

ISBN  
978-86-86355-42-3

Plenary  
Lectures

Quality  
Engineering

Reliability  
Engineering

Industrial  
Engineering

Systems  
Engineering

Military  
Engineering

Lean  
Production



Editor  
Ljubisa Papic

11th DQM INTERNATIONAL CONFERENCE

## LIFE CYCLE ENGINEERING AND MANAGEMENT ICDQM-2020

Prijedor, SERBIA, 25-26 June 2020

**Proceedings**

„Nemawashi“

根回し

Ne = „Korenje“ Mawashi = Kretanje u krug

Research

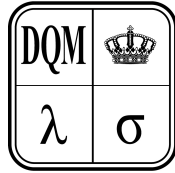
Education

Application



National award for business excellence  
of Serbia - "Quality Oscar" in 2012. year,  
in category small and medium  
organizations, for range Leadership  
obtained DQM Research Center, Prijedor.

11th DQM INTERNATIONAL CONFERENCE



**11th DQM International Conference**

**ICDQM-2020**

**LIFE CYCLE ENGINEERING AND MANAGEMENT**

**PROCEEDINGS**

**June 25-26, 2020, Prijevor, Serbia**

**Conference Topics:**

Plenary Lectures  
Quality Engineering  
Reliability Engineering  
Industrial Engineering  
Systems Engineering  
Military Engineering  
Lean Production

**Editor:**  
**Ljubisa Papic**

**The Research Center of Dependability and Quality Management**  
**DQM**  
**Prijevor, 2020**

**ICDQM-2020, Proceedings**

**ISBN 978-86-86355-42-3**

**LIFE CYCLE ENGINEERING AND MANAGEMENT, 2020**

- Plenary Lectures
- Quality Engineering
- Reliability Engineering
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- Lean Production

Editor-in-Chief: Professor Ljubisa Papic

Publisher: DQM Research Center - Prijevor, P. O. Box 132, 32102 Cacak

Printer: Graphical Enterprise NBSgraf, Ive Lole Ribara 20, 32300 G. Milanovac

Printing: 100 copies

**Prijevor, 2020.**

CIP - Каталогизација у публикацији  
Народна библиотека Србије, Београд

005.6(082)  
62(082)

**INTERNATIONAL Conference Life Cycle Engineering and Management (11 ; 2020 ; Prijevor)**

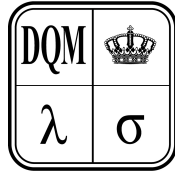
Proceedings / 11th DQM International Conference Life Cycle Engineering and Management ICDQM-2020, June 25-26, 2020, Prijevor, Serbia ; [organizer] Research Center of Dependability and Quality Management DQM ; editor Ljubisa Papic. - Čačak : Research Center of Dependability and Quality Management DQM, 2020 (G. Milanovac : Graphical Enterprise NBSgraf). - XVI, 337 str. : ilustr. ; 24 cm

Radovi na engl. i rus. jeziku. - Tiraž 100. - Str. IV-V: Preface / Ljubisa Papic. - Ljubisa Papic: str. 337. - Napomene i bibliografske reference uz tekst. - Bibliografija uz svaki rad. - Sadržaj s nasl. str.: Plenary Lectures ; Quality Engineering ; Reliability Engineering ; Industrial Engineering ; Systems Engineering ; Military Engineering ; Lean Production.

ISBN 978-86-86355-42-3

а) Инжењерство -- Зборници б) Управљање квалитетом -- Зборници

COBISS.SR-ID 19256329



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## **PREFACE**

Organizing an ambient for life cycle engineering and management should provide a delivery of effective systems, i.e. systems with minimal amount of failures during work and minimal life cycle cost. To achieve that it is necessary to integrate disciplines such as: functionability, reliability, safety, maintainability, logistic support etc. into the overall design process. Thereby, the main effort should be directed toward developing methods and tools that should be able to help designers while making decisions about investing in resources necessary for manufacturing, exploitation, maintenance and retirement of systems. Therefore, the main engineering and management life cycle principle is integrating all stages of requirements specifications and design until retirement of the system.

Therm "life cycle engineering and management" originates from attempting to develop integrated point of view on different stages of the system life cycle. Life cycle engineering and management can cover: quality engineering, reliability engineering, maintenance engineering, safety engineering, human factor engineering, lean production etc.

As life cycle engineering and management appeared in recent years the entire philosophy in research field and exploitation of the system has changed. Now the effective systems are no longer considered to be the ones that are effectively performing their objective function but the systems whose life cycle retires safely. This is due to the fact that the profit realized using the system can be measured only after it's life cycle is over.

Philosophy of life cycle engineering and management implies integrated approach i.e. team work of everyone: designers, manufacturers, customers and maintainers of the system. The latest knowledges acquired in the last decades indicate that required degree of the system competitiveness is not possible to obtain by undertaking efforts mainly after their manufacturing and getting into the stage of usage, which is usually done. It is much more important for engineers and managers to be able to perceive the consequences of potential errors that could occur during different early stages of specification, design and developing of the system. It means that engineers and managers should be capable to assume responsibility for the system life cycle engineering and management.

Research Center of Dependability and Quality Management (The DQM Research Center) is organizing multidisciplinary annual event, 11th International Conference on Life Cycle Engineering and Management (ICDQM-2020), during 25-26. June 2020, in the DQM Research Center, willage Prijevor, Serbia. The DQM conference ICDQM-2020 presenting new research, developments and applications of topics such as: quality engineering, reliability engineering, industrial engineering, systems engineering, military engineering, energy efficiency and lean production.

It is with great pleasure that the Research Center of Dependability and Quality Management (The DQM Research Center) welcome to you to the 11th DQM International Conference on Life Cycle Engineering and Management (ICDQM-2020). This DQM international conference are organizing The DQM Research Center and International Scientific Program Committee ICDQM-2020. Conference is regarded world-wide as the ranking conference in the promotion of scientific research, continuous education and industrial applications.

We expect that the DQM Conference will serve as a forum for researchers, academics and industrialists. Discussion will take place on the many and varied topics of the 42 papers which will be presented by delegates from 11 countries (Russia, Austria, Bosnia and Herzegovina, Chile, Germany, USA, India, Spain, Columbia, Iraq, Serbia) during the two days of the DQM Conference.

The following areas were addressed by the speakers at the DQM conference and reflect the broad range of accessible international expertise in the areas:

- Plenary Lectures,
- Quality Engineering,
- Reliability Engineering,
- Industrial Engineering,
- Systems Engineering,
- Military Engineering,
- Lean Production.

The quality of papers reviewed by international reviewers, and accepted for presentation and publication in this volume of the proceedings achieved a very high standard.

This DQM Conference would not have possible without the efforts of the secretarial staff in the DQM Research Center. The staff are thanked for their assistance and encouragement in preparing for this event.

We wish to thank all the authors for their contribution and efforts, which made the DQM conference possible. Their commitment and enthusiasm was the driving force behind the DQM event.

**Professor Ljubisa Papic**  
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## POLYCENTRIC GOVERNANCE OF THE COMPLEX SYSTEM FOR COMBATING HUMAN TRAFFICKING IN EUROPE

Andjelija Djukic

University of Belgrade, Faculty of Security Studies, Belgrade, Serbia

**Summary:** *Polycentricity is a concept that in science describes a complex form of governance with multiple governance centers that make decisions semi-autonomous and where a high degree of coordination and overlap of policies is needed. Polycentric governance systems are purposefully projected or became by the transformation of monocentric systems, as in the case of the European mechanism for combating human trafficking. The paper presents the results sublimation of the system analysis of the mechanism as a complex system with elements of polycentric governance. Governance is a combination of autonomous behavior and flexible interrelationships of governing components. Despite insufficient coordination, the efficient operation of the mechanism is ensured by the unity of objectives and overlapping policies of the governing units and by the development of national mechanisms.*

**Key words:** *Combating human trafficking, European mechanism, polycentric governance, multidisciplinary, synergy effect.*

**Note:** *Authos is Ph.D. student; Scholarship holder of the Ministry of Education, Science and Technological Development of the Republic of Serbia.*

### 1. INTRODUCTION

Human trafficking (HT) is a complex and dynamic social phenomenon that presents a problem for most countries, whether as countries of origin, transit, or destination of the victims. The complexity of the phenomenon originates from the interactions of supply and demand, the unity of the selection and recruitment process, transport and various forms of exploitation of victims, and the conditionality of social, economic, and cultural factors.

During the 1990s, broad initiatives to combat HT were intensified at the global and regional levels, and the complexity of the phenomenon required an adequate multidisciplinary community response in combating human trafficking (CHT) based on the dialectical unity of theory and practice. This led to states' cooperation and the adoption of *The Protocol to Prevent, Suppress and Punish Trafficking in Persons, Especially Women and Children* (2000) (UN Protocol), as a



supplementary protocol to *The United Nations Convention against Transnational Organized Crime* (UN Convention). On the territory of Europe, on the basis of *The Council of Europe Convention on Action against Trafficking in Human Beings* (Convention CoE) from 2005, a unique monocentric system was built - the European Mechanism for CHT (EM/Mechanism), which includes all European countries other than Russia (47 states, of which 27 EU members). The later brought *Directive EU on preventing and combating trafficking in human beings and protecting its victims* (2011) (Directive EU), was a parallel instrument which, as a "hard law", was binding for the EU members and countries in the accession process. As a third governing center, by forming special bodies and strengthening activities for CHT, the OSCE exists. Although designed as a monocentric system with hierarchical relationships of CoE bodies as governing components and national mechanisms (NMs) as functional components, the mechanism has recently taken on the characteristics of a complex system with polycentric governance.

General system theory, system approach as a methodological approach to scientific research and system analysis as a methodological procedure, provides a good starting point for critical scanning of existing and design of new systems for CHT. This paper presents a sublimation of the findings of EM system analysis at the present time, with a focus on the characteristics derived from the polycentric governing of the mechanism as a complex system.

## 2. HUMAN TRAFFICKING

Human trafficking is a global phenomenon that, in each individual case, includes several criminal acts with brutal violations of human rights. The international and widely accepted definition of HT is given in the UN Protocol (art. 3) and it characterizes HT as a complete process that takes place through three phases (components): a) *action*: recruitment, transportation, transfer, harbouring or receipt of persons; b) *means*: threat or use of force or other forms of coercion, abduction, fraud, deception, abuse of power or position of vulnerability or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person; c) *purpose - exploitation*, which at a minimum includes: exploitation of the prostitution of others or other forms of sexual exploitation, forced labour or services, slavery or practices similar to slavery, servitude or the removal of organs (within national frameworks, forms of exploitation may be extended in accordance with actual needs). HT is also considered to be any *action* even if there is the consent of the victim to the intended exploitation, if any of the stated *means* have been used. The crime of HT exists when at least one element of each component is present.

In addition to the complexity of the phenomenon itself - HT as a criminal activity, in a broader context and related to CHT, the complexity is influenced by the interactions of a large number of law enforcement authorities, governmental and non-governmental organizations and agencies, social institutions, private sector, and other actors. At the local or regional levels, with great simplifications,

HT can be seen as a complex system; due to a large number of actors and the very complex nonlinear interactions between them, this is almost impossible on a global scale. The interaction's nonlinearity is a consequence of multidirectional cause-and-effect links and relationships of system components; it is manifested through the asymmetry of inputs and outputs that occurs due to the accidental causes and unpredictable consequences in all phases of the HT process. The disproportion of inputs and outputs in any system that deals with CHT also originate from insufficient knowledge of this phenomenon, because each case is special, and the general law is difficult to determine, especially for a wider geographical area.

### **3. EUROPEAN MECHANISM AS A COMPLEX SYSTEM**

Based on available documents of the CoE, EU, OSCE, and other institutions and scholar's works in this field, EM is considered as a complex, open, dynamic, and stochastic organizational system, in which, as components, all European countries (except Russia) are implemented. The aim of the analysis is to consider the mechanism as a whole through: goals, structure, environment, and functioning.

The overall goal (objective, purpose) of the Mechanism is the adoption and implementation of multidisciplinary measures, activities, and procedures related to HT, in the domain of criminal law, active prevention, assistance to victims and their protection, with an emphasis on international cooperation in this area. In the presence of several relevant goals, adopted principles and norms for CHT, efforts were made to ensure a balanced relation between the criminalization, the efficiency of investigations and protection of human rights, which is a holistic approach to solving the problem. The subsystem of objectives is projected for states and NMs as functional components and bearers of primary activities, in order to achieve harmonization of national legislations and strengthening of states and other institutions for CHT as elements of NMs, and thus a synergy effect of the mechanism's functioning.

The mechanism's structure can't be considered as a system with one control center (CoE bodies) and in accordance with the CoE Convention, because the reality is that the mechanism was also built according to the EU Directive and OSCE recommendations. The structure of the mechanism (figure 1) consists of CoE, EU and OSCE bodies as mostly governing components, NMs as basic functional components, civil society organizations and the private sector and their links and relations, as well as norms, rules and restrictions on which components perform their functions.

The greatest effects are expected from the measures and activities of the NMs as the basic factors for the realization of the projected mission and their joint action, because most systems achieve results horizontally - cross-functionally, and not hierarchically. NMs are built mainly as monocentric systems with an extensive network of state institutions, non-governmental organizations, and other entities. The level of NMs development varies in individual countries, depending on economic development, the level of organization of the judicial and police

apparatus, social protection, participation of non-governmental organizations and private sector, attitudes towards human rights, and others.

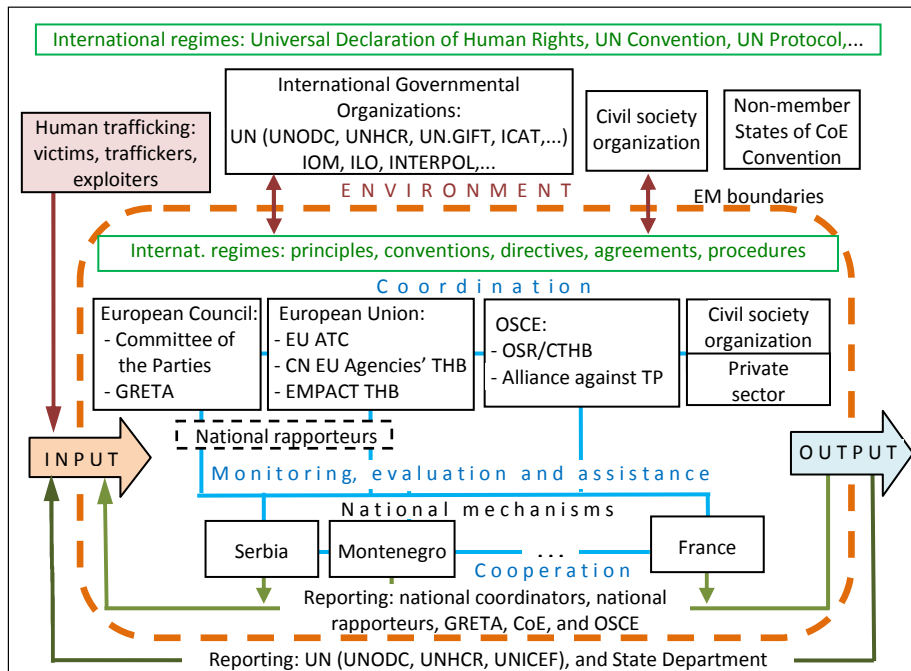


Figure 1. European mechanism for CHT as a system<sup>1</sup>

Defining the EM's environment and its borders, as a complex task of analysis of the system, was executed in relation to the *objective* (countries outside Europe) and *enacted* environment (international regimes and institutions important for CHT). The objective environment is characterized by a different scope of HT and diverse policies and systems for CHT in non-European countries, which significantly affects the burden of the mechanism due to the increased influx of victims. The boundaries of polycentric governance coincide in functional terms and

<sup>1</sup> Abbreviations used:

UN.GIFT - UN Global Initiative to Fight Human Trafficking;

ICAT - The Inter-Agency Coordination Group against Trafficking in Person;

GRETA - Group of Experts on Action against Trafficking in Human Beings;

EU ATC – EU Anti-Trafficking Coordinator;

CN EU Agencies THB - Coordination Network of the EU Agencies' contact points on trafficking in human beings;

EMPACT THB - European Multidisciplinary Platform Against Criminal Threats – Trafficking in Human Beings;

OSR/CTHB - Office of the Special Representative and Co-ordinator for Combating Trafficking in Human Beings;

Alliance against TP - Alliance against Trafficking in Persons.

in relation to the NMs with the established boundaries of the Mechanism, but the influence of the CoE, EU and OSCE bodies, as well as individual European countries, is wider than the boundaries of the Mechanism. The impact is directed at strengthening state institutions for CHT outside Europe (professional assistance and funding), primarily in the countries of origin or transit of a large number of victims coming to Europe. In this way, the goals that are projected for realization outside the mechanism are achieved, which indirectly affects the realization of the basic mission and CHT in Europe.

In defining the EM environment, HT processes are the only reason for its existence, but the mechanism does not have control over the processes and different HT systems, which means that HT mostly belongs to the mechanism's environment. In part, HT is part of a mechanism through identified actual or potential victims whose assistance and protection are given, and identified traffickers controlled by police or judicial authorities. Therefore, HT mainly represents the input into the mechanism in the form of information on HT flows or identified victims and traffickers.

The European mechanism is a complex organizational system because it has all the essential features that determine complex systems [1,2,3]:

a) The structure consists of a large number of components and elements, from coordinators at the top of the mechanism to individuals in local teams, interconnected by interactions, often more important than the components attributes themselves, such as accessing and using the information or working in joint teams within EMPACT THB.

b) A large number of interactions between components and with the environment that has a nonlinear character and reflects the disproportionate relation of inputs and outputs in the mechanism. The nonlinearity of interactions originate from the nature and dynamics of the HT process, the ability of the mechanism to adequately respond to challenges, different characteristics of components (development of NMs, many non-governmental organizations, bilateral and multilateral state agreements) and various stakeholders in the environment, feminist movements, international institutions for human rights, labor, crime, migration, child protection, the private sector), which indicates the openness of the mechanism.

c) At all levels of the mechanism, there is the feedback that represents modified information about the processes and the achieved effects obtained at the output. The results of the mechanism's functioning, as an output of the system, can assess the effectiveness and efficiency of EM and NMs based on indicators of financial and human resources, identified and cared victims, the importance of interrupted HT flows, identified and sanctioned traffickers, etc. Monitoring and evaluation of the NMs by GRETA, the EU, and the State Department affects their development, and the consequences for countries can be positive in the form of financial and other assistance or negative in the form of diplomatic or financial sanctions.

d) The mechanism has a history, from the development of international conventions and the activities of associations of European states to the abolition of slavery in the 20th century. Changes in the structure, quality of components and interactions within or with the mechanism's environment are caused by globalization processes, overall international relations, increasing scope and change of methods and techniques of HT, expansion of migrants towards Europe, expansion and abolition of EU inter-state borders, which indicates the adaptive features of the mechanism.

The complexity of the mechanism also derives from the complexity of the regime which is a consequence of the expansion of international instruments, organizations, and institutions in the field of CHT [4: 3-4]. The impact of complex regimes on the actors of the mechanism depends not only on their overlap, but also on the intersection with the national strategies of the states. European countries are signatories to the UN Protocol, which is where their obligations in CHT come from, but they are complemented by obligations under regional regimes. In the European area, two basic regimes have emerged (CoE Convention and EU Directive) that largely overlap in a comprehensive approach and range of necessary measures and activities, which in terms of coordination and cooperation can bring positive effects. The EU directive stipulates that coordination between international organizations for CHT should be "supported", with the aim of avoiding "duplicated efforts", which primarily refers to organizations involved in the implementation of measures from the UN Protocol and the CoE Convention. This position of the EU reflects the need for "support", but not close coordination of work on joint strategies, which is an extension of the policy of EU bodies not to accede to the CoE Convention as a union, but only for member states to do so. The overlapping of interests in the field of HT has led to the creation of various international regimes that link HT to migration, human rights, gender equality, the rights of the child, or organ removal.

#### **4. POLYCENTRIC GOVERNANCE OF AN MECHANISM**

Polycentric governance systems have been researched in an interdisciplinary context, mostly in studies on public administration and governance of natural resources [5: 2]; they consist of several formally independent autonomous units that take into account other units when making decisions and decide through the processes of cooperation, competition, conflict and conflict resolution [6,7]. The autonomy of governing units implies that they act independently and without centralized coordination. The concept of polycentric governance can be understood by comparison with monocentric governance: a monocentric system of the ideal type is one that controls a central dominant authority (state body or private monopoly), while a polycentric system is characterized by multiple governance authorities that are not in hierarchical relations. Monocentrism and polycentrism are extremes, in practice many systems exist in a continuum between them [8: 3].

Polycentric governance is characterized by a set of multiple institutions that overlap by the membership and regulatory area [9: 7]. EM was not projected as a system with polycentric governance, yet it became over time. If the CoE, the EU and the OSCE are set up as governing units, according to their influence can be formed two unequal sets of states. Under the influence and control of the EC and the OSCE is a set of all European states (NMs), and a subset of this set consists of EU members and countries in the accession process, which are additionally controlled by EU bodies. For most countries, governing is manifested through the parallel interactions of all three governing units. From the glance of Serbia, it means that its NM is exposed to monitoring and evaluation of the CoE, EU, and OSCE, and additionally, the State Department. In the Action Plan<sup>2</sup> for the implementation of the Strategy for CHT are stated data from the reports of the EU, GRETA and the State Department as initial and target values and a source of verification of objectives, while the individual significance and priority of these reports have not been determined.

The efficiency of complex governance, when there is an overlap of strategies and intergovernmental institutions in one area, depends on the cooperation of governance institutions [9: 3]. The efficiency of polycentric governance, when the functional components are the same - NMs, depends on the degree of overlap of principles and policies of institutions for CHT, coordination of activities and cooperation, as well as the harmonization of relations between functional components. The CHT policies of the governing units, as a set of uniform and standard decisions, guidelines, principles, and recommendations directed on CHT, reflect the great overlap as a consequence of the adoption of the UN Protocol as a starting legal instrument for elaborating regional documents.

The degree of cooperation and coordination of EC, EU and OSCE bodies is evident from the reports<sup>3</sup> of these institutions for 2018, according to which cooperation between the CoE (GRETA) and the OSCE is mainly based on participations in conferences and other events organized by one of these institutions, co-ordination of visit plans to countries and data collection on the functioning of the NMs. Cooperation between GRETA and EU bodies is based only on individual exchanges of experiences and opinions on some current topics, such as the structures of organized criminal groups or the role of civil society actors in CHT. Such individual events do not represent the cooperation necessary for the efficient governance of EM, having in mind the scope of HT and the new methods and technologies applied by traffickers. No report, for example, mentions

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<sup>2</sup> The Government of the Republic of Serbia (2019). Action Plan for the implementation of the Strategy to Prevent and Suppress Human Trafficking, Especially Trafficking in Women and Children and Victims Protection for 2019 and 2020.

<sup>3</sup> CoE. (2019). 8th General Report on GRETA-s Activities. Strasbourg: Council of Europe; EC. (2018). Second report on the progress made in the fight against THB. Brussels: European Commission; OSCE. (2019). 2018-19 Report of the Special Representative and Co-ordinator for Combating THB. Vienna: OSCE.

the joint work of expert teams or other activities in improving strategies and policies for CHT, or the impact of a complex governance mechanism on the NMs. The policies and strategies of governing units, with a multidisciplinary approach in CHT, have a high degree of overlap, which largely eliminates the negative consequences of polycentric governance of the mechanism. The absence of a clear institutional leader directs the structure of the mechanism beyond the required integrations, as none of the governing units can claim to possess a core of governance and accountability. This leads to a re-examination of the obligations of states, primarily member states and states in the EU accession process, to redirect their interests towards the EU, which may limit compliance with the accepted rules under the CoE Convention and OSCE.

## **5. CONCLUSION**

The CoE Convention and the later brought EU Directive adopted an integrated and holistic approach in CHT, as a basis for harmonizing national legislations and building more uniform NMs. From the aspect of general system theory, it can be concluded that a set of conventions, directives, agreements, protocols and procedures, existing European entities and national bodies for CHT and their relations, represent a unique and complex organizational system. Through a unique policy for CHT, the Mechanism has strengthened capacity and increased the quality of NMs, observed separately. By integrating NMs into a unique EM, their more homogeneous functioning and more harmonized functioning are ensured, a new quality of components is created and the preconditions are fulfilled so that the Mechanism can achieve greater effects.

The existence of three governing units in the mechanism (CoE, EU, OSCE) makes it a complex organizational system with polycentric governance and requires better coordination of policies and activities between them, especially due to the lack of a unique coordinating body. From the aspect of the NMs, due to monitoring, evaluation and obligations towards several governing entities, the interactions of the NMs with governing units are complicated for all European countries, less for members and more for non-members and candidates for EU accession, such as the Republic of Serbia. For the successful functioning of the mechanism and in the absence of the required level of coordination of governing units, their relationship must be directed at expanding cooperation and building a common representative strategy, norms, rules, roles and decision-making principles. However, the unity of the objectives of the NMs and the governing units of the EM reduces the negative impacts on the overall execution of the projected missions of the NMs. Strengthening the EU institutions gives a new quality in CHT and strengthens interactions with the member states and candidate countries, thus imposing the EU institutions as a potential dominant component of the Mechanism. The functioning of the mechanism, despite the elements of polycentric governance, is characterized by harmonization of principles and strategies in CHT, harmonization of national legal systems, and state actions, by which the synergy effect is achieved.

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