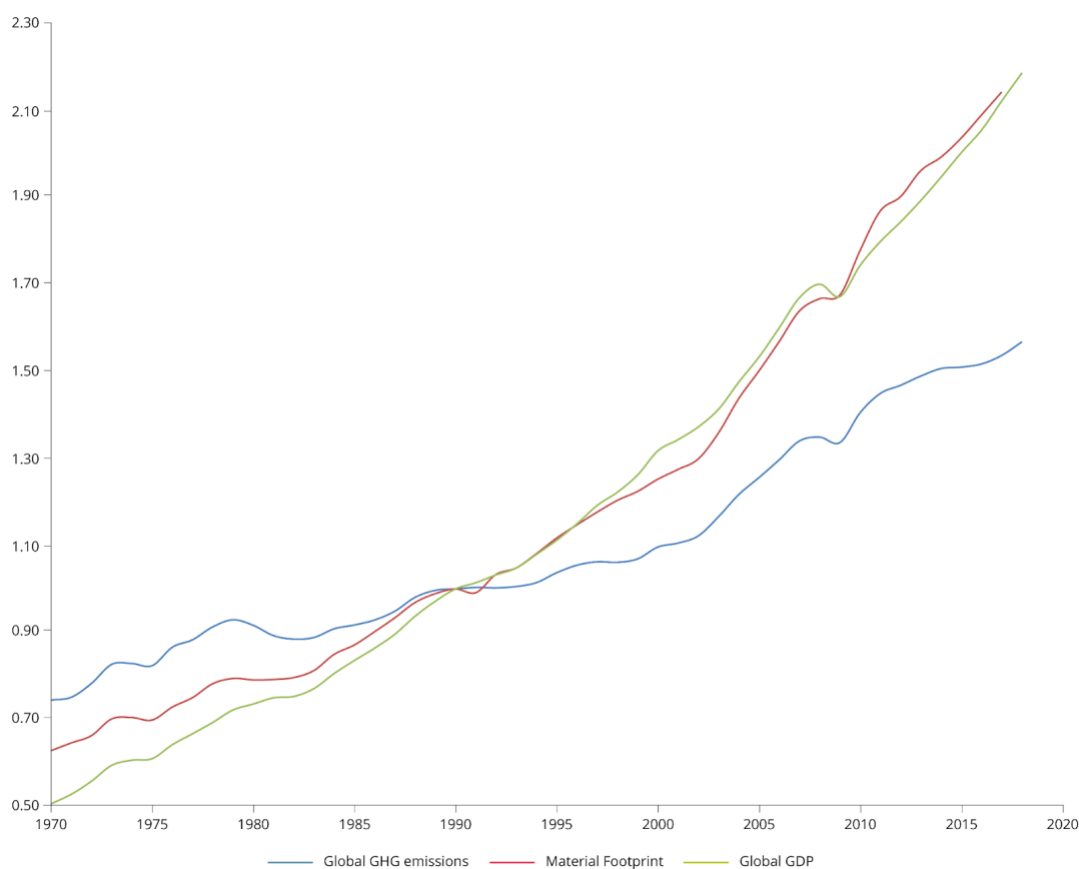


Figure 4. Global GDP and its relation with Material Footprint and Global GHG emissions

Source: European Environment Agency, 2021

Taking into account the above analysis of the transitioning of the economy from economic growth to more complex sustainable development, we can look at the future of the GDP in three ways:

- Keeping the GDP as it is (reinforcing the “technical enthusiasts” view).
- To completely stop to measure economic growth and focus on different ways to measure the development of society. In this case, GDP will become completely obsolete (following the views of decoupling the growth from the measurements of the development of the society).

- iii) We will still consider economic growth and want to measure it in the future. However, the measurement will also comprise the features of sustainable development. In this case, GDP would need to be either modified or supplemented with some other metrics (following the views to pursue “sustainable,” “inclusive,” or “balanced” growth).

6. Chronological developments in the initiatives to enhance GDP

From the above analysis, it is clear that there is a need to rethink the way we view the development of our society, heading from the exclusive focus on economic growth towards focusing on more complex sustainable development. Academics, researchers, national statistical institutions, and international organizations recognized the pressing need. They started to develop new measures that would reflect the new way of perceiving human development. Several concepts, measures, and indices were developed that aim to adjust, complement, or replace GDP (a graphical representation is included in Appendix).

As mentioned, GDP was developed in 1937 and established as a standard tool for measuring the country’s economy in 1944. In 1959, economists realized that GDP was not appropriate for measuring the country's welfare. However, it has been widely used (for example, the GDP per capita is commonly used as a measurement of living standards).

As Samuelson and Nordhaus mentioned in their earlier version of the Economics textbook (1995), in 1972, Nordhaus and Tobin discussed the criticism of the GDP as not meaningfully representing the national output. They mentioned two major issues with the GDP, such as that it excludes many components that contribute to individual well-being and includes components that do not contribute to well-being. Authors called the idea an experimental and primitive “measure of economic welfare” (MEW).

Samuelson and Nordhaus (1995) took the discussion further, and they proposed in 1980 an improved measure called “Net Economic Welfare” (NEW). This measure corrects the GDP as follows:

- Minus environmental damage
- Plus the underground economy
- Plus the value of leisure time

In 1989, “The Index of Sustainable Economic Welfare (ISEW) was proposed by Daly and Cobb. It provided a more down-to-earth representation of a society's well-being than GDP since its definition also involves variables that are not included in the conventional national accounts (such as social and environmental issues)” (Chelli et al., 2013).

In 1990, the “Human Development Index” (HDI) was developed by Pakistani economist Mahbub ul Haq to supplement GDP by the measure that reflects the contribution of social systems to development. This measure is used by the United Nations Development Program to measure a country’s development.

Also, in 1990, the concept of the ecological footprint was introduced. It measures the rate by which consumption generates waste (Nautiyal and Goel, 2021).

The discussion took a few years to settle, and in 1991 Bartelmus et al. (UN and Statistical Federal Office Germany) published their newly developed “SNA Satellite System for Integrated Environmental and Economic Accounting” (SEEA).” According to the authors, this system records “Environmental costs of economic activities, natural asset accounts and expenditures for environmental protection and enhancement,” and those “ are presented in flow accounts and balance sheets consistently, i.e., maintaining the accounting identities of SNA. Such accounting permits the definition and compilation of modified indicators of income and expenditure, product, capital and value-added, allowing for the depletion of natural resources, the degradation of environmental quality and social response to these effects.”

In 1993, the UN published its System of Environmental-Economic Accounting (SEEA) as an internationally agreed statistical standard. The work on this started in the 1980s as a response to the above-mentioned movement in economic thinking. This standard “integrates economic and environmental data to provide a more comprehensive and multipurpose view of the interrelationships between the economy and the environment and the stocks and changes in stocks of environmental assets, as they bring benefits to humanity.” (UN, n.d.).

After the release of the 1993 SEEA, several countries began experimenting with the accounts and green GDP, for example, the United States, China, Norway, Australia, Canada, Indonesia, and the UK. Yet, green GDP failed to catch on. (Schweinfest et al., n.d.)

According to the UN’s website, “The SEEA framework follows a similar accounting structure as the System of National Accounts (SNA). The framework uses concepts, definitions, and classifications consistent with the SNA to facilitate the integration of

environmental and economic statistics. The SEEA is a multi-purpose system that generates various statistics, accounts, and indicators with many potential analytical applications.” (UN, n.d.).

In their textbook of Economics, Samuelson and Nordhaus (1995) mentioned another initiative to improve the output measurements - Green Accounting. Already in 1994, the US introduced its plan to create so-called environmental accounts (sometimes called “green accounts”) that “will estimate the contribution of natural and environmental resources to the nation’s income” (Samuelson & Nordhaus, 1995, p. 418). J. Damrstadtler (2000) reflected that this was the most ambitious effort and a multiyear initiative to address GDP’s issues at the time.

According to Samuelson (1995), the first construction of environmental accounts did not reveal a lot of destruction, as the environmental accounts added up to 0.4-1.4% of the GDP. However, the Commerce Department was committed to working further on the approach, but it seemed to be an unwelcome activity by Congress and did not continue further. However, the academic efforts to find the solution to this issue continued further.

Also, in 1994, the proxy for sustainability, Genuine Savings, or Adjusted Net Savings, was introduced by Hamilton and Pearce in their publications (Hamilton and Clemens, 1998). The Adjusted Net Savings is a measurement of sustainable development, building on the concept of green national accounts. It reflects the realistic rate of savings in the economy, adjusted by investments in human capital, depletion of natural resources, and depletion of the environment.

In 1994 also, the development of the regional index of Sustainable Economic Welfare (R-ISEW) started, led by economists Nic Marks (The New Economics Foundation) and Professor Tim Jackson (University of Surrey).

In 1995 the “Gender Development Index” (GDI) and the “Gender Empowerment Measure (GEM) were introduced by the UN to complement the GDP measure in terms of measuring inequality and social aspects (UN Academy, 2022).

Also in 1995, The “Genuine Progress Indicator” (GPI) was designed “by economists in the United States...as an alternative measure of economic progress to replace or to supplement the gross domestic product (GDP) with a more genuine measure of economic well-being” (Anielski, 2014).

In 1997, Weitzman and Lofgren published what they called “the most inclusive possible measure of net national product, including net investments not just in traditional “produced means of production” like equipment and structures, but also in human capital, pools of natural resources, and environmental assets more generally}all evaluated at their respective efficiency prices,” (1997, p.139) or green net national product “Green NNP.”

The same year, Costanza et al. (1997) claimed, “The services of ecological systems and the natural capital stocks that produce them are critical to the functioning of the Earth’s life-support system. They contribute to human welfare, both directly and indirectly, and therefore represent part of the total economic value of the planet”. Based on this fact, the paper provides the first estimate of the current economic value of the ecosystem to be at least US\$33 trillion dollars worth of services annually at that time.

In 2002, the “Environmental Performance Index” (EPI) was developed by Yale University, and it is regarded as an “all-inclusive proxy to examine the country’s environmental conditions” (Raza et al., 2021).

In 2003, the UN released an updated version of SEEA - Handbook of National Accounting: Integrated Environmental and Economic Accounting 2003 (SEEA 2003).

In 2004, China started to pilot the new “Green GDP,” adjusting the conventional GDP for the costs of environmental damage. However, these efforts did not continue, facing several issues, such as low implementation and a lack of unified calculation methodology (Ye, 2021).

In 2005, the “Environmental Sustainability Index (ESI) ” was developed to measure overall progress toward environmental sustainability. It was based on NASA data and calculated for 146 countries (Sedac, n.d.).

In 2006, “The Happy Planet Index” was created by New Economics Foundation. It reflects the fact that people can live happy lives without depleting the resources for future generations (NEF, 2006). .

In 2007, the UN started to work on the enhancement of the SEEA and produced the SEEA 2012 Central Framework, which was adopted as the initial version of the international standard for environmental-economic accounts in 2012. During this

developmental phase, several issues were pointed out related to the value of the Ecosystem not being accurately reflected in the standards. Therefore, in 2012 an Experimental Ecosystem Accounting (SEEA 2012 EEA) to complement the SEEA Central Framework was issued.

In 2015, China restarted its efforts in compiling a greener measurement of development. It used the “Gross Ecosystem Product,” or GEP (Ye, 2021), to create a comprehensive structure for measuring sustainable development. This system (Figure 5.) includes the GEP as a measure of the ecosystem’s contribution to human well-being, GDP as a measure of economic activity, and the Human Development Index (HDI) as a measure of social development. GEP is the “aggregated value of final ecosystem goods and services supplied annually to people in a given region, such as a country, a province, or a county.” Ouyang, 2020

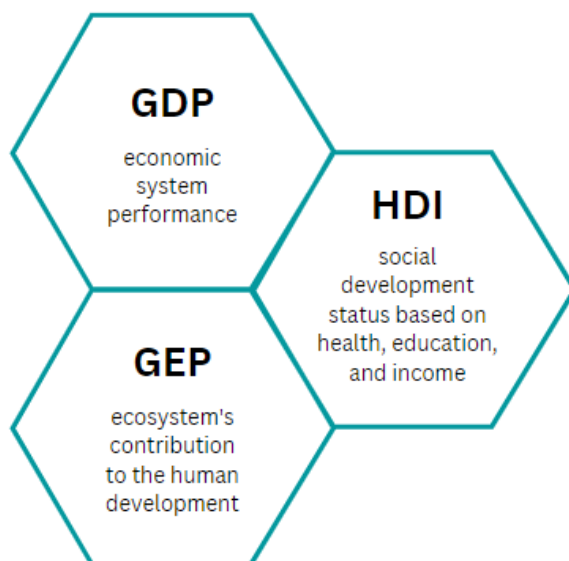


Figure 5. Comprehensive system of measuring sustainable development

Source: adapted from Ouyang, 2020

According to Ye (2021), China is progressively heading in the right direction, as “Not only did China’s most recent five-year plan, published in March, omit the usual annual average GDP growth target, but local governments are also experimenting with a new, greener measurement of development called “gross ecosystem product,” or GEP” (Ye, 2021)

In 2017, a document with Technical Recommendations was issued further to support the experimental statistical guidelines on ecosystem accounting (SEEA EEA 2012). Also, in 2017, the UN decided that the revision of the SEEA EEA 2012 was needed. The revision process lasted until 2021, when the new version of the accounting standards was submitted. The same year, the UN Statistical Commission elevated the SEEA EA to become an international statistical guideline (the first part containing the statistical guidelines).

Also in 2017, “The Ease of Living Index” (EoLI) was developed in India. EoLI “aims to evaluate the quality of life and the impact of various initiatives for urban development. It provides a comprehensive understanding of participating cities across India based on the city’s quality of life, economic ability, and its sustainability and resilience.” (EOL, 2022).

In 2018 an official revision of the SEEA EA was launched, resulting in its adoption in 2021. According to the 2022 Global Assessment Report, already 92 countries have implemented the SEEA.

In 2020, the “Gross Ecosystem Product” or GEP measure was published by Ouyang et al. (2020), is “an index, modeled after Gross Domestic Product (GDP) that provides a clear signal of the value of nature’s contribution to human wellbeing” (Stanford, 2022). This index was created and piloted in China and adopted by the UN as part of the UN SEEA system of ecosystem accounting (SEEA EEA).

In 2021, China's city of Shenzhen claimed "it had established the country's first complete account system for GEP, after six years of pilot work and investigation" (Ye, 2021).

On top of the mentioned initiatives, several regional attempts had enriched the measurement of their development, tailored to the specific localized needs. Examples of such initiatives were

- Regional Quality of Development Index (QUARS) — Sbilanciamoci!, Italy
- Better life index (EU)
- Social progress index (EU)
- National Accounting Matrix including Environmental Accounts (NAMEA) - Netherland
- German Environmental-Economic Accounting (GEEA)

4. Conclusions

Gross Domestic Product (GDP) has been globally accepted and adopted measure economic activity and growth. GDP per capita also became a universal measurement of the quality of life. However, more than 60 years ago, the discussion arose on whether the focus on economic growth could lead to a sustainable development of our society. At first, the concerns about the methodological issues, such as the omission of important components and inclusion of components that are less than optimal, started to arise. Later on, also valued as the ecosystem assets and importance of natural social capital for the economic and sustainable growth highlighted by economists.

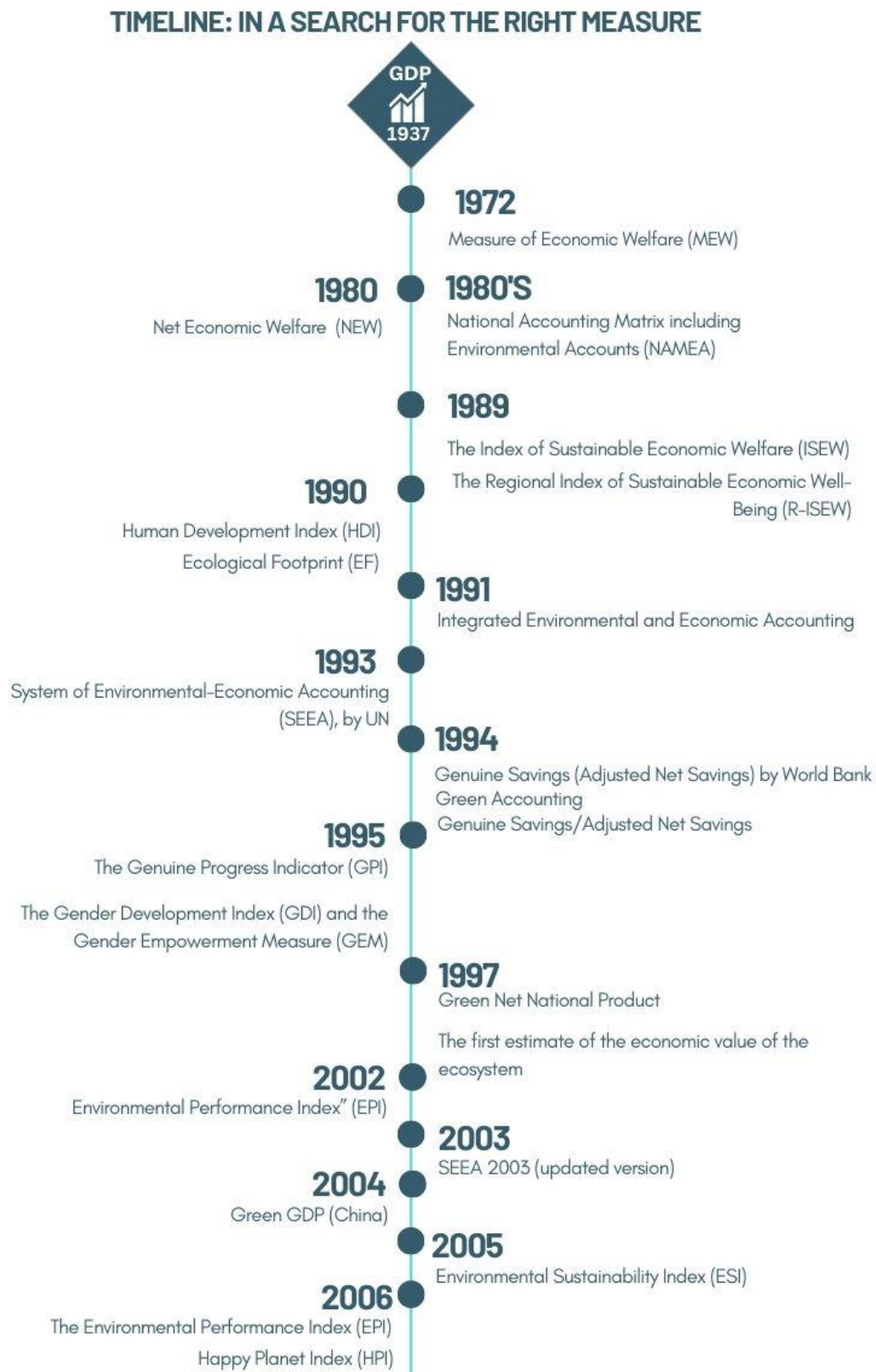
In response to the limitations of the GDP, several economic metrics have been developed to convey economic performance that reflects and supports sustainable development. This paper provides a chronological overview of such concepts, from the oldest Measure of Economic Welfare (MEW) to the newest Gross Ecosystem Product (GEP). Generally, these metrics could be divided into three categories; 1) adjusting GDP, 2) replacing GDP, and 3) supplementing GDP. It is obvious that as our knowledge and technology are improving, the measures are developing from a simplistic deduction and addition of certain activities from the GDP (or GNP) to more sophisticated methods using complex modeling systems to summarize the value of ecosystem services.

However, if any of these new measures should be successful, it would need to match the main virtues of GDP, such as its simplicity, objectivity, and universality. On the other hand, some economists argue that the GDP could continue to be an effective measurement of economic growth even without any adjustments in the future.

Our paper also serves as a guide for future research, providing an extensive overview and resources to start with. As a recommendation derived from this study, further analysis of the practical initiatives needs to take place to evaluate any possible gaps that those proposed systems and methodologies still might have. However, in 2023, we can say that we are fully armed to create a meaningful and generally accepted way of measuring human development accurately. This should be done very shortly, with the help of the knowledge and practical experiences we have already accumulated and with the help of the new supportive technology.

Appendix

Timeline: In search for the “right” measure





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Analysis of the financial distress of companies in the agricultural sector of the Republic of Serbia in the conditions of the COVID-19 crisis and bankruptcy prediction

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Abstract

Bankruptcy prediction is a relevant topic, which affects the economic well-being of all countries. Applying an accurate firm default prediction model, which can pick up on time the signs of financial distress, is vital for all firms. The aim of the paper is to evaluate the financial distress of agricultural companies in the Republic of Serbia in the period from 2016 to 2023, where financial distress means their performance in the field of profitability and the risk of bankruptcy. Financial reports for the analysed 17 agricultural companies are publicly available for the period ending in 2020, and for the period from 2021 to 2023, the risk of bankruptcy was predicted using the Gray GM (1,1) model.

Keywords: agriculture, COVID-19 crisis, analysis, financial distress

1. Introduction

Agricultural enterprises in the Republic of Serbia in the analysis period from 2016 to 2020 were exposed to two environmental disasters, where the first one affected the crops and occurred in 2017, which was an extremely dry year. The second crisis hit human capital and working conditions in 2020, when the COVID-19 crisis appeared in the Republic of Serbia and lockdown and other governmental measures were implemented to suppress the impact of this crisis. These two years of crisis in the analysed period are a good indicator of the applicability of different scoring models for assessing the risk of bankruptcy in general business conditions, where it is not possible to perform this type of validation.

In recent decades, predicting corporate bankruptcy has become a major concern for various stakeholders. If we add to that the fact that financially sustainable operations are influenced by numerous very complex factors, both internal and external, the situation becomes even more complex for profit-oriented organizations (Srebro et al., 2021). Many bankruptcy prediction models have been published so far, and most overlooked manufacturing companies. As pointed out by Karas et al. (2017), according to several studies, these models are unsuitable for other industries, as such application would be associated with significantly less accuracy than could be expected. Various authors applied bankruptcy testing models for agricultural enterprises (Kiaupaite-Grushniene, 2016; Rajin et al., 2016; Ogachi et al., 2020; Vavrek et al., 2021; Srebro et al., 2021; Milić et al., 2021; Ilmiyono & Bon, 2021; Kolodii et al., 2022 and many other).

Since ancient times, accounting has been an effective tool for proving financial operations and showing business results over a certain period (El-Toby et al., 2020). Financial reports are the final product of the accounting information system. Based on information from financial reports, it is possible to evaluate financial performance and apply different bankruptcy prediction models.

The paper is organized in the following way. The first chapter deals with the consideration of the impact of the COVID-19 pandemic on the environment. The next chapter refers to the presentation of data and methods used in the evaluation of bankruptcy risk. The fourth part includes the results of research and discussions, after which concluding considerations are given.

2. The impact of the COVID-19 pandemic on the environment

The novel coronavirus disease 2019 (COVID-19) pandemic has posed a significant threat to the global health system worldwide. As stated by the United Nations' report, "although the COVID-19 crisis is, in the first instance, a physical health crisis, it has the seeds of a major mental health crisis as well, if action is not taken" (United Nations 2020). Since its outbreak, coronavirus disease 2019 (COVID-19) has spread rapidly around the world (Vall-Roqué et al., 2021). On March 15, 2020, the Government of Serbia declared a state of emergency, implementing measures to combat the pandemic (Vujčić et al., 2019). Due to the consequences of the pandemic, there are concerns about financial sustainability, especially for highly indebted countries.

COVID-19 not only affected people but also initiated the cessation of trade, business and economic activities (Debata et al., 2019). The COVID-19 pandemic affected the operations of companies from all sectors (Temelkov, 2022), including the agricultural sector (Stanišić et al., 2022). Health disasters (infectious and non-infectious diseases), in addition to having a global impact on health, at the same time cause widespread socioeconomic disruptions and losses (Ahmad et al., 2020). Coherent and coordinated responses by global policymakers are needed to limit the economic consequences (Gupta et al., 2020).

"A lot of people are really afraid to be free" (Buchanan, 2005, p. 23). Thus, especially when they are frightened, they voluntarily transfer the decision-making authority about the choice of themselves and their fellow citizens to the state. This shift in public opinion led to a massive expansion of government regulation into economic and other types of interaction (Boettke & Powell, 2021). The COVID-19 pandemic represents an unprecedented disruption to the global economy, as production and consumption decline (Debata et al., 2020). Sectors like tourism, hospitality, aviation, textiles, agriculture, construction and start-up businesses that mainly contribute to the economy and create jobs, measure losses in millions during the pandemic (Seetharaman, 2020). The agricultural sector has also been affected by COVID-19. Namely, on the one hand, there was an escalation of demand for wheat, vegetables and other crops during the pandemic, and on the other hand, it was not possible to distribute agricultural products to consumers due to problems in the supply chain (Deabata et al., 2020). The Food and Agriculture Organization (FAO, 2020) states that COVID-2019 affects agriculture in two segments: supply and demand for food. The COVID-19 pandemic has placed enormous pressure on food supply chains (Kerr, 2020).

3. Material and methods

In order to perform an evaluation of the risk of bankruptcy, i.e., in order to choose an adequate model for this evaluation, the following were tested: Altman's EM Z"-Score model, Springate and Taffler model in relation to their ability to discriminate companies in the sample into groups with a lower and higher degree of bankruptcy risk for a sample of 17 agricultural companies in the Republic of Serbia. Altman's and Taffler's model classify companies into three groups depending on the estimated risk of bankruptcy of these companies, where the least vulnerable companies are marked under group 1 in the paper, while the most vulnerable companies are marked under number 3. The Springate model is adapted so that the group of vulnerable companies is divided into 2 subzones. Companies in the third group for all three models are marked under "distressed" companies, while companies in the first and second risk groups are marked under less-distressed companies (LD).

The analysis of the model is derived from the angle of analysing the profitability of companies in these two groups of companies and the angle of sensitivity of the model to registering the different impacts of the crisis on these two groups. In the profitability analysis, 4 indicators were used: operating profit rate (OPR), net profit rate (NPR), ROA, and ROE. The assumption of the research is that a scoring model is better if it better differentiates companies in terms of their profitability and susceptibility to a crisis, where it is understood that more vulnerable companies will feel a greater degrading impact of the crisis, than when it comes to less vulnerable companies in the context of bankruptcy.

4. Results and discussion

a) Analysis of the risk of bankruptcy of agricultural enterprises in the period 2016-2020

According to the Altman's model, from 2016 to 2020 there is a negative trend of increasing the number of endangered companies (companies from the red zone - cluster 3), while the number of endangered companies decreases to 3 in 2020. The average Z"-Score in the LD group increases in the analysed period, except in 2017, which was a year of drought, while in the group of distressed companies, it grows until 2019, which is a negative year for this group of companies. **Therefore, if we look at the average values of the Altman score in the group of distressed companies according to this model, the year of great drought in 2017 had no impact on the group of distressed companies**, where this value increased, while a smaller negative impact is present in the group of LD companies. The impact of the crisis in 2017 can only be registered through the analysis of profitability indicators, where all 4 analysed indicators in the LD group of companies decreased this year compared to the previous one, while in the D group, the ROE indicator had a higher value in 2017. In the D group in 2017, greater negative changes were present when it comes to the OPR and ROA indicators, while the NPR indicator was more affected in the case of LD companies. In 2020, according to Altman's model, in both groups, despite the presence of the COVID-19 crisis, the average Z"-Score is

increasing. From the analysis in 2019 and 2020, company number 14 was excluded, with an extremely pronounced drop in Z"-Score in 2019.

Table 1. Scoring model for period 2016-2020

Scoring model:		Altman					Springate					Taffler				
Year		2016	2017	2018	2019	2020	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
AS		9.1	8.6	9.8	9.3	10	0.48	0.10	0.09	0.07	-2.97	12.3	3.97	16.5	6.1	-1.7
-tr		/	1	0	2	0	/	4	0	2	0	/	4	2	1	0
+tr		/	0	0	0	1	/	0	1	1	2	/	1	0	3	3
No-D		1	2	2	4	3	2	6	5	6	4	4	7	9	7	4
AS	LD	9.5	9.4	10.8	10.8	0.6	0.6	0.5	0.5	0.4	0.5	18.5	15.1	50.9	19.4	15.9
	D	2.00	2.81	2.82	2.76	-0.2	-0.2	-0.6	-0.9	-0.5	-14.1	-7.9	-13.6	-14.1	-13.0	-58.7
ANe	LD	60	59	61	65	61	61	76	70	74	62	60	74	76	50	59
	D	19	44	44	32	33	33	24	31	22	22	44	35	40	62	31
%Δ Ne	LD	/	-1%	1%	-5%	-5%	/	-1%	0	-2%	-5%	/	-1%	-3%	1%	-1%
	D	/	5%	15%	-25%	-5%	/	-21%	+8%	-23%	-2%	/	9%	0%	-1%	-5%
OPR	D		-					-	-	-		-	-	-	-	-
	LD	0.349	1.103	0.158	0.174	0.033	0.349	0.116	0.844	0.342	0.388	0.125	0.535	0.190	0.007	0.024
NPR	D		-					-	-	-		-	-	-	-	-
	LD	0.065	0.269	0.071	0.214	8.361	-0.15	0.149	0.654	0.258	0.332	0.039	0.300	0.142	0.068	8.396
ROA	D		-					-	-	-		-	-	-	-	-
	LD	0.110	0.003	0.047	0.024	0.012	0.05	0.047	0.047	0.025	0.022	0.048	0.028	0.011	0.01	0.006
ROE	D		-					-	-	-		-	-	-	-	-
	LD	0.007	0.006	0.009	0.000	0.029	0.008	0.008	0.018	0.012	0.023	0.002	0.012	0.014	0.005	0.031
ROE	D	-0.05	-0.01	0.07	0.05	-0.56	-0.06	-0.06	-0.07	-0.03	0.00	0.01	-0.04	-0.01	0.00	-0.57
	LD	0.15	-0.01	0.00	0.00	0.02	0.16	0.16	0.03	0.02	0.02	0.17	0.01	0.03	0.02	0.02

Source: Publication of author

-tr: nr of negative transitions from to 3, + tr: nr of positive transitions out of the cluster 3, No-D-number of Distressed companies, AS – average score, D- distressed companies, LD- less distressed companies, ANe-average number of employees, %Δ Ne - percentual change of number of employees in a year

When considering the relationship between the number of employees and the distress of the company, the number of employees at company 9, which has a disproportionately high number of employees and high reductions in the number of employees in the analysed period, was excluded (from 2016, respectively: 407, 379, 362, 192, 188). According to Altman's model, as shown in the table above, companies with fewer employees were more at risk in the period 2016-2020. In the D group, greater changes occurred in the relative number of employees in 2018 and 2019 (+15% and -25% respectively), while in 2020 both D and LD companies reduce the number of employees). In both groups in the period 2016-2020, there is a high correlation between the percentage change in the number of employees and the number of endangered companies in the same year, with this negative relationship being stronger in the case of D companies (correl: -0.97) than in LD companies (correl: -0.89). Therefore, the more companies reduced the number of employees in a given year, the higher the number of endangered companies was, and vice versa. A strong positive relationship was identified in group D, where reductions in the number of employees in the previous year compared to the year of analysis influenced the decline in the number of vulnerable companies in the year of analysis (correl: +0.82). **Therefore, the more distress company was facing it reduced in a higher extent the number of employees, in a given year, while reductions in the number of employees in the group of companies at risk had a positive effect on the number of companies at risk in year t+1. Due to the extremely high reduction in the number of employees in the D group in 2019, the impact of the COVID-19 crisis on the risk of bankruptcy in this group in 2020, according to Altman's model, remained unnoticed.**

At the same time, the OPR indicator is strongly positively correlated with the percentage change in the number of employees in the previous year for both LD (+0.95) and D group (+0.93), while NPR, ROA and ROE indicators are positively correlated with

this change for D group (0.97, 0.58 and 0.96, respectively) and negatively correlated in the LD group (-0.86, -0.84 and -0.94). Therefore, in the case of endangered companies, the reduction in the number of employees in the previous year positively affects their risk of bankruptcy in the following year, but negatively affects the profitability indicators in the following year, while in the case of the LD group, this reduction positively affects the NPR, ROA and ROE indicators while negatively affecting the OPR.

The analysis of average profitability indicators by year showed that the COVID-19 crisis had a greater negative impact on the D group of companies, where 3 out of 4 indicators decline in 2020, while in the case of the LD group, only the OPR indicator declines in 2020, which supports the conclusion that is the impact of the COVID-19 crisis on the risk of bankruptcy in 2020 in the D group reduced through the reduction in the number of employees in 2019, although the profitability of these companies declined in 2020. It is worth mentioning that D companies had higher profitability indicator values in 2018 and 2019 in relation to LD companies, while in 2020 they had lower values of these indicators compared to LD companies, where the indicator of the rate of net profit fell in particular, with a drop of as much as 39 times compared to 2019. The conclusion that the reduction of the number of employees in 2019 has cancelled the negative effect of the COVID-19 crisis, although the negative changes in profitability in 2020 were still visible in the year for those companies. Second, Altman's EM Z"-Score model, with its original discrimination zones, does not adequately describe the relationship of groups of companies in bankruptcy risk zones to profitability, until sudden crisis conditions occur, as was the case in 2020 and 2017. Third, the original EM Z"-Score model does not provide insight into the impact of the crisis on the risk of bankruptcy in previously threatened companies, because in this model, the effects of the reduction in the number of employees in the previous year can compensate for the negative effects of the crisis in the context of the bankruptcy risk indicator.

The Springate model, applied in the original version according to which vulnerable companies have a Springate score value lower than 0.862, was also shown in previous studies to be too rigorous for the Serbian market (Matejić et al., 2022) and for a set of companies from the sample, it showed that in 2016 there were 15 companies at risk, in 2017 all companies were at risk, in 2018 only 1 company was not at risk, while in 2019 and 2020 all 17 companies were at risk. As a result, we adapted this model for application in the conditions of the Serbian market, so we introduced an intermediate zone where companies with a Springate score value of 0 to 0.862 are present. The Springate model, formulated in this way, identified a significant negative impact of the COVID-19 crisis in 2020 on two companies from the group of endangered companies (6 and 14), while in the case of 4 companies this score was increased in 2020, in such a way that two companies (7 and 15) moved to the LD group, while even in 9 out of 12 LD companies this score increased in 2020. So, although in 2020 the average Springate score of the entire sample dropped significantly to a negative value of -2.97, due to the strong influence of company no. 14 (-55 Score in 2020), the number of vulnerable firms has decreased.

According to this model, smaller companies than in Altman's model were more exposed to the risk of bankruptcy, while in this case also a large reduction in the number of employees in the D group was recorded in 2019 (23%) where these companies significantly reduced the number of employees and also in the negative 2017 (21%). In this model, reductions in the number of employees were to a lesser extent correlated with the number of endangered enterprises in the same year (LD: -0.45, D: -0.45), while the correlation between the percentage change in the number of employees in the previous year and the number of endangered enterprises in the year of analysis was the same as in Altman's model and amounted to: +0.82. This relationship was stronger for LD companies (correl: +0.53) than for the Altman model (+0.31). Therefore, with this model, similar conclusions can be drawn as with Altman's model regarding the change in the number of employees in the previous year and the number of endangered companies in the year of analysis.

Unlike Altman's model, in which the D group in certain years has higher average profitability indicators for a given sample, vulnerable and less vulnerable firms obtained by dividing the Springate scores depending on whether they receive a positive or negative value, provided a clearer relationship between these two classes of companies in terms of their profitability. Thus, distressed companies only in the case of the OPR indicator in 2016 had a higher value of any profitability indicator than the group of LD companies and were significantly affected in terms of the value of the profitability indicator in the case of 2020, which was not the case with the LD group, where only the average OPR and the NPR indicators lost their value, while the ROA and ROE indicators kept their value from 2019. **Therefore, we can conclude that the Springate model, with a discrimination value for separating groups of less and more endangered companies than 0, is more suitable for application to a set of agricultural companies in the Republic of Serbia, rather than Altman's EM model.**

In terms of the ratio of changes in the number of employees in the previous year and profitability indicators, these dependencies were weaker in the case of the Springate model, whereas they were somewhat stronger in the case of the LD group in terms of ROE (correl: -0.988) and OPR (+0.879) indicators, while they were weaker for the same group at: ROA (-0.57), NPR (0.63) and in D group of companies (OPR: -0.69, NPR:0.54, ROA: -0.12, ROE:0.58).

According to the **Taffler** model, in which the scores are subject to greater oscillations, the average scores of the sample dropped significantly in the dry 2017, especially for the group of distressed companies, for which the negative average Taffler score increased 1.7 times this year compared to 2016, while in the case of LD companies the positive value of the score decreased by about 19%. The model also registered a strong impact of the COVID-19 crisis on both groups of companies, with the fact that this impact was much stronger in the case of distressed companies, where the average value of this negative score from 2019 was increased by 4.5 times, while in the case of LD companies, the positive value of this the score decreased by about 18% in 2020. In

2020, in the group of endangered companies, three companies achieved a large growth in Taffler's indicator (9, 11 and 12), while for the remaining 4 companies, this score decreased significantly.

When it comes to the number of employees, in this model there is no greater differentiation in the sizes of companies in the D and LD groups, where even in 2019 distressed companies had an average number of employees more than LD companies. In contrast to the first two models, the fluctuations in the number of employees in the D group in the analysed period were smaller and reached a maximum of 9%. Considering the weaker differentiation in terms of the number of employees, a statistically significant correlation was recorded only between the percentage change in the number of employees in the group of LD companies in the previous year and the number of endangered companies in the following year (correl: +0.925), where the increase in the number of employees in the LD group affected an increase in the number of endangered companies in the following year.

When it comes to profitability indicators in Taffler's model, there is greater differentiation in these indicators in groups D and LD than in Altman's model, but less than in the case of the Springate model, where in all years and all indicators LD companies had better performance than D companies. The previously mentioned is also the case with Taffler's model, except in the case of the ROA indicator in 2016 and 2019 and the OPR indicator in 2019. As in the case of the crisis in 2017, the crisis in 2020 hit significantly harder the D group of companies in the NPR indicator and ROE indicator, while the crises both in 2017 and 2020 hit LD companies to a greater extent than D companies in the ROA indicator. These two crises differed in their impact on these two groups of companies in the domain of the OPR indicator, where the first crisis hit distressed companies to a greater extent (rate of change of -5.28 in the D group compared to -1.05 in the LD group, where the rate of change calculated as a quotient between the change of the indicator in the current year in relation to the value of the indicator in the previous year) while the COVID-19 crisis hit less vulnerable companies according to the Taffler model to a greater extent (change rate of -10.5 for LD companies compared to 2.5 for D companies). The crisis had the strongest impact on the NPR indicator at company D, where the rate of change was as high as 122.7, which points to a much stronger crisis in 2020 than in 2017, when this value was 6.7.

In general, the profitability indicators of the two groups of companies differentiated by the application of the Taffler model were highly correlated with the same indicators of the groups determined by the application of the Altman model (average correlation coefficient of all indicators for the two groups: +0.92), while the correlation with the indicators for Springate is low (only 0.37). Similarly, for the two Springate groups, these indicators have a low correlation with Altman's indicators (0.43).

In order to further analyse the relationship between the previous 3 models according to the company's profitability indicators, we performed clustering for each of the 4 profitability indicators, so that for each of the companies, the values of the given indicator were used in the period from 2016 to 2020. In this way, for each of the indicator's profitability of the company clustered depending on the development course of each indicator. The companies are clustered into 5 groups using the K-Means clustering, method: iterate and classify with a maximum of 10 iterations where the groups are numbered 1-5, where group 1 indicates the best group, while group 5 the worst group in relation to the given indicator. With the OPR and NPR indicators, it was not possible to distinguish sufficiently different groups of larger sizes, and these groups included 1, 13, 1, 1, 1 members respectively for the OPR indicator and 12, 2, 1, 1, 1 for the NPR indicator. With the ROA indicator, 1 company had the best results, followed by groups of 5, 2, 1 and 8 members, respectively, while with the indicator for this order, the number of members was: 1, 10, 4, 1, 1.

In the next step, another cycle of clustering was performed, where companies were clustered in 1 of 3 clusters using K-Means clustering, depending on their clusters for 4 profitability indicators, and the Integral Cluster (IC) was performed. Within this cluster, in the best group, i.e., group 1, there were 2 companies, in the second group there were 12 companies, and in the worst group, there were 3 companies. The clustering results along with the groups of firms for the three bankruptcy risk assessment models for each of the 17 firms are shown in the table below.

Table 2. Bankruptcy Risk Groups and Profitability Clusters (PC)

R.br	CP					Altman						Springate						Taffler						
	SPD	SNP	ROA	ROE	IC	2016	2017	2018	2019	2020	AVG	2016	2017	2018	2019	2020	AVG	2016	2017	2018	2019	2020	AVG	
1	3	3	5	4	3	1	1	1	1	1	1	2	3	3	3	3	2.8	1	3	3	3	3	1	2.2
2	2	2	3	3	2	2	2	2	3	3	2.4	3	3	3	3	3	3	3	3	3	3	3	3	3
3	2	1	1	2	1	1	1	1	1	1	1	1	2	2	2	2	1.8	1	3	3	2	1	2	
4	2	1	2	2	2	2	3	3	3	3	2.8	2	2	2	2	2	2	3	3	3	3	3	3	
5	2	1	2	2	2	2	2	2	1	1	1.6	2	2	2	2	2	2	1	1	3	1	1	1.4	
6	1	1	1	1	1	3	3	3	3	2	2.8	3	3	3	3	3	3	3	3	3	3	3	3	
7	4	4	3	3	3	1	1	1	1	1	1	2	3	2	3	2	2.4	1	1	1	1	1	1	
8	2	1	2	2	2	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	
9	2	1	2	2	2	2	2	2	2	1	1.8	2	2	2	2	1	1.8	3	1	3	3	1	2.2	
10	2	1	3	2	2	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	
11	2	1	3	3	2	1	1	1	1	1	1	2	3	3	2	2	2.4	1	3	3	3	1	2.2	
12	2	1	2	2	2	1	1	1	2	1	1.2	2	2	2	2	2	2	1	1	1	3	1	1.4	
13	2	1	2	2	2	1	1	1	1	2	1.2	2	2	2	2	2	2	1	1	1	1	1	1	
14	5	5	4	5	3	1	2	1	3	3	2	1	3	3	3	3	2.6	1	3	3	1	3	2.2	
15	2	2	3	3	2	1	1	1	1	1	1	2	2	1	3	2	2	1	1	1	1	1	1	
16	2	1	2	2	2	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	
17	2	1	2	2	2	1	1	3	3	3	2.2	2	2	2	2	2	2	1	1	1	1	1	1	

Source: Publication of author

For each of the scoring models and each company, the average value of the risk group for the period 2016-2020 was calculated and the difference in value was found in relation to the IC value. For each of the models, the sum of the absolute values of the differences of the firms was then found, and it was determined that this sum is 8.6 for the Altman model, 9.6 for the Taffler model, and 4.8 for the adjusted Springate model. In the Springate model, there was a significant difference between the bankruptcy risk group and the IC value of the company numbered 6, which was classified in the best group in terms of profitability indicators, while according to this model, as well as according to the Altman and Taffler models, it was classified in the group of the highest bankruptcy risk. Overall, we conclude that the adapted Springate model gives the best results in the context of differentiating the companies from the sample not only in terms of their bankruptcy risk, but also in terms of their profitability indicators and in the context of the response of these two classes of companies to the crisis conditions, where the last two factors, i.e. profitability and the response of the company are also significant in terms of their resilience to bankruptcy.

b) Prediction of bankruptcy risk in the period 2021-2023

In order to predict the risk of bankruptcy, a customized Springate model was used, where the values of the Springate scores in the period 2016-2020 were used to predict these scores in the period 2021-2023 using the GM (1,1), Grey model. The reasons for applying this model stem from its suitability for the analysed problem, i.e. the simplicity of the modeling process, where GM (1,1) has only one dependent variable but no independent variables (Ding et al., 2018, Liu et al., 2016) for this model small amount of data needed and is suitable for application in conditions of uncertain and volatile exogenous and endogenous factors (Ma et al., 2019). The Grey theory holds that the development and evolution of a system are influenced by many uncertain external environments and internal factors (Zeng et al., 2018) and that under such circumstances, it is difficult to establish a definite functional relationship between dependent variables and independent variables.

According to the results of the Grey prediction, within the sample of 17 firms in the period 2021-2023, 5 firms will be significantly threatened by the occurrence of bankruptcy, 9 firms will be close to bankruptcy, while 3 firms should be safe in terms of the risk of bankruptcy, which speaks of the degree of vulnerability of this sector in the current period. Even for 7 out of 9 companies in the second group, the Springate score is estimated to be declining in the forecast period, and they are also approaching the most vulnerable group. In the case of the most threatened companies, the IC for profitability in the period up to 2020 is 2 or 3, while, as mentioned, company 6 was ranked among the best companies in this period when it comes to profitability. When it comes to the 3 least threatened companies, two had an IC indicator value of 2 for the period up to 2020, while one was classified in the best group.

In addition to the Grey model, the Exponential smoothing model (AAN, additive error, additive trend, no seasonality, Confidence Level 95%) was used for the purposes of predicting Springate scores in the same period. This model had a more negative forecast than the Grey model and assessed that 8 companies in the current period will be very strongly exposed to the risk of bankruptcy, adding the companies under ordinal numbers 4, 7 and 15 to this group, which were classified in the second group in the Grey model, while the company under ordinal number 13 was classified as the riskiest group in 2023. On the one hand, the company under ordinal number 11 had higher prospects according to the ESM model compared to the Grey model. On the other hand, there are discrepancies between these two models and for the company under number 16, where the Grey model classified this company in the least vulnerable group, while the ESP model classified it in group 2 and under number 9, where the situation

was reversed. The ESP model classified 7 companies in the group of medium-risk companies and only 2 companies in the group of lowest-risk companies.

Table 3. Predicted values of Springate scores using GM (1,1) model and ES model

Ord.No	Springate				Exponential Smoothing model			
	2021	2022	2023	RMSE	2021	2022	2023	RMSE
1	-1.52	-1.31	-1.133	0.818	-1.97	-2.14	-2.3	1.56
	3	3	3		3	3	3	
2	-0.18	-0.203	-0.22	0.051	-0.13	-0.1	-0.77	0.10
	3	3	3		3	3	3	
3	0.845	0.904	0.967	0.038	0.75	0.74	0.73	0.13
	2	1	1		2	2	2	
4	0.02	0.01	0.008	0.04	-0.07	-0.15	-0.23	0.05
	2	2	2		3	3	3	
5	1.04	1.31	1.67	0.12	0.88	0.96	1.05	0.18
	1	1	1		1	1	1	
6	-0.24	-0.28	-0.33	0.144	-0.25	-0.27	-0.28	0.14
	3	3	3		3	3	3	
7	0.29	0.38	0.497	0.327	-0.11	0.46	-0.05	0.17
	2	2	2		3	2	3	
8	0.71	0.72	0.73	0.01	0.71	0.70	0.74	0.03
	2	2	2		2	2	2	
9	0.32	0.28	0.24	1.21	0.94	1.1	1.2	0.35
	2	2	2		1	1	1	
10	0.18	0.14	0.12	0.025	0.15	0.09	0.04	0.04
	2	2	2		2	2	2	
11	0.00	0.00	0.00	0.173	0.09	0.12	0.14	0.21
	3	3	3		2	2	2	
12	0.52	0.52	0.52	0.069	0.49	0.5	0.5	0.09
	2	2	2		2	2	2	
13	0.3	0.24	0.2	0.08	0.21	0.14	-0.01	0.10
	2	2	2		2	2	3	
14	-55	-55	-55	1.06e-13	-51	-63.2	-75.9	18.7
	3	3	3		3	3	3	
15	0.15	0.10	0.06	0.51	-0.59	-0.41	-1.2	0.56
	2	2	2		3	3	3	
16	0.97	1.65	2.82	1.6	0.48	0.48	0.47	0.38
	1	1	1		2	2	2	
17	0.32	0.28	0.24	0.06	0.30	0.24	0.18	0.00
	2	2	2		2	2	2	

Source: Publication of author

The increase in the number of employees has a negative impact on the performance of companies from the sample of 232 companies. The number of employees can be a good indicator for predicting the bankruptcy of Serbian companies, which the authors explain in two ways. In state-owned enterprises in the Republic of Serbia, there was a policy of excessive employment, which threatened the survival of the enterprises. During the world economic crisis, companies did not have enough time to adjust the number of employees to the new market situation, which brought them high fixed costs and reduced profits (Stanišić et al., 2013).

Authors noticed that cutting employees directly improves short-run earnings performance by lowering wage expenses and that physical assets and labour should be substitutes meaning that a decrease in employees relative to total assets could signal overstated asset balances (Stanišić et al., 2013; Dechow et al., 2011).

In their paper, Pavlović, Muminović and Cvijanović tested the Taffler model for predicting bankruptcy applied to 62 companies whose shares are listed on the Belgrade Stock Exchange in the period from 2006 to 2010 and 32 companies that were bankrupt during 2009 and 2010. The authors further conclude that the model is not adequate for application to companies in the Republic of Serbia (Pavlović et al., 2011). Taffler's model proved to be inadequate from the point of view of predicting business failure as well as evaluating changes in the production regime and initiating investments on the company's creditworthiness (Muminović et al.,

2012). Stanišić, Mizdravković and Knežević compared models of logistic regression, decision trees and artificial neural networks with Altman's models for developing markets and private companies. The results of the research showed that only the neural network model gives better results than Altman's model for private companies, which, according to the author, is adequate for application to companies in the Republic of Serbia (Stanišić et al., 2013)

Rajin, Milenković and Radojević applied Altman's Z' score model, Kralicek's DF model and quick test to 5 agricultural companies operating in the Republic of Serbia in the period from 2010 to 2013. Based on the obtained Z' score results, the authors state that the analysed companies are most at risk, that is, they do not have credit performance, except for one company that operates in the grey zone. The reasons should be sought in the reduction of business income, high financial costs and high receivables from customers. Similar results were obtained with Kralicek's DF model. Unambiguously, both models indicate the possibility of bankruptcy of the observed agricultural companies, with a low probability of exiting the financial crisis. Kralicek's quick test indicates indebtedness of the observed companies and a low rate of profitability (Rajin et al., 2016).

4. Conclusions

The paper points out the model that gives the best results in the context of differentiating the firms from the sample from two angles, the risk of bankruptcy, and profitability indicators and in the context of the response of these two classes of firms to crisis conditions. In addition, the risk of bankruptcy was predicted. Successful prediction is conditioned by setting the model and ratio of data. Furthermore, it is necessary that the quality of information from financial statements is satisfactory.

These findings are useful because the issue itself - bankruptcy prediction - is of considerable interest to both academics and practitioners due to its enormous economic and social impact. Academic research in this area is diverse, but no consensus has been formed regarding the superiority of different bankruptcy prediction methods, especially when it comes to different economic branches.

Further work in two directions is required. First, better data could be collected without the limitations of our sample. Second, the impact of bankruptcy on other branches of agriculture should be analysed empirically in order to gain a better insight into the effectiveness of the applied models.

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The Use of Blogs in Learning a Foreign Language

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Abstract

One of the tools that has been increasingly used in foreign language teaching is blogs. Regardless of the popularity of this tool, various open questions remain about how best to include it in the conceptual teaching framework, as well as in practical application. Therefore, the current work presents an overview of research on the use of blogs in the context of foreign language learning, with a focus on English and German language learning. The paper gives practical recommendations in relation to learning foreign languages for the target groups, namely English and German language teachers and researchers.

Keywords: Blog, Learning, Foreign Language.

1. Introduction

Blogging is a widespread social activity that has an interactive effect. A blog represents, to put it simply, the point where texts and visual elements intersect, that is, it is a kind of protected space. As Godwin-Jones (2003) states, a Weblog (or blog) is a web-based writing space where the writing and editing of information is managed through a web browser and is immediately publicly visible on the Internet, while Helmann et al. (2010) point out that the popularity of weblogs continues to grow, while the automatic assessment of the quality of user-generated content is increasingly oriented towards the focus of scientific and commercial discussions. Namely, in the last few years, a large number of papers from conferences and articles in magazines have been dedicated to elucidating this issue (Dohn, 2010). Information and communication technologies have become an integral part of our lives (Buran, 2015), in the manner that they provide different opportunities for learning English and German.

According to Korovina et al. (2016), the basic purpose of teaching foreign languages, both English (and German), at universities is the formation of communicative competence. One of the key issues to which special attention should be paid is the way of incorporating blogs into teaching activities as a frame of reference from the adopted curricula. Hundreds of papers have been published in this area and the topic is still highly positioned in terms of its topicality. When it comes to the field of education, as Hamuddin et al. (2018) point out, the blog has been widely used in recent years as a very effective tool in the function of global teaching results. In educational circles, this phenomenon is given a lot of attention. Hamuddin (2016) points out that the blog-based class has a positive perception among bloggers, on the one hand, and is used through various modalities to increase students' knowledge base and increase students' critical thinking, on the other hand.

The paper is structured as follows. The first chapter provides an introduction to the issue of language learning through blogging. The second chapter is about blogging as a form of online discourse whereas the final one contains concluding remarks.

Publication of articles in professional journals, which publishes papers for specialists and do not ordinarily pay for contributions, may benefit a person in many ways. Such publications are likely to increase career advancement, to increase your circle of your professional acquaintances, to get feedback of your ideas, etc. Usually, papers submitted to the journals are very large and many a times they are either rejected or returned with a request for major/ minor revisions. A paper is turned down for a number of reasons, which is not only due to the quality of work but also due to the quality of presentation. Although quality of work and presentation are equally important (Singh *et al.*, 2002).

2. Language learning through blogging

Learning is the process of connecting specialized nodes or sources of information (Bremer, 2012). Every learning process, regardless of the way it is implemented, has both its advantages and disadvantages. Thus, training in English and German has certain obstacles when it comes to the application of blogs as a medium. Higher educational sectors form an important part of societies and their economies, from which society members expect individual and collective future benefits (von Alberti-Alhtayba et al., 2017). In order to maximize the result of this type of education, removing existing restrictions as much as possible is of the utmost importance. Information needs are often aimed at gaining insight or reducing uncertainty (Griesbaum et al., 2015). In this context, the same author is of the opinion that as far as answers are concerned, factual information is the dominant type of content

and has the greatest value when it comes to knowledge because it is the strongest predictor in terms of generating new knowledge. Internet communication tools such as m-learning, email, blogs, and chat provide an integrated environment for teachers and students (Saruca & Cavus, 2009). Bloggers typically publicly post their opinions and ideas, and the resources they cover include text, images, audio, videos, maps, hyperlinks, hypertexts, and so forth (Yang, 2011).

Blogs are used by various interest groups, researchers, academics, teachers and students in a variety of educational contexts (Bartlett-Bragg, 2003). This raises the question of the importance of investigating the possibilities in this regard. The basis of popular blogs about German and English language learning run by teachers has an impact on foreign language learning and leads to the development of teachers' intercultural competence (Gorąca-Sawczyk, 2013). Blogs in different countries differ not only according to one criterion, which is the language of the texts but there are also differences in many other aspects, especially when it comes to cultural differences between countries. In addition, it has been found that if teachers can provide students with insight into their own progress and experience success, students will gradually build confidence and will be more motivated to work hard (Mynard, 2008). "Research has confirmed the blog's positive uses, including writing for an audience and peer review" (Hussein, 2021).

Language learners could use a personal blog, linked to the course, as an electronic portfolio that shows development in the course of time (Saruca & Cavus, 2009). Research results (Wu & Wu, 2011; Hamuddin, 2018; Hung & Huang, 2015; Mynard, 2008) have shown that blogs have the potential for developing reading and writing skills. Educators often emphasize the numerous benefits for language learners through blogs, however, none of the available researches focuses on the potential of blogs as a medium for reflecting on learning (Bremer, 2012). Shih (2010) states that "free access, ease of revision, and interesting material for learning were major factors that enhanced students' learning satisfaction by motivating them to learn effectively".

3. Blogging as a form of online discourse

Blogging is such a kind of learning platform that provides a wide range of opportunities for learning English and German which has multiple advantages (Bond et al., 2018). As Amir et al. (2011) state, firstly, it can improve students' knowledge of their language performance in writing, and secondly, how students see themselves in the role of author (public display). In blogging, teachers and students become partners beyond the classroom walls (Stevens, 2004; Dieu, 2004). Roters (2015) states that "many Internet tools, email, discussion forums, and chats are familiar to many language teachers and learners". According to Azdemir & Aydin (2015), several studies have been conducted on the effects of blogging, especially on writing achievement in English as a foreign language.

Digitization in higher education institutions is an issue that concerns various stakeholders in education (Bond et al., 2018). The increasing popularity of computer and Internet technology, on the one hand, as well as the growing interest in blogging, on the other hand, have given educators an impetus to orient themselves towards the application of Web 2.0 technologies such as blogs or podcasts, bearing in mind the numerous advantages this way of learning possesses. Some of the advantages are: more personalized form of learning, more interactive, more dynamic, more efficient flow and exchange of ideas, an increase in the visibility of student work, and others.

The wide use of blogs in education is due to its multimedia features, easy web publishing, interactivity and ability to support cooperative and autonomous learning (Ahluwalia et al., 2011). Thus, bloggers can read other blogs, make their comments on them and refer to them in their own blogs, which gives a stamp of interactivity and visibility, encourages students' motivation through receiving feedback about what is published on the blog.

Taking into account the fact that blogs have a simple and open approach, it can be said that as a result of their communicative and collaborative possibilities, and their increasing use, educational blogs appear in different educational contexts. A review of the literature suggests that blogs can serve in many different ways to cover different learning objectives (Jimoyiannis, 2013). Although certain groups of students are very familiar with computers and the Web, it happens that they have very little prior experience with educational blogs and blogging.

4. Conclusions

A blog is one of the most innovative tools to help students find opportunities to practice English writing outside the classroom. It can also be pointed out that speech blogs are an important predictor of students' oral presentations. Stronger interaction between teachers and students has a positive impact on foreign language learning outcomes. Despite the fact that the use of blogs as a learning tool varies among countries, it is highly developed and researched in many countries and has shown good results so far. Today's classrooms, through the application of new media, influence the simplification and efficiency of the learning process in various dimensions. New technology trends expand the capacity of English teaching in authenticity and literacy, such as students' reading, writing, speaking and listening skills. Modern technologies (based on the web) and fast internet connections lead to the development of a wide range of new possibilities in learning foreign languages, both for teachers and for students. The advances in the area of technology are helping students deliver more meaningful content.

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The Role of Accountants in Litigation Support and Expert Witnessing in the Republic of Serbia

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Abstract

Regardless of the fact that the very term "fraud" always arouses some curiosity in people, it is quite certain that we will not think about it every day, but it affects our lives, both business and personal, more than we can understand. In a general sense, fraud can be presented as a deliberate manipulation of the truth for financial or personal gain. In the litigation process, forensic accountant expert witnesses play a crucial role in, even in the event of a settlement and in any situation where a member of the firm delivers professional opinion in deposition or at trial. The objective of our research is to show the importance of forensic accountants in litigation support and expert witnessing. The method of content analysis was applied in the paper for the purpose of research.

Keywords: accountants, forensic accounting, litigation support, expert witness, support

Introduction

It is a well-known historical fact that people have kept records of their transactions since ancient times. Luka Pacioli is considered to be the father of accounting, who in 1494 made the first known written record of double-entry book-keeping in his paper *Summa de Arithmetica*, printed in Venice (ICAEW, 2012). Accounting as an information system is a platform for making economic decisions. In a market economy, information, especially of a financial nature, is of particular importance in financial decision-making, and any deviation and asymmetry of information lead to errors in decision-making, causing great damage to information recipients. Transparency of financial information is the focus of the attention of numerous stakeholders. Detecting fraud, information and disclosure errors in financial statements has always been a very complex task, both for auditors and related parties (Hung et al., 2017).

A strong accounting profession within countries is essential to enable transparency and accountability, build trust, and support sustainable economies (Kirtley, 2016). In addition, the same author emphasizes that it should be borne in mind that the appropriate combination of analytical and forensic skills of professional accountants with the application of strong internal control processes can be of great benefit in combating corrupt activities, as well as increasing the flow of resources to support economic growth. According to research by the Association of Chartered Certified Accountants (ACCA), the accounting profession will face significant changes by 2025, and professional organizations, their members and educational institutions should respond to these changes - the development of smart and digital technology, the constant globalization of reporting/disclosure standards and new forms of regulation (IFAC, 2017; ACCA, 2016).

As Knežević et al. point out (2019), bearing in mind that the company's management is responsible for the efficient functioning of the company, internal control and preparation of financial statements, which implies its central place in the structure of the company, it further indicates that it has a unique ability to commit or approve fraud, because it is often in a position to directly or indirectly manipulate accounting records and present false information, so the auditor should pay special attention to management behaviour. Internal control and internal audit are a strong support to the processes of identifying fraudulent actions, and effective risk management of their occurrence, and ultimately to prevent misuse of company funds.

This paper is arranged as follows. After the introductory part, the accounting profession and its development are described in Chapter 1, and thereafter, within Chapter 2, the application of forensic accounting services in expertise procedures is pointed out.

Furthermore, the state and directions of development of the profession of a forensic accountant in Serbia are described in Chapter 3. Concluding remarks appear in section 4, followed by an overview of the sources used for the research.

1. Accounting profession and its development

There is no unique definition of forensic accounting in the accounting literature. Of the many definitions that can be found in the literature, the most acceptable, according to the ACFE (Association of Certified Fraud Examiners), is the definition of forensic accounting as the use of skills in potential or actual civil or criminal disputes, including generally accepted accounting and auditing; determining losses of profit, income, property or damage, assessments of internal controls, fraud and everything else that leads to the inclusion of accounting knowledge in the legal system (Mitrić et al., 2012). “Forensic accounting is simply defined as the intersection of accounting and the law” (Kranacher, & Riley, p.3.). Forensic accounting can be preventive and curative. The purpose of preventive work is to prevent the occurrence of illegal economic and financial activities. In curative work, there are already phenomena that indicate illegal actions. A forensic accountant should review and evaluate such actions, provide an independent and impartial opinion, and provide evidence of criminal activity.

Business transactions and financial events of a business entity are reflected by financial statements. Further, the adequate internal control system of an entity will enable reducing the fraudulent activities of interest groups. Thus, the accounting analysis able to uncover possible fraud in a manner suitable to be presented in court is called forensic accounting. The basis of discussion, debate, and dispute resolution is forensic analysis (Zysman, 2004). From a professional point of view, a forensic accountant is one who has mastered the science of accounting, and can, therefore, assist lawyers and the courts by providing appropriate analysis to understand and apply accounting issues in legal proceedings, i.e. those concerning the law and disputes that should be resolved by court. The services of a forensic accountant are often used in cases of fraud and embezzlement in order to clarify the nature of the financial crime.

There are numerous studies focused on the issue of forensic accounting. The results of one of them (DiGabriele & Huber, 2015) suggest the use of mimetic topics and methods of accounting research by forensic accounting researchers. Hence, the absence of diversity in the topics and methods will potentially compromise the overall contribution of forensic accounting research. The aim of the research by Van Akkeren et al. (2013), was to identify the latest trends in the work of forensic accountants in Australia by examining how accounting firms specializing in forensic services meet the needs of their clients and inform universities about appropriate curricula and programs to support the economy. There have been major differences of opinion on how this accounting profession should evolve, followed by the increased lack of certification of forensic accounting, based in Australia.

The results of the study by Amara et al. (2013), have shown that pressures on the manager of a company to commit financial statements fraud is lead by the desire to increase its visibility in the market, the reputation and the good image on the stability of the company.

2. The application of forensic accounting services in expertise

Forensic accounting practices can be used in a variety of ways and criminal investigations and fraud-related activities as engagements in accounting and auditing in both the private and public sectors. In the private sector, forensic accounting practices can be classified into three areas: fraud examiner; litigation advisor; and expert (Rezaee et al., 1992). What is important to keep in mind when dealing with the issue of harmonization of educational programs in higher education and practical needs in the field of forensic accounting, and as the same author points out, for the purpose of establishing and promoting forensic accounting courses in business schools accounting firms can promote forensic accounting education and practice by contributing funds to those schools; making and compiling actual forensic accounting cases and establishing a representative portfolio of cases for use in teaching forensic accounting; constantly including accounting faculty in all of their forensic accounting-related professional education programs; and providing internship programs in forensic accounting. In developing countries and countries with gaps in the economics law due to increasing fraud, corruption and business collapse forensic accounting has just emerged (Ciger & Topsakal, 2015),

A forensic accountant may be engaged in the detection of financial crime and related matters, in the following areas:

- a) bankruptcy, insolvency, and reorganization;
- b) business valuation;
- c) calculating economic damages;
- d) forensic computing.
- e) money laundering;
- f) securities fraud;

g) tax fraud.

As pointed out by Rezaee et al. (1992), forensic accounting is a rapidly evolving field in the accounting profession, and they also add that it has contributed to expanding the capacity of accounting education and practice. They also point out in this paper, that forensic accountants can work as fraud examiners, experts or legal advisors, and today's business environment and increased frequency of fraudulent activities are influencing the growth in demand for forensic accounting practices. Lawyers rely heavily on forensic accounting to prove their cases using a knowledge base outside of their own, that is, the knowledge base of forensic accountants. As such, forensic accountant expert witnesses have a very important role in legal proceedings, and at the same time, they are a great support to lawyers who invoke their expertise.

Financial (accounting) ratios are effective in signaling irregularities. The gross margin index, the sales growth index and the accounts receivable index are often used in the identification of fraudulent activities (especially their trends). Also, Altman Bankruptcy Z-score, and Beneish and Dechow Fraud Models (F-scores) can be used to predict fraud (Tiwari & Debnath, 2017).

A complex, multidisciplinary environment in which forensic accountants perform their activities requires them to deal with ever-changing unstructured problems characterized by uncertainty of facts and outcomes. The "good" forensic accountant will be technically competent and have moral virtues such as courage and self-control as suggested by virtue ethics. (Howieson, 2018).

3. The state and directions of development of the profession of a forensic accountant in Serbia

According to the Law on Accounting (2020), acquiring a "professional title" is a condition for obtaining a license to perform accounting services, which means that there is a legal obligation to license accountants only if they are professionally engaged in the provision of accounting services. A professional title in the field of accounting must be acquired with an organization that is a member of the International Federation of Accountants (IFAC), which is the case in our country with the Association of Accountants and Auditors and the Chamber of Certified Auditors.

In addition to licensing for an accountant, in Serbia, the Chamber of Certified Auditors is responsible for acquiring the professional title of certified auditor and certified internal auditor (according to the program of the Chamber). According to Article 2 of the Law on Audit (2019), a distinction is made between the following:

- a certified auditor is a natural person who, in accordance with this Law, has passed the examination for acquiring the title of a certified auditor, and who does not have a valid license to perform auditing;
- a licensed certified auditor is a natural person who, in accordance with this Law, has passed the exam for acquiring the title of certified auditor and has a valid license to perform auditing;
- an independent auditor is a licensed certified auditor who, in accordance with this law, has a valid license to perform audits as an entrepreneur.

Professional training in the field of fraud risk management is only performed by the Republic Bureau of Statistics, and the certificate is called "certified investigator of abuse and fraud". For example, in the Republic of Serbia, the Special Prosecutor's Office, as well as the Higher Public Prosecutor's Office, has a financial forensic officer as an employee. Prosecutors in criminal proceedings may use the services of a financial forensic expert or, at their personal request, the services of court experts registered with the Ministry of Justice in the sense of having the license. Lawyers have the right to engage an expert advisor in criminal proceedings in order for a certain professional discussion to be conducted in the right direction between one and the other party - the prosecution and, for example, the expert and lawyer and his professional associate, i.e. to clarify the case better. The prosecutor bases his work to a large extent on the expertise and intersection of the opinions of the financial forensic expert/court expert and associates. In this context, it is important to emphasize the importance of forensic accounting expertise in determining the movement of cash flows, the endpoint where the funds are located, the transfer of funds through the account, as well as how to withdraw funds from the company for tax evasion, and how to insert or return illegally acquired (laundered) money into legal flows.

It is important to emphasize that a part of the professionals within the Ministry of Interior have a certificate of Certified Fraud Examiners - CFE, issued by the "Association of Certified Fraud Examiners". It is about the world's largest anti-fraud organization and the premier provider of anti-fraud training and education.

Concluding considerations

The profession of forensic accountant combines experience in accounting and auditing with investigation skills so that accountants can be adequate support in providing services in legal scenarios. Forensic accounting includes both litigation support and investigative accounting. A forensic accountant typically provides investigative accounting services to provide useful evidence in a report suitable for representation in court.

In Serbia, the professional title of an accountant, certified auditor, licensed auditor and independent auditor is regulated by appropriate legal and professional regulations, while licensing related to forensic accounting is not regulated. Professionals in the Ministry of Interior mostly have a CFE license (some) and financial forensics exist as permanent employees to support the work of certain prosecutors' offices.

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Organizational culture as the motivator of service sector employees during the COVID – 19 pandemic

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Abstract

Organizational culture consists of a unique system of values, beliefs, procedures and ways of behaving, which employees have developed and adopted through shared experience and action. Employees become familiar with the basic postulates of organizational culture independently through performing their work duties or interacting with other colleagues, including both superiors and subordinates. The adopted organizational culture is enriched over time under the influence of values that are transmitted from the top to the lower management. Organizational culture has an extremely strong influence on creating a pleasant organizational climate, and thus on strengthening the motivation of employees to give their maximum in performing work duties and achieving the desired goals and objectives, as well as on fostering a sense of belonging to the organization they are employed in. The creation of a strong and healthy organizational culture is influenced by the business environment, team environment, organizational values, organizational structure and processes, salary and incentives, provided infrastructure, the use of technical and innovative methods in the execution of work tasks, training and career development programs, business models, tradition and customs of the organization, corporate brochures, symbols, slogans and events (seminars, conferences, workshops, celebrations, etc.) and others. The goal of this research is to identify the key dimensions of organizational culture that have influenced the motivation and satisfaction of employees during the Covid pandemic, which are accountable for their performance, that is, for consumer satisfaction in the service sector.

Keywords: organizational culture, employees, motivation, satisfaction, consumers, COVID-19

1. Introduction

Organizational culture is a set of common values, beliefs, norms, rituals, and written and unwritten rules that are shared among employees of an organization and accepted as valid. It should even be influenced by factors like history, variety of product, market, technology, and strategy, variety of workers, management vogue, and national culture (Alexiou, 2022). Every organization in service industries has its own unique way of conducting business that continuously affects its organizational culture. According to Schein (2010:18), who is one of the unavoidable authors of organizational culture, organizational culture is “a pattern of shared basic assumptions that was learned by a group as it solved its problems of external adaptation and internal integration that has worked well enough to be considered valid”. Organizational culture is the most important component of an organization. The work culture gives a character to the organization (Alexiou, 2022). The advanced organizational culture motivates the employees to work harder and achieve better results, promotes career advancement, increases their communication skills and tendency to teamwork, follows the organization values and helps in avoiding confrontations. Organizational culture contributes to the increase of the competitiveness of the organization. To make the business more competitive, corporate executives must inculcate a culture of knowledge transfer, conversion, innovation, creativity, efficiency, and productivity in all employees (Pallathadka, 2020).

Employees are the most important resource of any organization in service industries. The image of an organization is created by employees who are in direct contact with customers and other stakeholders. The success of an organization is largely determined by the quality of the employees who should work so that the organization can achieve the expected results. Motivation has a key role in improving the quality of employees that affects employees to work optimally and improve the organizational performance. If employees are motivated, they will be more committed to their work. Indicators of employee motivation are: work itself, salary, promotion opportunities, supervision, and coworkers.

The main characteristics of organizational culture are planning orientation, innovation and risk taking, attention to detail, results orientation, people orientation, team orientation, confrontation and stability, action orientation. The COVID -19 pandemic has created new working environment and conditions such as: work from home, an obligation to use masks at work, reducing close communication, new organizational forms in communication and implementation of business activities and all these have affected organizational culture. Although there are changes in organizational culture caused by the impact of the COVID-19 pandemic, they will not change the organizational commitment of employees (Sumual, Tumbelaka, Ngantung, 2022). Thereby, organizational

culture is defined as the values of organization, relationships and hierarchy, grounding the behavior patterns and attitudes that define the main actions and decisions of the organization (Schuldt, Gomes, 2020).

2. Literature review

Organizational culture can be explained as a system of values, beliefs, and habits in an organization that interact with each other to produce behavioral norms (Norman, Paramansyah, Abdan, 2022). As far as organizational culture means respecting norms and ethics in the business, keeping and improving interpersonal relations, team work, keeping and developing traditions, creating and transmitting the most powerful values and convictions, the competitiveness of the enterprise is maintained or even improved (Tidor, Morar 2022). Organizational culture is a basic assumption model invented, discovered or developed by a particular group, while learning how to deal with the problem of external adaptation and internal research that has worked well enough to be considered valid and, therefore, new members must be taught how to perceive thought and concerning such problems (Lakshmi, Bhavani, 2020). The role of organizational culture consists of formulating organizational procedures, integrating the organizational capabilities, solving the organization's problems and conflicts, and increasing the effectiveness of an organization.

By forming an organizational culture that represents in general all the values, beliefs, assumptions, expectations of the members of the organization, it will form a shared belief value that underlies the identity of the organization (Munir, Arifin, 2021). It is very complex to diagnose the organizational culture in a short period of time, but it is necessary to diagnose and modify it in order to achieve the desired business results.

Apart from performance appraisals, a reward system is a substantial aspect of organizational culture because no matter what their nature is, rewards can reinforce, strengthen, and transfer the culture by focusing on the characteristics that are central and crucial to organizations' values (Irfan, M et al, 2022). Only in an environment where dedication is sufficiently rewarded or where constructive work habits are widespread can a successful corporate culture thrive (Pallathadka, 2020).

Employees must respect the culture of their organization to present their best level of work (Cruz Junior et al, 2022). Otherwise, employees will not be motivated. Organizational commitment is directly influenced by organizational culture (Ari S, Umiyati, Ambarwati, 2022). Organizational culture affects knowledge sharing both directly and indirectly (Sawan, Suryadi, Nurhattati, 2020). In order to listen to "the voice of organization", leaders should constantly ask employees for feedback on the reflection on the organizational culture, practices and experiences, thus will learn more about the employee's needs and issues (Mileva, Hristova, 2022). The results of empirical research show that employees' commitment depends on reward system, communication, team work and management support. Employees with high commitment will show an attitude where employees need and have high expectations of the organization where employees work, and are more motivated at work (Badrianto, Permatasari, 2022).

Digitization of business is the challenge of the times we live in and it has been accelerated by the emergence of the COVID-19 pandemic. It is, thus, critical for organizations to establish an organizational culture that is receptive to and supportive of digital transformation, otherwise, it takes the serious risk of being left behind in the digital world (Serpa, José Sá, Ferreira, 2022). Organizations should carry out a periodic audit of the organizational culture dimensions in order to identify area(s) for improvement on one hand and also to appraise employees' commitment of their employees in order to continue to enjoy highly motivated work forces that will guaranty quality service for the general public (Olayiwola, Akeke, 2022).

3. Research methodology

This research was carried out by collecting, processing and analyzing primary data, but also by using information collected from secondary sources, such as: relevant literature, scientific journals, research studies. The main goal of this research is to identify the key dimensions of organizational culture that influence the motivation of employees in the service industries during the COVID pandemic. In accordance with the objectives of the research, the following hypotheses were set:

H1: Clearly set goals and objectives are an essential aspect of organizational culture that affects employee motivation.

H2: Rewarding is not a key motivator for employees.

H3: Teamwork orientation has a significant impact on employee motivation.

The analysis of the collected data was carried out using the statistical package SPSS (*The Statistical Package for the Social Sciences*). Among the statistical methods of data analysis, descriptive statistics, factor analysis and one-factor analysis of variance (ANOVA) were implemented. One part of the questionnaire refers to the characteristics of the respondents and data on the structure of the observed characteristics in the sample are presented in Table 1. The second part of the questionnaire refers to the assessment of the attitudes of the respondents by using a Likert scale. The scale contains 55 items (statements) and respondents expressed their degree of agreement or disagreement for each individual statement, usually, on a five-point scale as: 1. Strongly disagree, 2. Disagree, 3. Neutral, 4. Agree and 5. Strongly agree.

4. Research results

The data representing the basis for empirical research were collected in the period from September to October 2022 in Serbia in the area of the city of Belgrade, Kraljevo and Čačak. Sample included respondents who are employed in the following sectors of service industries: Information and Communications, Transportation and Storage, State Administration and Defense, Finance and Insurance Services, Administrative and Auxiliary Services, Trade. Data were collected from 148 respondents.

Table 1. Structure of the sample (n=148)

Age	Number of respondents	Participation percentage
< 25	14	9.46
25 - 34	25	16.89
35 - 44	30	20.27
45 - 54	61	41.22
>55	18	12.16
Gender		
Male	77	52.03
Female	71	47.97
Work experience in the organization		
< 1 year	4	2.70
2 - 4 year	12	8.11
4 - 6 year	10	6.76
6 - 8 year	11	7.43
8 - 10 year	33	22.30
> 10 year	78	52.70
Level of Education		
Primary Education	0	0
High School	58	39.19
College or university	70	47.30
Master	19	12.84
Ph.D	1	0.68
Average work per day		
6h	0	0
7h	9	6.08
8h	106	71.62
9h	19	12.84
10h	13	8.78
Service sector		
Information and communications	37	25
Transport and storage	34	22.97
State administration and defense	20	13.51
Financial activity and insurance activity	22	14.86
Administrative and auxiliary service activities	16	10.81
Trade	19	12.84
Working from home since the beginning of the pandemic		

Yes	54	36.49
Not	94	63.51
Online work due to the pandemic		
Zero days	94	63.51
Less than 1 month	26	17.57
1 - 6 months	26	17.57
6 - 12 months	2	1.35
13 - 24 months	0	0
More than 2 years	0	0
Now I work from home		
Yes	0	0
Not	148	100
Further compliance with protective measures		
Yes	126	85.14
Not	22	14.86

Note: Author's calculation based on SPSS

Male respondents were represented by 52.03% and female respondents were represented by 47.97% in the sample. The largest number of respondents is in the category of 45 to 54 years old (41.22%) while the smallest number of respondents belong to age category under 25 years old (9.46%). Respondents are employed in six different service industries and the largest number work in Information and Communications (25%), followed by Transportation and Storage (22.97%), while the smallest number of respondents work in the sector for Administrative and Auxiliary Services (10.81). Regarding the level of education, the largest number of respondents have a university or higher education (47.30%). The largest number of respondents work an average of 8 hours a day (71.62). Since the beginning of the COVID-19 pandemic, 36.49% of respondents worked online, and the largest percentage of them worked online for a maximum of one or up to 6 months (17.57%), while 63.51% of respondents do not have a single working day online. Not a single respondent has worked online for more than 12 months. During the survey period, not a single respondent worked from home, and 85.14% of them declared that they still take protective measures to prevent infection.

In order to determine the homogeneity/heterogeneity of respondents' attitudes, a descriptive statistical analysis was applied to the entire sample. The obtained results of the descriptive statistical analysis are presented in Table 2.

Table 2. Descriptive statistics

	N	Mean	Std. Deviation
	Statistic	Statistic	Statistic
q1	148	4,2162	,81266
q2	148	3,9865	,81638
q3	148	3,9595	,87192
q4	148	3,8784	,88760
q5	148	3,5676	,97004
q6	148	3,4392	,88238
q7	148	3,3311	1,02611
q8	148	3,3243	1,07042
q9	148	3,6351	,95582
q10	148	3,3176	1,14308
q11	148	3,3378	1,10382

q12	148	3,0811	1,25364
q13	148	3,0338	1,12132
q14	148	3,6486	,82367
q15	148	3,7905	,97068
q16	148	3,7432	1,00422
q17	148	3,5338	1,10297
q18	148	3,7568	1,02101
q19	148	3,6284	1,11441
q20	148	3,2635	1,21421
q21	148	3,3378	1,10382
q22	148	3,0473	1,18571
q23	148	3,5405	,92860
q24	148	3,7230	,85572
q25	148	3,3243	1,05763
q26	148	3,6824	,89623
q27	148	3,8649	,81356
q28	148	3,8378	,79157
q29	148	3,6149	,96555
q30	148	3,0811	1,20381
q31	148	3,4932	1,19805
q32	148	2,9662	1,27464
q33	148	2,2905	1,26305
q34	148	3,1622	1,10690
q35	148	3,3919	1,14663
q36	148	3,4730	1,16319
q37	148	3,0743	1,08854
q38	148	2,7500	1,15396
q39	148	3,6486	,94664
q40	148	3,5608	1,03822
q41	148	3,7905	,99148
q42	148	3,7905	1,03183
q43	148	3,2905	1,16790
q44	148	4,2162	,69537
q45	148	3,9662	,91410
q46	148	3,3108	1,24459
q47	148	2,7297	1,21552
q48	148	3,0338	1,16884
q49	148	3,0541	1,21657
q50	148	2,9595	1,21150
q51	148	3,0878	1,10613
q52	148	3,7973	1,04952
q53	148	3,3378	1,00714

q54	148	3,9662	,94340
q55	148	2,5541	1,21937
Valid N (listwise)	148		

Note: Author's calculation based on SPSS

The most favorable attitude of respondents, expressed with an average score of 4.22, is with the statement that sets focus on the organizations (companies, institutions) where the respondents are employed service users (consumers), as well as on the satisfaction of their needs (q1) and with the statement that respondents fully focused on their work tasks during working hours during the pandemic (q45). The next position with the highest degree of acceptance refers to the statement that the organization (company, institution) supports changes and innovations and that the goals and tasks for the employees are clearly set, that is, responsibilities they must follow while respecting the organizational rules and regulations (q2=3.9865 and q3= 3.9595). The favorable attitude of the respondents, rated approximately with an average score of four, refers to the findings that employees are ready to work together and that they had a good relationship with team members during the pandemic (q27=3.8649, q45=3.9662). At that level, the statements related to the fact that the rules of behavior and communication are clearly defined in the organizations (companies, institutions) where the respondents work, as well as to the fact that all safety measures to protect employees from infection and the transmission of infection during pandemics organizations were taken in a timely manner (q41= q42=3.7905).

The lowest value of the arithmetic mean was obtained when measuring the respondents' attitudes related to the statements "I am satisfied with my salary", "Employees receive well-deserved recognition", "I was provided with the opportunity for advancement even during the pandemic", "My work and dedication to the company was fairly rewarded even during the pandemic", "Worry about the pandemic made me less motivated to do work" (q33=2.2905, q38=2.7500, q47= 2.7297, q50=2.9595, q55=2.5541).

The lowest value of the standard deviation (0.69537) was obtained with the statement claiming that respondents are fully focused on their work tasks during working hours and during the pandemic, and accordingly, with the above statement, there is the highest degree of agreement among respondents (q44). The greatest heterogeneity of respondents' attitudes, which indicates the highest degree of disagreement among respondents, was obtained with the statements q32=My job does not cause me stress or anxiety (1.27464), q20=Managers point to exemplary values by their personal example (1.21421), q33=I am satisfied with my salary (1.26305), q47= Opportunity for advancement were provided even during the pandemic (1.21552), q49=I feel that my work is appreciated even during the pandemic (1.21657), q50= My work and commitment to the company were fairly rewarded even during the pandemic (1.21150), q55= Worrying about the pandemic made me less motivated to do work (1.21937).

Analyzing the results of the one-factor analysis of variance (ANOVA), we observed that there is a statistically significant difference between the average values of responses from the respondents belonging to six different groups of service industries and regarding the following statements:

- q17=The organization is committed to employee safety;
- q16=The organization behaves socially responsible;
- q20=Managers point to exemplary values by their personal example;
- q21=I have confidence in the organization's management;
- q22=The organization fosters open communication;
- q25=Communication channels are open between managers and employees;
- q26=The organization fosters a culture of teamwork;
- q33=I am satisfied with my salary;
- q34= I am satisfied with the overall benefits;
- q35=I work in a pleasant environment;
- q48=Working during the pandemic allowed me to develop new skills;
- q49=I feel that my work was appreciated during the pandemic;
- q52=I prefer working in an office to working from home;
- q54=I find working in the office more productive than working online.

In the observed sample, the overall significance of all the stated statements is $p < 0.05$. In the Multiple Comparisons Table of the results of subsequent tests (Post Hoc Tests), the statistical significance of the differences between each pair of service industries is noticeable, where the overall significance is $p < 0.05$, that is, it shows that the result of the evaluation of the respondents' attitudes in some of the service industries is statistically significant.

Statistically significant differences regarding the average rated attitudes of respondents to the statement q48=Working during the pandemic allowed me to develop new skills are in the sector of service industries Information and Communications (2.67) and Trade (3.97). Therefore, the work during the pandemic enabled the employees in the Trade sector to develop new skills significantly more than the employees in the Information and Communications sector.

Furthermore, there are significant differences in the average rated views of the respondents to the statement q25=Communication channels are open between managers and employees are between employees in the sector of Transportation and Storage (2.65) and Information and Communications (3.85), Transportation and Storage (2, 65) and State Administration and Defense (3.80), Transportation and Storage (2.65) and Trade (3.70). There are statistically significant differences in the average rated attitudes of respondents with regard to statement q17 between employees in Information and Communications (3.70) and Transportation and Storage (2.97), Transportation and Storage (2.97) and Administrative and Auxiliary Services (3.90), Transport and Storage (2.97) and Trade (3.90), State Administration and Defense (4.10) and Finances and Insurance Services (2.95).

Measuring the respondents' attitudes regarding the statement q52=I prefer to work in the office compared to working from home, there are significant differences between employees in Trade (3.05) and Administrative and Auxiliary Services (4.06), as well as between employees in Trade (3.05) and Finances and Insurance Services (4.23). When evaluating the statement q49=I feel that my work was appreciated during the pandemic, there are statistically significant differences between employees in the sectors of State Administration and Defense (3.85) and Finances and Insurance Services (2.77).

5. Conclusions

The following factors influence the increase in employee motivation: obtaining clearly defined goals and tasks, as well as feedback; supporting employees to express their ideas, proposals and suggestions freely; teamwork; advancement opportunities; an organizational climate in which the employees feel a sense of security, respect and belonging; rewarding employees through salary and other benefits. Employee motivation directly depends on the organizational culture. The results of this research indicate that the employees were completely focused on their work tasks during working hours, that they were oriented towards teamwork, that they respected the set rules of behavior and communication, that they felt safe, because the manager showed interest in their life and safety during the COVID-19 pandemic. This is made possible thanks to a strong organizational culture, which consists in clearly formulating organizational procedures, integrating organizational capabilities, as well as successfully solving problems and conflicts within the organization. The obtained results also show that employees are not satisfied with salary and advancement opportunities during the pandemic, but that they are satisfied with other motivational factors. As a result, we can conclude that salary is not a decisive factor in employee motivation, and that clearly set goals and objectives play a crucial role in employee motivation, i.e. in the dimensions of organizational culture, because employees know what is expected of them, however the orientation towards the satisfaction of service users, innovations and changes, as well as orientation to teamwork also play a huge role.

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The possibility of determining the relative maturity level of public procurement organisations in Hungary

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Abstract

This study aims to expose the degree of the relative maturity level of procurement organizations, related to procurement performance within Hungarian companies, with special focus on the public sector. The evaluation makes an experiment to identify whether public procurement maturity levels vary between the three evaluated sectors (SMEs, Corporate and Public Administration), and identify the main differences. The research design is composed of secondary and primary elements and uses both quantitative and qualitative methods, i.e. a mixed methodology. Data are collected by the internet-based tool and analysed via SPSS. The aim of the questionnaire, containing 17 questions (mainly Likert scale), was to identify the indicators through which public procurement practitioners in Hungary see the most feasible way to measure the performance of public procurement. Relevant findings shows that all three-sectors procurement maturity level is measurable on the same way. The study found that from the 107 organizations, based on the use evaluation criteria, none of the organizations falls under high performing mature level. However, majority of organizations are in the middle level followed by developing levels of maturity. Based on a comparison of the current maturity levels of domestic procurement organisations by sector, based on literature review, and related to organisational effectiveness, the maturity level of the public sector differs only partially from the maturity level of private sector (SMEs and large corporates). This study also aims to provide a potential high level general framework, which can be used by organizations, regulators, and policymakers, to evaluate their maturity level

Keywords: Maturity, Public Procurement, Performance, Effectiveness, Efficiency

1. Introduction

Performance management has become a key element in modern public sector governance, as many developed and developing countries have the need to measure organisational and individual efficiency in order to ensure that public sector organisations fulfil their mission. (Rhodes, 2012 61(3))

The relationship between the development level a purchasing organization, the maturity—and its impact on the performance of a firm becoming more and more important in the private sector but still considered as negligible in the public sector.

It is estimated that worldwide, public sector organizations purchase more than \$9.5 trillion worth of goods and services each year, equivalent to almost 13% of global GDP (in Hungary, this figure was 4.7% in 2012, and is stable at over 7% from 2019. (KH, 2020) Public procurement therefore plays a significant role in the economies of states. According to the OECD database, among the 22 OECD-EU countries for which data are available, public procurement has increased from 13.7% of GDP in 2019 to 14.9% of GDP in 2020. Therefore, public procurement plays a significant role in the domestic economy, and the improvement of the public procurement process can be a key driver for in increasing the efficiency of public budgets and spends. (OECD, 2021)

The public money spent on public procurement and the fact that this money comes from the collected taxes, makes accountability and transparency more important. Therefore, a well-functioning procurement system based on transparency, competition, economic efficiency, effectiveness, and accountability is critical to good economic governance and good stewardship of public resources, to improving the efficiency of public spending in reducing poverty, and to increasing public trust in government. Inadequate management and control of procurement, and failure to properly manage systems, can lead to significantly worse outcomes and consequently increase public indebtedness, reduce available resources, and in extreme cases increase poverty and diminish the social and economic rights of citizens.

Procurement can make a significant contribution to value creation and the exploitation of competitive advantage, and thereby improve organisational performance. However, it is more challenging and requires greater maturity both in the procurement process and in the management of assets and in the procurement organisation or function. (Hartmann et alii., 2012, pp. 24-26)

Properly managed public procurement (planning, implementation, control), can significantly support national development, improve resource mobilization, help to manage public debt efficiently, improve public expenditure management, boost national revenue generation and reduce economic and financial dependency. (Mamiro, 2014, p. 2)

To ensure the expected results from public procurement, continuous monitoring and evaluation of public procurement is essential. One of the possible tool to evaluate existing status and set the base for further development is maturity.

In general, the idea of maturity is presented by sketching a number of growth stages that depict the potential-upward development or performance of organizations during several sequential periods of time. (Batenburg et alii., 2008, p. 3)

Aim of this study to expose the degree of the relative maturity level of procurement organizations, related to procurement performance. The evaluation is cover three sector in Hungary: the SME'a, the Corporate and the Public Administration, with special focus on the public sector performance.

2. Literature review

Several studies have shown a positive relationship between the level of maturity and performance of purchasing. Therefore, determining the level of procurement maturity should be a fundamental task to develop an appropriate benchmarking system and to develop an appropriate action plan to improve procurement performance.

This is also the view of Batenburg and Versendaal, i.e. that the maturity level of purchasing affects purchasing performance. (Batenburg et alii., 2008, p. 2)

Schiele's study confirms that a more mature purchasing organisation can operate more efficiently.

In his research, he found that there is a significant relationship between the level of purchasing maturity and cost reduction outcomes. Furthermore, he found that if an organization's maturity is too low, then the best techniques, such as the introduction of innovative cost reduction methods, may fail. (Schiele, 2007, p. 274)

In his study, Plomp examined the maturity and performance of 5 hospitals and found a positive relationship between purchasing maturity and performance. (Plomp, 2009, p.206.)

Based on Patrucco et al.'s research, if a public procurement organisation wants to achieve higher status and better recognition, designing a formal clear strategy shows greater organisational maturity, leading to improved recognition levels. (Patrucco et alii, 2017, p. 5)

In their research, Batenburg and Versendaal described a linear relationship between the maturity level of the purchasing organisation and purchasing performance, expressed by the following estimating regression model. (Batenburg, 2007, p. 9)

Foerstl et al. also found a positive relationship between cross-functional integration, functional coordination and purchasing performance, and between purchasing performance and firm performance. In their opinion, both talent management and performance management have positive effects on cross-functional integration and functional coordination. Unlike performance management, talent management also has a direct impact on procurement performance. (Foerstl et alii., 2013, p. 689)

In general, maturity is represented by outlining number of growth stages that depict the potential upward development or performance of organisations over a number of consecutive periods. (Plomp, 2009, p. 206)

A maturity profile should ideally cover every relevant dimension that describes maturity. Using a theoretical background to structure the dimensions provides the opportunity to develop a comprehensive mode (Schiele, 2007, p. 276)

There are several possible names for the steps. Robert F. Reck and Brian G. Long gave the names passive, independent, supportive, and integrated. Syson's three stages are transactional, commercial, and strategic. Cammish's top level description is simply this naming of the factory server. This is followed by lowest unit price, coordinated purchasing and strategic purchasing. (Weele et alii., 2000, p. 10)

In their study, Van Weele and Rietveld created an integrated procurement development model based on 12 models. They distinguished six maturity stages of procurement: transactional orientation, commercial orientation, purchasing coordination, internal integration, external integration, value chain integration. (Weele et alii., 2000, pp. 4-6) Batenburg and Versendaal propose an approach to the development of the purchasing function through a coordinated purchasing framework. In their theory, they have developed a framework (based on Weele's study above) that includes, on the one hand, the performance of procurement as a business function, positively related to the maturity level of each of five business dimensions (strategy and policy, monitoring and control, organisation and processes, people and culture, IT), and on the other hand, the alignment of these five maturity dimensions. (Batenburg et alii., 2008, pp. 6-7)

The table below provides a summary of the maturity models. The table is an extended version of the summary in Schiele's 2007 study. Most of the models apply to procurement in general, but there are also domain-specific models, such as e-government or MRO procurement. The models work with 3-5 maturity levels, most work with 4 levels. In the distribution of the number of indicators, there is a wider spread. The fewest use 8 indicators, while most use 42. The evaluation criteria are similar across the different models. For the newer models, there are differences in the designations or the introduction of new criteria, possibly due to their field specificity.

While there is no single evaluation aspect that is found across the board in all models, typically organisation, design, process and human resources are found in most models.

The relevance of maturity in procurement and supply management has been clearly confirmed scientifically, but there are now concerns about the practical application of the models. Generalisation does not work for maturity models either. It is impossible to apply a single model to all types of organisations/companies and their departments, and maturity models are much more difficult to implement in small and medium-sized enterprises. (Tontini et alii, 2016, pp. 316-317)

The research of Patrucco et al. shows that the way procurement departments are organised has an impact on procurement performance, and thus on the overall performance of the company. Important characteristics of procurement departments include the formal and informal recognition of the procurement function within the organization, the degree of centralization and decentralization of decision making, the formalization of procurement tasks and procedures, the specialization of procurement tasks, the automation of procurement, and the level of maturity of procurement departments. (Patrucco et alii, 2017)

All these models have in common that they describe several stages a company has to go through to reach a high level of maturity, and these stages are all auditable

In summary, the performance of procurement and the extent to which it is able to achieve its objectives is influenced by the level of maturity of procurement. This includes a number of aspects, which are essential to examine, both for the procurement organisation and the procurement function. The different models provide a general picture of the possible aspects to be examined, but it is important that they are developed taking into account the specificities of the organisation.

3. Methodology and findings

Maturity models are usually presented by outlining a succession of growth stages that depict the potential upward development or performance improvement of organisations in a series of successive steps. (Batenburg, 2007, p. 3) The objective of this paper is not to define the maturity level of organisations, but only to examine the relative positioning of each evaluated group of organisation in relation to the others. The below framework was needed to be able to process and visualise the data.

Respondents answered nine sets of questions to measure the current maturity level of the public procurement organisation. The assessment was made through nine possible dimensions of public procurement, including strategy, transparency, type of procurement, strategic importance of procurement, procurement policy, procurement plan, contract management, type of procurement work and expertise. These nine indicators were selected on the basis of the 8 to 42 indicators found in the relevant literature, in such a way as to be most readily relatable to the terminology used by the research participants in their everyday work. The research design is composed of secondary and primary elements and uses both quantitative and qualitative methods, i.e. a mixed methodology. In the case of mixed methodologies, the aim is to combine and use quantitative and qualitative methodologies together, and thus to enable a better, broader interpretation of the phenomenon.

The primary aim of the secondary data collection and analysis was to provide an adequate literature base for a qualitative analysis of the assumptions by reviewing and systematising the national and international situation and literature

Performance management can be interpreted at many levels (macro, micro and mezo), which are interdependent and therefore not separate, but my research focuses primarily on indicators suitable for measuring performance of public procurement at the organisational level.

The aim of the questionnaire survey was to identify the indicators through which public procurement practitioners in Hungary see the most feasible way to measure the performance of public procurement, and in particular to measure and improve efficiency. The questionnaire contained 26 closed and 1 open questions. The questionnaire was structured in 3 parts. The first general part (4 questions) asked about the respondent's place and role in public procurement, which in fact allowed a description of the surveyed population. The second part (17 questions in total) contained questions to help explore the current operational framework of public procurement departments. In this section, questions were asked about the public procurement organisation itself, its operational environment, and the public procurement strategy, which explored the practical approach to the current situation. Therefore, in the analysis, there are cases where $n=107$ is replaced by a smaller value. This second part is the most relevant part for this study. In the third section (6 questions), there were questions aimed at assessing possible indicators of public procurement performance and identifying the most appropriate indicators to increase efficiency

Figure 1 summarises the values obtained by organisation type and dimension, thus giving the maturity level.

Each dimension was assessed individually, sometimes by combining several questions and answers, broken down by sector.

In the case of strategy, three questions were evaluated. First the existence of a written organisational/company strategy, secondly its cohesion with the procurement strategy and finally the frequency of review.

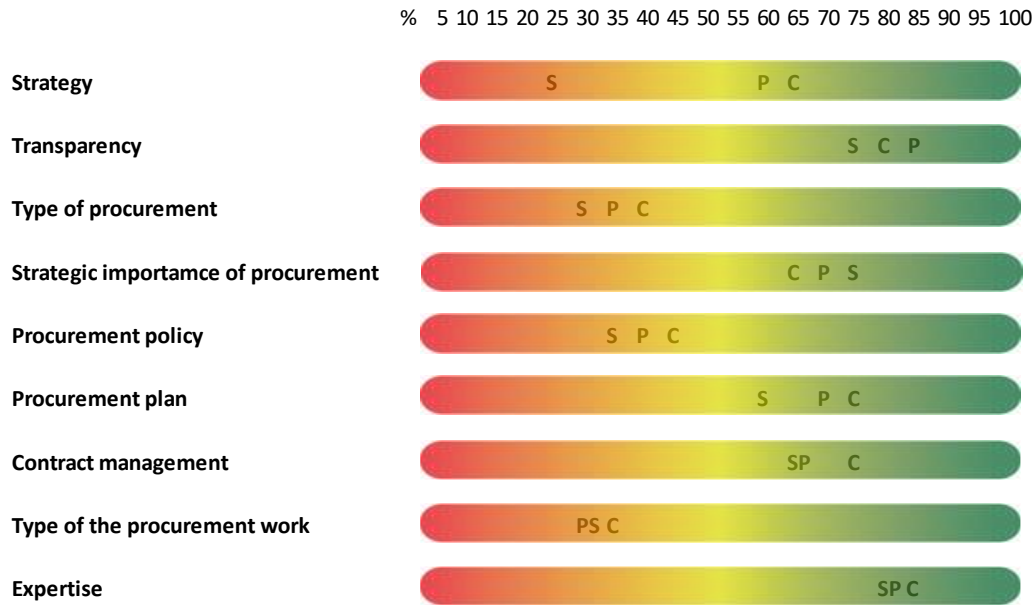
57% of all respondents indicated that they have a written corporate/organizational strategy. During the examination of the distribution by organizational type, it was by mean, that large companies have written corporate strategy. In case of public administration, the picture is more nuanced, 58% of the respondent has written strategy. In the case of SMEs, this ratio is reversed, and for the most part there is no written corporate strategy. As a next step, respondents were asked about the cohesion between the procurement strategy and the corporate strategy.

Procurement processes must be examined as part of the organizational strategy. Procurement must be included in the budget process, in the selection and strengthening of suppliers, in environmental, quality and other technological development issues. Procurement managers are in a position to influence positively or negatively company performance, environmental and social impacts (Rono, 2017, p. 14)

Based on the evaluation, it can be concluded that only 28% of the total population's procurement strategy is an integral part of the company/organizational strategy. The significant difference between SMEs and large companies also observable here. while public organizations again stay in middle.

Periodic review of the purchasing strategy is also very important, as this is the only way to ensure the necessary and timely changes in the constantly evolving external and internal environment. In this case, the questionnaire only asked whether the organizations carry out regular review of their strategy. Narrow down the population to organizations with a procurement strategy, total figures shows that 88% of organizations carry out activities to review their strategy. While for SMEs (67%) and state administrations (64%) the review is typically done annually, for large companies it is typically periodically every 2-4 years (53%). Overall in relation to strategy SME's are lagging far behind, while public organizations are on a better mature level (still not satisfactory) close to the corporate segment.

Figure 1: Maturity levels of national organisations compared to each other (edited by the author)
 S=SME’s; P=Public Administration; C=Corporate



The second evaluated category was transparency, as a well-functioning procurement system based on accountability and transparency which is critical for proper economic management at both organizational and state levels.. On the one hand, organisational transparency, on the other hand, overall systemic transparency. Here again, SMEs scored the worst, while public administration came first, reflecting the state of compliance with the law. For public administration, it is a legal requirement to be transparent and accountable in the use of public funds, thus in this part their performance is the best.

In terms of the type of procurement, the respondents had to evaluate their procurement organization based on the specified criteria, they were asked to rank the operational framework and role of the public procurement organizations. Most of the population considered the compliance with legal rules to be the most relevant, on the second-place traditional procurement, on the third-place completion of daily tasks, fourth strategic procurement, and finally value for money. Also, on sector level all three sectors identified legal compliance as top priority, thus all are in the bottom third. Interestingly, the value for money principle was the most important for SMEs and the least important for large companies, but the strategic importance was the most emphasised by large companies. Ranked by sector, strategic sourcing came second for both large companies and SMEs. As public administrations ranked in the bottom two places, both for strategic sourcing and for the value for money principle, they received the lowest scores on this issue. Value-for-money procurement should play a much greater role in the public sector, especially as there is a legal obligation to do so in the public sector. However, the result does not show a good track record. It suggests that, in practice, the public interest and the private interest are not equally weighted. While in the public sector, the result shows that the public interest is not adequately served, in the private sector the private interest is much more prominent.

The next set of questions assessed the strategic importance of the procurement role. As the strategic function is given priority over the administrative, supportive function in all three sectors, all three sectors are therefore in or close to the top third segment. SMEs were the strongest in this area, while large companies were the weakest, with the smallest difference between the two averages.

The elements of the procurement rules were assessed on the basis of the percentage of yes answers. The percentages were then averaged to give the total percentage and hence the ranking. Here, all three sectors performed worse than 50%, with the large enterprise sector coming closest at 49%, and SMEs performing worst with 37%. When assessing the question on the public procurement plan, the order of the scores was the same as for the previous question. As SMEs are the least linked to the objectives of the organisation and least supportive of resource allocation, they scored the worst here too. However, it should also be said that all sectors scored at least 60% on this question, which is basically a good picture of the quality of public procurement plans.

Overall, the results show that the quality of formal tasks is better in the large corporate and public sectors than in the SME sector. One possible explanation for this could be the quantity and quality of resources available.

In the area of contract management, large companies were the best overall performers, which is in line with expectations. This question was assessed by averaging the percentage scores of three sub-questions (monitoring, evaluation of contracts implemented and reuse of information). Since large companies monitor 100% of their contracts and 84% of them use the information obtained in the process of concluding new contracts, they scored in the top quartile on this question, while the other two sectors were slightly behind but also in the top third. In the area of contract management, the public sector also scored worse than the large business sector, despite the fact, that it is a legal obligation to develop, operate and monitor engagement. Looking at this issue in more depth, as already described above, the results suggest that the private and public interest are not pursued with the same efficiency and that the public interest is lagging significantly behind.

In the next question (Type of procurement work), the respondents had to score the activities performed during their daily work according to how important a role they play. The 19 daily tasks were primarily selected from the range of tasks that produce added value and thus increase performance according to the literature, in order to examine the order of importance they occupy in each type of organization. Basically, the primacy of compliance with the legislation already established above has been proven here as well. The average score given by the entire population is 3.69, thus 72% of respondents rated it as relevant or completely relevant. In second place the obligation to provide data and contract management were scored. Among the Hungarian public procurement organizations, the activities to which 70% or more of the respondents gave a rating of 0, 1 or 2 can be considered as the least important. Based on the responds, such activities are: mapping procurement markets, searching for new suppliers (70%), preparing and conducting green/social procurement (73%), conducting procurement that takes into account the full life cycle cost (70%), performing tasks related to logistics and shipping (80%), risk management (75%), supplier evaluation and development (76%), procurement portfolio analysis (70%). There is no significant difference between the sectors. The obtained picture is, that those activities that produce more added value based on the literature were ranked further back by the domestic experts.

The last assessed area is the relevant expertise. Trainings and expertise of the public procurement workforce is essential to ensure that the persons carrying out procurement have the skills and abilities that enable them to carry out their work and tasks in accordance with the legal regulations, efficiently and effectively, thinking strategically, in order to obtain the best possible price, which can provide the best value ratio. None of the respondents consider that domestic professionals do not have adequate knowledge, so no one gave the value 1. Only 1.61% of the total population gave a rating of 2. 35% of the respondents gave a rating of 4, while 51% gave a rating of 5, i.e. 86% of the respondents believe that procurement professionals have the appropriate knowledge to properly and efficiently conduct public procurement. In the case of large companies, this ratio, i.e. the ratio of those giving 4-5 evaluations, is 100%, but tends to shift towards the lower value. Although there were respondents in the state administration who believed that the specialists did not have adequate knowledge, even here the highest percentage (54%) of respondents who fully agree with the existence of specialist knowledge is found here. In the case of SMEs, a significant majority of respondents gave a rating of 3 and 4 (54%), which suggests that it is more difficult for SMEs to pay specialists and/or provide training due to their size and type.

5. Conclusions

Based on a comparison of the current maturity levels of domestic procurement organisations by sector, as identified in the literature, and related to organisational effectiveness, the maturity level of the public sector differs only partially from the maturity level of private sector (SMEs and large corporates). Based on the processing of the primary research, the public sector is on higher maturity level than the SME sector, while the public companies are at a less mature level, but closer to the maturity level of large corporate companies.

There is an important linear relationship between the maturity level of the procurement function and its performance. The results suggest that the weakest type of organisation in terms of procurement performance, which is essentially focused on legal compliance within a traditional framework. By mapping the maturity level of domestic organisations, the current situation can help to better tailor programmes to improve organisational effectiveness to the baseline situation.

In terms of transparency, the responses clearly show that the public sector has a clear preference for the legal framework, and that the main aspects that determine the objectives of procurement performance are: legal nature, day-to-day tasks, and the priority of traditional procurement elements, rather than efficiency and effectiveness. In large companies, and especially SMEs, private interests prevail more thus the value for money principle is more prevalent. In the public sector, among the elements that represent value add functions, those that contribute to the implementation of efficient procurement, such as conducting procurement considering full life-cycle costs, green and social procurement, supplier evaluation and development, innovation-friendly procurement, quality and risk management, are very low priority in the current operational framework. In the public sector, contracts are monitored, but the evaluation of their implementation is already lagging behind the performance of the private sector and the re-use of information is less, thus clearly lagging behind the private sector

Based on the results of the questionnaire survey, several further conclusions and findings can be drawn, and the identification of the public procurement profiles (for example: identifying strengths and weaknesses based on each aspect) of each sector can be targeted as a possible area of research. In order to improve the performance of domestic public procurement organisations, more emphasis should be put on the implementation of efficient procurement. Based on the responses received, there are indications of progress, but further incentive programmes towards value for money procurement should be introduced.

The existence of professional capacity is an important topic. From one side, respondents rated the existing professional knowledge on a high level, but on the other side, they also identified the need to increase the expertise and skills of public procurement staff as the primary means to improve performance. This suggests that the professional training adapted to the current legal framework is of a high standard and results excellent professionals. However, the skills and trainings that are currently available are not sufficient to make public procurement more efficient, effective, and economical.

The research suggests that neither the level of organisational maturity nor the skills of the professionals are yet sufficient to properly apply the main objective of public procurement, namely best value for money, in the public sector.

The results also show that much more emphasis should be placed on policy objectives. These are currently not among the most important objectives. Promoting the uptake of sustainable development and socially inclusive procurement can improve the quality of the Hungarian public procurement.

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Multimedia Technologies in Museum Education for People with Visual Impairments

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Abstract

The role, aim and identity of the museum in the 21st century are in transformation. Museums today strive to attract all groups of visitors, to meet their needs and expectations for an autonomous museum tour and an enjoyable experience in an inclusive and accessible environment. Many museums in this context of cultural democratization have set up initiatives to create digital devices and implement innovative applications for people with visual disabilities. Accessing museums has always been difficult for blind or partially sighted visitors, not to mention enjoying the works of Art. By introducing assistive new technology devices, museums provide special education services for visually impaired visitors, ensuring a pleasant stay in a barrier-free environment, where disabled people could feel welcome and coequal to any other visitor.

Drawing, mainly, on the multimedia technologies in museum education for people with visual impairments, this paper presents several digital projects and applications, such as iMAP (Interpreting Visual Art for the Visually Impaired), HOMERE (Haptic audiO Multimodality to Explore and Recognize the Environment), Be My Eyes and TapTapSee, Out Loud, devices and apps that enhance and enrich museum education experience for blind or partially sighted visitors.

Keywords: Inclusivity, Accessibility, Visually impaired, Museum Education, Multimedia Technologies,

1. Introduction

In 1960, UNESCO, in the context of drawing up a global cultural policy, promoted culture as a public good that originates from the community and should return to it, thus, establishing effectively the concept of cultural democratization, a model which supports the facilitation of access for all in cultural institution and encouraging the potentiality of their participation in cultural events.

Practically, half of a century later, the Convention on the Rights of Persons with Disabilities recognizes the right of persons with disabilities to take part on an equal basis with others in cultural life and states that *cultural institutions should take all appropriate measures to ensure that they enjoy access to cultural, activities and materials in accessible formats and to places for cultural performances or services, such as museums, monuments and sites of cultural importance*. It also enshrines the need for *recognition and support of their specific cultural and linguistic identity, including sign languages and deaf culture*.¹

Gradually, it was realized that it is in favor of museums the opening up to all groups of visitors, in opposition to the image of traditional museums cultural authority, exclusivity and isolation from the modern world. The ideas of audience development, participation, active involvement and engagement entered the global museum scene.² Thinking about inclusive and multivocal museum practices from the individual perspective of every potential visitor has become an essential endeavor for museum professionals to instantiate audience as actors with personal interests, knowledge and preferences and to make museum spaces safer and more human-centered than before.

¹ Access to cultural life for people with disabilities, [https://www.europarl.europa.eu/RegData/etudes/BRIE/2019/644200/EPRS_BRI\(2019\)644200_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2019/644200/EPRS_BRI(2019)644200_EN.pdf) (access 10/01/2023)

² Transforming Future Museums: International Museum Academy Audience Development Toolkit <https://www.britishcouncil.gr/sites/default/files/ima-audience-development-toolkit.pdf> (access 10/01/2023)

2.1. New perspectives for an inclusive museum experience

Focusing on the current role of contemporary museums, we would say that after disseminating of New Museology theory principles, more and more museums are doing what it takes to make visitors want to come and feel welcome when they arrive, engage them during their stay and make sure they are eager to return. Many of their aims and interests are directed to education services, tasked with serving various audiences and to the social function of museums as visitor-friendly cultural hubs rather than object-oriented Art Temples, often neutral and indifferent to visitors needs and expectations.

Furthermore, a museum, shouldn't cause to disabled visitors the feeling of weakness, exclusion and fruitless effort, neither the access should be limited to mobility matters and how to overcome existing physical obstacles. On the contrary, what every museum should do is to re-examine radically its social role, to encompass emerging trends and challenges in order to enhance inclusiveness and accessible services for all groups, regardless their degree of ability or inability. The design and function of a barrier-free museum should make no one feel excluded.

People usually take for granted the ability to observe and admire museum exhibits. Unfortunately, this is not a fact for disabled visitors. In this sense, museums educational policy should generate alternative terms and conditions, implement inclusive actions and embrace innovative services for people with disabilities.

Certainly, modification of their infrastructure and upgrade of their equipment, such as wheelchair entrances, ramps and handrails are very important, but not adequate, if they are not followed by further provisions, improvements and facilities that meet the needs of all visitors and ensure an autonomous and appealing museum experience even for disabled audience.

The modern museum, according to Falk and Dierking's "*Interactive Museum Experience Model*"³, should satisfy three levels of services for every group of visitors. It should combine physical, social and personal aspects:

- the physical, which concerns museum space and mobility within it
- the social, which refers to the effective relationships that can be developed between museum collection, personnel and audience and
- the personal, which reflects the specific needs of each visitor. (Falk & Dierking, 1992)

Additionally, the process of learning in the museum should take into account certain determining factors, such as:

- the personal motivations and expectations of visitors
- their pre-existing knowledge and experiences
- their interests and perceptions, as well as
- their ability to absorb and assimilate the messages they receive. (Falk & Dierking, 2000)

Therefore, an ideal museum is the one that caters to people with a wide range of needs and treats them exactly as they are, as individuals with varying expectations, possibilities, interests and limitations. Visiting a museum and enjoying the works of Art, could be though prohibitive for someone being blind or having low vision, when the appropriate conditions have not been provided. Indeed, people with visual impairments are often not interested in visiting museums because in many cases they face barriers, as museums do not provide services for blind or partially sighted visitors.

In some venues, information is not accessible, buildings are difficult to get to or to move around in, display texts are in tiny print and handling sessions aren't organized. Audio guides, audio descriptive displays, special designed guided tours, tactile images, tactile exhibitions and 3D printing, handling sessions, large-scale printed information, magnifying sheets, labelling and interpretation texts in braille are ways for a museum to improve access and education techniques for visually impaired people. (Tzanavara, 2020) Yet still, they might not be enough, as it is crucial for people with blindness or reduced vision, despite the usual ocular centrality of displaying museum collections, to feel truly welcome, to communicate as any "mainstream" visitor and perceive a prime opportunity to follow their own pace and explore independently a museum environment.

2.2. Theoretical approach in Museum Education

*...The only purpose of museums is education in all its varied aspects....
That education must be active, not passive and
it must always be intimately connected with the life of the people....
must be thought of as existing for the public and
not as processes isolated and self-sufficient unto themselves⁴*

(Low Theodore, 1942 "The Museum as Social Instrument")

³ Professor John Falk, Director of the Institute for Learning Innovation, University of Oregon, specializes in free-choice learning, based on the interests and needs of each individual. Professor Lynn Diane Dierking, Dean of Research at the above Institute specializes in free-choice learning for youth, family and community.

⁴ Theodore Low (1942) was an American art museum educator at the Metropolitan Museum of Art

With education undergoing significant change around the world nowadays, as a result of socioeconomical changes and technology growing exponentially, during the last decades of the 20st century became obvious to museum professionals that it was time to redefine museum education besides knowledge, in a more expanded sense, including terms as happiness, interaction, inclusivity and experience of the individual. Not lessening the importance of safeguarding art and cultural artifacts, it was crucial for museum professionals to understand that instead of teaching “at” people, museums as cultural institutions should focus more on how visitors of all backgrounds and potentials, included disabled people, could actually enjoy the experience of being in a museum environment.⁵ It was also essential to realize that museum education programs should be designed to enable every visitor to perceive and interpret museum exhibits through a multisensory approach, according the needs and expectations of a diverse audience.

According to John Dewey⁶, one of the preeminent educational theorists, all genuine education comes about through experience, “learning by doing”. This means that museum exhibits should be used as tools for reflection, thought-provoking, search, interaction and communication with the audience. Learning in the museum should act as a challenge for the visitor, but at the same time as a challenge for the museum educator, so as to design programs connected to visitor’s daily life, programs that embrace the complexity of his/ her life (Macdonald, 2006), facilitate and promote the interaction, activate relevant pre-existing experiences of the visitors (Ansbacher, 1998) Museums are not institutions that follow a linear curriculum; museums are places where visitors can learn actively. Dewey contrasts progressive to “static” education and discusses about participatory experience and hands-on activities for every group of visitors in a museum.

When designing inclusive education programs, museums can also apply the multiple intelligence theory of Howard E. Gardner (Morgan, 2021), the American developmental psychologist, who introduced several types of intelligence, for helping instructors pluralize their methods of assessment and enrich learning experience. During the implementation of multiple levels of intelligence in a museum program, such as verbal-linguistic, mathematical -logical, visual-spatial, musical-rhythmic, bodily-kinaesthetic, interpersonal, intrapersonal and naturalistic intelligence, visitors are encouraged to observe and explore museum exhibits, to ask questions, develop their imaginations and cultivate their skills. (Hooper-Greenhill, 1996) The ability of a person in one type of intelligence does not simultaneously presuppose ability in another or in all other types, since each individual acquires knowledge in a different way. (Kakourou – Chroni, 2005) If a disabled person has a specific impairment, a museum inclusive education program could stimulate a type/ or types of intelligence that overcome this disadvantage.

Gardner's education theory clarifies the distinction between a traditional and a new museum, as it introduces concepts and perceptions, which in no case would have concerned museum professionals a few decades ago, when learning in the museum was primarily focused on the "exaltation" of the objects and bumped into the “Do Not Touch” policy.

Another most used visitor-centered museum education model is the Discovery Learning Method, an active, hands-on style of learning, originated by Jerome Bruner in the 1960s.⁷ Bruner emphasized, like Dewey, in “learning by doing.” In this sense, museum education policy replaces predetermined routes within museum space and encourages visitors (disabled audience included), to follow their own path, to use their intuition, imagination and creativity, to reflect and search for new information, to experiment through multiple viewings, narratives and interpretations of the museum objects.⁸ Thus, instead of passively receiving knowledge, they are encouraged to observe and explore a museum environment on their own, to interact and participate in activities especially designed for their needs and abilities, to perceive and interpret museum collections, through experimental processes and supportive material for active learning. (Nakou, 2001)

2.3 Multimedia technologies in museum education for visually impaired visitors

Art and vision are almost synonymous, and up until recently, it would have been impossible for people with hindered sight to experience art. Luckily, several assistive technology applications and devices were designed to facilitate people with visual impairments and provide for them an enjoyable, multisensory museum experience.

⁵ “What is a Museum?” by Theodore L. Low (2019), <https://dvd.co/what-is-a-museum/> (access 27/01/2023)

⁶ John Dewey (1859 – 1952) was an American philosopher, psychologist and educational reformer whose ideas have been influential in education and social reform.

⁷ Jerome Bruner (1915-2016) was an American psychologist, who introduced the cognitive learning theory in educational psychology.

⁸ Instructional Design Models and Theories: The Discovery Learning Model, <https://elearningindustry.com/discovery-learning-model> (access 27/01/2023)

2.3.1. TapTapSee ⁹

TapTapSee (fig. 1) is a digital assistive technology application for people with blindness and low vision, available for ios and android. It uses the functions of the camera and the Voice Over technique to photograph objects and identify them aloud to the user. It describes photos, taken by a mobile camera, designed for users with visual impairments. The user photographs the museum exhibits that he wishes to "discover" and "interpret" and the application recognizes them and converts the image into verbal description. Since, lighting conditions are very important for the quality of identification, once TapTapSee is ready and focused on the desired object, it notifies the user audibly that it is in the optimal position to take a photo or video.

The application can work equally for two-dimensional and three-dimensional objects, which it detects, photographs from any shooting angle, analyzes accurately within seconds (the process lasts approximately 10 seconds or less) and identifies through the device's Voice-Over. For example, if the user takes a picture of a museum exhibit and wants to know what it is, the app can "read" loudly the explanatory text, like real-time streaming performance.

TapTapSee is particularly useful in museum education of visually impaired visitors, encouraging disabled learner's independence and promoting learning opportunities to navigate, select and explore museum objects on his own time and preference. It is an effective learning tool, surprisingly accurate and employs multiple cues before describing the object. Users find it effective to improve their independent mobility in and around the museum environment.

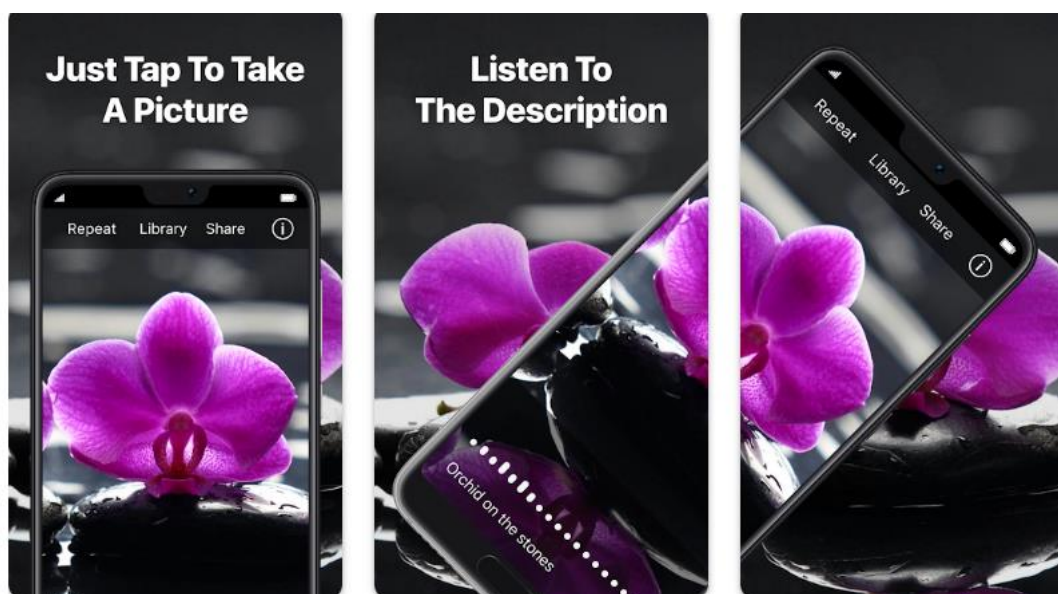


Fig. 1 TapTapSee application for people with blindness and low vision

Source: <https://www.vlanj.org/app-highlight-taptapsee/>

2.3.2. Seeing AI ¹⁰

Another application that facilitates learning for blind and visually impaired people is Seeing AI (fig. 2), a free easy-to-use iOS app that narrates the world around the user, by describing photos on a mobile phone or a tablet. Designed for the low vision community, Seeing AI harnesses the power of Artificial intelligence (fig. 3), to describe text and objects and provides visually impaired people an easier way to understand the world around them through the cameras on their smartphones. Seeing AI can act as visitor's eyes within a museum space, empowering people with visual disabilities and giving them an insight into museum exhibits. Seeing AI uses the rear camera on a smartphone to identify objects, turning the unseen image into an audible experience. The app describes the colors visible, scans and reads interpretive texts, generates sound related to the objects, describes facial expressions and enhances museum experience.

⁹TapTapSee, app for visually impaired people, <https://taptapseeapp.com/instruction.html>, <https://socialdigital.iadb.org/en/gdi/solutions/access-and-connectivity/taptapsee-app-visually-impaired-people>, <https://www.iaccessibility.com/apps/deaf-blind/index.cgi/product?ID=59>, (access 11/01/2023)

¹⁰Seeing AI app, <https://www.pathstoliteracy.org/resource/seeing-ai-free-app-narrating-world-around-you/>, <https://www.microsoft.com/en-us/ai/seeing-ai>, <https://www.londonvision.org/technology/seeing-ai-app-review/>, <https://www.njstatelib.org/be-my-eyes-and-seeing-ai-how-these-accessibility-apps-benefit-the-visually-disabled/>, (access 11/01/2023)

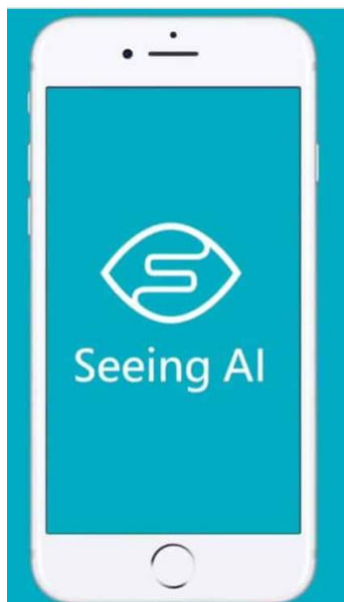


Fig. 2 Seeing AI application



Fig. 3 Artificial Intelligence in museums

Source: <https://www.onmsft.com/news/microsofts-seeing-ai-app-for-the-visually-impaired-now-available-in-the-uk/>,
<https://blog.techsoup.org/posts/how-museums-use-ai-and-tech-to-improve-visitor-experiences>

2.3.3. *Out Loud*¹¹

The Out Loud app at the Andy Warhol Museum (fig. 4) is designed by Apple to be compatible with iPhone - iPod devices and requires iOS 9.0 and above. The Museum, the largest museum in North America dedicated to a single artist, implements accessibility programs for every category of audience. A major innovation is this audio and tactile guide, an inclusive and comprehensive device designed to make Warhol's life and work accessible to the visually impaired help visitors with visual impairments, navigate Warhol's world. (fig. 5) The app offers optimized text reading or large font, accompanied by audio information. It works with Voice-Over and Dynamic Type, providing detailed descriptions of Warhol's works with low energy bluetooth technology – beacons. The narration of the "stories" and the description of the images with an audio tour are activated automatically, depending on the location, in which the visitors are in the museum area. At the same time, through touch, the visitor is led to "explore and read" three-dimensional tactile images, copies of the artist's works. (fig. 6)

According to Desi Gonzalez, director of the Museum's Digital Participation department, visitors with visual impairments perceive the colors and contours from the different levels formed on the surface of these reproductions, giving a sense of relief and thus facilitating the tactile process, which is accompanied by the corresponding audio description through the Out Loud application. Rather than asking visitors to input an art number, as most audio guides do, the app uses beacons installed near different art pieces to bring up information about the piece. When the app is launched, it recites stories of Warhol's life in addition to audio recordings and Warhol-based anecdotes told by his associates.

This interactive based audio guide has several features including, its ability to pick up on visitor's audio preferences and interests. But the features do not stop there, located on the seventh floor of the museum there are 3D printed touch replicas of select Warhol pieces. These features allow visitors to experience original 2D images with their hands. Screenprinting lends itself especially well to this approach, since the colors are printed in layers they can be more easily separated and translated into tangible sensations.

¹¹ The Warhol: Out Loud, <https://apps.apple.com/us/app/the-warhol-out-loud/id1103407119>, <https://gonzalez.desi/2018/08/01/out-loud/>,
[https://www.pittsburghartistresources.org/venue/andy-warhol-museum/\(access 11/01/2023\)](https://www.pittsburghartistresources.org/venue/andy-warhol-museum/(access%2011/01/2023))

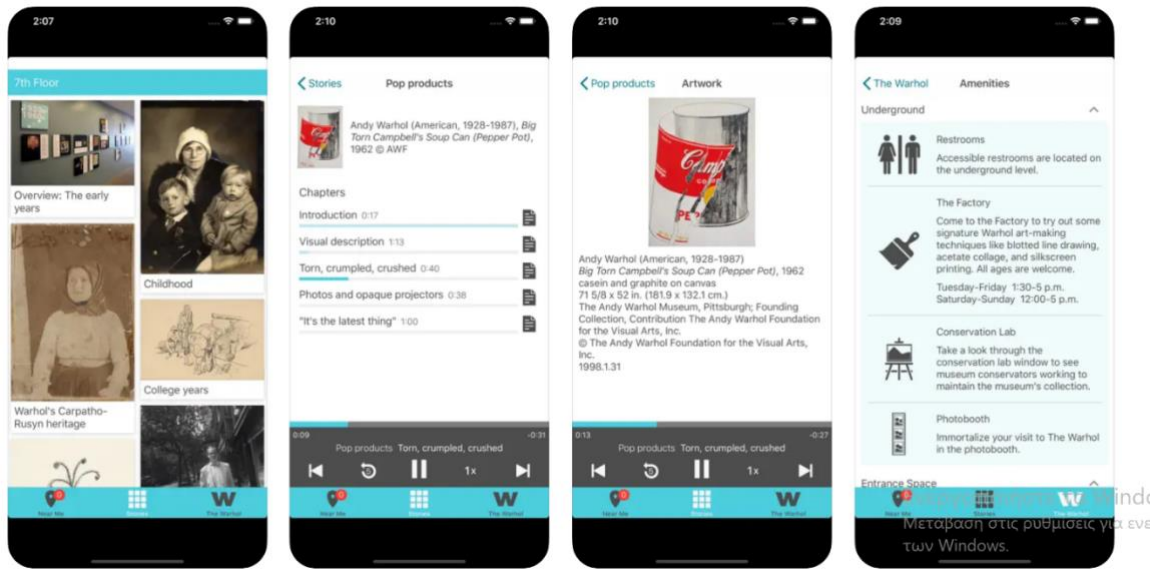


Fig 4 The Warhol: Out Loud

Source: <https://apps.apple.com/us/app/the-warhol-out-loud/id1103407119>

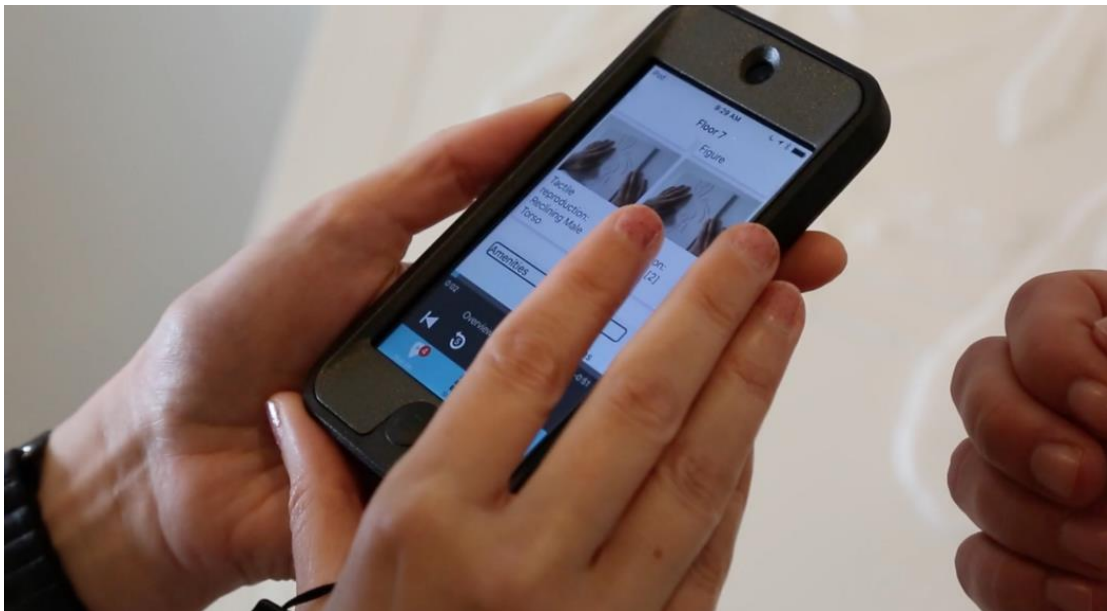


Fig. 5 Visitor using the Andy Warhol Museum's inclusive audio guide "Out Loud"

Source: <https://studio.carnegiemuseums.org/out-loud-cdc979453ef0>



Fig. 5 Visitors using the “Out Loud” mobile application while experiencing a tactile reproduction
Source: <https://studio.carnegiemuseums.org/out-loud-cdc979453ef0>

2.3.4. HOMERE (*Haptic audiO Multimodality to Explore and Recognize the Environment*)

Virtual reality technologies are applied to the assistance of people with physical impairments, so as to develop new skills, communicate more easily and simply have fun as everyone. The recent diffusion of haptic and auditory interfaces enabled VR systems for people with visual disabilities (haptic for reading, drawing, artistic creation, education and gaming, while auditory for reading, displaying visual information into verbal, navigation in virtual environments and also gaming) (Lécuyer et al., 2003)

HOMERE is a Tactile and Auditory Multimodal System for Environmental Exploration and Recognition, that provides the user with different sensations when navigating inside a virtual world. (Kuriakose et al., 2020) This virtual reality system focuses on three main applications for blind and visually impaired people:

- *Preparation through simulation for visiting a real space, such a Museum*
- *Training of the blind in the use of a cane for safe movement in the environment*
- *Entertaining exploration of a virtual environment (e.g. digital museum)* (Lécuyer et al., 2003)

To achieve its operational purpose, the HOMERE system proposes an approach based on the multimodal sensory (tactile-auditory) immersion of the visual impaired user in a virtual environment (with the manipulation of a virtual blind cane and various sounds corresponding to the ambient atmosphere and to specific events). (fig. 6-7) The tactile channel detects obstacles in the space and accustoms the user to locate them for safer navigation, e.g. in a Museum hall. At the same time, through touch (with the palm and fingers) it accurately recognizes the shape and texture of objects, e.g. of museum exhibits. The auditory channel provides information about their material and distances within the space. Sounds can also be used to enhance the user's spatial orientation and alert them to obstacles. (Lécuyer et al., 2003)



Fig 6-7 Haptic audio Multimodality to Explore and Recognize the Environment
Source:

https://www.researchgate.net/publication/221402565_HOMERE_a_Multimodal_System_for_Visually_Impaired_People_to_Explore_Virtual_Environments

2.3.5 iMAP

i-Map is an online art resource designed primarily for visually impaired people with a general interest in art, art teachers and their visually impaired pupils. The art works chosen, engage with subjects such as landscapes, still lives, interiors, portraits and with a wide range of techniques, materials and styles.¹² As Caro Howell, former Curator in the Youth and Special Programs department at the Tate Modern Gallery- London, argues “*i-Map application aims to be a personalized source of cultural information for visually impaired people interested in contemporary art and it uses animation to simplify, enlarge and pull out key elements of an artwork*”. (Mayfield, 2002)

The first i-Map project was implemented at Tate Modern in 2002 as an attempt to fill the gap in the cultural integration of visually impaired visitors, as for these people the possibilities of contact with works of art are very limited. The innovative use of animation led to the application being awarded the BAFTA (British Academy Film Awards) Interactive Award for Accessibility in the same year. He was also honored with the 2002 Visionary Design Awards and the 2003 Jodi Mattes Award.¹³

This digital application gets blind and low vision people into contact with museum exhibits, bringing visual elements of works of art to life with the use of moving image. This image is often accompanied by an audio interpretation of these elements, sometimes also with written text in a font adapted to the degree of visual difficulty of the person. The blind visitor can use the application either during his visit to the museum, or from a distance, choosing images from the Art works in the collection, which he can print on a special 3D printer and "explore" haptically. (fig. 8-9)

2.3.6 Be My Eyes¹⁴

Created by a global community and for people with vision challenges, the app is a daily resource for people who need help visualizing the real world. Be My Eyes is a free application, very simple to use, for receiving video support at a moment's notice. Sighted volunteers “lend” their eyes to help blind and low-vision people lead more independent lives. The app is available for iOS and Android and it also supports large text and large displays. Its primary purpose is to connect blind and visually

¹² iMap: Creative Access, <https://www.tate.org.uk/imap/imap2/index.shtml> (access 11/01/2023)

¹³ Project history, <https://www.tate.org.uk/imap/imap2/projecthistory.shtml> (access 11/01/2023)

¹⁴ Be my eyes, <https://www.bemyeyes.com/>, <https://www.perkins.org/resource/be-my-eyes-app-review/>, <https://metro.co.uk/2018/06/28/app-lets-blind-persons-eyes-anywhere-world-7661205/>, <https://www.afb.org/blindness-and-low-vision/using-technology/assistive-technology-products/mobile-apps> (access 9/01/2023)

impaired people with volunteers, who provide them with visual support via live video call, in daily activities, including cultural integration.

The goal of the "Be My Eyes" application is to make the urban landscape accessible to the blind or visually impaired user. Volunteers can view users' environment through a higher-resolution rear-facing camera, "become their eyes" and guide disabled visitors where to turn in a space, where to move, where to focus depending on their interests and needs. (fig. 10)

In a museum environment, the app could assist museum professionals to facilitate visitors with visual disabilities to navigate in unfamiliar surroundings, to locate a museum object and to "read" explanatory labels and texts.

In 2016, Be My Eyes won a Danish Design Award in the category "Share Resources" and became one of many selected winners from 1965 to 2018. Be My Eyes founder Hans Jørgen Wiberg was invited to speak at the opening of an exhibition (2018) celebrating Danish design at Struer Museum – Denmark. (fig. 11)

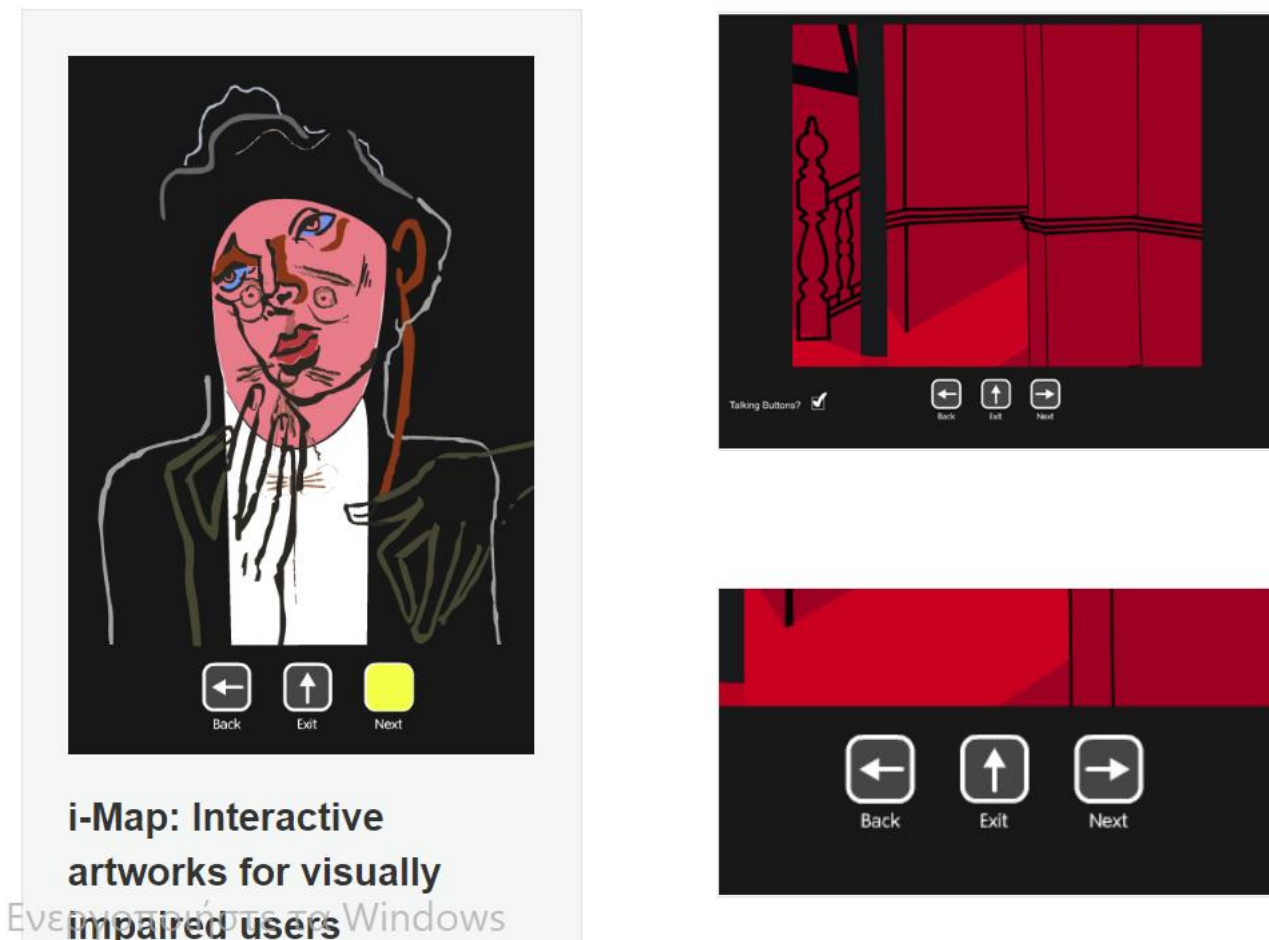


Fig. 8-9 Navigating artworks with iMap

Source: <https://www.tate.org.uk/imap/imap2/userguide.shtml>



Fig. 10 Be My Eyes - Bringing Sight to Blind and Low Vision People

Source: <https://www.artboost.com/projects/be-my-eyes>



Business

Community



Fig. 11 Be My Eyes displayed at Struer Museum (Denmark)

Source: <https://www.bemyeyes.com/blog/be-my-eyes-to-be-displayed-in-local-danish-museum>

Conclusion

The demarcation and treatment of disabled citizens as third-class citizens will continue to exist as long as human societies remain attached to outdated prejudices and perpetuate stereotypes and norms, as long as cultural and social conditions do not change in the context of a substantial democratization of human consciousness, in the direction of a sustainable society; a society that respects biological and cultural diversity; a society that recognizes the uniqueness of each person beyond differences and diversities.

A participatory museum fulfills its mission as cultural organization in the service of all citizens, when it functions as a means of social and cultural integration, when it creates inclusive conditions for all visitors, implements actions to reach out to underprivileged social groups and ensures a pleasant stay for everyone, disabled people included, with the assistance of New Technologies.

Accessing museums has always been difficult for visitors with visual impairments. By introducing assistive multimedia technologies, such as iMAP (Interpreting Visual Art for the Visually Impaired), HOMERE (Haptic audio Multimodality to Explore and Recognize the Environment), Be My Eyes, TapTapSee and Out Loud, innovative devices and applications that increase, maintain, improve functional capabilities of individuals with disabilities, as well as enhance and enrich museum education programs, modern museums provide special education services for blind or partially sighted visitors.

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