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Section 1. Mechanics

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COMPENSATION IN PRACTICE INSURANCE LAW

Summary

With an emphasis on the subrogation principle in the context of personal insurance, since it does not apply to the principle of similarity, is given in comparison with the regression and the session, the article deals with issues relating to compensation for damage caused by a third party in case of damage. My goal is to portray subordination of subrogation as an unreasonable struggle against the irrationality of the road, which is the best route to take in order to ensure that the legislative power's objective may be achieved while allowing for the unjust enrichment of an individual. The work is related to the wrong legal results expected in practice.

The idea of reparation and other recognized principles in the field of insurance of damage [2, 9] serve as the foundation for the subrogation principle. The word "subrogation" is of Latin origin and means "one subject entity [7].".

It is referred to as "Cessio law" in the countries of continental Europe, which means the law to refuse the request of Sierra Caesar or the force of law. The Georgian legislator does not use this term, but it will be significantly strengthened in the Civil Code.

The parties' agreement is not necessary for the subrogation concept to be adopted. Clearly, only harm related to insurance is covered by the Georgia Civil Code. Personal insurance variations are relevant. Personal insurance does not employ subrogation. This stance is comparable to how the United States Court operates. Here, personal insurance is considered an investment agreement, in which the principle of

subrogation is rare. This is given in one of the court decisions in the case– City of Birmingham v. [12] Subordination does not change the existing responsibility, only the creditor subject changes, the right to require that the insurer is transferred to the insurer, the insurer changes the insured person in the exercise of the right to demand compensation. In other cases, the insured may claim damages from the damage and the insurer concurrently with the subrogation, the Supreme Court explains that the request is a defense to prevent unreasonable enrichment [15]. We will discuss this issue later.

Compare subrogation institution with such civil law institutions as regression and cess.

The right of regressive demand and subrogation is based on the law, but the essential difference is that in one case, relations are terminated and new, completely independent relationships, and in the second case, the subject-creditor of the relationship changes during subrogation, but the content of the relationship does not change, it usually lasts. What is the difference between regression and subrogation? The Supreme Court (No. 581–549–2011) in one of the resolutions gives us an explanation that «there is no change in the existing obligations of the person, but in this case, the connection is completed and a new obligation arises. During the repetition, one of the obligations changes the other, and in the case of subrogation, the ratio only changes the creditor, the obligation itself remains unchanged. This distinguishes subrogation from a regressive obligation resulting from the performance of another obligation (termination) and, thus, the receipt of a new independent obligation. A new obligation does not arise during subrogation, but the basic obligation between the insurer and the successor performs. Such persons are obliged to change persons in accordance with the law" [16]. Article 832 sets out the law of the claim requirement, and in the case specified in article 199 of the Civil Code, the claim is still made, but under the transaction. This fact is a significant difference between the two institutions. The legal consequence of the concession is the requirement that the request be transferred to the new creditor, taking into account the legal loan obligations at the site of the original creditor. The latter will be transferred to the new creditor, as in the hands of the original creditor [13].

The request is concluded by agreement between the original owner and a third party, in which case the debtor's approval is not necessary and the original owner becomes a third party. It is not clear from the

insurer whether it can refuse damage to that person request, but the insurer is exempt from the obligation to compensate, necessary time for the creditor or third-party agreement. In the first case, an insured event occurs, and the insurer may claim damages to the taken person returns. There is no need for the insurer's consent, but it is unclear from the insurer whether it can refuse damage to that person request. Moving to the right of the transaction this time around without reference to the law.

The regressive right to use certain prerequisites: the norm, according to the request passes to the insurer, if he compensates the insured damage.

It is interesting to prohibit the use of subrogation rights. According to the norm, "if the right to an insurer is associated with the family members residing with him, the right to move is excluded if the family member caused damage" [11].

In the legal literature there is no doubt that there is normally a technical error by Bob on. In particular, the second part of Article 832 is amended as follows: when a family member has not intentionally caused damage. The lawyer believes that the insurer's right to subrogation is unreasonable on the grounds of damage caused through negligence on the part of the family member of the insured.

Subrogation is seen as a means of preventing unreasonable enrichment [5].

Subrogation is defined as follows by Georgia's Civil Code: "If the insurer can seek payment for damage to third parties, this requirement is passed to the insurer if it reimburses the insurer." As a result, the standard is set in the claim right. Notably, the exercise of the subrogation right does not require the approval of the parties; if necessary, it automatically ends the relationship and compels the parties to substitute one another.

If the applicant is a relative of the victim, the relative, friend, or victim informs the firm that he would not have brought his claim against this person if there had not been an insurance policy. In all circumstances, the insurer is entitled to subrogation; however, if the insurer does not grant him permission to exercise this right, the insurance company will be totally released from the insurer's liability from the insurer, or if the liability has already been issued, it requires a return from it. In this scenario, the insurer is released from the business, but only to the extent of the costs he incurred for services like an attorney or audit. The insurance provider will deduct these costs.

We should discuss two aspects of employing the Subrogation Institute, as stated in the new remark to Georgia's Civil Code: first, protect the insurer from disproportionate enrichment; and second, ensure equal involvement of all parties involved in insurance interactions, the insurer and the insurer [19]. First of all, we must closely monitor our place and role in the Civil Code system, since subrogation is exposed to the risk of damage, it is indisputable that this is a special rule and is only related to the legal relations in this chapter. In case of damage to the insured, the insurer shall assess the amount of damage caused during the insured event and within the limits of the insurance fee, the damage will always be reflected in specific indicators.

The regressive right to use certain prerequisites: the norm, according to the request passes to the insurer, if he compensates the insured damage, the third party insurer the right to demand damages the same time.

As stated above, the goal of the legislative branch to attract the Subrogation Institute did not allow the injustification of the person to be unfairly incurred. Absolutely the approach of the fair is that the norm in the absence of the insurer caused the damage compensated by the insurance company, as well as causing harm to the person and it is unjustifiably rich, therefore from the comments of the Civil Code, in accordance with subrogations, the insured person is entitled to compensation for damage to client demand, law [19], but here is another worthy transaction, since the insurance contract is a valuable transaction in exchange for insurance risk provided by the insurer's contract, periodically receives insurance remedy from the insurer, while the insurer is obliged to reimburse his harm.

Impeccable demand for the law. Compensation for damage will be insured by the insurer on the basis of unreasonable enrichment of the insurer. This question also matters in this case and is a rather controversial issue. One of them is indisputable — damage must be caused by losses, but the question is, who has the right to receive this reward? What will be the optimal solution at present, so as not to compensate for the interest of any party?

In this instance, the third-party insurer, who in turn accepted the insurance premium from the insurer on a periodic basis in exchange for insurance, issued insurance payments. The damage to one party, the responsible party insured by the other party, who has already received compensation from the insurance company to make up for loses. It is difficult to say which subject is really an authorized insurer or an insurer

for receiving compensation from losses. If we look at the issue with the fact that the insured to ensure that compensation has been received and the insurance pays for it again returns to damage, the same can be asked the same question in the case of the insured company that it periodically takes Contract insurance premiums. It will be more fair, equally divided between the insurer and the insurer in the amount of removal from the damage, in this case there is no doubt about the unreasonable enrichment of either party.

The above-mentioned example is the decision of the Supreme Court [16]. which states that "when an insurance policy insured by legal relations is insured, the person is insured with double demand. However, the insurer has no right to issue an insurance premium and further injuring the tort claims of the amount of the obligation. Accordingly, Article 832 as a normative norm of special relations can not be applied by analogy, since this explanation of the norm is not related to the objective objectives of the law".

Civil Code 858. Article of the law of recourse means an exception in which a number of shortcomings, since regression instead of being recourse, so this article is a subrogation ban train, private insurance lawmaker to control the policyholder insurer for replacement, and the reason for this is that head of regulated relationships, like for non-life insurance, it directly depends on the amount and, therefore, when the insurance company, the insurer reimburses the damage, it automatically replaces t it because the legislature can not allow the insured to receive compensation for double compensation, as well as to the private insurer, insurer, and policyholder in the legislature, to balance the introduction of subrogation rights.

Finally, it can be said that the subrogation institution has not been completely eliminated by any of the parties using unprofitable wealth, but it should be noted that the above proposal is the best way in which neither side will have the right to compensation for damage.

Important issues related to the Civil Code of the Russian Federation 832-p, in the second sentence, according to which, if the insurer is lowered by a third party in respect of its claim or its demand for the right to provide, the insurer shall be exempt from damages in the amount of the obligation to compensate, he can have his expenses and expenses implemen in relation to shouting or demand.

I agree with K. Iremashvili that the insurance has the ability to demand payment from a third party, but the law gives the insurer

the discretion to decide whether or not that third party will be held accountable and required to make repairs. The insurer is not required to completely compensate a third party for the damage; the insurer is free to not to do so. Iremashvili — 832 Haheli comments on CCG, 2016 In this case, the insurer must make a decision because such a solution to the issue will be detrimental to him.

It is interesting to learn about the limitation of this rule [14]. The Supreme Court, the decision of the court when considering the complaint, the policyholder of the transportation of cargo requires compensation for damage caused as a result of the limitation period, it is used incorrectly is RC-128, 3 of the following: in the case of claims brought by non-shipping violation of the rights of the relationship, but 832-items in the centuries properly, the insurer's regressive compensation claims are based on, and, since this article does not provide for the insurer's right of recourse restriction on the period, that I used RC Co. Article 128 (3) of the Criminal Code of Georgia Illuminated general limitation period.

Court of Cassation Definition:

In the event of a dispute, it is important to separate the transfer of the right to claim compensation from the insurer against a regressive obligation. The Court of Cassation mentions 832. Article in the centuries, and explained that this article does not provide for any recourse of the obligation, but also the opportunity during which the insurer moves the right to claim, which insured the damage from the person liable, and that the transfer is made by the insurer for the insurance contribution inside. Such a shift to the right of claim is known as the principle of subrogation. In this case, the insurer changes the insurer with the right to claim damages. Without compromises, the content of existing obligations — legal relations do not change, no requirement arises from the content of legal relations with the corresponding obligation. The demand will be transferred to the new creditor, as in the hands of the original creditor.

If it becomes clear that the claim of the insurer concerns damage caused by the damage, the insurer will also be older. The change in the creditor does not cause a change in the statute of limitations and the calculation rule. The appellate court also explained that in such circumstances the applicant, the issue of withholding will be decided in the provision of some regulation, regulating the client and injuring the

relationship between them, in this particular case, which will be used to deliver the rules.

I think that issues related to the limitation period are not a problem, and this is absolutely the right approach if we consider the problem on the basis of specific specifications.

Resume

This article served to illustrate how I see subrogation as a safeguard against unjustified enrichment. The aim of the legislator is to address the unjustifiable enrichment of a person, and I think the suggested approach will be more safe and preserve the fundamental civil law norm of equality. Although there is no question that any of the parties is unfairly enriched, it will be more equitable if the insurer and the insurer share equally in the proceeds from the damage.

The amendment which drastically alters the content of the standard, is likewise the focus of the study. This effort is an attempt to interpret the information that should actually be received from this article in order to ensure a correct understanding of the law and eradicate flaws. In the end, this gap is not closed, which in turn has an incorrect legal consequence.

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Section 2. Pedagogy

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DEVELOPMENT OF A STUDY PROGRAM FOR THE ELECTIVE DISCIPLINE "CHEMICAL TECHNOLOGY OF MINERAL FERTILIZERS" BY THE CASE STUDY METHOD

Annotation. This project focuses on the development of a study program for the elective discipline "Chemical Technology of Mineral Fertilizers" using the case study method. The aim is to provide students with a comprehensive understanding of the chemical processes involved in the production, formulation, and application of mineral fertilizers. The study program will incorporate real-world case studies that highlight various aspects of the chemical technology of mineral fertilizers, including raw material selection, manufacturing processes, quality control, and environmental considerations. By engaging in case-based learning, students will enhance their critical thinking, problem-solving, and decision-making skills in the context of mineral fertilizer production. The study program aims to prepare students for professional roles in the fertilizer industry or related fields by providing them with practical insights and knowledge about the chemical technology behind mineral fertilizers.

Key words: curriculum, elective subject, Chemical Technology, mineral fertilizers, case, Case Study Method, educational process.

Chemical technology of mineral fertilizers is a crucial discipline in the field of agriculture that involves the study of the production, usage, and management of chemical fertilizers. Chemical fertilizers are essential for modern agriculture as they enhance soil fertility, promote

plant growth, and increase crop yields [1]. The continuous increase in the world's population, coupled with the need to produce more food, has placed a tremendous demand for chemical fertilizers. The use of chemical fertilizers has become a common practice worldwide, making it a vital area of study [2]. The development of a study program for the elective discipline "Chemical technology of mineral fertilizers" is a relevant research topic as it seeks to bridge the gap between theoretical and practical knowledge in the production, usage, and management of chemical fertilizers. The lack of a structured and well-organized curriculum in this field has led to limited knowledge transfer and insufficient training of students in the chemical technology of mineral fertilizers. Therefore, the need to develop a comprehensive study program that provides students with both theoretical and practical knowledge is essential. The lack of practical training in higher education institutions can lead to a knowledge gap, which can have serious consequences, including the inefficient use of fertilizers, increased costs of production, and environmental pollution. This research aims to bridge the gap between theoretical and practical knowledge by developing a comprehensive and effective study program that equips students with the necessary skills and competencies needed to work in the field of agriculture, particularly in the area of chemical technology of mineral fertilizers. The proposed study program is unique in its use of the Case study method, which is a practical approach that emphasizes problem-solving and critical thinking skills [3, 4]. The study program will also provide students with an opportunity to apply theoretical knowledge in a real-world context and develop a deeper understanding of the production, usage, and management of chemical fertilizers. The use of the Case study method in the proposed study program for the elective discipline "Chemical technology of mineral fertilizers" is highly relevant in the context of this dissertation. The Case study method is a practical approach that emphasizes problem-solving and critical thinking skills, which are essential for students studying in the field of agriculture. The method involves the analysis of real-life situations, which enables students to apply theoretical knowledge in a real-world context and develop a deeper understanding of the production, usage, and management of chemical fertilizers. The Case study method is also highly relevant in addressing the knowledge gap in the teaching of the chemical technology of mineral fertilizers in higher education institutions. The lack of practical training in higher education institutions can lead to a knowledge gap, which can have serious

consequences, including the inefficient use of fertilizers, increased costs of production, and environmental pollution [5, 6].

Literature review

The case teaching method is a powerful instructional approach that promotes active learning, critical thinking, and problem-solving skills among students. Unlike traditional teaching methods that rely heavily on lectures and passive information transfer, case teaching engages students in the analysis and discussion of real-life situations or cases. The origins of case teaching can be traced back to the late 19th century when Harvard University's Law School introduced the "case method" to legal education. Since then, the method has been widely adopted across various disciplines, including business, medicine, education, and social sciences [7,8,9]. The use of case studies as a pedagogical tool allows students to apply theoretical knowledge to practical scenarios, fostering a deeper understanding of complex concepts and real-world challenges. Literature sources highlight several distinctive features that set the case teaching method apart from traditional approaches. Firstly, the case method encourages active participation and student engagement [10,11]. Rather than passively absorbing information, students are actively involved in analyzing and discussing cases, which enhances their critical thinking and problem-solving abilities [12]. For example, in a study conducted by Smith and Johnson (2018) in a business school setting, students who participated in case-based learning consistently demonstrated higher levels of engagement and deeper understanding of the subject matter compared to those in traditional lecture-based classrooms. Secondly, the case method promotes interdisciplinary learning and the integration of knowledge from multiple domains [13]. Cases often present complex problems that require students to draw on their knowledge from various disciplines to develop comprehensive solutions. This interdisciplinary approach fosters a holistic understanding of the subject matter and encourages students to make connections between different fields. In a study by Lee et al. (2020) in the field of environmental science, students engaged in case-based learning showed a higher ability to synthesize information and apply knowledge across disciplinary boundaries, compared to those in traditional instruction. Furthermore, the case teaching method emphasizes collaboration and teamwork. Students work together in small groups to analyze cases, exchange ideas, and develop solutions.

In summary, collaborative learning environment nurtures effective communication skills, teamwork abilities, and the capacity to consider

different perspectives. For instance, a study by Johnson and Smith (2019) in a medical school setting found that students engaged in case-based learning demonstrated improved teamwork and communication skills, enabling them to collaborate more effectively in healthcare settings. Professors and educators have expressed positive opinions about the case teaching method [14].

Methodology

The methodology for developing a study program on "Chemical Technology of Mineral Fertilizers" using the case study method is designed to provide students with a comprehensive understanding of the principles, processes, and applications of chemical technology in mineral fertilizer production. This methodology aims to engage students in active learning, critical thinking, and practical problem-solving through the analysis of real-world case studies [15]. The following methodology was employed in the development of the course:

Needs Assessment: Conducted a comprehensive needs assessment to determine the learning objectives, target audience, and specific requirements of the elective discipline. Gathered industry insights from fertilizer manufacturers and agricultural experts in Kazakhstan. Considered the background and expectations of the students enrolled in the program.

Case Selection and Adaptation: Identified and selected relevant case studies that highlight various aspects of chemical technology in mineral fertilizer production. Adapted the cases to fit the specific context of Kazakhstan, incorporating local regulations, industry practices, and technical details of mineral fertilizer manufacturing processes.

Teaching Methodology and Assessment Strategies: Designed teaching methodologies that promote active learning and student engagement. Utilized techniques such as group discussions, problem-solving exercises, role-playing, and simulations to encourage critical thinking and analysis of the case studies. Developed assessment strategies that measure students' understanding of chemical technology concepts and their ability to apply them in practical situations.

Results

By analyzing real-world cases related to mineral fertilizers, students can directly apply their theoretical knowledge to practical situations. This enhances their understanding of the subject matter and helps them develop critical thinking skills necessary for problem-solving in the field.

Here is an example of situational case that can be used in elective discipline course:

Case 1. Mineral Fertilizers

Ali owns 1.5 hectares of land. On his land, following crop rotation, Ali has been growing leguminous crops and perennial grasses every year. Last year, he decided to plant potatoes on 1 hectare of his land. To his delight, he harvested 50 tons of potatoes from that 1 hectare, while other farmers were only able to produce a few tons. Considering that he also sold his potatoes at a good price, he was inspired by the success of his produce. This year, Ali plans to plant potatoes again on the same plot of land and hopes to achieve similar results.

During a festive event with his friends, Ali shared his successful experience and his decision to produce potatoes every year. Experienced farmers advised him that the high yield he obtained was due to the fertility of his soil resulting from crop rotation, which enriched the soil with essential nutrients. They suggested that he should not forget to apply the necessary amount of fertilizers to replenish the nutrients in the soil. Since Ali had not previously focused specifically on potato production, he became concerned and sought advice from experts. He learned from them that every ton of harvested potatoes depletes the soil of 7 kg of nitrogen, 2 kg of phosphorus, and 8 kg of potassium. Realizing that he needed to apply fertilizers this year to replenish the soil fertility, Ali was determined to take the necessary steps.

In conclusion, developing a study program for the elective discipline "Chemical technology of mineral fertilizers" by the case study method requires careful planning and attention to detail. This study program is designed to provide students with a comprehensive and practical understanding of the chemical technology of mineral fertilizers, and to encourage them to apply their knowledge to real-world situations. The use of case studies is an effective way to engage students and enhance their learning experience, while promoting critical thinking and problem-solving skills.

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Section 3. Legal Studies

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THE EUROPEAN PUBLIC PROSECUTOR'S OFFICE: BUILDING TRUST ACROSS THE EUROPEAN UNION

Abstract. The European Public Prosecutor's Office (EPPO) mandate to investigate and prosecute crimes that affect the financial interests of the European Union (EU) as a whole, as well as its cooperation with non-participating member states, demonstrates the EU's commitment to upholding the rule of law and protecting its citizens. By effectively combating fraud and corruption, the EPPO helps build trust between member states and strengthens the accountability of EU institutions.

Given the importance of the EPPO's mandate, it is critical to assess its contribution to building trust and accountability in the EU. This paper investigates how the European Public Prosecutor's Office (EPPO) achieves this goal. The paper highlights that the EPPO's mandate and cooperation efforts contribute significantly to the EU's trust-building efforts by effectively combating financial crimes, promoting transparency and collaboration between member states, and upholding the rule of law. However, there are also challenges to effective cooperation, such as differences in legal systems and varying levels of political will among member states. Nevertheless, the EPPO has the potential to play a significant role in promoting transparency and combating fraud and corruption in the EU. Continued efforts to enhance cooperation and overcome challenges will be necessary to fully realize this potential.

Keywords: EPPO Regulation, EU Member States, PIF Directive, The European Public Prosecutor's Office.

1. Introduction

The origin of the EPPO can be traced back to a 1995 meeting of the Presidents of the European Criminal Law Associations at Urbino University in Italy, where the concept of a European legal space for the protection of the financial interests of the European Communities was first proposed [15]. The Corpus Juris report, published in 1997, proposed the creation of a European Public Prosecutor's Office, which would have the power to investigate and prosecute criminal offenses affecting the EU's financial interests. The proposal was discussed at the European Council meetings, and the Treaty of Lisbon eventually provided the legal basis for the establishment of the EPPO in 2017. The EPPO was established with the appointment of Laura Kövesi as the first European Chief Prosecutor in 2019, followed by the appointment of 22 European Prosecutors in 2020, and officially began its operations on June 1, 2021, with the publication of its first annual report in 2022 [10].

The European Public Prosecutor's Office it is a relatively new institution within the European Union and was established as an independent EU body with the mandate to investigate and prosecute crimes affecting the financial interests of the EU. Its creation represents a significant step towards strengthening the rule of law and protecting the EU's citizens from fraud and corruption. The EPPO's mandate also includes cooperation with non-participating EU member states, a crucial aspect of its work that aims to ensure consistent and effective action against crimes that threaten the EU's financial interests. Building trust is essential because it can strengthen the legitimacy of institutions and encourage cooperation between individuals and nations, thereby contributing to the stability and prosperity of a society or community. Consider trust to be, as Kasperson et al. state, the evaluation of a social relationship based on the violation or fulfillment of certain expectations [12]. This idea, that trust is based on the fulfillment of certain expectations, is interesting, as it highlights the importance of consistent and transparent actions by institutions such as the European Public Prosecutor's Office in order to maintain and strengthen trust.

As the topic of the European Public Prosecutor's Office was discussed for many years before its establishment, there have been various studies and reports published on the subject. For instance, Busuioc et al. argue that the EPPO has the potential to enhance the EU's capacity to combat fraud and other illicit activities that threaten its financial interests [2]. However, the scholars also identify some obstacles that may impede

the EPPO's efficacy, such as the lack of harmonization in criminal law and procedure among EU member states [13] and the limited resources allocated to the EPPO [13]. Overall, these studies indicate that the EPPO's success will depend on its ability to navigate these obstacles and establish itself as a trustworthy and effective institution in the eyes of EU member states and citizens.

2. Methodology

The research question that will follow this paper is: How does the European Public Prosecutor's Office contribute to building trust in the European Union through its mandate to investigate and prosecute crimes affecting the financial interests of the EU? It will involve a literature review and analysis of relevant documents, reports, and official communications from the European Public Prosecutor's Office. However, the EPPO's effectiveness relies on its ability to cooperate with both participating and non-participating member states. This paper will examine the mechanisms through which the EPPO cooperates with non-participating member states and the challenges and opportunities for such cooperation. Furthermore, it will analyze how the EPPO's work contributes to building trust between EU member states and strengthening the accountability of EU institutions.

3. The European Public Prosecutor's Office Mission and Role

Investigation, prosecution, and judgment of those responsible for crimes including fraud, corruption, and money laundering that harm the financial interests of the European Union are all tasks that fall within the competence of the EPPO. It also aims to guarantee that the perpetrators are held accountable and that the EU budget is safeguarded against fraud and other criminal acts. The EPPO Regulation and the PIF Directive are two key pieces of EU legislation that work together to establish and define the European Public Prosecutor's Office (EPPO) and its mission to fight against fraud and other criminal offenses that affect the EU budget. While the EPPO Regulation sets out the basis for the functioning of the EPPO, the PIF Directive defines which crimes are considered crimes affecting the EU budget and are subject to investigation and prosecution by the EPPO. The PIF Directive binds all participating Member States equally, allowing for national adaptation into law and creating a harmonized competence across the EPPO's member states for the crimes it investigates and prosecutes, despite the lack of a common EU criminal code [10]. According to Directive (EU) 2017/1371, the EPPO is tasked with investigating and prosecuting criminal offenses that have

an impact on the financial interests of the Union. The EPPO carries out investigations and prosecutes cases in the competent courts of the Member States until they have been finally disposed of [5].

As clearly stated in Article 22 of the regulation, the EPPO's competence is not affected by how a similar criminal act is classified under the national law of each participating member state, and it can investigate and prosecute criminal offenses affecting the financial interests of the Union regardless of such differences. This means that the EPPO has a wider scope of competence in investigating and prosecuting criminal offenses that may not have been pursued by national authorities due to differences in national law definitions or limitations. In respect of national direct taxes, an exception is made for criminal offenses. Article 24 establishes that the EPPO should be notified without delay of any criminal conduct that falls under its competence and that such reports should contain a minimum amount of information regarding the facts, damage, legal qualification, and any involved persons. Article 25 of the EPPO establishes the conditions under which the EPPO can exercise its competence and the circumstances under which it should refer the case to competent national authorities. Together, Articles 24 and 25 outline the procedures for reporting criminal conduct falling under the EPPO's jurisdiction and the conditions under which the EPPO can take action. These articles aim to strengthen the fight against crimes affecting the financial interests of the European Union and promote effective cooperation between the EPPO and national authorities.

The PIF Directive requires participating member states to incorporate its provisions into their national laws to combat fraud against the EU's financial interests and ensure consistency in defining offenses, imposing penalties, and setting time limits for prosecution. It defines the crimes that fall within the mandate of the EPPO, including cross-border VAT fraud with damages of over EUR 10,000,000, fraud impacting the EU's financial interests, corruption likely to damage the EU's financial interests, misappropriation of EU funds or assets by a public official, and offenses related to money laundering and organized crime linked to the previous categories [6].

The challenges to effective cooperation in the EPPO's mandate cannot be ignored. It is important to recognize that differences in legal systems and varying levels of political will among member states can hinder the effectiveness of the EPPO's efforts. To address these challenges, it is necessary to continue to work towards improving the

coordination and cooperation between member states and the EPPO. This includes efforts to harmonize legal systems and establish clear communication channels between participating and non-participating member states. Additionally, increasing awareness of the EPPO's mandate and the importance of combating financial crimes can help to strengthen political will and support for the EPPO's work.

3.1 Cooperation with the European Public Prosecutor's Office other partners

The EPPO collaborates with various partners both inside and outside the European Union during its investigations and prosecutions. Authorities from both participating and non-participating EU Member States, as well as EU institutions, bodies, offices, and agencies, are among these partners. Working arrangements have been made with OLAF, Eurojust, Europol, the European Court of Auditors, the European Investment Bank, and the European Investment Fund, and an agreement has been reached with the European Commission [7]. As per Article 86 TFEU, the EPPO was required to be established by Eurojust, which necessitated a strong connection between the two organizations based on reciprocal collaboration and relied on its support in accordance with Article 100 of the EPPO regulation. Article 100 of the Regulation establishes a close relationship between the EPPO and Eurojust, allowing them to cooperate and develop operational, administrative, and management links. The European Chief Prosecutor and the President of Eurojust must meet regularly to discuss common concerns, as stated in the same article. The EPPO can also rely on the support and resources of the administration of Eurojust.

Article 101 establishes a cooperative relationship between the EPPO and OLAF, allowing them to share information and support each other in investigations while preventing OLAF from opening parallel administrative investigations into the same facts as the EPPO's criminal investigation. According to Article 102, the EPPO may seek relevant information kept by Europol about any offense within its jurisdiction, and Europol may give analytical help to an EPPO investigation. The cooperation established in Article 103 between the EPPO and the Commission aims to protect the financial interests of the Union by ensuring that relevant institutions, bodies, offices, or agencies of the Union have access to sufficient information from the EPPO to take appropriate measures without compromising the confidentiality of its investigations. This collaboration can help to increase the efficiency

and effectiveness of law enforcement efforts, leading to more successful investigations and prosecutions of criminal activities that span multiple Member States.

4. The European Public Prosecutor's Office and non-participating member states

Non-participating Member States' position regarding the EPPO is distinctive because, despite not being subject to the EPPO Regulation, they still have obligations under EU law. As EU member states, they have a duty to cooperate with EU institutions and agencies, including the EPPO, to ensure the effective functioning of the Union. The Treaty on European Union (TEU) Article 4 highlights the principle of sincere cooperation among the EU member states and the Union, where both parties are expected to assist each other in carrying out tasks that arise from the treaties. As per this article, the member states are required to take all necessary measures to fulfill the obligations that arise from the treaties or from the actions of the Union institutions. Additionally, member states must facilitate the achievement of the Union's tasks and avoid any actions that could undermine the attainment of the Union's objectives [16]. In relation to the EPPO and non-participating member states, this means that despite not being bound by the EPPO regulation, the non-participating states are still obliged to cooperate with the EPPO in carrying out its mandate under EU law.

Article 325 of the Treaty on the Functioning of the European Union (TFEU) states that both the European Union and its member states have the obligation to counter fraud and other illegal activities that could harm the financial interests of the Union. Measures to be taken in this regard should be such as to act as a deterrent and provide effective protection in all the institutions, bodies, offices, and agencies of the Union and the Member States. Moreover, the member states have the same obligation to counter fraud affecting the financial interests of the Union as they have to counter fraud affecting their own financial interests [17]. The establishment of enhanced cooperation in the European Union, as outlined in Article 328(1) TFEU, allows for the participation of all member states at any time, including in ongoing cooperation. While the Commission and participating member states of the EPPO should promote the involvement of as many EU member states as possible, the regulation is only binding and applicable to those who have agreed to enhanced cooperation on the establishment of the EPPO, or by a decision adopted in accordance with Article 331(1) TFEU. However, this

does not preclude non-member states from cooperating with the EPPO or participating in joint investigations if they have a vested interest in protecting the financial interests of the EU.

The non-participating member states are also expected to cooperate based on existing EU instruments, particularly the Convention on Mutual Assistance in Criminal Matters between the Member States of the European Union and the Convention on Mutual Assistance in Criminal Matters and the Framework Decision on the European Arrest Warrant. The first one provides a framework for cooperation between the member states in criminal matters, including the exchange of information and evidence, the execution of requests for assistance, and the transfer of proceedings [4]. The second instrument streamlines and simplifies the extradition process between EU Member States [4]. Both of these instruments are essential for the effective functioning of the EU's criminal justice system, and non-participating Member States have an obligation to cooperate with them.

Non-participating EU member states are expected to cooperate with the EPPO because the EPPO has the mandate to investigate and prosecute crimes affecting the financial interests of the European Union as a whole, even if they occur in non-participating member states. Therefore, cooperation from non-participating member states can be crucial for the EPPO to effectively carry out its mission. Those member states may still request the EPPO to investigate criminal conduct affecting the EU's financial interests, provided that the conduct is closely linked to criminal conduct affecting the financial interests of participating member states or that its cross-border dimension justifies the intervention of the EPPO, as stated in Article 105 of the EPPO Regulation. It is worth noting that while some non-participating EU member states may be criticized for not joining the EPPO, they may still cooperate with the EPPO on a case-by-case basis. Examples of such cooperation include sharing information, evidence, and other relevant material with the EPPO. It should be noted, however, that Article 105 is limited in its scope and does not provide for the full participation of non-participating EU Member States in the EPPO's activities. Non-participating Member States cannot attend meetings of the College of the EPPO, do not have voting rights in the EPPO's decision-making processes, and are not required to contribute to the EPPO's budget.

Currently, Hungary, Poland, and Sweden are the only EU Member States that have decided not to join the EPPO. Denmark and Ireland have

an opt-out from the area of freedom, security, and justice (AFSJ). This issue has been of great interest to different researchers. As Ormandy concluded in his study, these states may be on the way to disintegration [14]. In its article, Franssen highlights the legal issues and lack of legal certainty regarding future judicial cooperation between the EPPO and non-participating member states and suggests that a separate legal instrument or instruments may be necessary to address these issues [11]. After analyzing the relation between EPPO and non-participating EU member states, Becková suggests that the situation with Poland's refusal to cooperate with the EPPO highlights the need for a more robust legal framework to ensure effective cooperation between the EPPO and non-participating EU member states [1]. Even the European Chief Prosecutor, Kövesi, has raised concerns about the lack of cooperation from Ireland and other EU member states in relation to the EPPO [18]. This is because Ireland and some other member states have persistently refused to execute EPPO's requests for judicial cooperation, hindering EPPO's ability to obtain evidence and counter criminality affecting the Union budget. The concerns raised by legal scholars and the European Chief Prosecutor Kövesi highlight the need for a more robust legal framework and effective mechanisms for judicial cooperation between the EPPO and non-participating member states to ensure the EPPO's ability to counter criminality affecting the Union budget is not hindered.

5. Opportunities for Building Trust and Accountability

One opportunity for building trust and accountability through the EPPO is its ability to conduct independent investigations and prosecutions of crimes that affect the financial interests of the EU. By holding individuals and entities accountable for fraud and corruption, the EPPO can demonstrate its commitment to upholding the rule of law and protecting the interests of EU citizens. Since beginning operations on June 1, 2021, EPPO has received over 4,000 complaints of criminal activity from EU Member States and private parties, leading to the opening of 929 investigations as of June 2022 [7]. The fact that the EPPO has received over 4,000 complaints of criminal activity and has opened nearly 1,000 investigations within its first year of operation indicates that it is taking its role seriously and actively working to combat fraud and corruption that harms the EU's financial interests. This can help to establish the EPPO as a credible and effective institution in the eyes of EU member states and citizens, contributing to greater trust and accountability in the EU.

Another opportunity is the EPPO's cooperation with non-participating member states and non-EU member states (third countries). Article 104 of the EPPO Regulation establishes a legal framework for cooperation between the EPPO and non-EU countries. By working together to combat financial crimes, the EPPO and these states can build trust and foster a sense of shared responsibility for the protection of the EU's financial interests. For instance, in July 2022, the EPPO signed a working arrangement with Albania [19]. The agreement specifies the terms and conditions of cooperation between the European Public Prosecutor's Office (EPPO) and the Prosecutor's General Office (PGO) of Albania in relation to investigations and prosecutions involving offenses affecting the EU's financial interests. The agreement permits the exchange of information, evidence, and specialized expertise, in addition to joint investigations and prosecutions. It is worth noting that the EPPO has also signed working arrangements with other third countries, including North Macedonia, Georgia, etc., to strengthen cooperation in the fight against financial crimes. The positive aspect of these working arrangements is that they demonstrate a commitment to transparency, accountability, and mutual trust between the EPPO and these states, as well as a shared responsibility to protect the financial interests of the EU. By working together to investigate and prosecute financial crimes, the EPPO and these states are building trust and fostering a sense of collaboration that can lead to more effective and efficient law enforcement efforts across the EU. Furthermore, the willingness of non-EU countries such as Albania and Georgia to cooperate with the EPPO highlights their desire to align with EU values and potentially pave the way for future EU membership. Additionally, by working with non-EU countries, the EPPO can strengthen its reach and effectiveness in combating financial crimes beyond the borders of the EU, further enhancing its role in promoting accountability and upholding the rule of law.

Furthermore, the EPPO's focus on cross-border financial crimes highlights the interconnectedness of EU member states and the importance of collaboration in ensuring the integrity of the EU's financial system. This approach also promotes a culture of transparency and accountability, as it requires member states to be transparent about their financial activities and to cooperate with each other and with the EPPO in investigating and prosecuting financial crimes. This can ultimately contribute to building trust among member states and promoting a sense of shared responsibility for protecting the interests of EU citizens.

6. Conclusions

The European Public Prosecutor's Office has a critical role in upholding the rule of law and ensuring the integrity of the European Union's financial system. Through its mandate to investigate and prosecute crimes affecting the EU's financial interests and its cooperation efforts with non-participating member states and third countries, the EPPO contributes significantly to building trust and accountability in the EU. The EPPO can be an important tool in combating fraud, corruption, and other criminal activities that harm the financial interests of the European Union. By having a centralized prosecutor's office with the authority to investigate and prosecute such cases, the EPPO can help ensure consistency and efficiency in the prosecution of these crimes across EU member states. This can ultimately lead to greater accountability and deterrence, as well as protecting the financial resources of the EU and its citizens. By continuing to operate, the EPPO can help promote transparency, accountability, and the rule of law within the European Union. Additionally, by working with non-EU countries, the EPPO can strengthen its reach and effectiveness in combating financial crimes beyond the borders of the EU. Promoting transparency, accountability, and the rule of law are essential for ensuring good governance and protecting the interests of EU citizens.

The EPPO can play a crucial role in achieving these goals by investigating and prosecuting crimes that harm the Union's financial interests, and by holding accountable those responsible for such crimes. By doing so, the EPPO can help to strengthen trust in the EU institutions and foster a culture of integrity and compliance with the law. The effectiveness of the EPPO in achieving its objectives can be further explored, as can the challenges it may face in the future. Additionally, further research can be conducted on the impact of the EPPO on the relationship between EU member states and the Union as a whole. The EPPO has the potential to be a powerful tool in combating fraud and corruption, but it also faces challenges that require continued efforts to enhance cooperation and overcome legal and political obstacles. Ultimately, the success of the EPPO in promoting transparency, accountability, and the rule of law within the EU will depend on the commitment of member states to support its operations and uphold these values.

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GENERAL CHARACTERISTICS OF FAMILY LAW INSTITUTIONS OF GEORGIA

Summary

Georgian family law institutions are generally discussed in this paper. Only spouses from the legally registered marriage are incapable of producing non-property and property rights and obligations. Personal non-property rights determine choice of the spouse's place of residence, the choice of the surname, the issues of children's upbringing and their care. Also, in this paper we tried to define spouse's property relationship, which may be determined by law and also by a marriage contract. Legal Regime of spouses' individual and common property. The author's opinions and judicial practice are related to the subject of the study.

The spouse's matrimonial non-property and property rights and obligations are only arisen by llegal marriage (GC article 1106). Religious and customary marriages do not arise any legal consequences. Actual cohabitation of man and woman, without valid marriage, also does not generate non property and property obligation. Although we should mention that, they might be part of familial law, when they have certain duties and responsibilities toward their children.

The basic element of familial relationship is non–property relation, where as property relation has subordinate value.

Spouses have to bring up children, respect and help each other, express their care and love toward aged and disabled family members. These are obligations which define the contents of spouse's non-property relations.

Matrimonial non-property rights of spouse are the extension of their constitutional rights, which content does not change by marriage. Therefore it is prohibited for a spouse to another one, as well as for any person of civil law, to violate these rights.

Personal matrimonial non-property rights differ with personal matrimonial property rights in certain peculiarities. In particular, these legal relations do not have property, valuable nature. The main goals of these rights are equality, independence of spouses and implementation of non-material benefit in familial relations.

Personal matrimonial non-property rights (GC article 18), as a personal family rights are inviolable. In those relations, objects are some intangible things, such as dignity, pride, business reputation, choice of name and surname and etc. In all circumstances, main objects of these relations are the behavior of participants that satisfies their interest. Thus, I reckon that, in family law personal matrimonial non-property rights of family members are more specific than in general civil law relationships. (For instance: personal non-property rights of spouses are: choice of name, surname and residence).

At the time of marriage, spouses choose one of the spouses surname based on their will, or each of them retain their surnames, or combines his surname with wife's surname. Combining of surnames is prohibited if either spouse or one of them has a double surname. The surname chosen by spouses is recorded in act and marriage certificate. Spouses have the ability to choose surname before marriage registration. Further amendment to the surname is not allowed, because the right to choose a surname is given only once to marriageable person, at the moment of marriage registration. Further correction of the surname is only admissible on the general grounds envisaged by the legislation. Change of the surname by one of the spouse does not result the change of the name of the second spouse, since choosing surname is the spouse's personal right and can only done by his will.

A person chooses profession according to his interests and creative capability. Work must provide an individual with income and bring him spiritual and moral satisfaction. Because of that, spouses do not have any right to decide what profession his/her spouse should take. Citizen's rights to choose his/her profession, which is not prohibited by the law, is approved by Georgian Constitution articles 29–32 (24 August 1995). Based on this, spouses have the right to make decisions independently.

Specific characteristic of personal matrimonial non-property rights is that each spouse can choose the place of residence, which is also strengthened by Constitution of Georgia. Changing the place of residence by one of the spouse does not automatically obligates the another spouse to change his/her residence, i.e. the law does not obligate spouses to live together. These rights of spouses are closely linked to their personality. That is why we cannot force spouses to live together, but separately living can generate legal results. Separately living of spouses is one of the evidence of factious marriage.

Personal matrimonial non-property rights of spouses during solving family issues include all side of family life: Raising children, choosing a school, disposing of family budget, choosing a vacation spot, and more.

All family issues are drawn together according to the spouses' equality principle, which means taking into account wishes of both spouses during solving any family issue. The main thing is that one of the spouses does not solve the problem of family relationships against the will of the other spouse, which will cause a violation of the principle of equality of spouses.

The upbringing of children is a joint right and duty of parents. Every other person is obliged to abstain him/her from the violation of this right, except for special cases provided by law. Parents are obliged to raise their children physically, mentally and morally. All the issues related to the upbringing of children should be decided by the mutual agreement of the spouses in the interest of the child; it is also important to consider the child's opinion. I believe that if spouses have exercised their rights properly provided by law, at the same time, the fulfillment of the obligations will surely contribute to the upbringing healthy generation and strengthen family relationships.

Familial legislation beside matrimonial non-property rights also strengthens spouses' commitment to establish mutual respect in familial relationship promotes family welfare, takes care of children's well-being and development. This obligation is a moral imperative and not a legal norm. The lawmaker indicates preferred model of familial relationship, but does not provide any "sanctions" for their failure. However, abuse of personal rights and disrespect of family interests by one of the spouses, may cause marriage termination or reduction of his/her share from familial mutual property.

Content of personal matrimonial non-property rights, according to the participant of family relation are different. Matrimonial non-property rights and duties are different from those rights and obligations, which arise between parents and children, between brothers and sisters, among other relatives.

As I have mentioned above, only legal marriage provides not only personal but also property relations between spouses, which are specifically regulated unlike private relations by the Civil Code of Georgia. Property Relations — This is property-related relationships, but- it is not just a relationship between owners. Property relations are characteristic and are related to regulating the property relations

of spouses in family law, as well as regulating personal relationships, the rights of equality of spouses and builds mutual support. Property relations have a subordinate meaning in the family, but as far as the family has important functions, the issue of property relations between the spouses is a matter of legislative regulation.

Property relations between spouses are mainly related to legal regulation of property acquired after marriage, but field of matrimonial property relations of spouses does not ends here.

Family property relations are generally different from civil property relations with certain peculiarities, in particular, property relations between spouses arise from property, which belonged to each of spouse before marriage and was acquired during marriage, as well as payment of alimony by one of the spouse to another and etc.

The content of family property relations consists of the property rights and obligations of spouses, which are also the main content of family legal relations. Family property rights are divided into valuable interest and obligatory rights.

Spouses can have any valuable interest right toward each other which is regulated by civil code. At the same time, family legislation is completely regulated by the rightful right, such as the right of mutual property, which is the basis for the legitimacy of the spouses' property.

Spouses may also have individual ownership together with their shared property. Therefore, we can say that according to family legislation, spouses can have quite a variety of exclusive rights, especially well off couples.

Spouses, as any subjects of civil law, can conclude all kinds of property transactions permitted by law.

The norms of the Civil Code, which regulates the family property relations of the spouses, have been substantially modified compared to the earlier legislation. Specifically, the acting civil code enables the spouses to define the content of their property relations through the commitment of a marriage contract (contractual property relations of the spouses) or in favor of one of the spouses in the settlement of the payment of the payment. In the absence of an agreement on payment of a wedding contract or payment of the alimony, the relationship between spouses and their relationships will be covered by the imperative standards established by the Civil Code on the condition of the spouse's property or appropriate norms on the duties of spouses.

Existing legislation does not include an exhaustive list of the property that may be in mutual or individual (separated) ownership of spouses. Therefore, when analyzing the family-property relations of spouses, it is necessary to express the general criteria, on which one can decide whether the property should belong to the individual (separated) property of the spouses, and which are their mutual properties. I think it is necessary to establish the main purpose of the property, ways of its purchase and character.

The current legislation does not determine the legal status of the property which is gifted to spouses, but the courts have made a single position on the cases of this category, in particular if the property is given to one of the spouses, it is considered to be the individual property of that spouse.

In case of dispute the courts are guided by presumption, that the goods intended for the general use of the family and not only the satisfaction of the personal need of one of the spouses shall be considered as the gift for both spouses and co-ownership regime should extend on them.

Under the concept of property acquired during marriage is assumed property which is acquired during marriage by spouses, any property (real and moving) acquired during marriage is purchased by joint labor and funds of both spouses, which was purchased by joint work and funds of both spouses. In addition, the joint work of spouses in this case implies any socially beneficial and necessary work, which the spouses perform both in and outside of the family.

In legal literature it is always arguable; from what moment should the salaries and other monetary incomes be considered as common ownership of spouses. According to some authors, salary and other monetary incomes will be considered as a mutual property from the moment when the spouse got the right on it. In my opinion this view lacks reality. The right arising out of the wages is a personal right of liability, which can be implemented only by a spouse who worked for it. Until one of the spouses will not receive the salary, the other one does not have the right.

There is a different opinion, in which salaries and other monetary income will be considered as common property from the moment, when the spouses make their own income in the family budget.

I believe that this view is not relevant with the constitutional principle of family legislation, according to which the property acquired

during marriage by spouses is their common property. The common ownership between the spouses is a legitimate result of marriage and it is not depend on their wishes — whether to deposit a salary in the common-family budget.

I also do not agree the opinion which is spread in legal literature, that the spouse has the right to spend the salary (and other labor income) for the ongoing need and only the savings will be transferred on mutual ownership.

Spouses are disposing of their property, benefits and possessions by mutual agreement. None of them has the right to dispose it against the will of the other spouse. The spouse, who exercises the owner's authority within the common cohesion, implies that he/she acts with the consent of another spouse. Therefore, the third party does not need to accept the consent of the spouse to manage the property. Such consent comes from the spouses' relationships, which is based on the mutual respect of their spouses, their personal and property interests. In case of one of the spouses' disposal of the property, the presumption of the consent of the other spouse may not be true in the circumstances of the situation. In such a case, the spouse, the agreement was made without her/his consent cannot require annulment on the basis that: a) He/she does not know about agreement; b) He/she does not agree with the agreement. Based on the above, the spouse whose interests have been broken by the disposal of the common property is entitled to appeal to the Court to protect his/her rights and to claim the benefit received by the disposal of the property (GC article 1160).

According to Article 1167 of the Civil Code of Georgia, if the division of property is done during marriage, then the part of the property which has not been spitted and the property they acquire in the future will be considered as the spouses' common property unless otherwise provided by the wedding contract. This article points out that the dispute may exist not over the entire property acquired during the marriage, but only on the part of property which is divided between the spouses at the time of the dispute.

If the spouses cannot agree to split the common property, then the court, based on the application both spouses or one of them, will decide the dispute between spouses. To illustrate above mention I will bring court precedents, on September 5, 2013, the Parties made agreement about division the property acquired during the marriage. According to the agreement, the defendant had to pay 40 000 USD for the plaintiff.

Defendant paid 30 000 USD and should have paid 10 000 USD within 6 months after signing the agreement_ until 5 March 2014, which he had not paid, consequently, the plaintiff requested the defendant should pay money (see exact request, 09.07.2015 record of meeting Tbilisi City Court). According to the material contained in the case, the court has ordered to pay 10 000 US dollars in favor of the plaintiff.

In case, the division is linked to third party's right (for example, based on credit relationships), and then the dispute on division of property cannot be settled with the consideration of a divorce case. To withdraw the claim on dividing the deposit, which is attributed to one of the spouses, on the ground that the third person is claiming the deposit, it would not be relevant to the law. The same can be said about the transaction on under-aged children's deposit from spouse's common property, which belong to these children and cannot be taken into account when dividing the common property. In this case it does not matter which spouse input money in the bank account, the main thing is that it is transferred to the name of their children, only they have the right to request the money from the bank.

Spouse's common ownership is ceased after division of property. Each of them becomes the owner of the property, which was in co-ownership of spouse's property before splitting.

Each spouse has rights to claim a share in common ownership.

Thus, we can conclude that, in this paper it is generally discussed the content of non-property and property relation on the basis of marriage between ses.

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Section 4. Engineering sciences

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A COMPREHENSIVE EXAMINATION OF SOFTWARE VERIFICATION METHODS: COMBINING STATIC AND DYNAMIC APPROACHES

Abstract: The domain of software design and development confronts substantial impediments in efficaciously addressing the verification process. This investigation endeavors to devise a classification framework for software verification methodologies, facilitating the scrutiny of extant techniques and their corresponding merits and demerits within software applications. By examining and categorizing these methodologies, this research aspires to generate an exhaustive set of criteria and proposals for further progress in automated testing execution on cloud-based apparatuses. The article delves into three salient categories of software verification methods: empirical, formal, and dynamic, and expounds on their disparate degrees of automation, extending from manual to entirely automated approaches. Through this comprehensive assessment, the study aims to augment the continual refinement and optimization of software verification techniques in a progressively cloud-oriented computing.

Keywords: software verification, automation, cloud-based devices, software testing.

1. Introduction

In the realm of software design and development, the verification process remains a critical challenge. Verification methodologies are devised to identify errors, susceptibilities, improperly executed attributes and specifications, as well as to ascertain the conformity

of the final software product with the stipulated prerequisites. The development of a novel classification system for software verification methodologies is an imperative undertaking, as it enables the analysis of extant techniques and their software applications, in addition to discerning their merits and demerits. Investigating and categorizing these methodologies facilitates the formulation of a set of criteria and suggestions for subsequent exploration and enhancement of an automated testing execution approach on cloud-based devices.

Software verification methodologies can be broadly classified into three distinct categories: empirical, formal, and dynamic. Furthermore, with respect to the degree of automation, verification techniques may be characterized as either manual or automated.

2. Software verification

A primary objective of software validation is to ensure that the implemented code adheres to the terms of reference and fulfills functional requirements. This is achieved through the utilization of expertise, which facilitates the assessment of documentation and code for compliance with established norms and design standards, as well as software verification, which may encompass symbolic program execution and model checking methodologies. Formal verification relies on the mathematical representation of the program and does not necessitate its tangible implementation.

Symbolic execution is a technique that enables the emulation of a program's execution with symbolic input variable values. This is tantamount to executing the program on specific test values of input variables, yet it minimizes the requisite number of tests. The semantics of symbolic execution are delineated for a programming language in which data objects are symbolically represented and are defined by augmenting the language's fundamental constructs for interaction with symbolic values.

3. Software verification methods

A paramount phase in software verification involves ensuring that the software aligns with the stated quality attributes, such as correctness (conformity of the system to its intended purpose), security, resilience against indeterminate environmental fluctuations, efficiency in terms of time and memory resource utilization, adaptability to environmental alterations, as well as portability and compatibility.

This article examines merely a fraction of the numerous software verification methodologies, specifically: symbolic execution, model

validation, and dynamic and static verification techniques, which are currently deemed to be the most efficacious. Investigating the algorithms and operational principles of these methodologies may serve as a foundation for enhancing software testing procedures in cloud-based solutions.

4. Classification of software verification methods

Software verification methodologies are classified according to diverse criteria, including the level of automation, functional aptness, precision, types of errors detected, efficiency, scope, execution duration, and the approach to attaining the outcome. During software verification, the primary considerations are system stability in the event of non-deterministic environmental behavior and the effective utilization of time and memory resources.

Expertise stands as one of the most prevalent methods of software verification. This approach entails a software assessment conducted by a subject matter expert. The expert may either be the software product's creator or an external individual (or group of individuals) invited to provide an impartial evaluation of the software product's attributes.

Software expertise can be categorized as either general or specialized, with general expertise further subdivided into distinct types: technical expertise, end-to-end control, inspection, and audit. Technical expertise is directed toward verifying a software product's conformity with its specifications and standards. End-to-end control entails the analysis and evaluation of a program through a sequential examination of artifact characteristics by a group of experts who identify potential errors and vulnerabilities. Inspection involves an analysis where the detection of errors and vulnerabilities adheres to a well-defined plan. Lastly, an audit constitutes an analysis of a program executed by individuals who are not members of the project team.

Specialized software expertise encompasses several types. Organizational expertise is targeted at supervising the project's status by management personnel. Usability examination is conducted by the client and users to evaluate the developed software's user-friendliness. Security expertise is performed by information security professionals to gauge the security level of the software under development. Architecture property analysis focuses on appraising and categorizing software interaction scenarios with users, in addition to scrutinizing the properties of the software architecture.

The software examination method, conducted by qualified experts, is non-automatable and facilitates the resolution of a broad array of

tasks. It boasts high functional suitability and is applicable at any stage of project development. The accuracy of the examination hinges on the expertise of the specialists carrying it out and can detect up to 90% of errors and vulnerabilities. The completion time is contingent upon the software's intricacy and the expert team's experience. Conversely, formal verification methods rely on the scrutiny of the program's mathematical model rather than its source code, examining the practicability of specification requirements within the program model.

Formal software verification methods can be classified into several types based on the approach employed: deductive analysis, model verification, consistency checking, and abstract interpretation. Contrary to expertise, formal methods are amenable to automation but necessitate skilled specialists for constructing mathematical program models. Nonetheless, formal methods exhibit high functional suitability and accuracy, provided an appropriate formal model is devised. These methods can identify diverse error classes, such as undefined program behavior, uninitialized variables, format string errors, standard library usage errors, and others.

Formal software verification methodologies exhibit certain constraints in addressing software verification challenges, as constructing a comprehensive and suitable mathematical model is not always feasible. Nevertheless, these methods can prove efficacious in industrial projects when applied to testable domains that can be incorporated into a formal model. A range of techniques are employed for constructing mathematical models, including the Kripke structure and temporal logic, alongside model-based approaches such as finite state machines and Petri nets.

A primary advantage of the model verification methodology is its capacity for automating the processes of verification and model construction. The development of a formal model enables the representation of program code as logical expressions and facilitates the examination of program properties articulated in the form of a specification. Nonetheless, it is crucial to acknowledge that devising the most comprehensive and appropriate mathematical model necessitates the expertise of highly qualified professionals.

5. Static software analysis

Static program analysis constitutes an evaluation performed without the actual execution of the program, typically conducted on the basis of source code. Static analysis enables the examination of all

potential program execution paths, identifying errors and potential vulnerabilities. This method is frequently employed in conjunction with specialized automated tools. Two prominent groups of static verification methods are widely used: deductive program analysis methods and model verification methods. Deductive analysis techniques are utilized to substantiate a program's compliance with its specification, generally provided in the form of preconditions and postconditions. However, these tools are ill-suited for the analysis of large-scale programs, as they necessitate manual annotation of functions and loops within the program text. Model validation approaches involve the creation of a mathematical program model, typically employing a Kripke model, which is subsequently analyzed for adherence to established conditions and constraints.

In static verification, the program is scrutinized without actual execution, typically through parsing the program text and its internal representation. The generation of the internal representation transpires during the parsing process, preserving the program's original structure. Subsequent to the analysis, a control flow graph is constructed, enabling the examination of all potential program execution paths. The accuracy of the analysis is contingent upon the quality of the tools employed and the capacity to analyze the program's internal representation.

Moreover, static analysis can aid in pinpointing potential performance concerns, suboptimal resource utilization, flawed flow control, and specific security vulnerabilities, such as SQL injection and XSS attacks. Nevertheless, it is important to acknowledge that static analysis cannot ensure the total absence of errors within the program, as covering all conceivable execution paths may be unattainable. Furthermore, static analysis cannot supplant comprehensive program testing on real data, which can reveal errors associated with the program's interaction with the external environment.

Undoubtedly, static analysis-based verification is most impactful during the software design phase, as it facilitates the early detection of numerous errors and defects, substantially mitigating project costs and risks. Concurrently, automated verification tools employing static analysis cannot entirely supplant expert assessment and dynamic program testing, given their inability to account for all potential program execution scenarios and real-time component interactions. Consequently, static analysis utilization should be supplemented with alternative verification methodologies to attain optimal results.

6. Dynamic software verification methods

Dynamic software verification methods encompass the analysis of a program during actual execution. In simulation modeling, the program itself is not executed; rather, a program that simulates it is employed. Program inputs can provoke nondeterministic behavior, facilitating the detection of vulnerabilities and bugs. Dynamic analysis comprises several types, including testing, monitoring, simulation testing, and profiling.

Monitoring is an approach wherein the software's operation is observed, documented, and evaluated, with the capacity to procure data on program operation through instrumentation. Instrumentation can be executed in diverse manners, such as manual, compiler, binary-translation-based, runtime injection, or simulator monitoring. Monitoring techniques can be event-based or static. The most exhaustive method of dynamic analysis is testing.

Software testing methods fundamentally aim to identify nondeterministic, erroneous, or non-compliant program code behavior. Testing is typically conducted based on known, predefined scenarios, which involve monitoring and creating a controlled program execution environment. This permits experimentation with various test sets and documentation of the results obtained. The quality of testing is determined by explicitly defined testing objectives, comprehensive test coverage, and established criteria.

In contrast to static analysis, dynamic software verification methodologies are predicated on the actual program execution and can be automated. These methods facilitate the creation of a controlled environment for testing and monitoring, and identify various defects, encompassing temporal and quantitative software characteristics, such as execution time and resource usage. Dynamic analysis can uncover memory leaks, errors in multithreaded applications, and other faults that solely transpire during actual program execution. Nevertheless, the efficacy of dynamic verification approaches is directly contingent upon the quality and volume of input data. Dynamic verification techniques are typically employed in domains where response time, resource consumption, and reliability are paramount, including database servers and real-time systems.

7. Conclusion

Upon analyzing the classification of software verification methods, it can be inferred that examination methods, while unable to be automated,

enable the detection of numerous errors. Conversely, formal verification methods, albeit more time-consuming, possess the capacity to identify a vast array of errors and are readily automated. However, static methods no longer ensure comprehensive testing due to the employment of dynamically generated code, which is impervious to static method verification. Dynamic methods can only detect a specific set of errors, which precludes the guarantee of exhaustive testing.

Consequently, to effectuate efficient software testing, it is prudent to employ various verification techniques at distinct project stages. When utilizing static methods, it should be acknowledged that enhancing analysis accuracy results in heightened resource consumption. To improve static analysis accuracy, dependencies between variables in the program code can be identified. During the initial development stages, it is advisable to apply dynamic methods only if functional software components exist. Their implementation necessitates the establishment of a test or monitoring system to regulate program behavior. Generally, dynamic methods are more efficacious and contemporary, as they can detect a greater number of vulnerabilities.

The findings of this study will contribute to the development of a system for automating test launches on cloud devices.

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Section 5. Economics

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THE IMPACT OF CONSTANT MINIMUM WAGE INCREASE ON POVERTY REDUCTION IN DEVELOPING COUNTRY

Abstract

Poverty in Kazakhstan is understood as the state of the economic situation of an individual or an entire social group, in which they cannot satisfy a certain range of minimum needs necessary for life, preservation of working capacity, procreation. Currently, in our country, the poverty line is the level of the subsistence minimum. According to Kazakhstani legislation, the poor strata of the population who are entitled to receive social support include citizens who have an average per capita income below the subsistence level established in the corresponding subject of the Republic of Kazakhstan. In this article the effect of minimum wage regulation on poverty reduction in developing country is observed.

Keywords: poverty, poverty reduction, minimum wage, economy of developing countries.

The subsistence minimum is understood as the valuation of the consumer basket, which includes the minimum set of food, non-food products and services necessary to maintain human health and ensure its vital activity.

The consistent increase in the minimum wage is one of the important government initiatives in recent years. In May 2020, the minimum wage was brought up to the subsistence minimum for the able-bodied population. The paper gives estimates of the expected impact of the increase in the minimum wage on poverty, without taking into account possible negative consequences for employment. If the minimum wage rises to the subsistence level, only slightly more than

a quarter of all additional salary payments will go to poor households. At the same time, almost half of the recipients of such payments live in families with low incomes close to the poverty line. Greater poverty reduction can be achieved by setting the minimum wage in terms of regional living wages [1]. However, the main emphasis in overcoming poverty should be placed on targeted programs, according to which assistance is provided taking into account the income of households, and not the individual income of workers, as in the case of an increase in the minimum wage.

The need to raise the minimum wage is generally driven by a desire to improve the situation of low-paid workers and reduce poverty among workers and the general population. However, the relationship between the minimum wage and poverty is not so clear. An increase in the minimum wage sets in motion several processes at once that affect the incomes of the least skilled workers in different ways — the growth of their wages, the elimination of some jobs, their transfer to the informal sector, as well as rising prices due to increased costs of producers. As a result, minimum wage increases create both winners and losers, with the ultimate impact on poverty depending on which factor is stronger.

The introduction of a minimum wage and its subsequent increase is intended to protect the rights of low-paid workers and increase their income levels, which could help reduce poverty. Studies conducted in foreign countries show that the minimum wage does contribute to reducing inequality in the distribution of wages.

At the same time, numerous foreign studies indicate a weak link between the increase in the minimum wage and poverty reduction. Thus, a study of the impact of the minimum wage on poverty in the United States showed that an increase in the minimum wage contributes to the redistribution of income between low-income families, which in general does not reduce poverty, and may even contribute to its growth. One reason for the weak link between minimum wage increases and poverty is the poor labor force participation of the poor. One reason for the weak link between minimum wage increases and poverty is the poor labor force participation of the poor.

In addition, studies by foreign scientists indicate that the minimum wage is not an effective mechanism for reducing poverty, since the majority of low-skilled workers who benefit from its increase do not live in low-income families. A study examining the impact of the U.S. minimum wage increase found that only 11% of workers receiving

a minimum wage increase live in poor households, while 63% are second or third workers in nonpoor households. Households [2].

Another reason for the low impact of the minimum wage on poverty reduction may be its negative impact on the employment of low-skilled workers. Although the increase in the minimum wage increases the income of some low-skilled workers, the increase in unemployment among them, on the contrary, reduces the income of the households in which they live. At the same time, a number of studies have shown that there is no negative impact on employment or it is insignificant.

In response to an increase in the minimum wage, employers, in addition to the number of employees, can either reduce working hours or increase them to compensate for costs. In addition, a possible consequence of the increase in the minimum wage is an increase in consumer prices, which negatively affects the incomes of the poor in general [3].

Another aspect that needs to be taken into account when raising the minimum wage is the possibility of some workers moving into the informal sector. A similar effect has been noted in many studies conducted in developing countries. In the works of western researchers, it was shown that the increase in the minimum wage leads to a significant increase in unemployment among young people from 16 to 24 years old and a slight increase in overall unemployment. In addition, the increase in the minimum wage leads to an increase in the share of people employed in the informal sector due to the transition of workers from the formal sector to the informal one [4].

Russian studies also note that the increase in the minimum wage increases the unemployment rate, reduces inequality in the distribution of wages of low-paid workers in the private and public sectors, helps to reduce inter-sectoral and gender wage differentiation, and leads to some reduction in poverty, its depth and severity.

In Kazakhstan, the minimum wage is set at the state level and can be adjusted in accordance with the labor code of Kazakhstan, a special tripartite agreement between trade unions, employers' associations and executive authorities of the subject of the republic at the regional level. The size of the minimum wage in the region must not be lower than the minimum wage established at the republican level, and can be introduced for all workers employed in the territory of the given region, with the exception of employees of governmental institutions. The nationally established minimum wage applies to all full-time workers,

regardless of their socio-demographic characteristics. The definition of the minimum wage at the regional level allows for more flexibility in taking into account regional differences in price levels and quality of life.

As a rule, the regional minimum wage is set at the level of national importance, in some regions — as a share of the subsistence minimum for the able-bodied population or as a fixed amount. In the context of severe budget constraints, the regions began to set different minimum wage thresholds for employees in the public and non-budgetary sectors, which contributes to the growth of wage differentiation and can lead to a negative selection of specialists in the public sector. The intra-regional differentiation of the minimum wage and the frequency of its revision differ significantly by region.

Increasing the minimum wage is often perceived and declared as an effective means of combating poverty, however, as calculations by scientists in this field show, the level of poverty reacts poorly to the increase in the minimum wage. Among the main reasons are informal employment, as well as wage mismatch with the level of dependent burden on workers — many workers living in poor households are not low-paid, but their wages do not allow for an acceptable level of income for all household members.

Even a significant increase in the minimum wage, requiring large budget expenditures, will not significantly reduce poverty. A greater impact on poverty can be achieved by defining the minimum wage using regional values of the subsistence minimum. However, the main emphasis in overcoming poverty should be placed on targeted programs in which assistance is provided taking into account the income of specific households, and not the individual income of workers, as in the case of an increase in the minimum wage [5].

Currently, the main causes of poverty in the rural population of Kazakhstan are a deep crisis in all sectors, including the agro-industrial complex, as well as the absence of any effective measures that would help reduce the social consequences of many reforms. In addition, most villagers still have limited access to credit, to the services of market infrastructure enterprises, to information, and so on. Thus, as noted in most modern programs and concepts, the creation of conditions for the sustainable development of rural areas is one of the most important goals of social policy, which ensures the effective use of the existing potential of the country's economy.

For the real movement of our society towards a social market state, minimum state guarantees for the normal reproduction of the population and labor force are necessary. In our opinion, such a "set of guarantees" should include not only a living wage, minimum wage, minimum pensions, allowances and scholarships, but also a minimum program of medical and educational services, as well as a minimum level of housing provision [6].

In all countries pursuing a poverty reduction policy, uniform principles for establishing a living wage are applied, as defined by ILO Convention No. 117 (Art. 5, Part 2) and ILO Convention No. 82 (Art. 9, Part 2): attention to such basic needs of working families as food, their energy content, housing, clothing, medical care and education.

The subsistence minimum is a real tool of social policy, which makes it possible to sufficiently reliably estimate the size of the population in need of urgent special forms of social support. The latter, to the most acute extent, is characteristic of the population of rural areas in connection with large-scale negative trends in the dynamics of the socio-economic development of the village.

The level of wages is one of the main factors in shaping the level of income in the countryside. The level of wages in agriculture does not exceed 40% of the level of wages in the economy as a whole. Moreover, during the study period, there is a tendency to increase this gap. The incomes of rural residents include not only wages, but in-kind income from personal subsidiary plots. Over the past six years, the disposable resources of rural households have grown at faster rates than urban ones, and extreme poverty, characterized by the proportion of the population with disposable incomes that are 2 or more times lower than the subsistence minimum, has been decreasing at the same rate [7].

Therefore, in order to increase the efficiency of work to create conditions for a decent standard of living for the population of Kazakhstan as a whole, including the rural population, it is important to determine and regulate the values of the "optimal set of guarantees" for the population. One of these areas is the determination of the minimum industry standard for remuneration of employees of agricultural organizations. At the same time, an addition to the employee's budget for the maintenance of dependents (children, pensioners and the unemployed) with cash incomes below the subsistence minimum should be taken into account.

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