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HEPATOPROTECTIVE POTENTIAL OF POLYPHENOLS IN CCL$_4$-INDUCED HEPATIC DAMAGE

Abstract. In this paper, the hepatoprotective potential of gossitan isolated from the plant *Gossypium hirsutum* L. and getasan polyphenols isolated from the plant *Geranium sanguineum* with carbon tetrachloride (CCl$_4$) was investigated. Goscitane and getasan polyphenols have been studied comparatively with quercetin, a hepatoprotective property that has an effect on blood serum alanine aminotransferase (ALT), aspartate aminotransferase (AST) and total bilirubin levels in toxic hepatitis conditions.The experiments were performed on healthy male rats and CCl$_4$-induced hepatitis model animals divided into 5 groups. Animals of the hepatitis model were given oral quercetin 10 mg/kg, gossitan 20 mg/kg, and getasan 20 mg/kg orally for 20 days. In healthy, hepatitis models and pharmacotherapy rats with plant compounds, changes in blood serum and ALT and AST enzymes and total bilirubin levels in the liver were detected.

Keywords: blood serum, liver, carbon tetrachloride, alanine aminotransferase, aspartate aminotransferase, gossitan, getasan.

In the world today, the number of people infected with acute and chronic hepatitis is increasing as a result of changes in the environment and the release of xenobiotic compounds into the atmosphere in many countries. Scientific research on the treatment and prevention of hepatitis associated with liver injury is being conducted in many scientific laboratories and centers around the world to find drugs that exhibit hepatoprotective properties.

The most effective pharmacological hepatopreparations in the treatment of liver diseases form the basis of a promising source of natural compounds are isolated from plants. Phytohepatoprotectors have special importance from synthetic compounds with their following properties.

While various compounds have endogenous effects on liver enzymes and synthetic drugs have exogenous effects. Involvement of synthetic drugs in liver metabolism often occurs in the presence of cytochrome P 450 [1, 1–19]. Synthetic compounds can reduce the activity of ALT and AST enzymes in blood serum in hepatitis conditions. However, they can form metabolites in hepatocytes that have a detrimental effect on the membrane. Changes in metabolism can occur not only in the presence of synthetic hepatoprotectors, but also in the presence of drugs prescribed in parallel [1, 1–19]. One of the active substances isolated from plants is quercetin, which reduces the formation of active forms of oxygen and lipid peroxidation in liver mitochondria in liver disease [2, 1–10; 3, 49–55]. Among plant hepatoprotectors flavonoids and polyphenols play main role. The hepatoprotective properties of polyphenol compounds are strong and provide a high level of protection of liver function from toxic effects in hepatitis [4, 1–19]. Currently, many studies have been conducted on the effect of such polyphenol compounds on the biochemical parameters in the blood and the amount of ALT, AST, glycogen, total proteins and phospholipids in the liver homogenate in pathologies associated with hepatitis [5, 2118–2125; 6, 2–11; 7, 6020–6047]. Of these polyphenols, gossitan and getasan are also highly biologically active. Gossitan polyphenols isolated from the plant *Gossypium hirsutum* L. [8, 109–117], streptozotocin has been shown to have an inhibitory effect on rat heart and pancreatic mitochondrial megakanal in diabetic conditions [9, 79–84]. The antioxidant activity of getasan polyphenols isolated from the plant *geranium sanguineum* [8, 109–117] was studied in *in vitro* experiments in the mitochondrial model [10, 146–150]. However, the corrective effect of polyphenol compounds such as gossitane and getasan on the dysfunction of hepatocytes and mitochondria in toxic hepatitis conditions has not been studied.

The purpose of the work. To study of the effect gossitan is isolated from the plant *Gossypium hirsutum* L. and getasan polyphenol compounds isolated from the plant *Geranium sanguineum* on the activity of ALT and AST enzymes in rat blood serum and liver tissue and total bilirubin in toxic hepatitis.

Materials and methods. There are currently many types of toxic hepatitis modeling in animals. One such classic method is a model of toxic hepatitis called CCl_4. White male rats with a healthy weight of 180–200 g isolated for the experiment were divided into groups.

I group. Control (healthy n = 5)

II group. CCl_4 0.5 ml/kg

III group. CCl_4 + quercetin (20 mg/kg)

IV group. CCl_4 + gossitan (20 mg/kg)

V group. CCl_4 + getasan (20 mg/kg)

To induce experimental toxic hepatitis in experimental group II, III, IV, and V rats, animals were injected subcutaneously with 50% CCl_4 (0.5 ml/kg) once every 3 days. 21 days after the administration of CCl_4 to rats, after an increase in ALT (60 U/L) and AST (120 U/L) enzymes in the blood, purified coconut oil (0.5 ml/kg) was administered to group II animals once a day, followed by quercetin to group III of the experiment. flavonoids, group IV gossitane and group B getasan polyphenols were administered once daily for 20 days per os.

The activity of ALT and AST in the serum of experimental animals was performed using as a generally accepted method. The principle of this method of determining the activity of enzymes is based on the formation of pyruvic and oxalic acetic acids as a result of chain reactions of ketoglutarate, aspargin and glutamic acids. Pyruvic acid is formed due to the transition reaction of amino groups under the influence of enzymes that ensure the transition of amino groups of aminotransferases from amino acids to keto acids. When 2,4-dinitylphenylhydrozine (2,4-DNFG) is added to this mixture, pyruvic acid hydrosone is formed, which gives color in an alkaline environment. The resulting color is directly proportional to the amount of pyruvic acid.

ALT catalyzes the transfer of amino groups from alanine to pyruvate and glutamate via 2-oxoglutarate.

ALT activity is determined by the rate of decline of NADH (nicotinamide nucleotide) [11, 241–244; 12; 13, 241–247].

Alanine + 2 oxoglutarate → Pyruvate + Glutamate
Pyruvate NADH + H$^+$ → Lactate + NAD$^+$
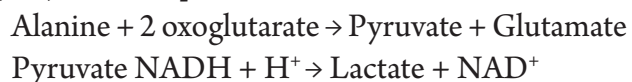
In non-breeding male rats, ALT is normally around 70 ± 1 U/L and in female rats around 56 ± ± 1 U/L. Aspartate aminotransferase (AST) catalyzes the formation of oxalate acetate and glutamate from aspartate through 2-oxyglutarate amino groups. AST activity is determined by the rate of decline of NADH. Color intensity was determined by peptical density using a spectrophotometer at a wavelength of 340 nm [11, 241–244; 12; 13, 241–247].

Aspartate + 2 oxoglutarate → Oxalate acetate + Glutamate

Oxalate acetate + NADH+H$^+$ → Malat + NAD
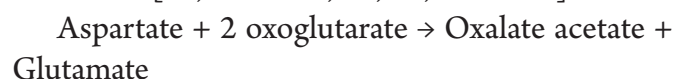
The AST norm is around 58 ± 3 U/L in male rats and 40 ± 2 U/L in female rats. For biochemical studies, blood from rats was centrifuged at 3000 rotation speed for 15 min. The amount of ALT, AST and total bilirubin in the blood of rats was determined using a spectrophotometer. The body and liver masses of the rats obtained for the experiment were determined on special laboratory scales. Research on rats has been conducted in accordance with Helsinki's animal protection bioethics guidelines.

Results and discussion. To make sure that animals develop toxic hepatitis, it is necessary to detect changes in enzymes and some protein types in their blood. ALT and AST are involved in metabolism.

Changes in the parameters of this enzyme signal the onset of the process of necrosis of cells or damage to the heart muscle or liver hepatocytes. ALT, AST, and bilirubin levels in the blood are determined in conjunction with clinical examinations to assess the functional status of the liver. For this reason, determining the amount of aminotrasferases in blood serum is an important diagnostic test in a number of serious diseases, including viral hepatitis and liver cirrhosis. For this reason, our experiments initially determined the effect of plant compounds on the amount of ALT, AST enzymes and bilirubin in the blood serum of animals with toxic hepatitis. According to the results, after 21 days of administration of CCl$_4$ every 3 days, the level of ALT in the blood of animals with toxic hepatitis (group II) was 203.4 ± ± 20.5 U/L, AST 178.6 ± 15.5 U/L and total bilirubin was 18.9 ± 1.6 μmol/l (Table 1.). This means that the ALT, AST, and total bilirubin levels were 2.6, respectively, relative to the control; 3.3; and increased 1.7-fold. The development of toxic hepatitis in experimental animals led to a sharp increase in the amount of ALT, AST and bilirubin in their blood serum. Animals with toxic hepatitis III were administered orally for 20 days with a standard prototype of quercetin with hepatoprotective activity. Serum ALT (86.6 ± 9.4 U/L), AST (68.2 ± 6.6 U/L), and bilirubin (12.5 ± 1.4 μmol/l) levels in rats treated with quercetin for toxic hepatitis were 1.5, respectively, compared with group II; 2.1; and decreased by 4.5 times (Table 1).

Table 1. – Effect of quercetin, gossitan and getasan on ALT, AST enzymes and bilirubin levels in rat blood serum in toxic hepatitis

Experimental groups	ALT U/L	AST U/L	Total bilirubin μmol/l
I control group	77.4 ± 6.8	54.1 ± 4.7	10.7 ± 1.1
II group experiment (CCl$_4$)	203.4 ± 14.5**	178.6 ± 15.5**	18.9 ± 1.6**
III group CCl$_4$ + quercetin	86.6 ± 9.4	68.2 ± 6.6	12.5 ± 1.4
IV group CCl$_4$ + gossitan	97.8 ± 10.6*	82.6 ± 7.5*	13.4 ± 1.2
V group CCl$_4$ + getasan	122.2 ± 11.3**	94.3 ± 6.2**	14.8 ± 1.3*

*P < 0,05; **P < 0,01 compared to the control group

When animals of group IV with toxic hepatitis were treated with gossitan polyphenols for 20 days, their plasma ALT (97.8 ± 10.6 U/L), AST (82.6 ± ± 7.5 U/L), and bilirubin (14.8 ± 1.3 μmol/l) were 5.5, respectively; 5.5; and decreased by 4.5 times. Group IV animals with toxic hepatitis were treated with getasan polyphenols for 20 days, and their serum ALT (122.2 ± 11.3 U/L), AST (94.3 ± ± 6.2 U/L), and bilirubin (14.8 ± 1.3 μmol/l) were 5.5, respectively; 5.5; and decreased by 4.5 times (Table 1). Thus, the natural compounds isolated from plants, gossitane and getasan polyphenols, had a corrective effect, such as quercetin, which has an existing hepatoprotective property, reducing the amount of ALT, AST enzymes and total bilirubin in the blood of animals with toxic hepatitis. It has been experimentally proven that the correction effect of these enzymes and bilirubin, which is increased in pathology of gossitan polyphenols, is more active than that of getasan. Aminotransferases or transaminases catalyze intermolecular reactions in the transport of amino groups from amino acids to keto acids. Pyridoxal phosphate and pyridoxamine phosphate, which are the active states of vitamin B_6 (pyridoxine), are involved as transaminases coenzymes. In toxic hepatitis, it is important to determine the activity of two ALT and AST enzymes, as these enzymes differ in their activity in different azo and tissues. For example, ALT activity in the liver is slightly higher than in heart tissue, while AST, in contrast, has higher activity in heart muscle. The activity of aminotransferases in the blood serum is very low, in various pathological conditions when liver cells or cardiomyocyte membranes are damaged and their integrity is compromised, their amount increases significantly. Subsequent experiments were performed to determine the levels of ALT and AST in the liver in toxic hepatitis and to determine the effect of biological compounds on them. The results showed that the levels of ALT (75.5 ± 5.7 U/L) and AST (54.7 ± 4.4 U/L) in the liver of CCl_4-induced toxic hepatitis (group II) rats increased by 211.9% and 154.4%, respectively. Thus, as a result of the development of toxic hepatitis in rats, the important enzymes in the liver, ALT and AST, increased. This leads to disruption of the membranes of liver hepatocytes and molecular dysfunction of the approximate parts of the cells. Continuing our next experiments, rats with toxic hepatitis III, IV, and B caused by CCl_4 were treated with pharmacotherapy with herbal substances quercetin, gossitan, and getasan. The existing hepatoprotective quercetin flavonoid was found to reliably reduce ALT (34.6 ± 3.5 U/L) and AST (29.8 ± ± 2.2 U/L) levels in the livers of toxic hepatitis rats by 168.9 and 115.8%, respectively, compared with group II indicators (Table 2).

Table 2. – Effect of quercetin, gossitan and getasan on ALT and AST enzymes in rat liver in toxic hepatitis

Experimental groups	ALT U/L	AST U/L
I control group	24.2 ± 1.7	21.5 ± 1.7
II group experiment (CCl_4)	75.5 ± 5.7**	54.7 ± 4.4**
III group CCl_4+quercetin	34.6 ± 3.5*	29.8 ± 2.2*
IV group CCl_4+gossitan	39.2 ± 3.7*	33.7 ± 2.9**
V group CCl_4+getasan CCl_4	43.4 ± 3.8**	38.4 ± 3.5**

*$P < 0,05$; **$P < 0,01$ compared to the control group*

Correction of toxic hepatitis-induced rats with gossitan polyphenols (group IV) revealed a 149.9% and 97.7% decrease in liver ALT (39.2 ± 3.7 U/L) and AST (29.8 ± 2.2 U/L) compared with group II, respectively. In our experiment, it was found that ALT (43.4 ± 3.8 U/L) and AST (38.4 ± 3.5 U/L) in

the liver of toxic hepatitis B rats treated with another natural polyphenol compound getasan decreased by 132.6 and 75.8% compared to group II (Table 2). This means that in the conditions of toxic hepatitis, the amount of rat liver enzymes ALT and AST increases. The compounds isolated from plants suggest that in the conditions of gossitane and getasan toxic hepatitis, rat liver can correct liver dysfunction by reducing the activity of ALT and AST enzymes.

Conclusions: Gossitan and getasan polyphenols reduced the levels of ALT and AST enzymes in blood serum and liver tissue in toxic hepatitis caused by CCl_4. The increase in total bilirubin in toxic hepatitis was effectively reduced by gossitan and getasan. The effect of gossitan polyphenols on ALT and AST enzyme levels and total bilirubin levels was found to be more effective than that of getasan.

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Section 2. Study of art

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MELODY TECHNIQUE DEVELOPMENT IN THE MUSIC CREATION SKILLS AS THE PREREQUISITE AT THE COMPOSITION LECTURE

Abstract. This research is aimed at developing melody technique in fulfilling skills in the music creation which becomes one of the topics in Composition Lecture in the Musical Arts Study Program, Faculty of Language and Arts, University of HKBP Nommensen. The basic method applied in this research refers to observation and description. Moreover, this research uses literary method in order the development of melody techniques can be achieved and students understand music composition and creation skills in the Lecture. The results show that developing melody techniques in music composition and creation skills is considered successful in which students can increase their creativity skills in the Lecture. The indicators for such a success can be seen and evaluated from the learning stages of observing, questioning, associating, and gathering information as well as communicating what students do in the Lecture. In addition, evaluation is carried out through assignments, class performances, and midterm and final semester exams.

Keywords: developing, technique, melody, skills, creation.

Introduction. Background

Learning is a "process" of students' interaction with educators' and with learning resources in a learning environment [1]. Learning as a learning process is built by teachers to develop creative thinking that can improve students' thinking skills and can increase their abilities to construct new knowledge which becomes their efforts to increase good mastery of subject matter.

Sabri states learning is a process of changing behavior by experience and training [2]. This means that the purpose of learning activities is a change in behavior, which includes knowledge, skills and attitudes and even all personal aspects. Teaching and learning, such as organizing learning experiences, assessing learning processes and outcomes, are included in the scope of teacher responsibilities.

In the academic year 2019/2020 learning in the Composition Lecture with special interest / concentration on theory and composition at the Musical Arts Study Program, Faculty of Language and Arts, University of HKBP Nommensen, Medan is running quite well. It is proved by the increasing number of students who choose their interests or concentration on theory and composition in the last few semesters. The compositions produced by students in the learning process are also quite good and their curiosity is also quite good. The interest or concentration of

theory and composition has itself existed since the establishment of the faculty in 1987. In the lecture of Composition 1, students are required to be more creative in the process of creating composition.

Composition lecture is taught in fifth semester of each academic year, contains competences on the creation of musical composition, and is focused on students' ability to work on a musical composition. The lecture requires participants to master the basic material in music, which aims to stimulate students' creativity in musical composition. The lecture is given in stages, starting from discussion on the composition itself, for example on the theme, structure, form among others, then to how to make or work on a musical composition. Students' experience in making compositions must be accompanied by audio and visual appreciation.

Problems

In this research, the problem is: how is melody techniques in the music creation skills developed?

Aims

This research is aimed at developing melody techniques in the music creation skills.

Significance

This research is significant to students, lecturers, and study program. Students are hoped to improve their skills in the composition and to overcome learning difficulties so they are able to work independently or to be creative. Lecturers can contribute teaching materials which improve students' development of skills in the compositions during learning process. Study program can use students' development of skills to promote the program.

Related literature. Developing creation skills

The term "development" is a process, a way of developing deeds and the word "skill" is the process, method, act of creating [3]. The existence of a national qualification framework is expected to be encourage the students' development of skills [4]. The word "creation" is a process, a way, an act of creating [3]. Definition of composition. Composition is a basic combining process with the basis for accommodating a concept that has not been accommodated in a word. Panggabean states that the process of creation etymologically refers to 'structure' expertise, talent, and obedience to predetermined rules [5]. Thus, musical composition must comply with certain musical rule or rules on the basis of vocals and instruments.

Skills development is closely related to process of skills. Dimyati and Mudjiono argue process of skills can be interpreted as insight or role models for the development of intellectual, social, and physical skills derived from basic abilities which in principle already exist in students [6]. Process of skills give students a proper understanding of the nature of science. Students are able to experience scientific stimulation and can better understand scientific facts and concepts. Thus, process of skills gives students the opportunity to work with science, not just telling or listening to stories about science. They learn both the process and the product of science.

The term skill is usually used to describe a person's varying levels of ability. Skill shows the degree of success in achieving goals that are effective and efficient which are determined by speed, accuracy, form and ability to adapt. Someone is said to be skilled when the activities carried out are characterized by high quality (fast or careful) with a relatively precise level [7]. There are several important composition processes [8] that become a basis for writing compositions and such processes should also be applied in group.

Diagram 1. Prier's modified process of developing creation skills (1996)

Materials in composition lecture

Pannen states that teaching materials should be arranged systematically [9] and Widodo and Jasmadi argue teaching materials contain learning materials, learning methods, limitations and evaluation which are designed systematically and attractively in order to achieve the expected goals, namely achieving competence and subcompetence with all its complexity [10]; see also [11].

Research methods. Basic method

The basic method in this research is descriptive qualitative which is intended to make a complete, factual and thorough description of the facts, characteristics and relationships between the phenomena being investigated [12].

Data collection method

Data collection involves literature and observation methods. The first is directed to obtain written data about the students' development of melody techniques in music creation skills in composition lecture. The second compares what informants say and do. Data was also collected by recording activities in the students' development of composition creation skills by using an audio-visual recording device.

Analysis method

Data analysis uses the following procedures: data selection, data classification, data description, data interpretation, and conclusion.

Results and discussion

Achievement of melody technique development

According to Panggabean, every human being has self-potential, such as healthy personality, the observer of life, read and write, musical ability, experience musical expression. imagination and, and sensory sensitivity [13]. The whole self-potential is raised to get sensitive ideas and imagination and a sharp sense of doing creative work. In terms of creation, the composer's potential must be able to find interesting and challenging ideas to be used as a creative composition. This interesting and challenging idea as a material to create a composition or composition is produced by a creator who has a healthy personality. As a creator, he must also be able to be an observer of life.

According to Prier [8], in creating a composition, there are five important compositional processes, such as ideas, concept, shape, structure, and style (and for more details see [14; 15]). Composition course is taught in fifth semester and contains competences on the creation of music composition, that is, to assess students' ability to work on music and compositional arts, such as theme, structure, form, basic melody, basic rhythm, basic harmony, among others. Basic melody is given to students who should provide the development of melodic techniques with motifs which are expressed effectively through repetition (see Fig. 1).

Figure 1. Effective melody and motif expressed through repetition

Melody creation refers to the use of technique variations, such as paying attention on excessive repetition techniques can make the composition monotone, so by using the variation of techniques can eliminate the monotony and this must be done at least three times (see Fig. 2).

Figure 2. Melody creation by developing motif with technique variation

Figure 2 shows technique variation that can also be done through tempo playing techniques and also demonstrates three examples of melodies using three tempos, namely Con Brio tempo, Animato tempo, and Moderato tempo and each melody uses a repetition technique. The repetition of each melody can be seen in number 1 and 2 which are above the notation and the subsequent repetition of the melody has used variation techniques. For this stage, students are taught to be able to develop how to process motifs with repetition techniques without feeling monotonous.

Repetition and contrast are the foundation of music and in this case, they refer to make a melody with two themes; each theme should be different in which students should create a strong contrast and avoid monotony. An example of the effective contrast in the 2nd theme can be seen in (Fig. 3). The figure shows the Allegro Con Brio movement; example 1 refers to theme 1 and example 2 to theme 2. In the Tempo Di menuetto movement, effective contrast is also found in theme 1 and 2.

Figure 3. The second theme of each melody having effective contrast with theme 1

Melody and obbligato form are complementary motion. As a general rule, obbligato parts are written with a relatively static rhythm when the melody is active, and the rhythm is active when the melody is static, which is effectively complementing each other. In this part, melody is processed using obligato techniques, which are tonal in nature.

For the next stage, it is necessary to understand the basics of harmony. A harmonious sound is produced from a good mix and combination of rhythm and melody. In making a musical composition, one of the musical elements that must be considered is harmony. One of several harmony processing techniques can be done by means of a large melody jump; the accompaniment can play or sound the same chord tone (see Fig. 4).

Figure 4. Big jump of melody using the same noots of accords

This teaching material explains how to make a melody that has large jumps / intervals can be done by sounding or playing the same chord notes in the accompaniment. In case of basic rhythm in music composition, rhythm is a musical element that is also very important. It can give its own character and characteristics in a musical composition, because rhythm is a sound arrangement in one time, long, short and in tempo. It should be noted in terms of creating a rhythm that has characteristics, rhythmic character should exist that creates a strong impression by repeating a fixed rhythm pattern. The goal is that music lovers can easily hear, imitate, remember or enjoy (see Fig. 5).

Figure 5. Characteristics of effective rhythm, resulting in strong image

With reference to construction basics in music, in general, the composition of music consists of the beginning, continuation, complication, and resolution can be seen in (Fig. 6).

Beginning step:

Continuation step:

Complication step:

Resolution step:

Spring by M. Okada

Figure 6. Basic construction steps of music

Efforts in the skill development are also carried out through two strategies, namely general skill outcome and special skill outcome. The first is addressed to the following points:

- implementation of science and technology that pays attention to and applies artistic values in accordance with their field of expertise;
- ability to demonstrate independent, quality, and measurable performance;
- ability to make decisions appropriately in the context of problem solving in their area of expertise, based on the results of information and data analysis;
- ability to be responsible for the achievement of group work and to supervise and evaluate the completion of work assigned to workers under their responsibility;
- ability to document, store, secure, and retrieve data to ensure validity and prevent plagiarism.

The second, that is special skill outcome, may have three points:

- critical thinking: analyzing and commenting in detail on the science of melody and the practice of creating new compositions using a framework defined in disciplines related to the course of the music arts program;

- synthesize: incorporate the various elements of the course of the arts of study (the science of melodies in every era, church music, critical research) into a unified, coherent understanding of the discipline and subject of study;
- external application: applying acquired skills (creativity, research, critical thinking, synthesis) to other disciplines as well as to contexts outside the university environment.

The results obtained through the development of melody techniques in the music creation skills are:

- students are able to create something new both in the form of ideas and in real composition;
- students' mental process results creative thinking;
- students are able to produce music compositions;
- students are able to elaborate (develop, enrich) ideas and to put more emphasis on aspects of the changing process (innovation and variety).

Photo 1. A group of viewers (source: personal document)

Photo 2. Ester Mendrofa shows her composition (source: personal document)

Photo 3. Exam participants and lecturer of composition 1
(source: personal document)

Conclusions and Suggestions
Conclusions

Developing melody techniques in music creation skills can be carried out in the followings:

a) Melody basics and motifs are effectively expressed through repetition; in this section, students are taught how to make melodies by processing motifs with repetition techniques,

b) Make a melody with reference to the use of variation techniques,

c) Repetition and contrast are the basis of music. In this case make up a melody,

d) Melody and obbligato form complementary motion,

e) Basic harmony is one of the most important musical elements in processing a melody,

f) Basic rhythm is also one of the musical elements that can be used in processing melodies,

g) The basics of construction in musical composition should be generally understood, consisting of the beginning, continuation, complication and resolution.

Suggestions

Five general suggestions need to pay attention as shown in the following:

a) students may change their negative to positive thinking in every assignment given by each lecturer.

b) students may always ask questions.

c) assignment submission may be based on mutually agreed deadlines.

d) self management may be improved.

e) mastery and self-competition may become focus.

Specifically, lecturers might stimulate students' creative thinking and identify what can motivate students in the skill development. It is suggested that study program provides wifi facilities and makes sure students are in a comfortable environment so they can think broadly.

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CHAMBER-VOCAL OEUVRE OF THE UKRAINIAN COMPOSER VITALY HUBARENKO

Abstract. The article defines the place of vocal genres in V. Hubarenko's creative legacy. The article focuses on the early period of his creative life, when one of the foundations for his further pursuits was defined. The main features of the vocal music of the composer are denoted.

Keywords: V. Hubarenko, vocal oeuvre, Ukrainian musical culture, vocal cycle, romance.

The chamber-vocal oeuvre of the Ukrainian composer Vitaly Hubarenko of the Sixtiers causes much controversy in contemporary academic amateur circles. His oeuvre was most diverse in its forms, genres, styles, structure, content, interpretations and unconventional ways of handling his tasks. The magnitude of his creativity can be seen in his well-known and often performed pieces such as the operas Zahybel' eskadry (The Destruction of the Squadron) (1966), Mamai (1969) and The Reluctant Matchmaker (1982), the mono-operas Letters to Love (second title – Tenderness (1971)) and Loneliness (1993), the ballet Kaminniy hospodar (The Stone Master) (1968) and the choreographic scenes Zaporozhtsi, opera-ballet Viy (1980) and symphonic-ballet Liebestod (1997), symphonies No 1 and No 2 (1967, 1978) and chamber symphony No 1 for violin and orchestra (1967), Concrete Poem for cello and orchestra (1963) Concerto for flute and chamber orchestra (1965) and Ukrainian Capriccio for violin and chamber orchestra (1973), the vocal cycles From the Poetry of Iosif Utkin (1962), Colours and Moods (1965) and Prostyagni Doloni (Hold out Your Hands) (1977). The composer also wrote other less frequently performed but no less remarkable operas, ballets, symphonies, pieces for orchestra including those with solo instruments, chamber music, music for films, vocal cycles and romances, which were composed in different years.

The beginning of active creative work by V. Hubarenko accounts for the second half of the fifties, at the time of a relative liberalization in a total totalitarian regime. Rehabilitated writers B. Antonenko-Davydovych, N. Godovanets, N. Zabila, Z. Tulub, G. Hotkevich, and others; and posthumously rehabilitated N. Voronoy and A. Oles. New composers also emerge: V. Vinogradsky, E. Gutsalo, I. Drach, R. Ivanychuk, V. Korotych, D. Pavlychko, N. Rudenko, V. Simonenko, V. Shevchuk and others.

In music, due to liberalization, the oeuvre of S. Lyudkevych, Heorhiy and Platon Maiboroda, L. Revutsky, Y. Meitus, A. Shtoharenko, and A. Kos-Anatolsky spread actively. Pieces by O. Bilash, O. Filippenko and I. Shamo are becoming popular on the Ukrainian pop scene. Certainly, the censorship imposed by the previous regime alleviated its pressure temporarily, but there was no sign of it ceasing. According to the composer's wife M. Cherkashyna-Hubarenko, "Vitaly Hubarenko belongs to the generation of musical figures of the sixties, which is associated with openness to the new, overcoming the cultural isolation of Soviet art of the previous decades" [2, P. 6]. Many of the Sixtiers artists began to experiment, to renew the imagery world, to seek

new ways to express their ideas. In vocal music relevant issue was the interaction of word and sound, the possibility of their synthesis to reveal the depths of the inner world. The young Vitaly Hubarenko also pursued this line of thought.

In general, the creativity of the composer is inherent in an ardent desire to reflect the reality surrounding him, allowing it to pass through his personal understanding and comprehension. This can be clearly seen in his vocal cycles created in the second half of the twentieth century: From the Poetry of Iosif Utkin (1962), Colours and Moods (1965), Two Romances in Words by F. Krivin (1966), Prostyagni Doloni (Hold out Your Hands) (1977) and Osinni sonety (Autumn Sonnets) (1983). Musicologist N. Gordeichuk, a contemporary of V. Hubarenko, described his oeuvre as follows: "A sharpened psychological comprehension of reality and the constant mapping of its underlying tendencies" [1, P. 11].

Though much has been written about the composer to date, there remains a wide field for musicological research. For example, there is an insufficient analysis of the vocal-theoretical and performing aspects of such chamber pieces as the mono-opera Letters to Love (for soprano and orchestra) based on Tenderness (1971) novel by H. Barbusse and Loneliness (for tenor and orchestra) based on a novel by P. Mérimée Letters to an Unknown (1993). An analysis of these pieces will undoubtedly lead to a greater popularisation of the composer's oeuvre among young performers. The topic of professional cooperation between potential soloists and the composer in the course of the work remains insufficiently covered. This aspect is also extremely important, as performing in this kind of genre requires both specific skills in working with literature, and knowledge of the practical side of vocal performance. It is partly thanks to this knowledge, which was acquired through creative interaction with practising performers, that V. Hubarenko was able to make the most of the human voice. It is partly thanks to this constant creative symbiosis that his characters have such emo-

tionalism and genuine power of feeling. The virtue of scrupulous work with literary and poetic sources and the selection of emotionally charged material was inherent in the character of the composer. As the musicologist N. Nekrasova noted, "taken from the outside was subjected to thorough analysis before entering into flesh and blood, preserving everything natural" [3, P. 2].

Vitaly Hubarenko turned to the genre of vocal music throughout his artistic life. While studying at music school in Kharkiv under the guidance of O. Zhuk, he wrote vocal pieces such as Stoyala ya i sluhala vesnu (lyrics by Lesya Ukrainka), Oy odna ya odna (lyrics by Taras Shevchenko), and Na mostu, nad tihoyu vodoy (lyrics by Mykhailo Rylsky), alongside instrumental pieces. This list of compositions shows that the young composer was attracted by emotional subjects. It should be mentioned that during those years he became fond of choir lessons with a famous choirmaster and composer Z. Zagranichny with the Manpower reserves chorus, where the future famous actress Evgeniya Miroshnichenko was performing.

During the first conservatory years, his fascination with the beauty of the human voice nurtured creative communication with the best representatives of the Kharkiv vocal school, many of whom taught at the Kharkiv Conservatory. Among them were Pavel Golubev, who brought up a pleiad of vocal performers, the most famous of whom are Boris Hmyria, Nikolay Manoylo, and Nonna Surzhina; Tamara Veske, who trained the future Honored and National Artists of Ukraine Oleksandr Vostryakov, Gaziella Tsipola, and Vasily Tretyak. Many of the vocal students became close friends of V. Hubarenko, whose professional opinion the composer valued highly. Romances were dedicated to some of them. For example, Dub (The Oak Tree) romance on words by M. Isakovsky was dedicated to a future soloist of Odessa Theatre of Opera and Ballet Evgeny Ivanov. At the stage of the Kharkiv Conservatory (now Kharkiv National I. P. Kotlyarevsky University

of Arts) the future soloist of the Bolshoi Theatre, Vladimir Valaitis, loved to perform the composer's romances. It is known that he always followed the advice of his older friend from the Conservatory. Hubarenko always listened.

Generally speaking, Hubarenko is a composer who strives for large composition forms, the peak of which is undoubtedly the opera genre. But in the opinion of the author of this article, despite existing publications, one should not believe that small forms in Hubarenko's pieces are just blanks for future major works, on which he honed his skills. As a renowned musicologist B. L. Yavorsky writes in his "Vitaly Hubarenko" book, "the capacious and mobile genre of the romance offered great opportunities for innovative research of themes, ways of musical and figurative expression" [4, P. 50]. It was a new world, new creative possibilities. Two years after he graduated from the conservatoire, his first collection appeared which, according to the composer, brought him his first fame; these were romances to the words of Iosif Utkin. The vocal genre and its variations subsequently came to occupy an important place in the master musician's oeuvre.

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Section 3. Pedagogy

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FORMATION OF ALGORITHMIC COMPETENCIES IN FUTURE SOFTWARE ENGINEERS IN THE PROCESS OF STUDYING PROGRAMMING

Abstract. The article considers the formation of algorithmic competencies in future software engineers in the specialty 122 "Computer Science" in the process of studying the cycle of programming disciplines. An example of the application of the competence approach in the process of studying the discipline "Programming" is given.

Keywords: algorithmic competence, software engineers, programming, competence approach.

The modern specialist must be an expert in his work, have the ability to respond to events and find new ways to solve problems that arise, as well as meet the changing demands of the labor market [1, P. 5]. Therefore, the question of quality training of future software engineers who will be able to adapt to the rapidly changing conditions of professional activity, implementation and operation, maintenance of new software systems that can make adjustments to program codes or based on them to develop fundamentally new software that meets all modern requirements for their development. In other words, the graduate must not only acquire certain knowledge, skills and abilities in the disciplines of the university course, but also be able to apply this knowledge in practical professional activities to solve problems [2, P. 233].

Algorithmic competence is key in the process of training future software engineers in the specialty 122 "Computer Science", it is characterized by a certain level of development of algorithmic thinking, awareness of the general components of algorithmization and, consequently, used in various forms of algorithmic activities that encourage new learning and knowledge.

Thus, algorithmic competence provides the formation of algorithmic culture, and its result is not only the formed knowledge and skills, but also the acquired skills of algorithmic thinking, which are used both in professional activities and in the social environment and in everyday life.

Algorithmic competence of a future software engineer can be defined as an integrated learning outcome, which is formed primarily through mastering the content of algorithmic subjects and gaining experience in using algorithmic knowledge in the process of teaching subjects from the compulsory and elective cycle.

Programming is the first among professionally-oriented disciplines studied by future software engineers in the specialty 122 "Computer Science", the number of credits 41, equal to 1230 hours.

From the content of the course, from the methods of its teaching, from the knowledge, skills and abilities that students will receive in this course, depends on their further education, the quality of learning disciplines based on programming knowledge, success in future professional activities. At Melitopol State Pedagogical University named after Bohdan Khmelnytsky, students study programming from the first to the fourth year of study. In the second year there is a training practice in programming, which is 90 hours, 3 credits. It is also planned to write a term paper in the third and fourth year [4].

Taking into account the TIOBE index and the demand on the labor market, the sequence of studying programming languages for the specialty 122 "Computer Science" of the compulsory component of the educational program, the discipline "Programming", was proposed as follows:

- 1 course programming language C – 1 semester and C ++ – 2 semester;
- 2nd year C # programming language;
- 3rd year java –1 semester and javascript-2nd semester;
- 4th year Python.

Analyzing the special competencies to which the discipline "Programming" corresponds, from the standard of the educational-professional program of the specialty 122 "Computer Science" the following SC_3, SC_4, SC_8 were determined which allow to form algorithmic competence, in particular:

SC_3. Ability to think logically, build logical conclusions, use formal languages and models of algorithmic calculations, design, development and analysis of algorithms, evaluate their effectiveness and complexity, solvability and unsolvability of algorithmic problems for adequate modeling of subject areas and creation of software and information systems.

SC_4. Ability to use modern methods of mathematical modeling of objects, processes and phenomena, to develop models and algorithms for numerical solution of mathematical modeling problems, to take into account the errors of approximate numerical solution of professional problems.

SC_8. Ability to design and develop software using different programming paradigms: generalized, object-oriented, functional, logical, with appropriate models, methods and algorithms of calculations, data structures and control mechanisms [4].

In accordance with the considered special competencies, laboratory works were developed which allow to form in students from the first to the fourth year of study algorithmic competence in the process of studying disciplines from the programming cycle.

Next, consider an example of laboratory work "Rapid Hoar Sorting" in the first year. The purpose of the work is to consolidate theoretical knowledge and gain practical experience in organizing a set of static and dynamic data structures, fast sorting of Hoare (quicksort). Students are encouraged to write code that implements a quick array sort on my C ++ programming. At the beginning of the work the main idea of the algorithm is discussed, which is implemented using pseudocode.

The main idea of the algorithm.

Let the pointers L and R be such that all the elements to the left of a $[L]$ are smaller than the reference element, and the elements to the right of a $[R]$ are smaller than the reference element. Moving the pointer L to the right (pointer R to the left), find the element not less (not more) basic and to exchange their places. The process continues until the pointer L is to the right of the pointer R.

Hoare fast sort pseudocode

```
repeat
{while a [L] < x
L = L + 1;
while a [R] > x
R = R – 1;
if L < = R
then {rearrange (a [l], a [r])
L = L + 1;
R = R – 1;}}
docks (L > R)
```

The next step is to write a program in C ++.

In the process of performing this laboratory work, students analyze the presented algorithm, learn to read the pseudocode and step-by-step implementation of the algorithm in the C++ programming language. This allows students to form algorithmic and logical thinking, learn to apply the acquired skills in programming and algorithms in the process of solving problems.

In the senior course for formation of algorithmic competence laboratory works have other direction. Students have already mastered the basic algorithms, know several programming languages, so the tasks are difficult, for example:

In the fourth year students study the Python programming language, one of the laboratory works has the task of writing a program by the method of fast Hoare sorting, this method was already considered by first-year students, it was implemented in the C++ programming language. One of the conditions of laboratory work is to write a program without the use of additional memory.

Program code.

```
def Quick Sort (A, l, r):
  if l > = r:
    return
  else:
    q = random.choice (A [l: r + 1])
    i = l
    j = r
    while i <= j:
     while A [i] < q:
      i + = 1
     while A [j] > q:
      j - = 1
     if i <= j:
      A [i], A [j] = A [j], A [i]
      i + = 1
      j - = 1
    Quick Sort (A, l, j)
    Quick Sort (A, i, r)
```

After writing a program in Python, students must determine the complexity class and execution time of the program, and also need to make a comparative analysis of this algorithm, written in programming languages such as C++, C# and Java. The complexity of the program depends on the size of the input data, so you need to check the array for 100 elements and 1000. The results of comparisons and conclusions must be presented to protect laboratory work.

Conclusion

Thus, the achievement of positive results in the formation of algorithmic competence of future software engineers in the field of training 122 "Computer Science" in the study of the cycle of programming disciplines was achieved by creating conditions for implementing the basic principles of competency approach. The use of laboratory work in the training of future software engineers contributes to the formation of their algorithmic competence and allows you to build a holistic pedagogical process.

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Section 4. Political science

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THE ROLE OF EU SPECIAL REPRESENTATIVES IN EUROPEAN FOREIGN POLICY: REVIEW OF EUSR FOR HUMAN RIGHTS

Abstract. The post of EU Special Representatives (EUSR) was established in the 1996 and since then it has become an important instrument of EU foreign policy. EUSR for human rights evolved from the post of a Personal Representative for Human Rights in the area of the Common Foreign and Security Policy (CFSP). In order for EU's human rights policy to boost its coherence and effectiveness the office of the EUSR for Human Rights was established in 2012. The appointment of this first thematic EUSR followed the adoption of the EU Strategic Framework and Action Plan on Human Rights and Democracy. Rather broad mandate of EUSR for Human Rights is aimed at enhancing the effectiveness and visibility of EU human rights policy. The article reflects over busy agenda of special representative for human rights, their contribution to the promotion of EU human rights policy and coordination with other international organizations and third countries.

Keywords: EU foreign policy, Special Representatives, Human Rights.

Introduction

The post of EU Special Representatives (EUSR) was established in the 1990 s (the first EUSRs were deployed in 1996) which reflected the EU›s long-term involvement in conflict resolution in different regions (particularly in Central Africa and the Middle East). The main task of EUSRs was initially limited to collecting information on the situation in the conflict zone. Establishing its approach to certain country or region EU relied on the information received from EUSR. Today EUSRs work in different regions and countries such as, Central Asia, Middle East, Afghanistan, Bosnia and Herzegovina, Kosovo, the South Caucasus and Georgia, the Horn of Africa and the Sahel. Most of them are based in Brussels and visit periodically the countries of their mandate.

The Lisbon Treaty introduced a lot of significant changes into the conduct of European foreign policy. The position of EUSR have been retained as an important foreign policy tool. The article will analyze the role of this diplomatic instrument in the implementation of the Union's foreign policy with a particular focus on the first thematic one – EUSR for the Human Rights, which is tasked to enhance the EU›s human rights profile worldwide. Human rights issue is becoming even more important today and Member States seek to put more efforts to combat violations of international law and impunity for crimes. The article firstly introduces the history of the establishment of

the EUSR. Next, mandates and the appointment procedures of the EUSRs are being presented. The following part analyses the EUSR for human rights in light of activities of the two envoys for human rights, their contribution to the promotion of EU human rights policy and coordination with other international organizations and third countries.

Historical overview

EUSRs have operated under the responsibility of the Council since 1996. In the initial years when EUSRs were first introduced, their main task was to obtain information and assist EU develop a common policy towards a country/region. [4, p.141] Eventually, this tool has proved to be efficient for coordinating the missions on the ground. The Lisbon Treaty (also known as a Reform Treaty) signed in 2007 became part of EU law and introduced an institutional reform with prominent changes. In the field of foreign relations, the Treaty merged some departments of the Commission and former parts of the Council Secretariat in order to establish the new mechanism European External Action Service (EEAS). The Treaty also created the "double-hatted" post of High Representative of the Union for Foreign Affairs and Security Policy and Vice-President of the European Commission (HR/VP). Since 1999 EUSRs report to the HR/VP. The institutional mechanism evolved over years to guarantee flexibility in the exercise of EUSRs' functions: EUSRs also closely cooperate with EEAS and its Delegations on the ground, the Council and its Political and Security Committee (PSC).

EUSRs are sometimes considered as an obsolete instrument in the EU's foreign policy system. Institutional confusion over the unclear position of EUSRs in EU foreign policy system led to many conflicts. For instance, HR/VP baroness Catherine Ashton considered anomalous the status of the EUSR and decided to abolish several posts. This decision was received negatively by many as destructive for the effectiveness of the conflict management policy of the Union [12, p. 94–95]. Interestingly enough, in light of vague responsibilities of EUSRs and budgetary

considerations, the Parliament went as far as calling to integrate them fully into the EEAS [11, p. 173–4]. To the contrast of scholars that doubt the effectiveness of work of EUSRs (especially considering scarce resources they have at their disposal), EUSRs are being valued by others mainly for their field-level interaction and flexibility in times of crisis management diplomacy. The supporters of EUSRs argue that EU delegations will not have resources and expertise to focus on a given issue. Nor will local and regional actors agree dealing with EU Delegation representatives in the same way in which they dealt with EUSRs (usually acknowledged for their proficiency in the given area).

As for the EUSR for human rights specifically, the history of this post goes back to the establishment of a Personal Representative for Human Rights in the area of the CFSP. The personal Representative served as an advisor to the EU HR/VP (Mr. Javier Solana) and by interactions with the various EU actors sought to promote mainstreaming of human rights into all aspects of EU policies with a particular focus on integrating the human rights into crisis management operations and missions of the EU. EUSR for human rights was created to replace the post of Personal Representative.

Appointment, mandate, financing and tasks of EUSRs

EUSR are EU emissaries with specific tasks in troubled regions and countries. While the EU delegations oversee affairs with a single country, EUSRs operate in conflict areas or on specific issues. EUSRs are be appointed to countries, regions or for thematic issues. Usually, these special envoys are diplomats with previous experience in EU institutions, international organizations, or in national politics of member states. The appointment of the EUSRs (especially with regards to the mandate areas) is very sensitive and quite often controversial issue between the Member States and the Council seeks to balance between these interests. As per Article 33 of the TEU 'the Council may, on a proposal from the HR/VP,

appoint a special representative with a mandate in relation to particular policy issues. The special representative shall carry out his mandate under the authority of the HR/VP [3].

All the expenses of the special envoys are controlled by the Service for Foreign Policy Instruments (FPI) which is a Directorate-General of the European Commission. EUSRs have a large degree of autonomy in the allocation of their budgets, which makes them more flexible tool for mediation and resolution of conflicts. So, based on the Council's decision EUSRs finance their expenses with regards to the office, staff, equipment, and the operational costs. Their mandates vary significantly which influences the size of the allocated budgets. If the mandate is extended, the EUSR receives new funds for the corresponding period. Interested EU Member States may also offer to send their own staff as members of the EUSR team. Even though the Lisbon Treaty has given the HR/VP a certain level of involvement in the appointment of special envoys, the overall picture in recent years shows that if a group of Member States insists on a certain candidate to a given region, the HR/VP is not in a position to resist decisively.

EUSRs build relationships with different parties on the ground, local political leaders and are considered to be part of the public perception of the EU in the areas of their mandates. Today EU with the instrument of EUSRs covers Bosnia and Herzegovina, Central Asia, Horn of Africa, Human Rights, Kosovo, Middle East Peace Process, Sahel and South Caucasus and the crisis in Georgia, Belgrade-Pristina Dialogue and other Western Balkan regional issues. In response to changing situation on international arena EU may consider increasing or decreasing the number of mandates. For instance, in 2019 European Parliament called for appointing EUSR for Ukraine [10].

While representative tasks are entrusted to the heads of EU delegations, EUSR's functions are mainly gathering information and being a mediator in the conflict zone/thematic area. Depending on the objectives of the EU each mandate of EUSR has its specific focus: regional cooperation, conflict prevention, crisis management etc. However, there are also common responsibilities for all EUSRs regardless of the mandate. First, the special representatives are seen as the "eyes and ears" of a united Europe in the area of their mandate. The information transmitted by EUSRs is especially important for those Member States that do not have a wide network of diplomatic agencies abroad. This significantly contributes to the drafting the strategies of EU in the given area. For being a flexible instrument to be deployed on the given ground, EUSRs have broad travel resources. Also, EUSRs seek to raise and strengthen the visibility and better understanding of EU foreign policy in the world and contribute to an efficient coordination of relevant EU activities. This is vital not only with regards to active engagement with other EU institutions but also other international organizations, regional and local actors. Another key function of the EUSRs is mediation in the peaceful settlement of conflicts. If there is an EU mission operating in the region, EUSR becomes member of the team. They prepare reports for the PSC.

EU human rights policy actors: EUSR for the Human Rights

Human rights engagement at different levels (both positive engagement and critical positioning vis-à-vis problematic situations) is being mainstreamed into all EU policies by protecting the fundamental human rights for its own citizens and promoting human rights worldwide. EU seeks to develop bilateral partnerships with third countries (China, India, the United States etc.), as well as through regional partnerships (Enlargement Policy, the European Neighbourhood Policy etc.), and also with international (UN) and regional organisations (European-based such as Council of Europe, the OSCE and non-European ones such as African Union, the Arab League, the Organisation of Islamic Cooperation, etc.). EU also seeks to establish cooperation with non-state actors such as businesses, civil society, NGOs and individual human rights defenders. Being a strong conditionality mechanism

human rights issue is regularly included in political dialogues with third countries or regional organisations (EU conducts human rights dialogues (with different objectives and formats) with more than 40 non-EU countries).

Human rights policies are financed by different financial instruments such as the European Instrument for Democracy and Human Rights (EIDHR), the Development Cooperation Instrument (DCI), the Instrument contributing to Stability and Peace (IcSP), the European Neighbourhood Instrument (ENI) and the European Development Fund (EDF) etc. Human rights is a cross-cutting issue that EU mainstreams across all policy fields and due to that different actors on multiple levels are relevant for ensuring and implementing successful EU human rights policy. Along with EUSR for Human Rights there are various relevant Union institutions and bodies that implement the human rights policy of the EU on horizontal (the European Council, the Council, the European Parliament, the Commission, the Court of Justice of the EU, HR/VP, the EU Agency for Fundamental Rights (FRA), the EEAS and EU delegations) and vertical level (between the EU and the Member States).

Respect for human rights is incorporated in every aspect of the functioning of the EU. Relevant clauses and provisions are written down in the treaties, strategic frameworks, action plans, and other documents. It has been on many occasions underlined that human rights are not European but rather universal rights and should never be compromised. By supporting the idea of establishing a mandate of EUSR for human rights Member States underlined their interest in strengthening support for international humanitarian law and international justice. In response to alarming human rights violations in the world, various NGOs, such as Human Rights Watch, Women's Initiatives for Gender Justice, the International Federation for Human Rights and others called the EU to create a special instrument in charge of international justice and international humanitarian law that would enhance vis-

ibility as well as consistent and coordinated action in mentioned areas [1].

His appointment followed the adoption of the EU Strategic Framework which outlined main principles, priorities and objectives to improve the effectiveness and consistency of EU policy both with EU Member States as well as Union's institutions. Also, Action Plans on Human Rights and Democracy (2012–2014, 2015–2019 and 2020–2024) set out certain principles to keep EU accountable of its performance in the area of human rights and democracy and hence assess its impact. EUSR for Human Rights guides the dynamic implementation of the these Plans in order to deliver sustainable progress. Rather general mandate of EUSR for Human Rights is aimed at enhancing the effectiveness and visibility of EU human rights policy. But his human and financial resources are limited. He also requires support from the HR/VP and Member States on certain issues. Criticism for the efficacy of the post sometimes overlaps with the disapproval of EU's human rights policy in general for being too reserved ('quiet diplomacy') in its human rights rhetoric [9]. The EUSR adapts to given geopolitical situation based on the intentional flexibility of his mandate. The candidate must have an international reputation and extensive experience in the field of human rights.

EU Parliament prepared a recommendation and outlined the main areas of EU human right policy to be covered by the mandate of EUSR, which include strengthening democracy, international justice, humanitarian law, abolition of the death penalty, freedom of expression, gender issues and children and armed conflict [5]. The recommendation also suggests that EUSR engages with the UN, chairs high-level bilateral, regional and international dialogues on human rights issues. One of the recent examples of the cooperation with UN is an initiative 'Building Quality Lives through Economic, Social and Cultural Rights' hosted in the margins of the UN General Assembly with the participation of UN High Commissioner Michelle Bachelet, EU High Representative Federica Mogh-

erini and other high level officials from International Human Rights fora. Participants commit to improve their human rights record and seek to share with others their own best experiences [8].

First and second EUSRs for Human Rights

The office of the EUSR for Human Rights was established by Council Decision 2012/440/CFSP of 25 July 2012 and Mr. Stavros Lambrinidis, former Minister for Foreign Affairs of Greece became first Special Representative appointed to this post. S. Lambrinidis was widely welcomed for his political experience, enthusiasm and particularly for expert knowledge of human rights. He set to ensure close work and coordination of all players within and outside the EU. However different human right policies of Member States and different position of EU institutions on a given human rights issue sometimes challenged this envisaged cooperation.

S. Lambrinidis focused first on the countries – biggest violators of human rights. Other areas of his particular interest were improving women rights around the world, dealing with the freedom of religion, freedom of speech etc. During his mandate he frequently met with governments, civil society, head of the military, religious leaders in different countries around the world (China, Cuba, Indonesia, South Africa, Russia, Belarus etc.). EUSR was actively involved in tackling human rights crisis in Myanmar with regards to ethnic and religious minorities (Rohingya crisis) where on human rights grounds different sanctions were introduced (www.sanctionsmap. eu). Later, in response to positive changes they were partly lifted (with the exception of the arms embargo and the embargo on equipment which might be used for internal repression).

At the opening of the General Assembly of the EU-Russia Civil Society Forum in 2012, Lambrinidis outlined nine principles essential for the protection and promotion of human and fundamental rights highlighting the bottom line in the conclusion: some countries are clearly better (or worse) in the protection of human and fundamental rights [6].

Speaking about the limitations of the international human rights system, S. Lambrinidis underlined tendency to regionalize, relativize and politicize human rights and inability of governments to avail the expertise and support from civil society. Later, he focused more on positive narratives, on countries and organizations that can create a coalition of good human rights stories. His central focus was placed on identifying, sharing and publicizing positive examples to inspire and create "cross-regional alliances on human rights". In 2018 he launched in New York the "Good Human Right Stories" with the EU and 13 non EU countries.

S. Lambrinidis launched the first formal sectoral dialogue on human rights and governance between the EU and Ethiopia with a special focus on rule of law, economic and social rights and human rights in the context of migration. The new EU action plan on human rights and democracy, "Keeping human rights at the heart of the EU agenda" adopted by the Council praised the important contribution of S. Lambrinidis to the effectiveness, coherence and visibility of EU human rights policy and reiterated its full political support for his work [7]. He linked the EU promotion of human rights worldwide with the six 'E's: empower the state institutions, courts, civil society organisations, media and activists who fight for rights in their own countries (EU doesn't impose but rather keeps an eye on local human rights defenders and those who wish to silence them); encourage foreign governments to see the human value and interest of defending human rights (EU seeks to achieve it mostly by means of persuasion; engage even with governments that are guilty of human rights violations; enlarge the defence of human rights by reaching out to local governments and regional organisations (African Union, the Arab League, the Organization of Islamic Cooperation, etc.); enforce human right; embody human rights at home and to ensure consistency across is actions and actors [2].

Eamon Gilmore, former Deputy Prime Minister and Minister of Foreign Affairs of Ireland, took up his

duties on 1 March 2019. E. Gilmore has involved in multiple human rights dialogues with countries like Myanmar, Bangladesh, Ethiopia, and Eritrea. Also, he seeks to establish a dialogue on social media and labor rights with countries of the Persian Gulf and Middle East. Special Representative also reaffirmed the EU's support for the "rules-based international order and effective multilateralism" and with respect to upholding human rights in certain areas such as human trafficking, and migration he outlined regional mechanisms as very important and effective ones. E. Gilmore reiterated on various occasions the importance of developing new synergies with the Bureau of the European Commission against Racism and Intolerance (ECRI) in a spirit of complementarity. E. Gilmore also had different dialogues on human rights priorities and opportunities for transatlantic cooperation. The EU is aimed at promoting complementarity with the UN, to contribute into an establishment of an effective international system. In February 2020 Special Representative presented two regional and two thematic initiatives in UN Human Rights Council: on the dire human rights situation in the Democratic People's Republic of Korea, on the situation of human rights of Rohingya Muslims and other minorities in Myanmar as well as on freedom of religion or belief, and on the rights of the child. Along with those initiatives Gilmore voiced the EU's strong concern over the human rights situation in Syria, Libya, China, Crimea and the city of Sevastopol, the occupied Palestinian territory, and Yemen. [13] Along with all mentioned regions, EU also remains committed to constructive cooperation with all countries in order to promote and protect human rights.

Conclusion

Overall EUSR instrument is considered a valuable foreign policy instrument. Key added values of this instrument are flexibility and diversity of their mandate areas. Despite pessimistic opinions that EUSRs will be gradually removed, they continue to play vital role in EU foreign and security policy. The added value of the EUSRs is the reason why they have been retained as a foreign policy tool. It goes without saying that EUSRs contribute to shaping the EU's international image. This tool complements existing institutions and tools, and develops strong network between the different actors. The broad mandate of EUSRs is aimed at increasing the visibility of the EU in the region and contributing to the unity, consistency and effectiveness of the EU policies.

In order for EU's human rights policy to boost its coherence and effectiveness in line with spirit of Lisbon Treaty a post of Special Representative for human rights was established. EU seeks to keep in mind human rights issue when dealing with all types of foreign policy issues. The broad mandate of EUSR for human rights enables him to put all possible efforts not only to enhance the visibility of the EU's human rights policy but also to integrate it more with other policies. It has been mentioned that the EUSR for human rights has a broad mandate and limited resources. Whilst its mandate should be retained flexible there is a need for the EU as well as for Member States to provide adequate human and financial resources for him to implement such a vital mandate. Also to benefit as much as possible from the expanded mandate political backing at different levels is required.

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PENAL CODE ENFORCEMENT AGAINST POLYANDROUS SPOUSE AMONG MUSLIMS

Abstract. This paper deals with positive criminal law enforcement that can be implemented when an act can harm another person; therefore, the nature of positive criminal penalties is repressive (retaliatory), so the punishment enforced with various threats (low or high punishment) is in accordance with the losses suffered. Conversely, Islamic law is both repressive (retaliatory) and preventive (prevention) that criminal acts do not occur so that the punishment enforced is of course relatively high. Muslim polyandry actors can be punished with the death penalty, beatings a hundred times or imprisonment for a year as stipulated in the Qur'an and Hadith, whereas in positive criminal law polyandry acts are considered adultery which is punishable only by nine months in prison. Thus, they have never been tried criminally, even though they can actually be threatened with a sentence of 7 years in prison as stipulated in Article 279 paragraph 2 of the Criminal Code.

Keywords: Criminal Law Enforcement, Muslim Poliandry Perpetrators.

Introduction

Marriage (*munakahat* in Arabic) is a decree of Allah (*sunnatullah*) on man and woman [1]; marriage is not just to fulfill the legitimate biological interests (needs) between the two of them, but also a provision that every creature on the surface of this earth is created in pairs as the words of Allah in Surah Az-Zuriyat verse 49, which states "And We create everything in pairs so that you will remember (the greatness of Allah)". Apart from that in the Qur'an, marriage is also categorized as the sunnah of the Prophet Muhammad as his saying states:

"Getting married is my sunnah. Who doesn't practice my sunnah, then he doesn't follow my path. Get married, because I really boast of you over other people, who has wealth, then marry, and who is not able to do so, let him fast, because fasting is a shield for him" (Hadith Narrated by Ibn Majah).

Even though marriage is a legal act from the perspective of the Qur'an and Sunnah, there are some people who do not follow the guidelines of marriage; one of these acts is polyandry marriage. A case of polyandry marriage has ever occurred in Pematang Siantar, North Sumatra Province (see Decision of the Pematang Siantar Religious Court in case number: 141 / Pdt.G / 2011 / PA.Pst, dated September 13, 2011, between Taufan Lesmana Putra Bin Sumantri as the Plaintiff who was a son of the Defendant II, with the Head of the Office of Religious Affairs in Dolok Silau District, Simalungun Regency, North Sumatra Province as the Defendant I, with Nurhaida Binti M. Lekar as the Defendant II and with Ahmad Azman Halim Bin Abd. Gani as the Defendant III.

The case began when the Plaintiff (who was also the son of the Defendant II) filed a lawsuit for marriage annulment to the Pematang Siantar Religious Court on August 10, 2011 on the grounds that the Defendant II (Nurhaida Binti M. Lekar) was the legal wife of Sumantri Bin Temin Kertorejo, who died on May 30, 2010. Before the husband of the Defendant II died, the Defendant II was married secretly with the Defendant III (Ahmad Azman Halim Bin Abdul Gani) on May 3, 2010 in Kisaran. The marriage of the Defendants II and III could be carried out with the help of the Defendant I (Head Office of KUA Dolok Silau District, Simalungun) who also acted the guardian judge of the Defendant II. Both the Defendants II and III did not have a Marriage Certificate, meaning that the Defendant I did not issue a Marriage Certificate for the Defendants II and III because the Defendant I did not have documents to complete administrative requirements.

A year later, on June 3, 2011, the Defendant I issued a Marriage Certificate with number: 058/04 / VI / 2011 to the Defendants II and III and this issuance was a follow-up to the marriage dated May 03, 2010. The Marriage Certificate was apparently not equipped with documents for completeness of administrative requirements. Thus, the Marriage Certificate issued on June 3, 2011 was evidence of polyandry marriage.

The problems in this paper are: how is the enforcement of criminal law against Muslim polyandry actors?; is it sufficient for a polyandry actor to be punished by the law of 9 (nine) months in prison (based on Article 284 of the Criminal Code) because the perpetrator's act is only considered an act of adultery or is subject to 7 years in prison (based on Article 279 paragraph 2 of the Criminal Code) because the offender's act is categorized as an obstacle in marriage?

Polygamy marriage and justice in Islam

There are some in the Muslim community of the view that sexual relations are not much different from the need for food and drink. If Muslims are given the freedom to choose food and drink, then they are also given the same rights in sexual relations. The analogy of freedom in choosing food and drink with freedom in sexual relations is certainly unacceptable from the divine dimension because this dimension does set different rules regarding the analogy. Sexual relations that are carried out without being preceded by Islamic marriage are seen as deviant social behavior and the perpetrators can be subject to severe punishment [2].

In order for a Muslim not to have sexual intercourse freely, Islam regulates the procedure for polygamy in that a Muslim may marry more than one Muslimah. The concept of marriage between one man and more than one woman is called polygyny, but a woman who has several husbands is called polyandry; thus, polygyny and polyandry are called polygamy in a narrow sense. From a practical point of view, there is no difference between polygamy and polyandry or polygamy and polygyny; polyandry arises because there is another husband apart from the first husband, and polygyny arises because there is another wife apart from the first

wife. Thus, polyandry and polygamy have similarities in terms of practice. In the view of Islamic law, polyandry is an act of *haram* but polygamy is not forbidden.

Literally the word "polygamy" comes from Greek and is formed from the words *polus* 'many' and *gamein* 'married'. The question is whether the husband has many wives or wive has many husbands? In Arabic, "polygamy" is called *ta'did al-zawjah* 'the number of partners.' In Islam, polygamy is allowed (mubah) and in Surah An-Nisa' verse 3, the word "fankihu" is the *amr* which means 'is allowed but not be obligatory.' In this context, the principle of *ushul fiqih* is *al-asl fi al-amr al-ibahah hatta yadula dalilu 'ala al-tahrim* 'the origin of something is "allowed", unless there are arguments that forbid it.'

Polygamy can occur for a number of reasons [3]:

a.   There are reproductive problems, for example infertility.

b.   A wife does not act as a wife, for example, she cannot carry out her obligations as a wife.

c.   Husbands have great sexual needs (hypersexual) so that they need services / channeling of more than one wife.

d.   There are more women than men.

e.   The wife asked her husband to practice polygamy.

In the history of human civilization, polygamy did not originate from Islam but was practiced by various nations in Asia, Europe, Africa and America long before the arrival of Islam. In Arabia, in the era of ignorance (*jahilliyah*), adult men (*baligh*) tried in various ways to marry adult women through wealth and / or power. The Roman Empire stipulated that its male citizen had only one wife, while the kings and nobles had multiple concubines.

Hakim (ibid) argues that in Islamic *sharia*, it is recommended that a man only has one wife and the suggestion is that the household is in the perspective of *sakinah*, *mawaddah*, and *warahmah* and this perspective is certainly difficult to realize if men have more than one wives. Having a fair attitude is an absolute requirement if a man wants to do polygamy as

mentioned in the Words of Allah in the Qur'an Surah An-Nisa' verse 3, which means:

"Then if you are confused about not being able to act fairly (among your wives), then (marry) a single, or (use) the female servants you have. That is closer (to prevent) in order you do not do injustice ".

The Words clearly explain that husbands have a fair attitude when they want to practice polygamy. If they are afraid that they will not be able to do justice if they have up to four wives, then only three wives are sufficient. Even if they can not afford it, just two wives are enough. Also, if two wives are still not sure they can do justice, it is sufficient to marry only one wife.

Mufassirin (interpreters) have the opinion that being fair is obligatory. Justice that is meant here is not only fair to his wives, but also means to do justice absolutely (*kaffah*). So the meaning of "fair" for a husband absolutely includes [4]:

a.   fair to himself.

b.   fair among the wives.

c.   fair in providing a living.

d.   fair in providing shelter.

e.   fair in giving time in rotation.

f.   fair in providing protection, care and affection for children.

The above concept is very difficult for a husband to fulfill; justice in different matters should give a feeling of love / affection to wives. Justice in affection relating to the heart is a matter beyond human capacity. This is in line with the Words of Allah in the Surah An-Nisa' verse 129 which states:

"And you will never be able to do justice among your wives even if you really (intend to do so); therefore, do not tend to be overly (biased towards the wife you love) so that you let other wives like hanging objects (in the sky)."

Siti 'Aisyah (r.a.) explained that the Messenger of Allah often acted fairly regarding the distribution among his wives and Rassullah prayed: "O Allah, this is my ability to share what is in mine. O Allah, do not be scold me for sharing what is mine and what is mine and what is not mine".

Nasuha [5] states that a fair attitude to polygamy is "fair in material matters, fair in dividing time, fair in distributing income such as clothing, food, and shelter, and fair in how to treat the desires of the inner needs of their wives." However, spiritual justice is not required by Islamic law, because spiritual problems are beyond human ability. Implicitly, polygamy is not allowed to man, so what about polyandry?

Polyandry in Islam

If polygamy is permitted with certain conditions, but this is not with polyandry which, in an Islamic perspective, is a forbidden act as mentioned in the Al-Qur'an Surah An-Nisa' verse 24: "and (forbidden too you marry) a woman who has a husband (*al-muhsanat*), except for the slaves you have" [6]. A woman who is already married and then marries another man while the woman is still in the bond of marriage, then the woman's acts are called polyandry marriage. The word Al-Muhsanaat is intended as a prevention (*Al-Man'u*) for married women so that they maintain their chastity and honor [7].

Because polyandry is not justified in the Islamic law and is considered haram by law, and if such a marriage continues then the marriage is categorized as adultery. Such an adultery is considered an act of *jarimah* (a an act of crime that is severely punished), and this view is agreed by many scholars. This model of adultery also applies to *ghairu muhsan* (unmarried) or muhsan (married) people even though the act is done on a voluntary (consensual) basis [8]. Musfir al-Jahrani (1997) has discussed at length about children from polyandry marriage [9] (see also [10].

A man is burdened with the obligation to earn a living because of his physical strength, but women are not obliged to work [11]. An understanding of the differences in body structure between women and men is the basis for understanding why Islam gives men the right to marry more than one (polygamy) while women do not. Islam determines everything with care and detail regarding women's issues in a form that is in line with their nature as a woman. Rasulullah Muhammad said which means "Whoever

is a woman who is married by two guardians, then (a legal marriage) that woman is for (the guardian) is the first of the two" (Hadith Narrated by Ahmad). Polyandry marriage does not bring any good to a wife who has multiple husbands, so Islam does not justify it and even forbids it.

Enforcement of Positive Criminal Law Against Muslim Polyandry Offenders

Criminal law in Indonesia is a legacy of Dutch colonialism which was ratified by Law No. 1 of 1946 with several changes to the Criminal Code (KUHP) [12; 13]. The Criminal Code is a law developed by the Indonesian people, after Indonesia's independence in 1945 and applies to Indonesian residents [14]. Polyandry acts are clearly prohibited based on both Islamic law and positive criminal law as stipulated in Article 284 of the Criminal Code.

Article 284 of the Criminal Code relating to adultery states:

A. The threat of imprisonment up to nine months to:

1 a. A man who is married and commits *mukah* (*overspel* in Dutch) even though he knows the Article 27 of *Burgelijke Wetbook* (BW) applies to him;

b. A woman who has married and is doing *mukah*.

2 a. A man who supports the act of *mukah*, even though he knows that the perpetrator of the *mukah* is married.

b. A woman who is already married and supports the act of *mukah*, even though she knows that the perpetrator is married and that Article 27 BW applies to her.

B. There are no prosecutions but complaints by husbands / wives who are tainted, and if they are put into effect of the Article 27 BW of the Criminal Code, within three months they may be followed by requests for divorce or a change in table or bed for that reason.

C. Article 72, article 73, article 75 of the Criminal Code do not apply to this complaint

D. Complaints can be withdrawn as long as the hearing for the trial hearing has not yet started.

E. If husband and wife are enforced Article 27 BW, complaints are not heeded as long as the marriage has not been decided because of divorce or before the decision stating separation of table or bed becomes a decision.

Article 284 shows that prosecution of adultery can only be carried out on complaints from one of the spouses or one of the partners feels contaminated by the act. Therefore, if all of them are silent, and no one feels defiled or does not feel harmed, they are considered to be doing it voluntarily and of course the perpetrators cannot be punished. Positive law considers a case of adultery as a complaint offense, meaning that prosecution is only carried out when there is a complaint from a party who feels aggrieved. The complaint can still be withdrawn as long as it has not been tried.

Polyandry offenders are not only suspected of committing adultery, they are also reasonably suspected of committing other criminal acts, such as crimes against the position of citizens with a 7 year sentence as stipulated in Article 279 paragraph 2 of the Criminal Code and Article 280 of the Criminal Code with the threat of a sentence of 5 years imprisonment when for polyandry marriage is proposed to cancel the marriage to the Religious Court and the boundaries are cut by the Religious Court, this is because the perpetrator of polyandry can be suspected of hiding their husband's status from other men. Falsifying documents carries a sentence of 6 years in prison as stipulated in Article 263 of the Criminal Code, because polyandry actors are suspected of using a fake ID card or fake divorce certificate or fake death certificate and so on. Polyandry actors also commit fraud with the threat of four years imprisonment as regulated in Article 378 of the Criminal Code because the polyandry perpetrator provides information about her status as a widow for a long time. In addition, polyandry marriages do not rule out the involvement of state officials who know that there are obstacles to the marriage but continue to carry out the marriage and they can be threatened

with seven years in prison as stipulated in Article 436 of the Criminal Code.

Based on Articles 279, 280, 284, 263, and 378 of the Criminal Code for the Case of the Decision of the Pematang Siantar Religious Court No. 141 / Pdt.G / 2011 / PA.PSt, polyandry perpetrators (women) can be punished under Article 279 paragraph 2 Jo. Article 280 paragraph 1 of the Criminal Code. Article 279 paragraph 2 of the Criminal Code is aimed at polyandry actors who hide their previous marriage and there is still a legal bond; Article 279 paragraph 2 of the Criminal Code which reads as follows:

"Whoever holds a marriage knowing that an existing marriage is a legal barrier to it, then hides from the other party that her existing marriage is a legal barrier to remarry."

The article above can be interpreted into two elements as follows:

1. The subjective element of "Whoever"

This "whoever" element is related to the existence of a person as a legal subject where he can be held accountable because he does have the ability to assume responsibility before the law. To fulfill the "whoever" element, a person must meet legal skills both in criminal law and in civil law. Polyandry actors in the case of the Pematang Siantar Religious Court Decision No. 141 / Pdt.G / 2011 / PA.PSt named Nurhaida Binti M. Lekar. She is a 51 year old woman, has five children and still has a legal marriage bond with another man. Besides, the polyandry actor is also not in a crazy state, so that the person concerned is not worthy of being "forgiven" but she must be held accountable because she has fulfilled the element of "whoever" is a polyandry actor.

2. The objective elements of "holding a marriage", "knowing the existing marriage", "the existence of a legal barrier" and "hiding the existing marriage".

a. *Having a marriage*

"Having a marriage" refers to a marriage that is carried out in a manner or procedure that is regulated in both legal provisions and community customs. According to the provisions in the Islamic Law Compi-

lation (KHI), a marriage is considered valid if it fulfills five parties, namely the presence of a prospective husband, a prospective wife, a marriage guardian, two witnesses and a *Kabul* consent (*ijab kabul*). All parties have been present in the case of the Pematang Siantar Religious Court Decision No. 141 / Pdt.G / 2011 / PA.PSt where the polyandry actor is married to a man named Ahmad Azman Halim Bin Abd. Gani and her marriage guardian, the Head of KUA Dolok Silau District, Simalungun. The wedding was attended by two witnesses namely Muhammad Arifin Marpaung and Wagiman and the Ijab Kabul was carried out by the prospective groom in the presence of the Wali Nikah, in this case the Head of the KUA. Thus, "having a marriage" here is considered valid because all the elements have been fulfilled.

b. Knowing the existing marriage

This element means that before getting married to another man, the polyandry actor is aware that she is still married, as in the case of the Pematang Siantar Religious Court Decision No. 141 / Pdt.G / 2011 / PA.PSt where she married another man on May 3, 2010 while her first legal husband was sick and died on May 30, 2010. Thus, the polyandry actor knows that she is still married her first husband.

c. There exists a legal barrier

This element means that the polyandry actor has a legal husband and there has been no divorce between the two, whether living divorce through the decision of the Religious Court, or divorce as evidenced by the existence of a Death Certificate from the competent authority, so that the existence of her husband becomes a barrier for her to marry another man. This is what is called the prohibition of marriage as stipulated in Article 40 letter a of the KHI (Compilation of Islamic Law).

d. Concealing the existing marriage

This element means that there are hidden attempts by polyandry actors against their new partners and also against officials who process the issuance of the Marriage Certificate. The issuance of Marriage Deed No. 058/04 / VI / 2011, dated 3 June 2011 is evidence that polyandry actors hide their status with their new partners and also with officials so that marriage certificates can be issued.

Apart from the application of Article 279 paragraph 2 of the Criminal Code in the case of the Pematang Siantar Religious Court's decision, polyandry actor is also subject to Article 280 of the Criminal Code which cannot be separated from Article 279 paragraph 2 of the Criminal Code. Article 280 of the Criminal Code states:

"Anyone who gets married deliberately concealing to the other party that there is a legal obstacle for her to marry, is sentenced to a maximum imprisonment of 5 years, if the marriage is canceled on the basis of that obstacle".

Article 280 of the Criminal Code has the same elements as Article 279 paragraph 2 of the Criminal Code, it's just that Article 280 of the Criminal Code. Polyandry marriage as in the case of the Pematang Siantar Religious Court Decision No. 141 / Pdt.G / 2011 / PA.PSt has been canceled through the Pematang Siantar Religious Court. Accordingly, the issuance of Marriage Deed No. 058/04 / VI / 2011, dated 3 June 2011 was also automatically canceled. Thus, law enforcement against polyandry actors is based on Article 279 paragraph 2 Jo. Article 280 of the Criminal Code is very precise and sufficiently grounded.

Conclusions

The crime of polyandry marriage is included in the civil sphere in the Religious Court so that polyandry actors are very rarely subject to the articles discussed above. Because the Religious Court itself is one of the courts under the Supreme Court which has the authority to handle civil matters, various cases of polyandry marriage cannot be prosecuted by the Religious Courts criminally and this is one of the weaknesses of the Religious Courts. In fact, the Religious Courts have the authority to handle criminal matters so that crimes of polyandry marriage can be tried in accordance with Article 279 paragraph 2 Jo. Article 280 of the Criminal Code.

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Section 6. Agricultural sciences

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GROWTH, PRODUCTIVITY AND YIELD OF WHINTER WHEAT VARIETIES IN THE IRRIGATED CONDITIONS OF TASHKENT REGION (UZBEKISTAN)

Abstract. Wheat is a grass widely cultivated for its seed, a cereal grain which is a worldwide staple food. In this article, it is presented an analysis of data obtained on the impact of growth, development, stem height, spike parameters, grain yield and mineral fertilizer application norms on its quality indicators in soft wheat varieties. In the experiment, the increase in the rate of mineral fertilizers did not affect the increase in grain size, but rather its decrease. In particular, the highest yield was achieved when the feeding norm $N_{200}P_{150}K_{100}$ kg/ha was applied, but when determining the amount of grain formed at the expense of 1 kg NPK, it was 13.62–15.33–14.15 kg by varieties.

Grain quality indicators are the highest in the variants applied $N_{200}P_{150}K_{100}$ kg/ha, protein (15.0%), gluten (28.6%) and vitreous (63.9%) of the variety "Matonat", control "Yaksart" (13.5%; 26.3%; 60.6%) and "Zamin-1" (14.0%; 27.8%; 59.7%).

Keywords: wheat, experiment, design, replication, statistic, flowering, maturity, seed weight, yield, quality of seeds.

Introduction

Wheat is grown on more land area than any other food crop (220,4 million hectares, 2014) [2]. World trade in wheat is greater than for all other crops combined [3]. In 2017, world production of wheat was 772 million tonnes, with a forecast of 2019 production at 766 million tonnes [4], making it the second most-produced cereal after maize [4; 5].

The Republic of Uzbekistan gained grain independence in 2003 and produced 5 million tons of grain. More than 1 mln. tons of grain were grown. This was achieved due to the expansion of irrigated areas from 24,0 thousand to 1356,1 thousand hect-

ares over the years. By 2020, productivity will be even higher, at 6 million tons and the average grain yield in the Republic was 55 c/ha.

Agro-climatic zoning of agricultural crops is an urgent problem in Uzbekistan. In particular, in order to ensure sustainable grain independence, our grain growers face important and responsible tasks, such as the selection and introduction into production of varieties that are adapted to each climate and have a high yield [1].

Purpose and functions of scientific work. The purpose of the research is to determine the optimal standards of mineral fertilizers that will ensure the production of high quality grain from soft wheat varieties in the conditions of typical irrigated sierozem soils of Tashkent region.

To achieve this purpose, the following tasks are set:

- germination, wintering rate and number of stem accumulation of wheat varieties;
- development periods and biometric indicators of wheat varieties;
- agrophysical, agrochemical properties of typical sierozem soil of the studied factors in the cultivation of winter wheat;
- the effect of wheat varieties on the leaf surface;
- to determine the effect of mineral fertilizers on the yield and quality of wheat varieties, as well as the optimal feeding rate.

Materials and methods

Field studies were carried out at the experimental station of Tashkent State Agrarian University. The experimental station is located near Tashkent, in the upper part of the Chirchik river, Kibray district of the Tashkent region, at an altitude of 481 m above sea level, 41°11″ northern latitude and 38°31″ east longitude. The terrain of the site is uneven, slightly wavy, with a general slope to the Salar canal. Irrigation water was pumped from the Bozsu channel.

The soil of the experimental site is long-irrigated sierozem, non-saline, with a low content of humus 0,9–0,7%, nitrogen 0,082–0,066%, phosphorus 0,153–0,139%, potassium 1,33–1,30%.

Table 1. – The soil characteristics of the experimental area

№	Depth (sm)	Gross content,%				Mobile forms, mg/kg		
		humus	nitrogen	phosphorus	potassium	N-NO$_3$	P$_2$O$_5$	K$_2$O
1	0–30	0,925	0,083	0,152	1,33	4,8	47,1	180,7
2	30–50	0,715	0,070	0,134	1,30	3,2	40,3	162,0

Field and laboratory methods of research, developed by the Uzbek Research Institute of Plant Production, were used. Phonological observations were conducted according to the Methodology of the State Variety Testing of Agricultural Crops. Statistical processing of data was carried out according to B. Dospekhov. Application of organic and mineral fertilizers and necessary agro technics on these soils, enable to obtain the high yields of field crops.

Climatic condations

The climate of Tashkent region, as well as of Uzbekistan in general, has a sharply continental char-acter. Spring comes early: at the beginning of March, the air temperature rises noticeably, although sometimes a sharp cooling occurs. During this period a significant part of the annual precipitation falls. Summer is long, hot and dry.

Sometimes precipitation falls in the month of June in the form of rains, but then comes hot and dry weather, usually continuing until late autumn. The maximum air temperature reaches 43 °C in July, sometimes in August.
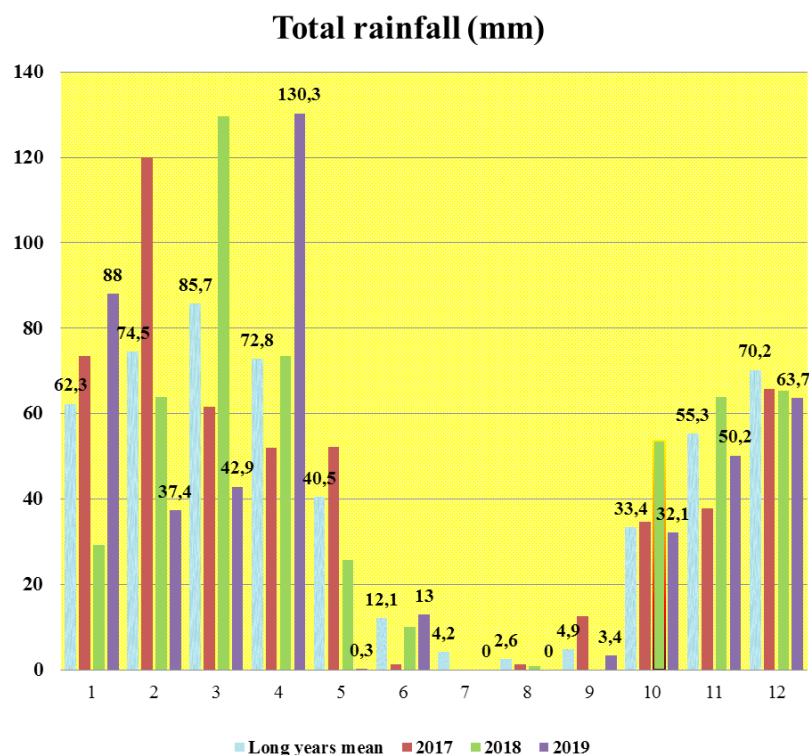
Total rainfall (mm)

Table 2. – The climatic conditions during the growing season and long years mean

The following phenological observations, calculations, laboratory analyzes were carried out in the experiment:

1) The degree of germination of grain. 2) The number of grasses, seedling thickness per 1 m² was determined at 3 points of all options. 3) Phenological observations were made on the stages of development. 4) The height of the stem of winter wheat according to the options (during the periods of booting and full ripening); spike length (during full ripening); the number of grains per spike; grain weight per grain; Weight of 1000 grains. 5) At the time of harvesting, 1 m² of wheat was harvested from 3 points of repetition of all variants in the experiment, the grains in it were milled and the yield of grain and straw was calculated by weighing. 6) Technological quality indicators of grain (samples were delivered to a special laboratory) were determined. 7) In the mathematical analysis of the yield of winter wheat grain and straw, B. A. Dospekhov's (1985) multiple factory field experiments used the method of variance analysis based on randomized returns.

Experimental results

Grain crops go through several developmental stages during development, namely from germination to the formation of new seeds. During the developmental stages, morphological changes occur in plants and new organs are formed. The winter wheat crop, like other cereals, goes through the following stages: seed germination (seedling), stem accumulation, booting, heading, flowering and ripening (milk, dough and full ripening).

The rate of development of wheat sown in autumn depends to some extent on growing conditions, biological characteristics of species and varieties, bush thickness, soil moisture, air temperature, sowing depth of seeds, sowing times, standards, fertilization and irrigation standards and other factors.

Phenological observations were performed continuously every two days from the beginning of each development period (10%) until 75% were manifested in the plant. The grassing period was observed in Yaksart and Zamin-1 varieties on November 4–6, and in Matonat variety on November 6–8. After the

germination of winter wheat seeds, the next stage of development of the plant gradually enters the stem accumulation phase. The experiment showed that the studied varieties entered the stem accumulation phase during the onset of cold winter days.

Booting (stem formation) period: During this period, the plant grows rapidly, its mass increases rapidly. Therefore, during this period, the demand of plants for nutrients and moisture increases. During this period of development, the second feeding of the plant with the remaining 50% of nitrogen fertilizers led to the rapid development of wheat varieties. Booting wrapping period March 24–30 in Yaksart variety; the Zamin-1 variety was observed on March 16–18 and the Matonat variety on March 22–24. During this period, the differences in varieties were significant, and the development of the variety Zamin-1 was accelerated.

Table 3. – Development periods of winter wheat varieties, 2018–2019

Varieties	Transition period of developmental phases				
	grassing	stem accumulation	heading	flowering	full ripening
$N_{100}P_{75}K_{50}$					
Yaksart	22.10	24.03	24.04	06.05	12.06
Zamin-1	20.10	16.03	20.04	28.04	08.06
Matonat	23.10	22.03	24.04	02.05	14.06
$N_{150}P_{110}K_{75}$					
Yaksart	22.10	26.06	26.04	08.05	14.06
Zamin-1	20.10	18.03	22.04	30.04	10.06
Matonat	23.10	24.03	26.04	04.05	16.06
$N_{200}P_{150}K_{100}$					
Yaksart	22.10	30.11	28.04	06.05	14.06
Zamin-1	20.10	18.03	24.04	30.04	12.06
Matonat	23.10	24.03	26.04	04.05	16.06

The results of observations between the varieties show that the Zamin-1 variety passed 112–115 days, the Matonat variety 114–117 days, and the Yaksart variety 118–122 days later.

The heading period was observed on April 24–28 in Yaksart variety, on April 20–24 in Zamin-1 variety, and on April 24–26 in Matonat variety. By this time, there was a rapid development of the variety Zamin-1. Data on the impact of fertilizer standards on the development periods of prospective wheat varieties are given in (Table 3).

Ripening: In the winter wheat plant, the ripening period is divided into three periods: milk, dough and full ripening. During these periods, a decrease in the amount of moisture in the grain is observed (55––60%; 25–30%; 13–14%). According to Table 3, full ripening of grain in the variety Zamin-1 08–12.06.; Matonat variety 14–16.06. and 12–14. 06 days in the Yaksart variety. It is known that the high yield of agricultural crops means that the crop structure is well formed. The main indicators that determine the weight of winter wheat are: the length of the spike, the number of grains in the spike, the weight of the grain in the spike, and the weight of 1000 grains, almost all of which depend on the biological characteristics of the variety. Feeding the wheat plant with mineral fertilizers has a major impact on the number of grains.

In the experiment, the effect of the norm of mineral fertilizers on the biometric indicators of prospective wheat varieties was observed. According to (Table 5), in variants 1, 2 and 3 mineral fertilizers NPK 100:75:50 kg/ha were applied, while in the first variant the average spike length was in

Yaksart variant 7,9 cm, in Zamin-1 variety 9,0 cm and in Matonat 8,7. On the sequence of varieties when applied NPK 150:110:75 kg per hectare, while the variety was 8,7 cm; 9,5 and 9,4 cm; mineral fertilizers high NPK 200:150:100 kg/ha when applied norm 7; 8 and 9–1,7 cm compared to op-tions; caused an increase of 0,3 cm and, 1,7 cm. Another yield element of winter wheat is the number of grains per spike, with NPK applied at 100:75:50 kg/ha per hectare; in 1; 2 and 3 variants were – 39,8 in options; 42,2 and 42,1 piece, respectively.

Table 4. – Spike analysis of wheat varieties

The rate of mineral fertilizers, kg/ha	Spike length, cm	Number of grain per spike, piece	Grain weight per spike, gr	Grain weight of 1000 pieces, gr
$N_{100}P_{75}K_{50}$				
Yaksart	7,9	39,8	1,47	41,1
Zamin-1	9,0	42,2	1,53	39,5
Matonat	8,7	42,1	1,66	42,7
$N_{150}P_{110}K_{75}$				
Yaksart	8,7	42,3	1,65	41,6
Zamin-1	9,5	43,1	1,69	41,1
Matonat	9,4	43,9	1,74	43,9
$N_{200}P_{150}K_{100}$				
Yaksart	9,2	43,9	1,76	42,2
Zamin-1	10,7	43,7	1,72	40,7
Matonat	10,1	45,0	1,82	45,2

In options 4, 5 and 6, the grain weight per grain applied to mineral fertilizers $N_{150}P_{110}K_{75}$ kg/ha was 1,65, 1,69 and 1,74 grams, respectively. It can be seen that the feeding norms with mineral fertilizers affected the length of the spike, the number and weight of grains per spike.

Affecting factors to the yield of cereals include: first of all, the biological characteristics of the variety, natural climatic conditions, optimal planting method, duration time and norm, nutrient content and duration of application, moisture supply, disease and pest infestation, timely harvest.

When the analysis of grain yield, the average yield of Yaksart variety was reached to 49,2–61,3 c/ha, Zamin-1 variety is 53,9–69,0 c/ha, Matonat variety is 51.7–63.7 c/ha.

The main problem in grain production remains quality indicators. The reason for the fact that the quality of grain grown in Uzbekistan does not fully meet the requirements for the closure of bakery bread: the average vitreous content is 63%(15–90%), gluten content is 26.7%(23.6–33.2%), IDK – 95(65–120) In Kazakhstan, the figures are relatively high: 81 (41––95%), 32.6(24.0 – 37.6%), and IDK 80 (60 – 95).

Table 5. – Productivity and quality indicators of wheat varieties

The rates of mineral fertilizers, kg/ha	Grain productivity, c/ha	Protein content,%	Gluten content,%	Vitreous,%	Grain formed at the expense of 1 kg of NPK, kg
1	2	3	4	5	6
$N_{100}P_{75}K_{50}$					
Yaksart	49,2	11,8	24,0	52,7	21,87

1	2	3	4	5	6
Zamin-1	53,9	12,2	24,8	52,3	24,06
Matonat	51,7	12,6	25,9	58,6	22,98
$SAD_{0,5}=1,62\ c\ SAD_{0,5}=3,06\%$					
$N_{150}P_{110}K_{75}$					
Yaksart	56,0	12,7	25,2	55,4	16,72
Zamin-1	61,8	13,3	26,4	55,0	18,43
Matonat	58,1	14,1	28,1	61,3	17,34
$SAD_{0,5}=1,57\ c\ SAD_{0,5}=2,67\%$					
$N_{200}P_{150}K_{100}$					
Yaksart	61,3	13,5	26,3	60,6	13,62
Zamin-1	69,0	14,0	27,8	59,7	15,33
Matonat	63,7	15,0	28,6	63,9	14,15
$SAD_{0,5}=1,44\ c\ SAD_{0,5}=2,83\%$					

According to the experimental data, the quality of winter wheat was affected by the amount of mineral fertilizers. One of the indicators of grain quality is the amount of protein. The importance of protein is that it is easily digested in the human body, increasing its physical and mental capacity. In the experiment, it was found that the values of protein, gluten, vitreousness in the studied varieties were different in terms of the biology of the varieties. The data obtained are presented in (Table 5). In the experiment, the amount of grain (in kg) formed at the expense of 1 kg of NRK fertilizers in the formation of grain yield was determined.

In the experiment, when calculating the amount of grain formed per 1 kg of NPK, NPK in the variants used 100:75:50 kg/ha was 21.87–24.06–22.98 kg by varieties.

The increase in the rate of mineral fertilizers did not affect the increase in grain content, but rather its decrease. In particular, the highest yield was achieved when the feeding rate $N_{200}P_{150}K_{100}$ kg/ha, but when determining the amount of grain formed at the expense of 1 kg of NPK was 13.62–15.33–14.15 kg for varieties.

Conclusion

In the experiment, the increase in the rate of mineral fertilizers did not affect the increase in grain size, but rather its decrease. In particular, the highest yield was achieved when the feeding norm $N_{150}P_{110}K_{75}$ kg/ha was applied, but when determining the amount of grain formed at the expense of 1 kg of NPK, it was 13.62–15.33–14.15 kg by varieties.

Grain quality indicators $N_{200}P_{150}K_{100}$ kg/ha are the highest in the applied variants, protein (15.0%), gluten (28.6%) and vitreous (63.9%) of the variety "Matonat" compared to control "Yaksart" (13.5%; 26.3%; 60.6%) and Zamin-1 (14.0%; 27.8%; 59.7%).

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Section 7. Technical sciences

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INFORMATION PROCESSES MANAGEMENT

Abstract. An approach to automation of information-analytical activity tasks which is based on processing of the text documents content has been offered. Developing a methodology is based on a knowledge-oriented approach will allow qualitative assessment of the texts content. The tasks' peculiarity of information and analytical activity has been determined. Applying the methods of automating the extraction of knowledge contained in natural-language texts, the formal presentation of them in machine languages will allow you to integrate and generalize knowledge in a particular subject area, in particular to check for meaningful compatibility and contradictions, which is an important component of information and analytical activity. There is a practical example of finding information on a content query, taking into account the conceptual structure of the subject area.

Keywords: information technologies, natural language, multifunctional model, linguistic multifunctional model, semantic coincidence, automated educational systems.

Introduction

Recently, began to actively develop information – analytical systems.

Their main purpose is the automated preparation of analytical documents on the totality of all available natural and multilingual information.

The need to create such systems is due to the fact that government agencies as decision-makers, most decisions have an information base.

The security of decision-making and its consequences largely depends on how timely the necessary complete and objective information formed the basis of the decision.

The basis of decision-making is adequate information, which means reliable. Which is delivered to a certain person on time and in an accessible form.

From these positions, information and analytical support (IAS) of public administration should be considered as one of the determining factors of efficiency and security of management.

Much of the information flows circulating in public administration are textual information, including multilingual.

One of the leading places in the decision-making process belongs to information-analytical units. Whose task is to analyze, summarize, and systematize both open and closed information on its reliability, usefulness, and compliance with the tasks to be solved by the governing bodies.

Objectives (IAS) are to assess the situation, forecast trends in its development, identify patterns, trends, and deviations in the development of situations.

The source product is analytical references and reviews that are formed by the requirements for their content, scope, and level of generalization.

The source analytical document is an information resource for the decision-maker.

In the process of preparation of analytical documents, specialists of information-analytical departments solve tasks to assess the quality of the material. Tasks to identify misinformation, logical and semantic compatibility, inconsistencies regarding the applied problem to be solved.

Solving these problems creates conditions for management to save time and more effective interaction.

Automation of informational and analytical activity tasks

The information which is contained in the text sources may be filed in different languages, which makes it necessary to converse the multilingual input information to its only representation in the knowledge base. The information presentation format is the basis for solving the complex issues of information and analytical activity (I & AA). Some tasks that require specific automation methods, but their effectiveness is limited. Solving problems of information and analytical activity, for instance, planning of analytical certificates, reports, reviews or forecasting of acceptance or rejection managerial decisions, occurs through the stacking axiomatic models (model of cause and effect relations between sentences) which contain the relation of an implicative nature or another system of relations that will reveal implicit knowledge. The requirements for a formalized knowledge submission include: a form of representation that will ensure correct logical and semantic processing of knowledge; the necessary information to solve specific information and analytical tasks so that maximum retains the text representation of knowledge elements.

Taking into account the quality requirements of the formalized submission of knowledge, the conceptual structure (CS) of the content of the natural-language text (NLT) is chosen. It is a hierarchical structure, at the top level of which are the most common concepts and relations between them, each lower level is represented by concepts and relations that specify the relevant concepts, the ratio of a higher level. That is, the top level of the CS corresponding to the most general description of the content of the text, Its lower levels are the appropriate level of concretization of this description. Each concept and attitude in the CS is accompanied by characteristics that determine their properties (a concept and an attitude), modalities and other aspects; linguistic information that characterizes linguistic means, their reflection in the input text; semantic information (e.g. an object, a subject, a relation type, a direction, etc.). Thus formed CS contains all the necessary information to solve the applied problems of I & AA. The possibility of its formation is determined by the presence of relevant knowledge in the thesaurus of the system.

The peculiarity of the conceptual structure is its hybrid representation which combines properties of semantic networks and predicate models; in order to unify the presentation of knowledge contained in texts, such as analytical reports which contain a variety of arguments, including a content structure; to reproduce

implicit knowledge and adapt it to further processing; also special facilities are introduced to store natural-language textual presentation – the prefixes and the postfixes of the predicates and concepts, the logical-linguistic connections and the anaphoric references.

CS corresponds to the formulated requirements and contains all necessary information for its further logical and semantic processing and for the synthesis of the description of the CS or its fragments in natural language, it is formed as a result of the linguistic processing of NLT.

It should be noted that during the processing of the "Notion" that occurred at the beginning of the text and turned out to be polysemic, is specified at the end of the text. In addition, the content contains a certain structure during the formation of the text.

The feature of the synthesis process of the description of the CS is the logical structure of the synthesized text, defined by the structure of the CS or user requirements. In the latter case, the necessary fragments "are removed" during the logical processing of the conceptual structure which are integrated into the only CS with a formalized representation of the content of the text. The linguistic synthesis of the text is carried out under the control of the structure and content of the elements of the CS incoming to it.

Therefore, at the first stage of the information processing, it is unified to the only form of presentation in the look of a conceptual structure (for natural-language texts by removing knowledge from textual sources and formalizing it). The natural-language texts are submitted in English, Russian and Ukrainian. The knowledge base integrates the everything necessary for a comprehensive analysis of a priori ("the old") and current information. Information is analyzed for functional completeness, compatibility, and contradictions by methods of logical and semantic knowledge processing. These methods solve the applied problems, which means generalization information, and formating an analytical review and recommendation certificates.

The core of the instrumental knowledge-oriented system of automation of natural-language information processing subsystem which is named "Dictionary". For the complex solution of automation problems of knowledge extraction from natural-language texts, their formalization and processing in the interest of solving application problems "Dictionary" contains three main sections: the first section that contains linguistic knowledge of the language tools of natural language; the second section that contains general knowledge of the real world and knowledge of specific subject areas; the third section that contains the knowing of how knowledge about the real world is formulated in a specific language. "Dictionary" is a model of the process of displaying ("coding rules") knowledge about the world in a specific natural language.

The subsystem "Formalizer" implements procedures for extracting and formalizing of content (a knowledge) reflected in natural-language textual sources. The subsystem "Unifier" implements procedures for converting the formalized knowledge representation to a single look and can be used on its own. One of the functions of this subsystem is, for example, the replacement of such action relations as "locomote", "fly", "go", "go" with a semantic synonym for "move".

Due to the formalization of knowledge, their representation is formed in the form of a conceptual structure. The generated CS contains all the necessary information to solve the application problems of I & AA automation. The possibility of its formation is determined by the relevant knowledge in the "Dictionary".

Therefore, a formal presentation of the content can also synthesize its description in natural language. The subsystem that implements this procedure is named "Synthesizer". The "Identification" (ID) subsystem analyzes formalized representations of knowledge or fragments of them for the identity of the content they display and transforms those representations into a single representation. With the help of the considered subsystems, it is possible to solve the problem of identification of NLT fragments at the substantive level quite effectively and eliminating duplicate text fragments with the same content. Moreover, if "Formalizer" can process multilingual

text sources (Ukrainian, Russian and English) and at the same time transforms their content into a single formalized view, while "Synthesizer" can also formulate content descriptions in different languages. Also, the information systems that comprise these two subsystems are also multilingual.

The combination "Formalizer-Synthesizer" gives a possibility to realize machine translation and abstracting of text documents based on an analysis of their content. The peculiarity of constructing such a translator is that the translation does not do in separate phrases (sentences), as it does in modern translators. First, the input text is fully processed by the "Formalizer", resulting from which, form a unified formalized presentation of the content of the text. Then this view is "processed" by "Synthesizer". During the formation of formalizing a presentation, the information that is specific to a concept and is distributed throughout the text concentrates around that concept. Therefore, logical content structuring is carried out. In the case where the "Formalizer" and the "Synthesizer" operate in the same language mode. It will be a "machine translation" of the contents of the document, also is logically structured.

In the abstracting mode, the CS text is partially used, depending on user needs. If the user needs a generalized abstract of the text, so in the CS is separated by a layer of only the upper level, which is perceived as a conceptual image of the input text. Truly of using the term "image" is justified by the fact that the selected part of the CS reproduces the generalized content of the text. The description in a natural way synthesizes its description in natural language, which is a generalized abstract (summary) of the input text. In case the user wants to get an abstract with some level of detail about those aspects of the content of the text which are interested for him, then, apart from the upper layer, the corresponding fragments of the lower levels are separated from the CS. The selected fragments of the CS synthesize the conceptual image of the input text, which is the basis for the synthesis of his abstract. The amount and content

of detail may look like a way by keyword list or based on natural language requests. Thus, this approach makes it possible to form purposeful abstracts, that reflect the user's needs in extending the description of certain aspects of the text.

This approach allows you to build multilingual auto-referencing systems, which are able, for example, to form abstracts of English and Russian texts into Ukrainian.

The "Formalizer-Identification-Synthesizer" combination allows automating the solution of the problem-finding the necessary information on the meaning of the request, formulated in natural language.

The "Formalizer-Identification" combination with the active use of the "Dictionary" and the "Unifier" makes it possible to automate the solving of such problems:

- the elimination of duplication of the same content of different text documents or their fragments;
- the automatic indexing of multilingual text documents by their contents (the solution to this problem is based on the formation of a formalized presentation of the substantive essence of the rules of document indexing);
- automatic classification and distribution between thematic sections of the textual knowledge base of the multilingual documents by their content.

An important task of I & AA automation is to integrate the knowledge in the specific CS, which is contained in multilingual sources. This task is not treated even in the plan. The "Integrator" subsystem is introduced to automate this task, such as English text, which is devoted to the methods of presentation of knowledge, according to which the "Formalizer" the conceptual structure is formed by its content. This is how the conceptual structure is constructed, and according to the Russian-speaking text, which refers to the methods of the processing of knowledge. But it also describes the methods of representation of knowledge discussed in the English language text.

The identical fragments of incoming texts are generate and identical fragments of the conceptual structure, because their representations are standardized in the form and by the language of the intra-machine representation. This makes it possible to unite the conceptual structures of multilingual texts with the unification of their common parts. If necessary, links to sources that have formed those fragments of the conceptual structure can be fixed. Therefore, knowledge in some subject areas contained in multilingual textual sources may be accumulated.

One of the most important tasks of text information processing is the definition of correctness, in particular, logical and contextual compatibility or contradiction of knowledge. The sources of contradictions are, for example, stylistic flaws in the input text, vague or negligence wording, incomplete informing the authors, distortion of textual information during its transmission through the network, as well as deliberate distortion of information (disinformation). The task of automation of detection of contradictions in information at the level of processing directly input text is extremely difficult. To automate the task of defining logical and semantic compatibility or contradictory knowledge extracted from the NLT, the subsystem "Logic" is introduced. The functioning of this subsystem is based on the implementation of a sufficiently wide range of formal and logical methods of logical and semantic knowledge analysis already developed and developed today for functional completeness, compatibility, or inconsistency.

The main task of analytical activity is the formation of analytical reviews and references. Knowledge-oriented approach to the development of information systems provides an opportunity to automate the process of forming analytical reviews and certificates by the user requirements for their volume and thematic orientation. This is especially important if the same sources contain diversified and multifaceted, in the thematic plan, information, and the user is interested in specific aspects, for example, the development of certain events. In this approach, the pres-ence of a subsystem (which is called "Analytics"), which by the formalized submission of requirements for analytical review (a reference) would search and locate the necessary fragments of knowledge in the corresponding conceptual structure, their isolation, and unification into a single meaningful – holistic structure. This conceptual structure and is the basis for forming the text (the Synthesizer) of the desired review (a reference) in natural language. To solve this task, a significant portion of the "analytics" functions can be implemented in previously considered components ("Identification", "Unifier", "Integrator") about unified application tasks.

Representation of knowledge about the subject industry

The most widespread methods of knowledge processing are acquired in expert systems of various purposes and instrumental systems of automation of programming. A capsule of expert systems can be considered as instrumental systems of programming of applied expert systems, or programming of knowledge for them. From the point of automation view, I&AA is interesting not by expert systems, but by the methods of representation and processing the knowledge they are implemented. Analysis of practical aspects of the situation in this field demonstrates that in the classical theory of representation of knowledge, two principal forms are considered: the semantic and the logical. The semantic representation of knowledge about the subject area (SA) includes: semantic networks and their variants, frames, a model of universal semantic code (USC). Special attention is drawn in the semantic representation of knowledge on hierarchical models. Logical representation includes productive and predicate models.

Semantic networks and frames form a class of relational models of knowledge representation. In the basis of relational models are binary relationships of knowledge representation. The language of the formalized knowledge representation contains common patterns for the entire class of relational models. To model knowledge about the world (SA), we distin-

guish several classes of elements that are fed through linguistic units (words and phrases) as the basic concepts and relation of describing a certain subject area (SA). Thus, it distinguishes names, relation, concepts. The concepts are divided into "concepts-classes", "concepts-processes" and "concepts-states". The "concept-class" is a collection of specific objects and objects that contain certain properties like (a noise generator, a table, etc.). The concepts "processes" describe a group of homogeneous processes (load, damage, etc.). The concept "status" defines the state of the object (normal mode, line on, etc.). "Names" serve as for the identification of concepts (airplane AH-64A, company "McDonnell Gelcopter", etc.). "Relation" serves as to establish relationships on plural concepts. In some sources, up to 200 simple (base) relations are highlighted. The most commonly used of these relations are shown in (table 1).

Table 1.

Relation type	The name of the relation	Marking the relation
Time	**to be at the same time**	R_{11}
	to be previously	R_{12}
Spatial	**to be surrounded**	R_{21}
	to be	R_{22}
	to be behind	R_{23}
	...	R_{2r}
Dynamic	**to move to**	R_{31}
	...	R_{3n}
Classification	**to belong to a class**	R_{41}
	to have (properties)	R_{42}
	...	R_{4k}
Identification	**to have a name**	
Pragmatic	**to serve for**	R_{51}
	to have a conditional	R_{52}
	to be the obstacle	R_{53}
	...	

The table shows not language relations, but the relations of the physical world. A particular language relationship may contain different descriptions. For example, in the following different phrases: "The part moves through the conveyor to the final bunker", "The robot moves to warehouse number 4", «The car is approaching the intersection» – one relationship is implemented R31 from (table 1).

To conclude, correctly constructed formulas (CCF), a set of syntactic rules proposed.

The class of relational models contains a very wide range of their varieties.

Semantic networks have gained active distribution in artificial intelligence systems to automate management tasks. Semantic network in the general case indicated as:

$$C = <x_1, x_2, ... x_s, r_1, r_2, ... r_q>,$$

where, $x_1, x_2, ... x_s$ – fixed sets; $r_1, r_2, ... r_q$ – system of relations defined on the elements of these sets. There are a lot of different concepts in constructing semantic networks, the authors of which are trying to convey a more fully formalized representation of knowledge about SA. Examples of very common semantic networks are the language of conceptual dependencies, developed under the leadership of R. Schenk, pyramidal growth networks.

Syntagmatic chains and RX – codes are special cases of semantic networks. Three species $(X\ r\ Y)$,

where *X* and *Y* are codes of concepts, *R* is a code of relation, it is necessary to call an elementary syntagm. Formulas that consist of elementary syntagms and the connections between them (logical operations) are called syntagmatic chains. Over such chains administered algebra, which makes a certain conversion over them. *RX* codes fix the binary relationship *R* between X_i and Y_j. *RX*-codes are used to build a statistical representation of the properties of objects in the subject area.

A separate class of relational models forms a frame representation. Frames are structural and role-playing. An analogy can be drawn between role frames and RX codes. So, any *RX* code is considered a role frame. They contain a branching hierarchical structure where the nodes of the higher layer correspond to a more general concept. The concept of each node is determined by a set of attributes called slots. It is possible to associate a certain number of procedures with each slot. These procedures can monitor the assignment of information to the appropriate node and control what actions must be taken when changing this information. These capabilities of frames are useful in those subject areas where the form of presentation and content of the information provided are important. The frame analysis procedure is used in a number of systems, including for the analysis of natural language text. But the frame is too large a unit of content, which does not allow to show all the features of NLT.

The universal semantic code was developed by Martinov. The elementary structure of the USC is represented by three: (*S, A, O*), where *S* – is the subject in the sentence, *A* – is the predicate, *O* – is the direct complement. The rules of transformation of a natural-linguistic sentence into USC are to single out elementary constructions in a sentence. Over elementary structures introduced algebra (assembly syntagms, integration, decomposition).

The structure of concepts in the subject area is hierarchical. This led to the development of hierarchical models of knowledge representation. Hierar-

chical models represent a "tree" of subordination. At the top level there is only one node called the root. Each node, except the root, is associated with one node at the highest level, which is called the input node for that node. No element has more than one input node, each element can be associated with one or more elements at the lower level. The hierarchical view is that each record contains its value only in the context of the tree. The subordinate item cannot be without its predecessor in the hierarchy. Hierarchical models are distributed during the laying of the thesaurus from the subject industry, but not all relationships fit in hierarchical boundaries.

Semantic models contain certain advantages in the description of knowledge in machine systems, namely: visibility and simplicity of perception. The use of binary relations is one of the most natural means of presenting information to the user; relationships between concepts, on the one hand, are realized through linguistic vocabulary, on the other hand, are subject to a formal description suitable for computer processing.

Most predicate languages are based on numerous first-order predicates. Multiple and single predicates, logical connections, and quantifiers are used. Knowledge is presented in the form of formulas of predicate logic. Joining the formulas to those obtained earlier makes it possible to obtain new statements about objects using the rules for deriving plausible formulas in numerous first-order predicates. This procedure is interpreted as a logical conclusion. The predicate numbering alphabet consists of the following set of characters:

- punctuation marks: $\{(,).\}$;
- proposal links:;
- quantifiers $\{\}$;
- symbols of variables x_j, $j = 1, 2, \ldots$;
- *n* – local functional symbols: *f*

From the symbols of the alphabet build different statements. Thus, we distinguish terms, elementary formulas (atoms) and correctly constructed formulas (CCF). Any symbol of a variable or functional

constant is a term. If p is a predicate symbol, and t_1, …, t_i- terms, so $p(t_1, …, t_i)$ – is an atom. The atom is a correctly constructed formula (CCF). If A and B are CCF, then (A, AB, AB) are CCF too.

Methods of predicate representation of knowledge contain a fairly wide range. But the vast majority of them are based on the programming style developed by Kowalsky, who uses the logic of predicates to control the analysis of declarative statements. At the same time, each statement is written in the form: *consequent: antecedent-1 [antecedent-2] …*

Antecedents are predicates whose probability values can be determined by the way, and the consequent is a predicate that contains the value "truth", when every antecedent and predicate also contains the meaning "truth".

The program that implements this mechanism selects the goal and compares it with the consequences of all statements. When it finds such consequences, it tries to prove the goal by considering the antecedents of the found consequence as subgoals. If, as a result of such a recursive process, all subgoals are proved then. The goal itself is considered proved. A classic example of the implementation of this approach is the Prolog system and other systems like prolog. At the present stage, there are practical systems and theoretical developments that implement logical systems with more complex mechanisms of logical inference and with much greater opportunities to present different aspects of knowledge. For example, the Platan-D1 logistics programming language is designed to formalize the tasks of action planning in a dynamic environment in the interests of synthesizing a model of the behavior of dynamic objects or an algorithm for achieving goals by objects that are the basis for compiling a program from autonomously debugged software modules. The core of this language is the procedure for deductive excretion that operates with a conditionally true form of presentation of logical statements. The language of Platan-D1 contains modal and modal-temporal logic and is constructed in such a way that it is open to expand the means of other logics. In addition, the constructions of this language provide for the possibility of maintaining logical assertions of imperative information or information that characterizes the peculiarities of the use of software modules that interpret the content of primary predicates. This allows you to simply implement the mechanism of procedural accession to the logical output scheme. This capability can be used for a variety of purposes, for example, to extend the language using multi-valued logic, to estimate the probability of goal achievement, etc. In the context of discussed problems, *Platan-D1* can be considered as a logical and instrumental core for constructing the language of representation and logical-semantic processing of knowledge extracted from the texts.

The advantage of the predicate type systems is that the logical systems contain an effective procedure. That is, for the final subject areas and in the presence of the functional fullness of the logical system is the algorithms of logical output, providing a publication of the answer on determining truth target instruction.

Among the disadvantages it should be noted that the number of predicates does not have a sufficient set of tools for the formalized representation of knowledge that is in natural language texts.

The presentation of knowledge in the form of products (or rules) provides a formal way to record recommendations, guidelines, or strategies. This method is most effective in cases where subject knowledge is formed on a base empirical associations, accumulated over the years of work while solving problems in a particular subject field. Products are noted as a statement, for example, "if-then". There are three ways to use these rules: direct chain, reverse chain, and a combination of them.

Development of a logical-semantic model of knowledge representation from the subject area of natural language text. The main components of knowledge in terms of their formalized presentation are the notion, the relation between them, their characteristics, and also the modality of these character-

istics. Therefore, the processing of input text must be directed to the detection of the text of main components of knowledge and establishment of logical-semantic relations between them in order to form the conceptual structure of the input text.

As noted, the information contained in the text sources can be filed in different languages, which determines the need to transform the multilingual input information into its single presentation in the knowledge base. Such reporting is the basis for solving the complex tasks of I&AA. It is also the basis for the synthesis of the description of the content, which is reflected in the formalized representation. There are requirements for a formalized presentation of knowledge. The first is that the presentation must be of a certain form, which will provide the possibility of correct logical and semantic processing of knowledge; The second is that filling the necessary information to solve certain information and analytical problem, so maximally fully at the factual level to preserve the text representation of elements of knowledge.

An implicit predicate is a relation that has no corresponding lexical equivalent in the text. To preserve the means of expression of natural-linguistic textual representation, special means were introduced – prefixes and postfixes of predicates and notions. An elementary predicate formula can also contain quantifiers of unity ($\forall$) and existence ($\exists$).

Elementary predicate formula: $NP_k^q(LX_t^i, MY_g^j)$; where N, L, M – respectively, the prefixes of predicate and arguments that define the type of semantic class; P – the name of the semantic class of the relation; X, Y – names of semantic classes of notions. Arguments have a fixed position. The formula is interpreted in terms of classical predicates: "the notion X is in relation to P to the notion Y". Postfixes are the upper and lower indices of the predicate and arguments. The upper index of the predicate q ($q \in Q$) determines the lexical and grammatical way of linguistic combination of relations and notions in the text. The plural Q is a list of linguistic units (for example, preposi-

tions, particles, etc.) and grammatical features (for example, the case of control between a verb and the corresponding noun), which reproduce the rules of combining relations and notions in the text. The lower index of the predicate k determines the specific lexical representative for the corresponding semantic class N. The upper indexes of the arguments i and j ($i, j \in A$) determine the grammatical characteristics of notions (for example, number, creatures, etc.). The set A is a list of grammatical characteristics of notions that are arguments of the predicate formula. The lower indexes of the arguments t and g ($t \in L$, $\in g M$) determine the specific lexical representative of the respective semantic classes. In the process of formal-logical inference, postfixes are ignored. They are crucial at the stage of synthesis of the description of fragments of CS by natural language means. In a separate lexical-semantic class of relations are allocated lexical units that have the meaning of modality (want, be able, need, etc.).

Unification of lexical notions and relations within a certain semantic class is carried out by the relation "genus-species". The structure of the semantic class is a hierarchical structure, at the upper level of which are the most general concepts (relations), each lower level is a notion (relations) that specify the corresponding notion (relations) of the highest level. The choice of genus relation for the unification of notions and relations in the subject area is of fundamental importance. Replacing specific concepts (relations) with generic ones in free phrases does not lead to a violation of the semantic meaning of the expression (except about other hierarchical relationships).

For each elementary predicate formula, a size truth matrix is constructed that reproduces the possible values of the arguments for a particular predicate. In essence, this matrix is a fragment of knowledge about the relationship between notions in the subject area. The columns of the matrix reproduce the valid values of the argument X, and the rows – the argument Y. The elements of the matrix take the value: "1" (the predicate contains the value "true", so

the corresponding arguments *X* and *Y* are valid for the predicate), "0" (the predicate contains the values "wrong", so the corresponding arguments *X* and *Y* are invalid for the predicate) and "?" the predicate contains the meaning "conditional truth". So the admissibility of the corresponding arguments *X* and *Y* must be determined based on the axiomatic model and linguistic context.

It should be noted that the truth matrix determines only the semantic correctness of a certain elementary predicate formula. A fragment of the truth matrix for the relation "move" is given in the (table 2).

Table 2.

N: relation-action; P: to move							
M	*Q*	*Y*	*Who?*		*What?*	*...*	*L*
			People	*Animals*	*Vehicle*	*...*	*X*
Spatial characteristics of action	*Where?*	*Destination*	1	1	1	*...*	

Solving the problems of informational and analytical activity, for example acceptance or rejection managerial decisions, is presented by an axiomatic model that allows revealing the implicit knowledge and predict consequences of a decision. Such an axiomatic model in terms of content reproduces the knowledge of a particular applied problem. The main issue of recognition is the solution of polysemy and new words for the system. The proposed representation of CS allows you to recognize "new" words and make a choice on many possible meanings of words. Processing of new (unfamiliar to the system) words: if the word (lexical representative of a notion or relationship) is absent, then based on the matrix of truth it is possible to choose from the appropriate lexical-semantic class representative with a more general meaning. For example, if there is no dictionary entry for the English phrase "to go by bicycle" in the translation dictionary. Then using an axiomatic model, the program interprets the translation as "to ride by a vehicle". If the program does not recognize the lexical representative of the relation, then the text selects all contextual connections (it means the ways to use it with other concepts) and selects the most plausible axiomatic model, then assigns the name of the relation with the most common meaning. For example, the phrase "walking to the work" will be interpreted as "go to the work". To finding a suitable equivalent for a relation (notion), there must be a context for the new word, which is determined by two or more elementary predicate formulas. Under the conditions of certain three elementary predicate formulas, the algorithm works with the reliability. Thus, while analyzing new words, the program may violate the stylistic integrity of the text but preserves its semantic integrity, which is important and meets the requirements of the analysis of scientific and technical texts.

The implementation of the relevant functions of ICS is based on the analysis of the content of texts. That allows, on the one hand, to implement a targeted search for information, on the other – increases the level of relevance of the selection of the necessary information material.

Therefore, based on the above, certain conclusions can be drawn.

1. The general fundamental feature of the tasks of IAA is that the subject of analysis is the content of textual information or knowledge contained therein. Taking into account this feature during the development of information technology for automation of support for IAA tasks necessitates the solution of the problem of modeling the process of human comprehension of textual information. The key point of this process is the implementation of methods for automating the extraction of knowledge contained in natural language texts and their formal presentation in machine formats.

Automation of IAA tasks, based on the processing of the content of text documents, provides primarily an intensive path of information technology development.

2. Today there are no systems that allow to integrate and generalize knowledge in a particular subject area, which are contained in multilingual text sources, as well as to check them for content compatibility and contradictions, which is an important component of IAA.

3. The proposed approach of IAA automation for processing multilingual text sources does not require in the system of preliminary (non-automated) processing of natural language text (separation of sentences and their fragments, separation of relations and their arguments).

4. The implementation of the relevant functions of IRS is based on the analysis of the content of texts, which allows, on the one hand, to implement a purposeful search for information, on the other – increases the level of relevance of the selection of necessary information material.

5. The most important expected results are:

– creation of electronic information resources and their operative use in important spheres of state activity;

– significant expansion of the information space through the integration of foreign information funds (modern achievements of science, technology, etc.) in national information resources;

– improving the quality of assessment of the current situation in the political, economic, environmental, social and other areas on the basis of automation of processing large amounts of information contained in disparate sources;

– analysis for the presence of distorted and contradictory information, which will facilitate decision-making at the state level.

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Section 8. Economics and managementes

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IMPACT OF INFORMATION TECHNOLOGY ON THE PUBLIC FINANCIAL MANAGEMENT REFORMS

Abstract. Management of public finances, as a rule, the main component of the government's economic policy, which involves the efficient use of state financial resources, regulation of revenues and expenditures, effective money management, which is reflected in the country's economic growth indicators. Through effective management of public finances, the state should have a positive impact on the production processes in the country, should have a positive impact on solving socio-economic problems of society. This became particularly apparent during the period of the fight against CO-VID-19 in 2020, when states and governments have to make quick decisions and mobilize additional financial resources to fight and prevent the virus, as well as economic recovery and stimulate.

Keywords: public finances, public finance management, Electronic Systems, budgetary process, State treasury.

The scarcity of financial resources had been an insurmountable problem in Georgia for years. In the conditions of permanently deficient budget and non-fulfillment of income parameters, it was com-

pletely impossible to implement an orderly spending policy.

The spread of coronavirus has changed the agenda of both the world and Georgia, and our country has faced medical and economic challenges. Today, when remote communication becomes more important, electronic systems and their integration become especially important.

Financial system for such kind of countries as Georgia is developing concepts in Georgian practice, the sturcture of financial system used to change fundamentally during last 30 years, which is directly related to transformation of current market. The comparative stabilization of the economy, integration of Georgia in the world economy, amendments of the current financial legislation provided transformation of the financial system of Georgia and approximation with the international standards.

The field of public finances includes the units of central and territorial budgets. The main goal of public finances is the formation of a centralized financial resources and the distribution for financing public needs.

Between the reforms implemented in the recent period in Georgia one of the important reform is public administration, which represents the horizontal and multi-sectoral policy and and its implementation is depend on the executive authority decision-makers and high-ranking state officials involvement. The goal of public finances management reform represents provision of effective distribution of finance stability and public finance in accordance with government priorities. Public finance management reform is closely integrated with the modern electronic services and IT technologies. Electronic systems and electrical management in many countries are growing very rapidly. Georgia is trying not to fall behind the global tendency and according to electrical management it occupies one of the leading position in the countries of the region.

IT support of Public Financial Management is implemented by LEPL "Financial Analytical Service" of the Ministry of Finance of Georgia, the

above service provides the development of information resources of the Ministry of Finance and other government agencies, business management and informational security. It is oriented for the creation and delivery of internal and external consumption of electronic products and services. Successfully functioning integrated electronic system of public finance management of the country- PFMS [1]. Within the mentioned reform was implemented electronic systems of budget management (eBudget), state treasury (eTreasury), public debt and investment projects management (eDMS), human resource management (eHRMS).

Electronic system of public finance management serves 4400 internal and half a million external customers. Through the system electronic transfer of all the budgetary salaries of organizations, pensions and other funds collecting of taxes and charges are implemented electronically.

Implementation of electronic systems (eBudget) of budget management contributed to the public finances accounting maximally. Through the mentioned system Georgian central, autonomous republics and functioning of local management and with the performance of their duties acceptable revenues, rendered payments and management of changes in the balance of data are implemented.

One of the important component of reforms within the system of public finance management is implementation of state treasury electronic service system. Through the state treasury electronic service system are implemented accounting, reporting and calculation of revenues, payments and change of balance of state budget, budgets of the state, autonomous republics, local self-government units LEPL and N (N)LE. Until 2015 only budgetary organizations subordinated in the state budget and legal entities and non-profit (non-commercial) legal entities established by them were on the state treasury service.

In the last 10 years many fundamental reforms were implemented in the stated treasury. Since 2006 created a treasury single account (TSA), which

covered all the budget revenue and payments of the state budget. Since 2012, occurred integration with the public finance management system and implemented web- system based on modern technologies, which is always available. This is an online service.

Internal control and integrated web services – As part of the reforms of the Treasury Electronic System Module, the Treasury system was integrated with various systems, ensuring internal control of the expenditure part and simplification of procedures.

- The Treasury Electronic System Module receives information on the "Budget Planning and Management Module" software codes, budget classification codes and budget allocations;
- The PFMS is connected to the e-system of the State Procurement Agency, from which the e-treasury receives information on signed contracts (tender number, contract number and date, identification code and supplier name, total amount and currency, CPV code);
- The system uses the electronic database of the Revenue Service and the Civil Registry to verify the name and identification code of the supplier;
- Identification of individual beneficiaries (payroll, service contracts, etc.) checks the correctness of the civil registry database (observing all rules of personal data privacy).

The positive result of the implemented reforms is the statistics of claims transferred from the electronic system of the state treasury, which in 2014 was 400 thousand units, and today the transfers exceed 2 million units.

State treasury electronic system is tightly integrated with various systems: state budgeting and management system (eBudget), state debt and investment project management (eDMS) system, state electronic purchases system, revenue service (rs) [2] electronic systems, human resources management system (eHRMS), bank payment in real time mode payment (RTGS) [3] and worldwide

interbank financial telecommunication SWIFT-'s system (society for worldwide interbank financial telecommunication). Through the mentioned systems constantly being data exchange. By using of best practices and methodologies of IT process management made it possible to achieve business continuity. Electronic service system of statet-reasury consist of three levels: The spending side (Frontoffice), which gives the opportunity to the organization financed under the budget to manage their own funds. The intermediate layer (Middleoffice), which through the local self-government bodies have the capacity to manage revenues and payments of the district and treasury side (backoffice), which means the control for state treasury and funds, monitoring and instrument assembly required for the implementation of analysis [4].

Electronic service system of state treasury became available and centralized as for all organization being on the services of the treasury, also it is possible to access from any point of the world. Automation of exchange process of information between electronic systems of management public finance for the document processing caused a significant reduction of the time, costs, from both sides of personnel. State treasury offered convenient and transparent form of communication to the organizations. Through this system, disappeared paper documents from the circulation, it became possible to get information in real time mode, reduced operational risks minimize [5].

Conducted reforms and implemented system provided complex, effective and transparent management of the state systems, improvement of service, reduction of expenses, effective management of time and resources. In a short time provided reliable, accurate, complete and consistent collection of information about a financial event. Accounting data produced by the cash operations and accrual method in a common system is integrated. The optimation is implemented and being on the main book of the treasury, which will eventually give us a complete picture of the state of public finances [6].

Conclusion. The reforms carried out and the systems implemented have ensured complex, efficient and transparent management of public systems, improved services, reduced costs, and efficient management of time and resources. Gathering reliable, accurate, complete and consistent information about the financial event in the shortest possible time.

In order to establish a complete public finance management module, it is necessary to introduce an integrated public finance information system – the treasury general ledger, which:

– Provides automated accounting and reporting of economic and financial operations of budget organizations;

– The public sector financial reporting quality and raise the level of transparency.

Accounting system reform – introduction of International Public Sector Accounting Standards (IPSAS) and preparation of financial accounting and reporting methodology in accordance with IPSAS;

– Prepare and publish government consolidated financial statements in accordance with international standards;

– Improving the quality and transparency of public sector financial reporting;

– Access to complete and reliable information for public sector financial management and decision makers.

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IMPROVING THE HR MANAGEMENT SYSTEM AS A FACTOR IN INCREASING THE EFFICIENCY OF INNOVATIVE ENTERPRISES

Abstract. The article is devoted to the study of the problems of scientific and technical personnel of innovative organizations. Particular attention is paid to the analysis of the state of the labor market in the innovation sphere in Georgia. In the course of the analysis, the main problems of personnel management in innovative activities, both at the state and private levels were identified. In order to improve the efficiency of the personnel management system, new solutions were proposed in the field of recruiting and training personnel in innovative organizations, the main of which is adherence to the principles of "mentoring".

Keywords: innovative activity, innovative organizations, personnel management, social and psychological factors.

Introduction

In the modern Georgian economy, the development of a profitable business is possible only if competitive advantages are achieved. One of the ways to be successful in the market is through HR management. Neoclassical economic theory, which puts labor and capital in the same corner depending on the production function, does not correspond to the modern picture of the economy, in which a stable competitive advantage can only be achieved through the development of knowledge characteristic of a given organization and the competencies that underlie innovation. Thus, traditional, well-known approaches to personnel management cannot be applied in innovative organizations. Personnel management of an innovative enterprise should be based on innovative management methods. From all of the above, the practical significance and main goal of our research follow. This is the development of: a) theoretical foundations of building a personnel management system in an innovative organization, b) basic technologies of personnel management, allowing them to increase their innovative potential.

Study

Research into the approach to creating project teams to solve a particular problem in the innovation sphere began in Georgia at the beginning of the XXI century and continues to this day. Gibson J. L., Peters T., Ivantsevich D. M., and others became the founders of the innovative approach to personnel management in the literature. The scientific works of these authors were theoretical and practical advice for building a personnel management system in the field of innovation.

During the study, the following tasks were set to achieve this goal:

1) Researching the content of the concept of "personnel management" and identifying the features of personnel management in innovative organizations;

2) Analysis of the state of the labor market in the innovation sector in Georgia. Identification of the main problems;

3) Development of new solutions in the field of recruiting, training, and personnel management.

Before starting the analysis of the state of the innovative personnel market in Georgia, it is worthwhile to dwell in more detail on the fundamental concepts of this study, such as "innovation", "innovative organization" and "personnel management".

The Georgian Innovation Development Strategy defines the concept of "innovation" as the end result of innovation activity, which has been implemented in the form of a new or improved technological process or product. In turn, an innovation organization is considered an organization whose main directions are research activities, activities to create, and sales of products in the innovative market. In other words, an innovative organization is engaged in activities that are associated with the transformation of ideas (usually the results of research and development) into a new or improved product or process introduced in the market. The definition of the concept of "personnel management" still causes many controversies, for example, Ts. Lomaia singles out the organizational and managerial relationships that arise between the subject and the object of management. In turn, E. Baratashvili emphasizes that "personnel management" is an applied science of organizational, administrative, socio-economic, legal, technological, psychological factors, methods, and ways of influencing personnel in order to increase the efficiency of the organization.

In connection with the main task of the personnel management system at an innovative enterprise, it is necessary to highlight a number of features of personnel management:

1) Focus on highly qualified personnel;

2) When recruiting, the need to focus on the creative abilities, personal and socio-psychological characteristics of the candidate;

3) The growing role of recruiting in connection with the increased requirements for the applicant, which, in addition to the named flexibility of thinking, include the ability to work in a team, quick adaptation to changing working conditions caused by a high risk of innovation;

4) Creation of conditions for continuous training of personnel in the field of technologies and competencies, which allows maintaining the innovative potential of employees at a high level;

5) Rotation of personnel between departments, project teams, functions performed in order to obtain more authority;

6) Periodic analysis of the compliance of the motivational system with the strategic goals of the organization;

7) The low degree of regulation of labor activity, which is caused by the intellectualization of personnel labor;

8) Complex and heterogeneous professional and qualification composition of personnel.

Thus, the personnel management system in the innovation sphere, in contrast to the traditional one, is based on the principles of personnel heterogeneity, labor of intellectualization, which means the principle of "knowledge above capital". Although over the past 10 years, state funding for fundamental science and applied research has increased, national research centers have been formed, tax incentives have been introduced for the commercialization of developments and the general innovation activity of businesses, the key problem remains the low demand for innovations in the Georgian economy.

Nevertheless, the main interest of this study is the state of the labor sphere of innovative development in Georgia.

Table 1. – Share of Organizations Implementing Innovations

	2013	2014	2015	2016	2017	2018	2019
The proportion of organizations that carried out technological, organizational, marketing innovations	9,5%	10,4%	10,3%	10,1%	9,9%	9,3%	8,4%

It is important to note that human capital is one of the main competitive advantages of the country's innovative development. In terms of the share of the population with higher and additional vocational education (22.8% of the population aged 25 to 64), Georgia is at the level of such leading foreign countries as Great Britain, Sweden, Japan, and is also ahead of Germany, Italy, and France. The situation in this area is characterized by several negative trends, which may devalue this competitive advantage. Challenges remain in achieving adequate quality in education. According to international ratings, Georgian universities are practically not included in the first hundred world leaders.

Table 2. – Statistical Data on the Granting of Patents by Patent Office of Georgia, Which Determines the Current Situation with the Protection of Intellectual Property in Georgia

Inventions	Plan 2018	Fact 2018	Implementation %	Plan 2018	Fact 2018	Implementation %
Applications submitted	40000	45517	114	42700	41587	97
Review completed	39596	40012	101	41100	43303	105
Granted patents	28800	34706	121	–	33536	–
Average processing time per month	12	10,5	–	12	10,3	–

Besides the quality of education, attitudes, and behavior patterns formed in a person plays a significant role in future innovative development. The key personal qualities for innovative entrepreneurship – mobility, the desire to learn throughout life, the propensity for entrepreneurship, and risk-taking are usually underdeveloped compared to countries with high innovative activity.

Table 3. – Number of researchers engaged in research and development by fields of science (as of 12.10.2017)

Year	Number of researchers total	Including by fields of science					
		Natural	Technical	Medical	Agrarian	Public	Humanitarian
2013	922	223	151	165	127	143	113
2014	936	224	127	168	129	170	118
2015	931	221	122	166	123	173	126
2016	922	214	125	163	119	184	117
2017	935	221	125	157	119	187	126
2018	948	217	122	158	113	209	129
2019	926	215	118	161	111	198	123

Turning directly to the analysis of the situation on the labor market in the innovation sphere, it is necessary to establish the number of researchers who are engaged in scientific activities. From the data in the table, most of the country's researchers are engaged in technical development, which is because of the continued growth of the scientific and technical fields.

You can observe the dynamics of a decline in interest in science. Everyone, including researchers, technicians, auxiliary and other personnel, leaves the science-intensive sphere. Perhaps this is because of a decrease in wages, the withdrawal of money from the innovation sphere, which is confirmed in the diagram below. Georgian economists have repeatedly proved by calculations that an employee in Georgia is underpaid for his work, and a cheap labor force, by definition, cannot be highly qualified. The cost of Georgian labor is many times underestimated and underestimated in comparison with the level of labor productivity.
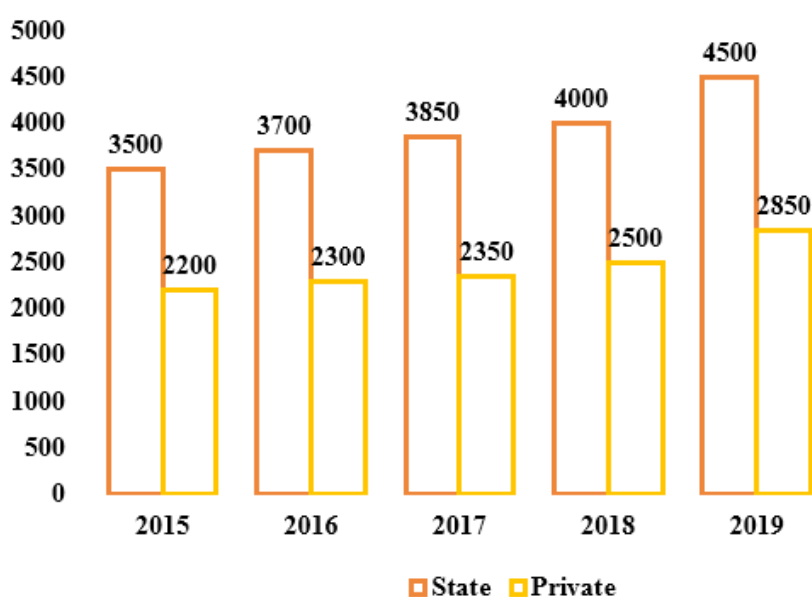

Diagram 1. The average salary of researchers in public and private organizations for 2015–2019 (GEL)

The widespread use of information technologies that reduce the factor of physical stress on workers significantly increases the psychophysiological burden on the employee of the innovation sphere, which can decisively affect the decrease in the quality, reliability, and safety of workers.

Thus, we can say that man is the most important, but also the weakest link in scientific and technological progress. It follows from this that when identifying problems in personnel management based on socio-economic factors, one should rely not only on the above dry statistics of the state's innovative development but also on the particular problems of the employees themselves used in science.

To identify problems at the private level, the method of socio-metric research in the form of a questionnaire was used. We interviewed 97 respondents, most of whom are university students studying toward "Innovation Management" and "Innovation Economics", in order to identify the major problems of personnel management in the innovation sphere. We present the survey results in a summary table.

Table 5. – Results of the survey of respondents of university students
(Directions: "Innovative Management" and "Innovative Economics")

Question	Answer options	Results
1	2	3
The physical and psychological workload of personnel in the field of high technologies	Work in a normal rhythm, with a normal load	44%
	Working hard, heavily loaded	51%
	Mostly do not overstrain	5%
The priority of professional development and continuous training of employees in the knowledge-intensive sphere	Very important	71%
	Not particularly important	26%
	It doesn't matter at all	3%
The prestige of innovative jobs in the labor market	Prestigious	35%
	Quite prestigious, but low wages	44%
	Not prestigious	21%
What is most important for the employees of the innovative sphere of the company	The content of the work, its variety	18%
	Degree of independence	13%
	Personal responsibility	17%
	Self-realization opportunity	15%
	Possibility of creativity at work	20%
	The ability to solve new problems	17%
The priority of labor results for an employee of an innovative company	Personal results of work	38%
	Unit activity result	46%
	The result of the company as a whole	16%

The results of the survey confirm the above analysis of the problems of innovative organizations in personnel management. Among the answers, one can single out the low labor cost of highly qualified personnel, restrictions on creative development, inadequate training in the workplace, and high workload of staff. The path to the innovative development of the enterprise lies through the training of employees, the creation of "intellectual assets".
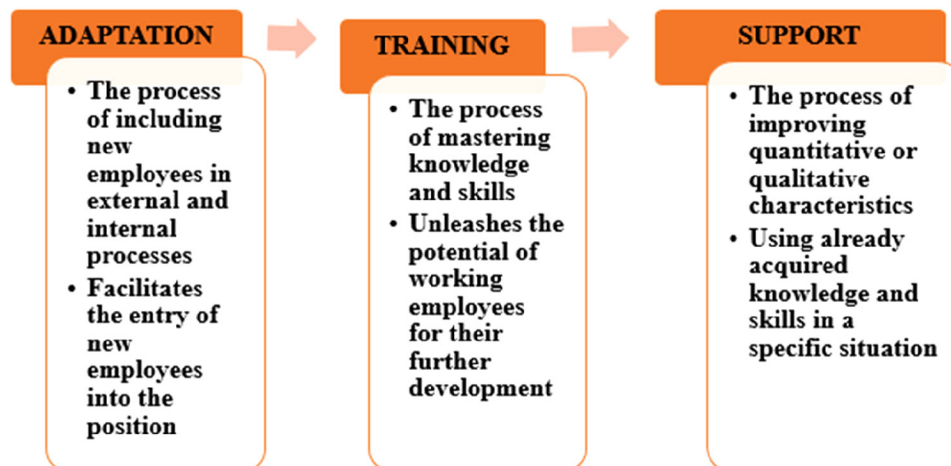

Diagram 2. An adapted mentoring system that is proposed for use in innovative organizations

Personnel training is a direct factor in increasing the efficiency of enterprises, which must be taken into account, controlled, and analyzed when assessing the activities of enterprises, when developing strategies and development tactics.

An increasing number of companies in Georgia are aware of the personnel training process. Companies pay special attention to training, considering the funds invested in the training of their employees, not as costs, but as investments in business development, as a proper tool to increase profitability.

But how to apply the personnel mentoring system in innovative activities, where one of the salient features is the low regulation of the action, and the result of the activity is the creation of intellectual property objects? It would seem that one excludes the other. This is where traditional mentoring methods are used.

Therefore, we suggest you familiarize yourself with an adapted mentoring system that performs the functions of personnel development, while allowing you to leave a wide choice in working methods, without regulating the creative aspect of innovation.

Conclusion

Thus, for organizations whose major areas are research and development work, and activities for the creation and sale of products in the innovation market, a creative approach to work and high professionalism in management are of great importance. This stimulates the search for innovative forms of management, the development of the potential of personnel, the improvement of their qualifications, and the provision of prime motivation for the labor process, taking into account the social and psychological aspects of the human factor. And it is the emphasis on the selection of highly qualified personnel, and the understanding of the role of personnel training in the form of mentoring, that will make it possible to rationalize the personnel management system in innovative organizations.

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THEORETICAL AND PRACTICAL BASES OF MANAGEMENT OF ECONOMIC AND ENVIRONMENTAL SAFETY OF THE CONSUMER MARKET

Abstract. The article examines the problems of formation of sustainable development of the national economy related to the state and prospects of ensuring economic and environmental security, since the global interpretation of sustainable development is based on the co-evolution of man and the biosphere, economy and ecology in order to develop a society acceptable for preserving the ecological recess of man. Threats to ensure economic and environmental security in the modern national economy leads to the emergence of a number of factors that hinder the achievement of a green economy and formation of economy of knowledge, allowing to effectively realizing the human potential, on both personal and public levels.

Keywords: economy and ecology, "green economy", economic and environmental security, sustainable development, national economy, monitoring of economic and environmental security.

I. Introduction

Traditionally, not enough attention is paid to the problems of interaction between the economy and the environment. However, it is difficult to argue that economic growth is linked to increased pollution and environmental degradation. This is reflected in the depletion of natural resources, the imbalance of the biosphere and climate change, which limits the possibility of further development.

According to the forecasts of the Organization for economic cooperation and development (OECD), with the current method of production and consumption, by 2050, in comparison with 2000, the world will lose from 61 to 72% of flora and fauna, and the preservation of natural territories will be irreversibly disrupted by 7.5 million square kilometers [1].

Environmental problems are now integrated into economic science as a limited good, and a new trend – "green economy" – has been formed and is actively developing. "Green economy" is a direction in economic science, in which it is considered that the economy is a dependent component of the natural environment within which it exists and is part of it, aimed at preserving the well-being of society through the efficient use of natural resources, as well as the return of end-use products to the production cycle [2, 1262–1266].

Experts of the United Nations environmental protection organization (UNEP) consider the "green economy" as an economic activity that "increases the well-being of people and ensures social justice, while significantly reducing the risks to the environment and its impoverishment" [3].

II. Literature review

The definitions of economic and environmental security given in international sources are directly related to the concept of "green economy" and sustainable development, while constant attempts to

deepen or expand these terms should be noted. In particular, the materials of world conferences on environmental issues (Stockholm, Rio de Janeiro), the UN concept of sustainable development of society and economy, which determines that the current state of the world economy leads to an increase in the global environmental crisis and requires a radical structural restructuring of the entire economic system in accordance with the objective requirements of the environmental imperative, are of great interest and key importance for the development of scientific thought. This is explained by the fact that, according to world experts, humanity reacts to global changes in the quality of the environment not as an integral system, but as a set of states that are heterogeneous in their interests and protect their national interests.

In our opinion, it is difficult to overcome this problem, and it is almost impossible for developed and developing countries to carry out economic activities in the current conditions. In the XX century, the Western world actively developed and continues to develop consumer lifestyle culture, which further aggravates the relationship between society and the environment, stimulating economic development, increasing needs, because a normal market economy cannot develop without an increase in consumption.

We systematize the main variants of definitions of key terms related to the study of the content and features of economic and environmental security in modern scientific theory and practice.

The term "green economy" in official international interpretations has the following interpretations –

– it is "an economy that improves the well-being of people and ensures social justice, while significantly reducing the risks to the environment and its impoverishment" (UNEP);

– this is a policy focus that relies on environmentally sustainable economic progress to promote low-carbon and inclusive development (UN Economic and social Commission for Asia and the Pacific (ESCAP)).

The term "sustainable development" is also defined in two ways – officially recognized at the international level and scientific in the practice of research by scientists:

– a process that meets the needs of the present, without compromising the ability of future generations to meet their own needs (Brundtland Commission 1987);

– a dynamic process in which resource exploitation, investment activities, scientific and technological progress and institutional changes are coordinated and strengthen the existing potential to meet human needs [4, 125–129].

The term "economic and environmental security" presented by us to the following interpretations:

– the state of protection of vital interests of individuals, society, natural environment from threats caused by exposure to human activity and industry on the natural environment and, in turn, the natural environment on people and businesses [5, 87–90];

– this is a set of states, processes and actions of security entities that can ensure a balance of interests and co-evolution of the national (regional, local) economy and the environment that do not lead to violations (or threats of such violations) for the natural environment and society beyond the limits established by law.

The last UN conference on the environment, held on June 20–22, 2012 in Rio de Janeiro, defined the main goal of further development of the world community – the creation of a sustainable "green economy" that ensures environmental protection. Relating to the main obstacles to achieving a sustainable green economy in the world, the problems of water, energy, food problem, the problems of ecosystems and the urbanization of mankind, the global community poses a solution to the problems of sustainable development, the most relevant of which for our economy is the following:

1. Expanding the use of renewable sources of energy, it should contribute to economic growth;

2. Transition to a greener economy with a focus on poverty eradication;

3. Improving living conditions in cities and improving the efficiency of urban infrastructure.

III. Methodology& results

The modern national economy of the Republic of Uzbekistan is in a dual state – on the one hand, the objective need to meet the needs of modern economic and environmental systems of the world, which is expressed in the adoption and active application of the basic principles of the "green economy", on the other hand – the consequences of recent decades, the raw material structure of the economy and at the same time:

– it is necessary to realize and implement at the national level a clear orientation of the economy in terms of its GDP structure to post-industrial production, including in agriculture;

– it is important to focus the national economy on "green growth", as can be seen from the example of a number of developed countries, since only this will help ensure sustainable development in the interpretation we have given, including in the social, economic and environmental systems;
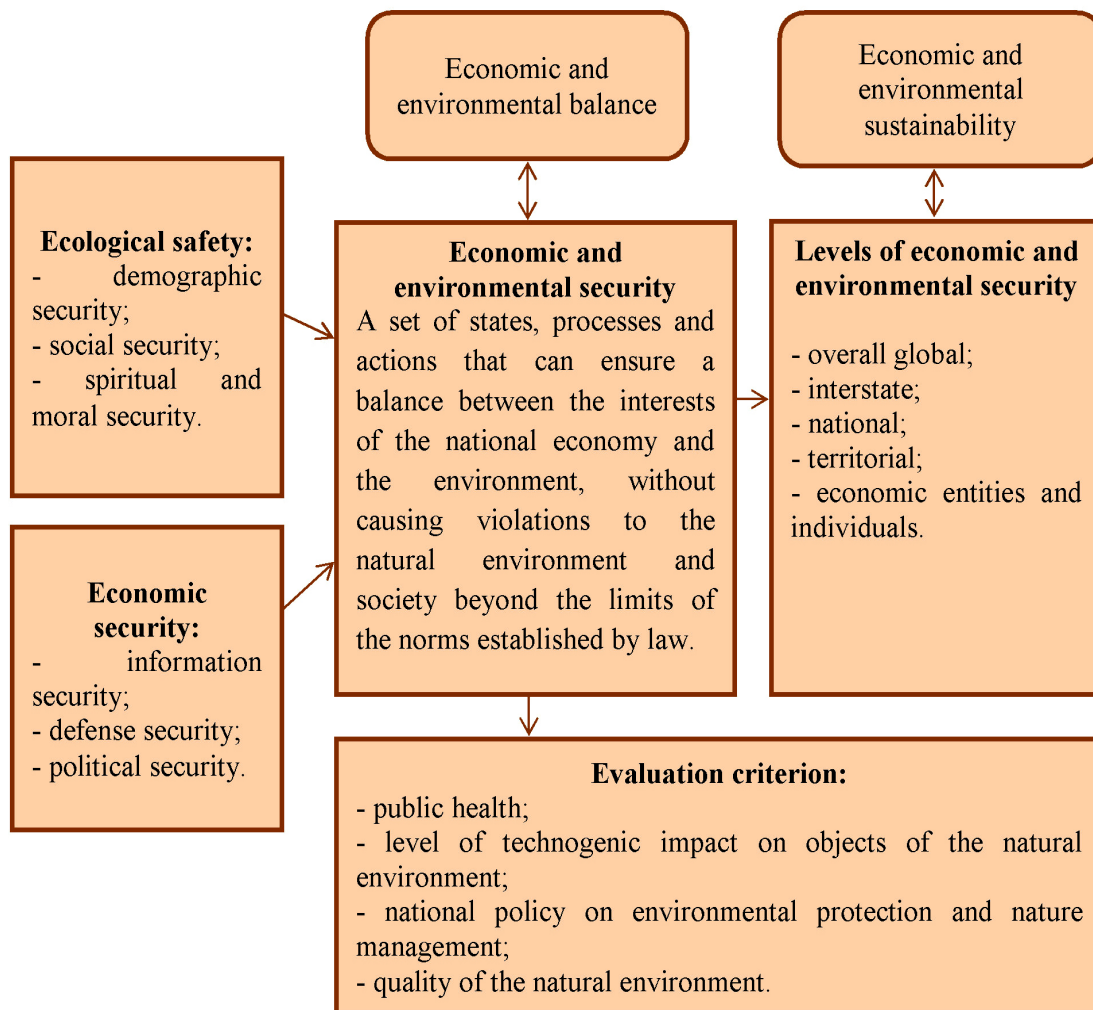
Figure 1. Content of economic and environmental security and criteria for its assessment

– it is important to supplement the theoretical and practical perception of the content and directions of national economy research with a new theory [6, 57] focused on identifying and studying national pathologies and territorial features of crisis socio-economic processes, and in our case, environmental processes;

– the presence of the mutual influence of the traditional in scientific and practical research of the national economy and its "reverse" side-national pathology, allows us to conclude that it is necessary to monitor the country's security in its various components, but, first of all, to monitor economic and environmental security in order to timely identify threats to economic and environmental security and determine measures to prevent them;

– the interdependence between the country's economic and environmental security and the high level of overcoming threats to this security, on the one hand, and sustainable development, on the other hand, is confirmed by international expert assessments and follows logically from the interpretation and content of these concepts.

In our opinion, it is the ability of the national economy in a timely and cost-effective to respond to threats of economic and environmental security is directly correlated with sustainable development, ensuring its full and harmonious achievement of the country should appear in such economic traits as stable individual well-being, continuing the stock of natural capital, as well as the stability and recoverability of territorial ecosystems.

In the Republic of Uzbekistan, the 2000`s were a period of active state participation in the development of the foundations and principles of sustainable development, taking into account the environmental factor. With the adoption of the Decree of the President of the Republic of Uzbekistan No.DP-4477 dated October 4, 2019 "On approval of the Strategy for the transition of the Republic of Uzbekistan to a "green economy" for the period 2019–2030", the impulses to environmental modernization have objectively increased.

The primacy of ensuring environmental security is obvious, otherwise it will be impossible to achieve environmental and economic security at any level, since the created economic system of the Republic of Uzbekistan in no way meets the criteria and principles of the "green economy", or the conditions for achieving sustainable development in the international concept of the United Nations. Figure 1 shows the content of economic and environmental security itself and the generally accepted criteria for its assessment.

IV. Analysis and results

We present the result of systematization of threats to economic and environmental security that are characteristic of the subjects of the Republic of Uzbekistan, which is relevant from the point of view of building methods for assessing factors that not only positively but also negatively affect the security and ability of the national economic system to sustainable growth (Fig.2).

As a result of active globalization of the world economy in the twenty-first century emphasis on the importance and possibilities of implementing programs of development and economic growth has shifted, primarily, to external threats and factors because of the high dependence of the national system of government, administration, defense against the requirements and standards of international institutions (World Bank, IMF and its management, defining contents and rules of monetary and fiscal policies of member countries, WTO, etc.). In our country, the development of production based on energy, raw materials, semi-finished products and mass production of serial products continues, although for most developed countries this technological structure was typical in the 1960`s-1970`s. If we compare the commodity structure of exports of the Republic of Uzbekistan and developed countries such as Canada and Norway, which share a large share of raw materials in commodity exports, developed countries have foreign markets for finished products, including high-tech goods.
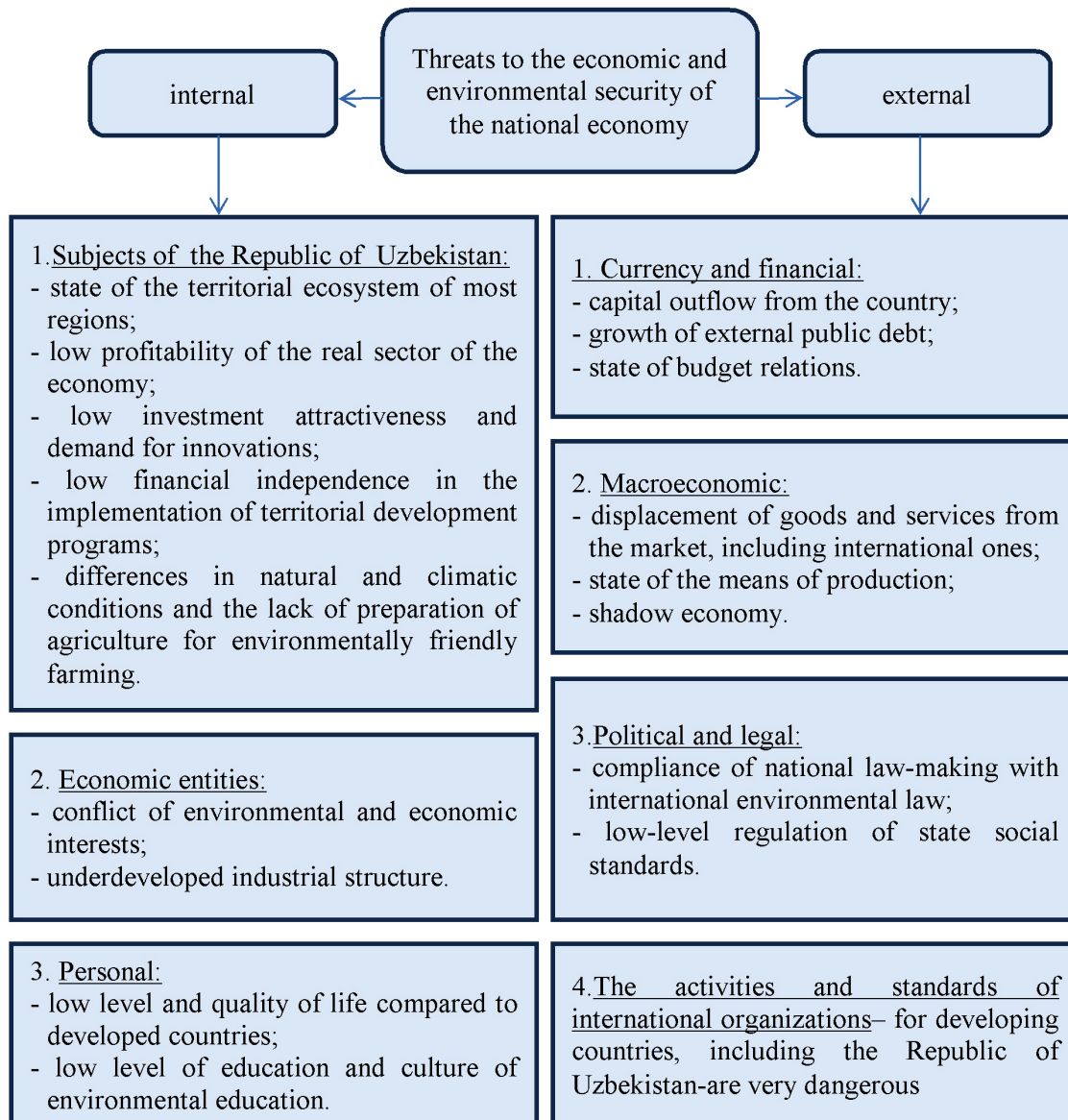
	Threats to the economic and environmental security of the national economy	
internal ←		→ **external**

1.Subjects of the Republic of Uzbekistan:
- state of the territorial ecosystem of most regions;
- low profitability of the real sector of the economy;
- low investment attractiveness and demand for innovations;
- low financial independence in the implementation of territorial development programs;
- differences in natural and climatic conditions and the lack of preparation of agriculture for environmentally friendly farming.

2. Economic entities:
- conflict of environmental and economic interests;
- underdeveloped industrial structure.

3. Personal:
- low level and quality of life compared to developed countries;
- low level of education and culture of environmental education.

1. Currency and financial:
- capital outflow from the country;
- growth of external public debt;
- state of budget relations.

2. Macroeconomic:
- displacement of goods and services from the market, including international ones;
- state of the means of production;
- shadow economy.

3.Political and legal:
- compliance of national law-making with international environmental law;
- low-level regulation of state social standards.

4.The activities and standards of international organizations– for developing countries, including the Republic of Uzbekistan-are very dangerous

Figure 2. Characteristics of types of threats to economic and environmental security

There are objective reasons that do not allow us to fully realize all the opportunities of the market economy, to ensure the uniformity and completeness of the implementation of any transformations. This is the presence of different natural and climatic conditions, a sharp difference in the density of the population and the density of industrial and economic objects.

V. Conclusion and discussions

Thus, until a stable understanding is formed at the national level by citizens, Executive bodies, representative authorities, and enterprise management of the need to switch to the principles of a "green economy", and only under this condition – achieving sustainable growth through renewable energy sources, creating conditions for improving the quality of life of the population, "planting" such technologies and such an ideology for the national economy can result in losses for enterprises, the state in the absence of effective demand and free, fair competition with foreign producers of "green technologies".

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GERMANY'S POLICIES ON DEVELOPING IOT (INTERNET OF THINGS) TECHNOLOGY MARKET AND LESSONS FOR VIETNAM

Abstract. Developing the internet of things (IoT) technology market will create of an IoT ecosystem, allowing organizations to connect, control, use IoT devices, and to be important implications for the socio-economic development of nations. Vietnam is a developing country with great potential for application IoT technology to serve the formation of technology roadmap, a roadmap for technological innovation in manufacturing industries, contributing to promote economic growth based on science, technology and innovation. With the method of field research and the use of secondary data, the paper will give lessons about Vietnam's IoT technology market development policy on the basis of learning from German experiences. The paper is part of the research results of the topic "Construction technology map and technological innovation roadmap in developing and applying IoT in Vietnam", code: ĐM.40.DA/19.

Keywords: IoT technology market, IoT development policy.

1. Overview of the IoT market

According to the International Telecommunication Union (ITU, 2015), the IoT is a global infrastructure for the information society, delivering cutting-edge services by connecting both real and virtual based on existence of information, its interoperability. Through the exploitation of identity, data collection, processing and communication, IoT system provides the services for many different types of application, and ensuring security and privacy. From there, the IoT can be considered as a trend of technology and a development trend of society. IoT is understood that when everything is connected to each other via the Internet, users can control all their objects over the network with just one smart device. Characteristics of IoT such as: The ability to communicate anytime, anywhere, anytime; the ability to locate devices; the device's ability to exchange information via the Internet or internal LAN. With the development of IoT, it will allow to connect to everything, monitor everything, control everything, find everything, and manage everything.

According to Rand Europe Research Firm (2016), by 2020 there are an estimated 24 billion IoT devices in the world. Total investment in the IoT sector in the coming year 2025 will reach 14 trillion

US dollars. According to Boston Consulting Group (2016), the Internet of Things market will reach 267 billion USD by 2020. The three main users of IOT devices, including governments, businesses and consumers. These market groups are expected to contribute mainly to the IoT market.

– For consumers: 5 billion IoT devices are installed by 2020, consumers spend about 900 million USD on IoT, and forecast capital investment in this market will be 400 million USD to 2020.

– For governments: there will be about 7.7 billion IoT devices installed by 2020, costing about 2.1 billion USD and 4.7 billion USD in investment.

– For the enterprise market: about 11.2 billion devices will be installed by 2020, at a cost of 3 billion USD and 7.6 billion USD for investment.

According to Business Insider Intelligence (2018), by 2020 many basic economic industries will increase investment in the IoT ecosystem with the total investment in IoT solutions estimated at 6 trillion USD. In particular, manufacturing industry will increase investment by 35% in the use of smart sensors.

– Transport industry will have more than 220 million connected cars by 2020. Route-tracking sensors are installed on shipments and shipments to minimize costs, while increasing the efficiency of the network. In addition, IoT robots such as Amazon's Kiva robot help reduce warehousing costs, manpower and cargo damage issues.

– Agriculture sector: An estimated 75 million IoT devices will be sold to the agricultural sector by 2020. These devices mainly senses in the soil to monitor acidity, temperature, and other factors to farmers increase yields.

– Oil & gas and mining Industry: An estimated 5.4 million IoT devices will be used in oil fields by 2020. These devices are mainly Internet-connected sensors used to provide information. In energy sector, energy companies in the world are trying to meet the rapidly growing global energy demand, and to do that effectively, they'll install 1 billion smart metering devices by 2020.

– Insurance industry: The leaders in the insurance sector believe that by 2025, the IoT will revolutionize the insurance industry and 74% plans to invest in IoT development and application.

– Defense industry: estimated that spending on drones will reach US $8.7 billion USD by 2020, and 126,000 military robots will be delivered by 2020.

– Infrastructure industry: estimated that the world's major cities will increase spending on smart IoT systems from 36 billion USD in 2014 to 133 billion USD in 2019. This investment will generate 421 billion in economic value for major cities in the world in 2019.

– Housing sector: By 2030, predict that the majority of home appliances produced and consumed are IoT devices, especially from the competitive dynamics of major manufacturers to connect the devices made by themselves.

– Hotel industry: 31% of large hotels use smart door locks, 33% have smart room control devices, and 15% use alarm devices. Food and beverage industry, estimated that 310 million IoT devices will be used by food service companies by 2020, and most of these devices are electronic signs that connect and collect information in the department store chain stores and fast food.

– Health service industry: estimated 646 million IoT devices will be used in the healthcare industry by 2020. IoT connected medical care devices can collect data, process information automatically.

2. Research method

In order to lessons for Vietnam about the policy of developing the IoT technology market, the research team inherited the researches published in technology market development policy, IoT development policy. At the same time, economic cooperation policies between Germany and Vietnam through the website: https://vietnam.diplo.de/vn-vi/themen/wirtschaft to better understand the situation of cooperation between Germany and Vietnam, as the basis to recommend the suitable solutions for developing Vietnam's IoT market.

To be able to provide authentic lessons for Vietnam on the policy of developing the IoT technology market, the research team exchanged and interviewed some employees and managers in the German research institutions, and universities such as the German Aerospace Center (DLR – Deutsches Zentrum für Luft- und Raumfahrt e.V.), OTH Regensburg University, Technical Darmstadt University.

– Discussing with the DLR about applied research in the field of IoT applications, especially big data research, smart mobile devices, robotics, and Smart, automatic production.

– Interview some lecturers and managers of OTH Regensburg University: This is one of Germany's prestigious universities in science and technology, especially IoT application in the biomedical field. Here, the team surveyed the university's research, training facilities, and co-discussing the collection of data related to building IoT technology application profiles in the medical and environmental fields.

– Surveying and interviewing some lecturers of the Technical Darmstadt University. This is Germany's leading technical university. Here, the research team discussed cooperation on research and collection of data related to the application of IoT technology in the field of mechanics and electronics.

3. Research results

3.1. Policy to promote the development of IoT technology market in Germany

The German government has identified investment opportunities for IoT development as general trend of the world, so there have been changes in science, technology and innovation policies. The technology development strategy in the field of IoT in Germany has established medium-term development directions for IoT R&D and innovation of Germany, including: to consolidate S&T institutions, enhance innovation, and address global challenges to improve people's lives; IoT application strategy will be expanded into a comprehensive interdisciplinary innovation strategy, including technological

and social innovation to accelerate the delivery of results research into enterprises.

According to the OECD (2019), the hightech strategy with IoT has linked the various fields of innovation policy between interstates, universities and public research institutes. Germany also has strong international connections, with important initiatives underway to further enhance the performance of public universities and research institutes. In addition, to accelerate the process of research and application of IoT, Germany has a policy to accelerate the connection between the industrial sector and the scientific research area. IoT initiatives are implemented to enhance and improve collaboration between business and science. In addition to spending up to 2.98% of GDP for R&D and targeting 3% of GDP by 2020, the German government also has many policy solutions to promote the development of the IoT technology market and support business technology innovation, in particular:

– The Government encourages research and development activities in the field of IoT in SMEs and cooperatives through the creation of a favorable institutional environment, along with preferential credit policies. At the same time, it called on organizations, individuals and the Government to share funding for IoT research projects, technology innovation in the fields of business. To promote innovation, the Government provides a non-refundable grant to enterprises' research and development activities, especially projects aimed at creating IoT technologies and advanced technologies.

– Germany has formed many science and technology development funds, these funds operate not for profit. The advantages of these Funds are flexible lending to research and deployment activities in the field of new technology, high-risk IoT technology. The Fund Council is elected by the Fund's members and approved by the Government. Members of the Foundation are scientists, policy makers and representatives of the economic sector.

– The Government creates an institutional environment for technology innovation activities in en-

terprises by issuing policies to develop the technology market, and giving research and implementation organizations autonomy in technology development IoT technology. The research results are widely publicized on the internet, through which businesses can easily research and buy and sell technology products. The government does not play a direct management role, but provides information for the needs of researching and assisting enterprises, especially small and medium enterprises in the application of new technologies and IoT technologies in production.

– In the agricultural sector, the German Government promotes fruit and vegetable processing cooperatives through preferential policies on developing IoT technology in the agricultural sector, considering the cooperative economy as an important part of the national economy, contributing to economic growth and job creation. At the same time, the Government donates up to 70% of the funding for research and development projects of public research institutes, up to 45% of the funding for enterprises to actively research and improve human resources to creating IoT technology for technology innovation.

Box 1: Support policies for IoT research and application

Promoting the development of IoT technology is a priority policy of Germany, the technological foundation of the fourth industrial revolution.They can enable mobile sensors, connect to cloud computing, integrate with embedded technology, smart mobile technology, big data technology. The Government has many policies to support and sponsor universities, science and technology organizations, and enterprises when researching new technologies and IoT technologies. In Germany, a dual strategy has been issued to bring Germany to the forefront of Industry 4.0. This set of strategy includes two strategic belts built on the IoT platform: supplier strategy (Implementing Cyber-Physical Systems – CPS in production), and market strategy (marketing of CPS technology and products).

Source: Synthesis of the research team from working results at OTH Regensburg University and Technical Darmstadt University

Developing the IoT technology market is of great importance to the development of German universities and research institutes. The German government has established and developed value chains between companies and networks through broad integration. End-to-end digitization of the entire value chain of both the product and related production system, develop and deeply integrate flexible and reconfigurable production systems within businesses. For the supply strategy, the target is necessary to meet the equipment, techniques and technology for Industry 4.0, including robotics technology development; advanced material technology and 3D printing technology; Training experts and high-tech human resources. As for market strategy, it is necessary to conduct industrial standardization activities, including: establishing testing centers and issuing Industry

4.0 standards, applying technology of industrial 4.0 technology to key industries in the country (DLR, 2020).

In addition, Germany applies a policy of infrastructure assistance to research centers, which is shown in the form of a program, in which centers are funded up to 80% by the State (Federation 50%, State 50%). Regarding the cost of the structure and operation of the center, the state subsidies in the form of a program, in which the centers are funded up to 60% (Federation 75%, State 25%). In addition, Germany considers science and technology human resources an important factor and spends a certain percentage of its annual budget on training, at the same time the Government evaluates the importance of scientific research and develop technology activities to prioritize research in the future.

3.2. Policy to promote the development of the IoT technology market in Vietnam

Promoting the development of IoT technology market is one of the important contents shown in the Prime Minister's Directive 16/CT-TTg dated May 4, 2017 on capacity building approach to Industrial Revolution 4.0. The Ministry of Science and Technology has issued a list of key technologies of Industry 4.0 to implement Content 4, Section 7, Resolution 138/NQ-CP dated December 31, 2017 of the Government on the Government Conference with province and the Government's regular December meeting (Decision no. 3685/QD-BKHCN dated December 3, 2018 of the Minister of Science and Technology).

In the past time in Vietnam, IoT applications have been researched and developed in the forms of automation such as traffic light control systems, automatic irrigation systems,… The foundation technologies of IoT such as delivery 6th generation network communication protocol, wireless communication, nanotechnology and sensors, storage and cloud computing, big data processing, information security and energy storage have also been achieved. certain results. Big companies in Vietnam have on research, deployment and application of IoT such as VNPT, Vingroup, and there were also many start-ups with IoT technology formed and initial successes such as Hachi, ArgiMedia, etc.

Regarding policies to support enterprises in the transition and application of IoT, Minister of Science and Technology – Chu Ngoc Anh (MOST, 2019) said about policies to support technology startups, including the National Technology Innovation Fund (NATIF) with the function of preferential loans, loan interest support, guarantee for loans, capital support for organizations, individuals and businesses to conduct research, transfer, innovate and perfect the public turmeric. According to the Minister of Information and Communications – Nguyen Manh Hung (MOIC, 2019), Vietnam's biggest advantage in developing IoT is having good telecommunications infrastructure, there are some strong telecom enterprises and capable investment in national coverage infrastructure. On the platform of connection for IoT, Vietnam's strategy to 2020 basically each household in Vietnam has an optical fiber transmission line, each person has a smartphone and 5G mobile infrastructure coverage, giving priority to IoT before.

As such, the Government of Vietnam is especially interested in institutional building and promulgating policies for the development of IoT technology. This is clearly shown through the Government's focus on developing information technology infrastructure, prioritizing the development of the digital industry, smart agriculture, smart tourism, smart cities, and promoting the innovative eco-start-up, education reform and vocational training, and training human resources to be able to absorb new production technology trends. In addition, in building policies to develop the IoT technology market, Vietnam also faces certain difficulties such as limited capacity, limited technological level and investment in R & D activities. Low funding for R & D activities accounts for only a very small part of the financial resources of businesses. Therefore, developing the IoT market also poses many challenges for businesses and society in terms of developing legal and ethical IoT business models, privacy in data collection because IoT is not only developing in technology, but also must promote upgrading of manufacturing industries, accelerate the process of national digital transformation and build a smart society.

4. Conclusion

On the basis of the general research on the development of the IoT market and the policies to promote the development of the IoT technology market in Germany, it is possible to draw some reference lessons for Vietnam in the process of policy finalizatio of research, application and IoT development, specifically:

Firstly, creating a favorable environment for IoT technology research and development, proceeding to support businesses in technology innovation and successful digital transformation. In general, Germany has created a favorable legal corridor for IoT technology research and development, technological inno-

vation through programs, projects and action plans by issuing preferential policies, tax incentives, credit through development investment funds, science and technology funds, innovation funds for each object.

Secondly, promote IoT research and support the development of IoT solution providers in Vietnam. Currently, Vietnam has a number of IoT solution providers such as: IoT Technology Services Joint Stock Company – IoT Group, DTT Technology Company, FPT Corporation, Konexy Company, Hachi Company, Rynan Smart Fetilizer Company, Mimosa Technology Company Limited, Microsoft Vietnam Company, Agricheck, etc. The application of IoT technology in general and the application of IoT technology will increase productivity and reduce costs. However, at present, the initial cost to implement an IoT solution is quite high, because there are not many enterprises producing hardware devices, the equipment is mainly imported from Israel, Japan, Germany, Thailand, and Taiwan (China). Therefore, in the coming time, in addition to encouraging the development of IoT technology providers, it is necessary to promote research and application of IoT to advance to master IoT technology in some necessary fields such as agriculture, tourism, education, transportation, smart building.

Thirdly, incentives for technology innovation and invention exploitation in the IoT field for digital transformation in enterprises (Nguyen Huu Xuyen, 2018). Tax, credit, direct support and training policies need to be further supplemented and improved. The State should have separate policies for businesses to invest, apply IoT technology of the fourth industrial revolution to strongly promote investment in research and technology development, reception and mastering IoT technology, expanding production, contributing to improving the competitiveness of technology products applying IoT in the market.

Fourthly, supporting the training of technological human resources to serve the development of the IoT market, creating a premise for innovation in the enterprise. This is an important factor to support businesses to adopt, adapt and master technology; At the same time, Vietnam needs to focus on key science and technology fields, orient the development of IoT technology in order of priority in each stage with specific industries. From there, encourage businesses to adopt IoT technology through technology transfer from abroad, and support businesses to conduct research and deploy IoT technologies.

Fifthly, to form an ecosystem of innovation and entrepreneurship, which emphasizes the role of the state in creating conditions that support and promote the economic impact of the IoT industry in all sectors. Building the communication network infrastructure with the 5G generation, developing and unifying IoT standards, enhance security, safety and security for the Io T.

In addition to developing the IoT technology market, the State needs to increase investment in technological infrastructure development, and support businesses to improve their endogenous capabilities by encouraging the establishment of research and development departments in the enterprise. At the same time, the Government needs to create an innovative ecosystem to support small and medium enterprises and startups through cooperation with global partners through IoT technology incubators.

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Section 9. Science of law

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THE PROBLEM OF APPLICATION OF AN AMICABLE AGREEMENT IN BANKRUPTCY PROCEEDINGS

Abstract. The article explores the possibility of conclusion of an amicable agreement in bankruptcy proceedings after the repeal of the Law of Ukraine "On Restoration of the Debtor's Solvency or Recognition of the Debtor's Bankruptcy" and the entry into force of the Bankruptcy Code of Ukraine. A comparative analysis of a settlement agreement in commercial litigation and bankruptcy proceedings is also examined in the article.

Keywords: an amicable agreement; bankruptcy proceedings; commercial proceedings; court procedures; a creditor; a debtor; a conflict of laws; a legal gap.

The Law of Ukraine "On Restoration of the Debtor's Solvency or Recognition of the Debtor's Bankruptcy", which is invalid now, provided in Article 7 that the court procedures applied to the debtor were disposition of the debtor's property; the settlement agreement; reorganization (restoration of solvency) of the debtor; liquidation of bankruptcy. In accordance with Article 6 of the valid Bankruptcy Code of Ukraine, the following court procedures, which are applied to the debtor (the legal entity), consist of currently disposition of the debtor's property; reorganization of the debtor; liquidation of bankrupt. The following court procedures, which are applied to the debtor (the natural individual), include debt restructuring and debt repayment. So the Bankruptcy Code of Ukraine did not indicate an amicable settlement in the list of court procedures. There is currently no concept of an amicable agreement at the legislative level.

The definition of an amicable agreement was provided only by previous legislation, which is invalid now. Part 1 of Article 77 of the Law of Ukraine "On Restoration of the Debtor's Solvency or Recognition of the Debtor's Bankruptcy" stated that a settlement agreement in a bankruptcy case is an agreement between the debtor and creditor regarding deferral and/or installment, as well as forgiveness (write-off) by creditors of the debtor's debts, which is executed by concluding an agreement between the parties. The scientiest Popkov P. O. proposes to define the concept of an amicable agreement as a bilateral or multilateral procedural agreement concluded by the parties to the commercial judicial proceedings and approved by a judge/judges of the commercial court, the Supreme Court, aimed at terminating the commercial dispute and closing the proceedings for the purpose of operative settlement of material economic legal relations [4, P. 3].

The issue of this article is whether it is possible to apply an amicable agreement in bankruptcy proceedings after the adoption of the Bankruptcy Code of Ukraine. This Code does not explicitly prohibit, but does not explicitly provide the application of an amicable agreement. On the one hand, the legal norm can be interpreted as Article 6 of the Code provides only an exhaustive list of court proceedings, because Article 6 of the Code of Civil Procedure does not contain the words "etc." or "and other court proceedings". On the other hand, in accordance with Article 2 of the Bankruptcy Code of Ukraine, bankruptcy proceedings are regulated by the Bankruptcy Code of Ukraine, the Commercial Procedure Code of Ukraine and other laws of Ukraine. So the Bankruptcy Code of Ukraine has a reference norm to the Commercial Procedure Code of Ukraine regarding legal regulation in bankruptcy proceedings. The Commercial Procedure Code of Ukraine provides the right to conclude an amicable agreement. According to Article 192 of the Commercial Procedure Code of Ukraine, the parties may conclude an amicable agreement and notify the court by making a joint written statement at any stage of the proceedings. The court refuses to approve an amicable agreement and continues the trial if the terms of an amicable agreement contradict the law or violate the rights or legally protected interests of other legal entities or natural individuals; or if one of the parties to an amicable agreement is represented by its legal representative, whose actions are contrary to the interests of the represented legal entity or natural individual.

Regarding the case law on the regulation of this issue, the Commercial Court of Cassation of the Supreme Court considered the cassation appeal of the Main Department of the State Tax Service in Kyiv against the decision of the Northern Commercial Court of Appeal dated 11 March 2020 and the decision of the Commercial Court of Kyiv dated 02 December 2019 in case № 910/26972/14 on the bankruptcy of the Public Joint Stock Company "Hydromechanization". The Supreme Court ruled not to approve the settlement agreement. The decision of the creditors' committee to conclude an amicable agreement at the stage of liquidation after entering into force of the Bankruptcy Code of Ukraine contradicted the provisions of this Code, because mentioned Code excluded the possibility of concluding an amicable agreement at the stage of liquidation.

The Bankruptcy Code of Ukraine currently recognizes an amicable agreement only as a tool to restore the debtor's solvency. In contrast to the provisions of the Law of Ukraine "On Restoration of the Debtor's Solvency or Recognition of the Debtor's Bankruptcy", an amicable settlement and reorganization are combined into a single unseparated procedure in the Bankruptcy Code of Ukraine. This can be explained by the fact that the settlement agreement and the debtor's rehabilitation provide generally the same mechanisms of debt restructuring and restoration of the debtor's solvency (deferral, installment, debt write-off, other possible repayment mechanisms).

Section III "Rehabilitation of the debtor" of the Bankruptcy Code of Ukraine provides the application of the debtor's rehabilitation procedure with the approval of the rehabilitation plan, the implementation of which may allow the debtor to restore its solvency. Article 51 of the Code of Civil Procedure of Ukraine defines a number of measures to restore the debtor's solvency, the list of which is not limited. So the conclusion of an amicable agreement between the debtor and an individual creditor at the stage of rehabilitation is possible. However, the conclusion of transactions on forgiveness, installment, deferral of debt should be made in accordance with Chapter 50 "Termination of Obligations" of the Civil Code of Ukraine (Articles 604–609) and according to the peculiarities of bankruptcy proceedings, which exclude certain types of transactions at certain stages of bankruptcy proceedings (in particular, due to the moratorium under Article 41 of the Bankruptcy Code of Ukraine). It is required in order to avoid satisfaction of creditors' claims individually, providing all creditors with equal legal opportunities in meeting their claims, realization of their rights and legitimate interests, ensuring the constitutional principle equality of

all before the law, including when the debtor's property is insufficient to fully satisfy all creditors' claims.

The ambiguity of a legal norm can lead to contradictory case law. In my opinion, the Bankruptcy Code of Ukraine should explicitly prohibit the possibility of concluding an amicable agreement in bankruptcy proceedings at all stages, including the rehabilitation stage. According to Article 192 of the Commercial Procedural Code of Ukraine, an amicable agreement is concluded by the parties for the purpose of resolving a dispute on the basis of mutual concessions and should concern only the rights and obligations of the parties. However, bankruptcy proceedings are indisputable. This is evidenced by Article 39 of the Bankruptcy Code of Ukraine, which stipulates that the commercial court refuses to open proceedings if the creditor's claims indicate a law dispute, since it must be resolved by way of action proceedings. Insolvency is characterized by the fact that they are not a tool for resolving a separate dispute between the debtor and his creditor, but must provide a collective mechanism to protect the interests of various creditors (bankruptcy, mortgage, current), other participants in bankruptcy proceedings and fair distribution of debtor's assets between creditors, fair conditions for the sale of the debtor's property in order to proportionally protect the property interests of the debtor and creditors. Therefore, it is not advisable to use an amicable agreement in bankruptcy proceedings which are deprived of any dispute, because an amicable settlement is a means of settling a dispute between the parties to the proceedings.

In order to avoid confusion and conflicts, I think it is necessary to explicitly provide the impossibility of concluding an amicable agreement in Article 6 of the Bankruptcy Code of Ukraine and it is needed to set out Article 6 as follows:

"1. According to this Code, only the following court procedures are applied to the debtor – a legal entity:

disposal of the debtor's property;

reorganization of the debtor;

liquidation of the bankrupt.

2. In accordance with this Code, only the following court procedures are applied to the debtor – an individual:

debt restructuring of the debtor;

repayment of the debtor's debts.

The procedure of repayment of the debtor's debts is introduced in the case of insolvency together with the recognition of the debtor bankrupt.

4. An amicable settlement cannot be applied in bankruptcy proceedings at any stage of legal proceedings.

3. Procedures of reorganization of the debtor or liquidation of the bankrupt shall be carried out in compliance with the requirements of the legislation on protection of economic competition."

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Section 10. Architecture

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PARALLELS IN ARCHITECTURE OF THE INTERWAR PERIOD IN KYIV AND ROME

Abstract. Analysis of the identities and differences of architectural trends in interwar Rome and Kyiv in the context of socio-cultural, historical and political factors that influenced the field of art. Comparison of the development paths of Soviet post-constructivism and Stalinist Empire style with the architecture of Fascist Italy.

Key words: historicism, eclecticism, avant-garde, Postconstructivism, Soviet neoclassicism.

The architecture of the USSR as a whole in the designated period was analyzed in their research works by A. V. Ikonnikov, Yu. S. Aseev, S. O. Khan Magomedov, D. S. Khmelnitsky and N. P. Bylinkin. In more detail in the context of Ukrainian national development, the issue is revealed in the works of B. S. Cherkes, B. L. Yerofalov-Pilipchak, etc. Khmelnitsky and Cherkes draw parallels of the genesis processes of domestic and foreign architecture. V. O. Vesnin gives a brief analysis of the Italian architectural experience as a contemporary in his diaries. However, given the vastness and versatility of the issue, the topic raised remains open for further in-depth study and development. Comparison of processes in Kyiv and Rome of the interwar period as a separate research topic is raised for the first time.

Analyzing the architecture of the Soviet neo-classicism, the so-called Stalinist Empire, researchers often draw parallels between the USSR and Nazi Germany, comparing domestic experience with the projects of A. Speer and P. Troost. These identities are regularly extrapolated to other totalitarian and authoritarian regimes of interwar Europe, including Fascist Italy, which is considered in the orbit of German political influence.

However, despite the significant similarities and almost identical socio-political and cultural processes, the architecture of Italy during the time of Benito Mussolini has a number of characteristic features formed by differences in both state factors of influence and authentic artistic heritage, which influenced the formation of the field of creative activity.

In general terms, the socio-cultural area seems close to the background of Hitler's Germany and Stalin's USSR, but with a more detailed analysis, we can note a number of key differences that are somehow related to the conditions for establishing power in the country. Unlike Germany, which lost the war and in which the National Socialist Workers' Party came to power in a wave of revanchism and opposition of the "strong" model of government to the "weak" Weimar Republic, which resulted in antagonism to the Bauhaus in particular and the avant-garde in gen-

eral; and in contrast to the USSR, whose transition from constructivism to neoclassicism, as a reflection on the new social climate, was mentioned in our previous articles [1]; the coming of the Nazis to power was more planned. In fact, the new ruling elite did not oppose itself to the previous government, but only radicalized the previously planned course. In art, this resulted not in the prohibition of the avant-garde, but in its gradual evolution in an ideologically favorable direction.

We consider it appropriate to compare some Italian projects of those times with Kyiv examples. In particular, with competitive proposals for the construction of the Government Quarter of Karo Semenovych Alabyan — one of the founders and inspirers of Soviet neoclassical architecture, who in 1932 became executive secretary of the newly created Union of Soviet architects (after 1955 known as the Union of architects of the USSR). Accordingly, considering the personal role of K. S. Alabyan in the power-induced, leading union of architects of the country, his work in this context can be extrapolated to the official course of the ruling elites.

We also consider it important that neoclassical reminiscences in the architecture of K. S. Alabyan had considerable experience gained after analyzing the best world samples during professional business trips: "… (in 1925 — to Paris, in 1935 - to France, Italy and Greece) he studies outstanding monuments of antiquity, Renaissance, classicism and modern European and American architecture and construction equipment" [2, p. 408]. Accordingly, the contemporary to Alabyan neoclassical architecture of fascist Italy also could not escape the artist's attention. In 1935, the construction of the World Fair quarter in Rome (EUR) began with the main dominant - the Palace of Civilizations, for the project of which a competition was announced [3].

Similar events took place in the architecture of Kyiv, where, after the return of the capital from Kharkiv, a competition was announced for the new Government Quarter [4], in which Kaso Se-

menovych [5] also took part. Two competitive proposals of K. S. Alabyan for the construction of the Government Quarter were submitted by the structures of the CPC and the Central Committee of the CP(B)U in the form of an almost direct citation of the Colosseum cut by the main axis of the square.

Italian architecture, built in similar to the Soviet and German conditions, the assertion of totalitarian ideology and the key role of the party leadership, historical reminiscences of the militaristic dictatorship of ancient Rome and the cult of ideas aimed at the general population — architecture created in almost identical realities — meanwhile found its expression through avant-garde conciseness, which contrasts sharply with the multi-decorated architecture of the USSR in the late 1930's — early 1950's. EUR architecture is designed exclusively in clear perpendicular lines, almost without decoration, with a minimum amount of brutalized polygonal sculpture. The main dominant, the Palace of civilizations, gets a rectangular, almost cubic shape, popularly called the "cubic Colosseum" as a diametric contrast with the cylindrical Flavian Amphitheater.

In our opinion, there are two main reasons for such a fundamental difference in the neoclassical architecture of Italy and the USSR:

Italian architecture was created against the background of a large number of authentic artifacts of antiquity, some of which, such as the Colosseum, the baths of Diocletian and Caracalla, the Roman Forum, etc., still play an iconic urban emphasis. Their importance can hardly be overestimated, they are self-sufficient in the city space. Therefore, the Italian architecture of the 1930s could afford more detached variable memories, without direct citation (which, moreover, would be put in conditions of significant competition with the actual monuments). Neoclassical architecture of the USSR is more focused on the experience of the French Empire during Napoleon's time than on antiquity - there are almost no ruins of the ancient period preserved on the territory of the Soviet Union.

Italy at the beginning of the twentieth century did not go through such significant socio-ideological upheavals as the Russian empire with the October Revolution, the Civil War and, as a result, a sharp fundamental change in artistic styles from Art Nouveau to avant-garde, which represented the "old bourgeois" and "new proletarian" eras. Accordingly, in our opinion, the avant-garde in Italian architecture developed more systematically than in Soviet architecture, and more progressively, without opposition, began to be saturated with neoclassical elements when the ideology changed.

The architecture of Karo Semenovych Alabyan in this context was addressed to the experience of antiquity precisely from the point of view of the Soviet background. His reinterpretation of historical experience was focused, in our opinion, precisely on the expression of the ideological ideas of the ruling elites of the 1930s, manifested in large-scale city-forming projects. If in Rome the new Quarter of the World's Fair was built on the outskirts, leaving the historic ruins intact, in Kyiv a new Government Quarter was created on the site of the specially destroyed St. Michael's Golden-Domed Cathedral and the Church of the Three Holy Hierarchs. In Italy, the quarter was a continuation of the historical genesis, in Kyiv - a contrast to the achievements of previous times. That is why, in our opinion, the "Stalinist Empire style" in the USSR had a number of key differences from neoclassical variations in Fascist Italy. We consider Alabian's approach to urban development, designed to create a new (rather than reinforcing the old) image of the city, to be key: "In no epoch architecture with such force and persuasiveness has solved the problems of a large ensemble as [in the epoch] of the ancient world." [2, c. 411]. However, comparing his projects (in particular the Government Quarter in Kyiv) with other concepts in the style of neoclassicism, one cannot fail to notice a relatively smaller number of sculptural details, baroque elements and decor in the ornamentation than in the proposals of his colleagues (D. M. Chechulin, I. V. Zholtovsky,

V. G. Zabolotny, O. V. Vlasov, etc.). In our opinion, the projects of K. S. Alabyan in Kyiv is a synthesis of the Soviet and Italian approach to the development of neoclassical architecture in the mid-1930s.

The following projects of the master in Kyiv also approved a global ensemble urban planning approach to the introduction of neoclassical art: "In 1945, he participated in a competition for the project of the main street of Kyiv — Khreshchatyk, and the street ensemble includes the Victory Arch, the project of which he made a year earlier." [2, c. 410]

Viktor Oleksandrovych Vesnin in 1937, analyzing the contemporary architecture of Italy, noted: "The state in Italy builds some large structures. The fascist regime wants to reflect a "new era"in them. < … > It is difficult to determine what this style is. The ideological leader of the new Italian architecture is a "friend of Mussolini", the architect Piacentini has not yet figured out what he wants and where he leads: either "neoclassicism" or "neo — romanticism". < … > There is undoubtedly a "neo" in it — since there is a new era, then it is impossible without "neo". Undoubtedly, there is also "latinism" as a continuation of the "great ideas of the Roman Empire", undoubtedly, there is also "rationalism" as the winning of the century." [2, P. 44–45]. In our opinion, it is paradoxical and, in a certain sense, ironic that such rhetoric is carried out by Viktor Vesnin, who together with his brother Alexander presented two projects for the aforementioned competition for the construction of the Government Quarter in Kyiv. And it was on the example of the transformation of their proposal from the first to the second round that they tried to adapt the constructivist idea to changing the vector of power elites, adding neoclassical elements in the decoration and sculptural design. Neoclassical elements just like in Italy played along with the imperial myth. Only not Roman, but great Russian-Soviet, which was also imbued with militarism in the mid-30s.

"Without giving preference to any "-ism", Piacentini and his associates deftly operate them depending on the circumstances, purpose and significance of

the structure " [2, p. 45], Vesnin notes further, meanwhile personally adding foreign empire elements to the avant-garde architecture and turning their object into post-constructivism (according to the definition of the term by Khan-Magomedov [6]). "Theatricality, pose, deceptive pathos, recitation, characteristic of the entire practice of Fascism, found full expression in this architecture" [2, p. 45] — words that we consider appropriate to apply not only to the architecture of the designated Italy, but also to the work of many constructivist and rationalist architects in the vast expanses of the USSR, through compromise and creative search, tried to adapt to new requirements and socio-political request. For example, we can recall the House of writers "Rolit" authored by V. G. Krichevsky.

However, we, as a researcher, do not share the unambiguously negative attitude of Viktor Oleksandrovych to such variations, considering the transition of styles process and the corresponding synthesis an extremely interesting period, which will lay the foundations for new decorative and constructive techniques that will be used in the new style iteration of the departure from neoclassical to modernism and functionalism in the USSR.

Note that in Germany and the USSR, where "pure" neoclassicism strongly rejected the avant-garde, it rapidly disappears with the death of the corresponding authoritarian personalities who supported it. In Italy, on the other hand, fascism architecture was not condemned and continued to develop gradually after the fall of the regime. We directly link this to the fact that the Italian architecture of the 1930s did not contradict previous artistic achievements, becoming, in fact, one of the ways of development of the avant-garde and then just as organically returning to the postwar modernism and international style.

Similarly to Italian, the architecture of countries that were under significant Italian influence, in particular, Albania and Romania, will develop. For example, you can recall the Royal Villa in Dures, on the Adriatic coast opposite Italy, near the capital of the country. It was built in 1937 by architect Cristo Satiri in the style of so-called Monumental rationalism [7], combining the features of avant-garde and neoclassical architecture. The architect, who graduated from Italian universities and also worked at the court of the Romanian royal family, designed the villa in the shape of an eagle.

Conclusion. Analogies and parallels that were drawn between the architecture of the USSR and world artistic progress reveal the depth of ties and the global cultural significance of creative achievements. It would be erroneous to consider Soviet and Ukrainian architecture as a separate phenomenon, devoid of influences and mutually enriching exchange with the global art of those times.

The architecture of Soviet and Ukrainian post-constructivism paradoxically has much in common with the Italian development of neoclassical variations of the interwar period. However, given a number of fundamental differences in the political system and historical environment, which significantly affected the artistic field, the development of Soviet and Italian architecture, with identical trends of the late 1920s, will acquire more and more disagreements during the third decade of the twentieth century. The Italian systematic evolution from the avant-garde to the neoclassical turned out to be more viable and socially acceptable than the Soviet and German directive transformations, which were criticized and "forgotten" after the death of their respective authoritarian initiators of creative change.

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