Poliheuristic Foreign Policy Analysis under Uncertainty of Gilpinean Hegemony an Neoliberal Hobbesian Anarchy of Cyberpolitics

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Abstract: The research aims to present a variant of the interaction between states that has the international hegemonic characteristics of the Gilpinean type as well as the characteristics of the anarcho-cybernetic interaction with Hobbesian and neoliberal features. The purpose of this article is to present through the concept of uncertainty the way in which the foreign policy decision maker can make a decision that can be favored or suppressed by the cyber anarchy that characterizes the Internet through the interactions between state or non-state actors. This cyber anarchy is considered one of the Hobbesian and neoliberal type to be consistent with the classical theory of international relations. This online political environment characterized by a Hobbesian and neoliberal cyber anarchy we will call cyberpolitics and we will try through four levels of analysis, four levels of uncertainty and three paradigms of international relations (the hegemonic war - the Hobbesian anarchy of neoliberal-the paradigm of poliheuristic foreign policy) to propose a way of analyzing the behavior of the state subject to cyber constraints or opportunities in foreign policy. The research will present the way of integrating the elements mentioned above in the foreign policy paradigm as a tool open to the analysis of predictive intelligence in the theory of international relations or cyber intelligence. The conclusions reached by the study are that the way of studying the hegemonic expansion of states that are subject to cyber-type constraints or opportunities can be extended to other areas of international relations.
Keywords: Cyberpolitics, Cyberwarfare, Cyber threat intelligence, LAMP, Predictive intelligence.

INTRODUCTION

The research aims to provide a unified framework for analyzing the uncertainty of the political decision induced by cyberwarfare (which includes only state actors in already declared or war actions) and the cyber threat (which includes the state actors and non-state ones and does not include pre-declared war actions).

The approach calls for the treatment of relations between states through the paradigm of the war of hegemony of Robert Gilpin (Gilpin, 1983) and the approach of relations between state and non-state actors through the political sphere of the Internet called cyberpolitics (Choucri, 2012) as an anarchic domain of type Hobbesian specific to the neoliberal analysis of international relations (Nye, 2016). Thus the foreign policy option becomes a variable depending on the political decision-maker (person, group or coalition of groups), on the political experience of that state which includes the previous results of internal and international politics, respectively, on the additional opportunities or constraints offered by the state or non-state actors through cyberpolitics.

This article intends to adopt the idea proposed by Steven Lamy (Lamy, 2017) of four levels of analysis but adapted to the specificity of this research. The four levels of analysis

include: the decision-maker at the individual level, the domestic level expressed by the experience of the previous results of foreign and internal policy on its tangible and intangible factors, the system level that treats the results of the foreign policy of the states and the fourth level, which it encompasses the interactions between state and non-state actors and analyzes the opportunities or constraints that states have in foreign policy by circumventing the concepts of national border or sovereignty. Thus in Table 1 below are described the elements that each level of analysis will focus on and the type of variable kept in sight.

Table 1. Variables and Levels of Analysis

Level of Analysis	Foreign Policy Focus	Variable
Individual	Behavior Options/Decisions	*Dependent*
Domestic	Domestic Outcomes	Independent
System	Foreign Outcomes	Independent
Global - Cyberpolitics in this research only	Cyber constraints and opportunities	Independent

The individual level will analyze the psychological variables of which the option or the choice of the behavior of foreign policy is the dependent variable, the domestic level will analyze the implications of the precedents the result of internal or foreign policy on the characteristics of the state such as the military arsenal of conventional or unconventional type, the type of the political system, economy, civil society, political or strategic culture, demography, bureaucracy, interest groups, etc.

These tangible or intangible factors can provide constraints or opportunities for the state's foreign policy. The system level is the one that is based on comparative analyzes between the previous results of foreign policy and explains the differences between them. The global level will deal only with the cyberpolitics sphere offered by the Internet, the critical infrastructures, the Internet of things, the IT&C revolution and examines the way in which various state or non-state actors overcoming the variables of sovereignty or national borders can offer opportunities or constraints that together with those offered by tangible or intangible factors give the line of options for foreign policy makers.

Generally, in the analysis of international relations of the phenomenon of cyberwarfare, cyber threat, cyberpolitics we resort to rationalist approaches (Brantly, 2015), or extensions of the classical theories from the theory of international relations to which the limits are highlighted (Choucri, 2012), (Vevera, 2019).

This is what this study is trying to do to highlight the validity of certain classical theories in the current international system and to bring complementary analyzes in an integrative way that will also include the new international realities brought by the Internet, the critical infrastructures, the Internet of things, the IT&C revolution.

Of the current research of the system of international relations that analyzes and the field of cyberpolitics, most of them start from the paradigm of rational choice and game theory, which does not take into account the majority of state and non-state players belonging to the global level, the anarchic dynamics of this level and the increased uncertainty which must take into account decision makers of the foreign policy specific to the system level.

In addition to the uncertainty provided by the foreign policy of the competing states in the global hegemonic system, a decision maker must also take into account the uncertainty induced in the national system of critical infrastructures by state or non-state actors and the diffusion of the cybernetic threat.

This issue of double uncertainty aims to analyze this article in correlation with the four-level model of analysis proposed by Steven Lamy and the integration of the Gilpinean analysis of the war of hegemony specific to the system level with the neoliberal analysis of Hobbesian anarchy characteristic of the global level all included in the poliheuristic foreign policy paradigm.

Uncertainty as an instrument of analysis has several approaches of which we select the one proposed by the American professor of management Hugh Courtney (Courtney, 2001) as an open one to the predictive modalities of the behaviors of states or non-state actors of qualitative type (Lockwood, 2013), hybrid (Sokolowski & Banks, 2009) or scenario-based (Martelli, 2014).

The research introduces the concept of uncertainty proposed by Hugh Courtney, the presentation of the elements of the poliheuristic paradigm, and then explains how the four levels of analysis will be integrated with the first two approaches mentioned above.

The approach of this paper is intended as a synthesis and takes a step forward in the great debate of neorealism-neoliberalism that marks the scientific community of international relations for several decades by proposing an approach that is not intended to be limited to the field of cyberpolitics but can be extended to others fields of study of international relations by integrating the three approaches the hegemonic war - the neoliberal Hobbesian anarchy - the poliheuristic paradigm of foreign policy.

METHODOLOGY

The research method presented in this article focuses on dealing with the uncertainty that characterizes the option or choice of the foreign policy decision maker who is subjected to a double challenge provided primarily by competing state actors specific to the system level and the global level through cyberwarfare or cyber threat activities carried out by state or non-state actors acting in an anarchic way.

The option to study the uncertainty that appeals to Hugh Courtney's ideas is given by the experience of predicting the results offered in the business sphere by scenario approaches (Courtney, 2001) which have proven to be more reliable as quantitative models of game theory that have begun to dominate the field by security studies of cyberpolitics.

The research will remind of the four uncertainty concepts defined by Hugh Courtney and explain how they will be integrated into the analysis tools of the poliheuristic paradigm: the decision matrix, foreign policy actions, the critical dimensions of the internal political system that coincide with the system level, the modalities whereby foreign policy actions overlap as political boundaries with those of global-cyberpolitics, etc.

Hugh Courtney's four levels of uncertainty, successfully tested in the business environment, retain their significance but change the way they are used as tools for quantifying uncertainty in the analysis of foreign policy by using the elements of the poliheuristic paradigm.

The central element of the poliheuristic paradigm is the decision matrix that builds a hierarchy of foreign policy options or choices based on the implications of the previous results of internal or foreign policy, which in this research must be subject to the double constraints / opportunities offered by the political competition in the international hegemonic system or cyberpolitics specific anarchy.

In the scientific literature of the analysis of foreign policy analysis the poliheuristic paradigm together with its specific elements such as two-step decision game, importance of internal politics over foreign policy decision and decision matrix are elements that have a long experience of analysis and that have provided explanations on areas such as: use of force and nonuse of force, diversionary uses of force, nuclear weapons tests, initial crisis reaction, war termination, coalition formation, intraparty rivalry, level of force used in a crisis, learning influence of advisers, war and peace decisions, military uprising framing, defection and retaliation, decisions by experts and novices, negotiation and conflict resolution (Mintz, 2010).

We consider that the uncertainty approach defined by Hugh Courtney is best explained by the specific elements of the foreign policy analysis that have a good experience in the state-centric analysis and which we will demonstrate that can be extended to non-state actors who have a great influence in cyberpolitics and can create opportunities or constraints for foreign policy decision.

We will start by briefly presenting the two approaches that will be presented in the synthesis in the results section. Hugh Courtney defines two decision models, one that clearly defines quantitative trends in society and another that defines uncertainties called residual uncertainty. The residual uncertainty (called short uncertainty) is the one we will deal with and which, according to the same author, is of four types (the levels of uncertainty have nothing in common with the levels of analysis):

- Level 1 uncertainty - represents a quantitative assessment of the future of the environment in which the actor is but for a relatively short time;

- Level 2 uncertainty - represents a qualitative evaluation of the future of the environment in which the actor carries out his activity, defined by several alternative futures;

- Level 3 uncertainty - represents a qualitative evaluation of the future of the environment in which the actor carries out his activity, defined by a continuum of alternative futures but which are delimited by some quite clear values.

- Level 4 uncertainty - represents a qualitative assessment of the future of the environment in which the actor operates, the future alternatives are difficult to define, their limits and the evaluation of decisions is based on analogies with past experiences.

The foreign policy polygraphic paradigm is a theory of the analysis of the new generation foreign policy that makes the synthesis between the decision is two-stage game. The first stage of the decision is of a cognitivist type based on „cognitive short-cuts" and the second stage is of a rational type.

The theory is called polyneuristics because each decision is the synthesis of several biases such as the following (Mintz, 2010): B01. "Focusing on short-term benefits rather than longer-

term problems"; B02. "Preference over preference"; B03. "Locking on one alternative"; B04. „Wishful thinking"; B05. „Post-hoc rationalization"; B06. „Relying on the past"; B07. "Focusing on a narrow range of policy options rather than on a wide range of options"; B08. "Groupthink" B09. "Overconfidence; over-estimating one's capabilities and underestimating one's capabilities"; B10. "Ignoring critical information; denial and avoidance"; B11. "Focusing on only part of the decision problem"; B12. "Turf battles leading to suboptimal decisions"; B13. "Lack of tracking and auditing of prior decisions and plans"; B14. "Polyheuristic bias"; B15. "Shooting from the hip"; B16. "Polythink" B17. "Group polarization effect". In the first cognitive decision stage, the biases between B01-B17 are established, which are the basis of the actor's choices or choices based on his previous experiences or analogies, lessons learned, specific to the decision environment.

It is identified if the decision-making environment is focused on a person one or more groups (Mintz, 2010) and determine which are the critical dimensions of the internal and foreign policy objectives and the spectrum of actions to be followed. In the polyneuristic paradigm, the internal political system is considered to be of great importance in shaping foreign policy by establishing a hierarchy of objectives based on B01-B17 biases (Mintz, 2010), so that decisions are taken on non-compensatory basis of weights (each objective has its own importance or weight w) (Mintz, 2010).

Table 2. Poliheuristic Decision Matrix

	a_1	a_2	a_3	…	…	a_n	Weights
o_1	r_{11}	r_{12}	r_{13}	…	…	r_{1n}	w_1
o_2	r_{21}	r_{22}	r_{23}	…	…	r_{2n}	w_2
…	…	…	…	…	…	…	…
o_m	r_{m1}	r_{m2}	r_{m3}	…	…	r_{mn}	w_m
Final choice	FC_1	FC_2	FC_3	…	…	FC_n	

For the objectives considered non-critical for the weights have negative values from -1 to -10, and the critical objectives have values from 1 to 10 depending on the hierarchy defined on the basis of biases B01-B17. The rates have values from 1 to 10 and express the implication that a certain action has on a critical dimension of the objectives. The second step of the two-stage game is determining the decision rules, one of a rational type, which based on the relationships between rates and weights establishes a hierarchy of policy options / choices of actions according to the final election order from the most favorable to the least favorable.

Hugh Courtney's research uses alternative approaches to the four levels of residual uncertainty that can lead to a multitude of cases to analyze. In this research we will propose in the decision analysis a conjugate type approach of the four types of residual uncertainties integrated in the poliheuristic paradigm together with the four levels of analysis named by Steven Lamy (Lamy, 2017).

RESULTS

In their research, Adam Gordon (Gordon, 2008) and Johnatan Lockwood (Lockwood, 2013) consider that long-term quantitative models are a failure and the solution is to focus on the actor's objective (s) / hierarchy of goals and understand how to understand the working environment, the mechanism of decision making, variants of decisions and finally the way to build his motivation.

Therefore, following the ideas of the two authors above, we build a model of the environment in which the actor performs the activity of the uncertainty mechanisms, the variants of opinions or choices along with the actions by integrating the three approaches the hegemonic war - the neoliberal Hobbesian anarchy - the poliheuristic paradigm of foreign policy with levels of uncertainty and analysis.
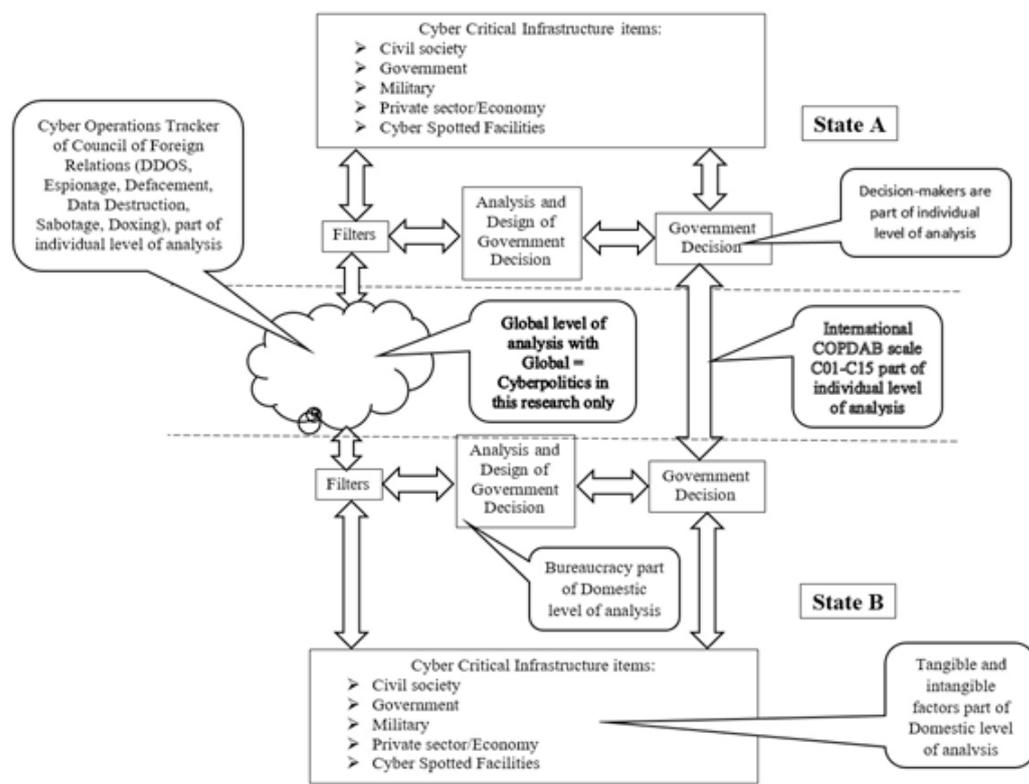

Figure 1. *The items of dyadic cyberwarfare involved in poliheuristic decision matrix*

Figure 1 shows the interaction between the three paradigms with four levels of analysis proposed by Steven Lamy (Lamy, 2017) and four levels of uncertainty proposed by Hugh Courtney (Courtney, 2001). In figure 1 below above the dotted line at the top of the figure are the important components for defining a state actor A, and at the bottom of the dotted line at the bottom of figure 1 are the same elements of state actor B. The variable "Government" Decision" defines the governmental structure that will make the decisions or make the choices specific to the level of individual and associated analysis of the two decision stages of the poliheuristic paradigm. This variable is the one that makes the management of foreign policy and is one of type personality, group or groups (Mintz, 2010).

The variable "Analysis Design of Government Decision" evaluates the cyber threat detected by network sensors (anti-virus, anti-malware, IDS / IPS, SIEM sensors, etc.) from the "Filters"

component. The "Analysis Design of Government Decision" component includes cyber commands such as the US Cyber Command or the Russian Informal Troops Command. These may be components of the defense ministry, the security ministry or the telecommunications ministry of a state. The component or variable "Filters" contains computer network sensors that are located at the connection points of the critical national cyber infrastructure with the Internet or along the critical cyber infrastructure. The types of cyber threats identified by the network sensors are (see Fig. 2a, the Cyber Operations Tracker typology of the Council of Foreign Relations (Cyber Operations Tracker, n.d.)): DDOS, Espionage, Defacement, Data Destruction, Sabotage, Doxing.

These threats come from the level of global-cyberpolitics analysis, which is characterized by a Hobbesian anarchy, in which both nation states represented by various national online players or non-state actors have equal relative capabilities and possibilities and generally the interests are not from the sphere of national security and predominate economic interests or prestige.

This is why we consider that on this level of analysis is more appropriate the neoliberal type anarchy than the neorealist-structuralist type (Nye, 2016). Due to the anarchic system specific to the level of global analysis, we consider that the most appropriate models of uncertainty that can influence the level of individual decision are the level 4 characterized by historical analogies or level 3 characterized by interval ends, those of level 1 or 2 being generally unlikely.

The variable "Cyber Critical Infrastructure items" contains the critical components of the poliheuristic decision matrix that can limit the values of the international results specific to the system level. The components of "Cyber Critical Infrastructure items" represent the impact that cyber attacks may have on data centers, clouds, server farms, individual servers that characterize the normal functioning of civil society, government, economy, military structures, characterized by standardized statistical indexes as evidenced. attacks provided by the Cyber Operations Tracker of the Council of Foreign Relations (Cyber Operations Tracker, n.d.), Green Cyber (Green Cyber, n.d.), Global Cybersecurity Index (Global Cybersecurity Index, n.d.), etc.

The variable "Cyber Spotted Facility" treats specific facilities of the national cyber infrastructure as was the case of the Iran Uranium Processing Complex, which are nationally relevant but are not included in the cyber statistical indexes but require a separate punctual analysis. The level of system analysis treats international results that have as internal consequences the impact that the rates or weights have in the decision-making environment. The level of system type analysis is one of level 3 uncertainty characterized by vague values for conflicting or cooperative behaviors. For the conflicting behaviors, the uncertainty varies from Dominate (Schafer M. & Walker, 2006) for relations with the winning null sum respectively Submit for relations with the losing null sum (Schafer M. & Walker, 2006).

For cooperative relationships characterized by the non-zero amount concluded with a social contract between the parties, they are delimited by Settle (Schafer M. & Walker, 2006) and for cooperation between the parties between which there is no non-zero sum of frozen conflict type, they are delimited by Deadlock (Schafer M. & Walker, 2006). For the values of uncertainty level 4 the analogies after which the decision makers are guided are based on the B01-B17 biases mentioned in the methodological section.

Besides the level 3 uncertainty specific to the level of system analysis, the decision that influences the construction of the decision-making matrix is a conjugate approach of the level 2 uncertainty for the values of the actions of the matrix, respectively the level of uncertainty 1

for the values of the ratios and the weights in the matrix that help to build the decision rules. In constructing the decision matrix for an international result of type Dominate / Submit or Settle / Deadlock the decision matrix will overlap three types of actions as in Fig. 2b.

Due to the combined use of the analysis on the system and global level the simultaneous actions to which the decision maker on the individual level is suspected that a simultaneous treatment of the type of gradual or massive expansion (overexpansion) defined by Gilpin (Gilpin, 1983) with the specific type of foreign policy behavior defined COPDAB typology (COPDAB, n.d.) from the war with major losses of any kind until the voluntary unification of nations into a new state actor (see Figs. 2a and 2b). Over the two behavioral dimensions specific to the system level, the typology of the cyber actions offered by the Cyber Operations Tracker typology of the Council of Foreign Relations (see Fig. 2a) will overlap. Of course, in the case of an analysis, the analyst must reduce the number of cases of actions taken in the analysis as in Lockwood's work (Lockwood, 2013). Research can provide consistent results in international relations theory, geopolitical forecasting and cyber/predictive intelligence comparable to those obtained by Adam Gordon, Johnatan Lockwood and Hugh Courtney in their fields. In this way, our approach contributes an additional value in the analysis of international relations and cyber intelligence by integrating the levels of uncertainty into the levels of analysis and specifying the relationships with the elements of the decision-making matrix.

For the second stage of the decision rule, the reader can consult several works specified in the bibliography of this work (Moga et all, 2019a, 2019b) and what we can mention in this paper that the values of the respective rates of the weights will be directly related to the uncertainty of level 1 and the reduction of the number of specific actions of figures 2a and 2b are directly related to the uncertainty of level 2 and the relevant behaviors to be studied.

The research has shown how to integrate the three approaches the hegemonic war - the neoliberal Hobbesian anarchy - the poliheuristic paradigm of foreign policy and the way of analyzing the foreign policy decisions based on uncertainties. Thus, operating with level 3 or 4 uncertainties increases the accuracy of predictive intelligence analysis with scenario in the area of international relations and respects Adam Gordon's recommendation to operate on problems of high complexity with vague notions (Gordon, 2008).

COPDAB INTERNATIONAL SCALE		CYBER OPERATIONS TRACKER OF COUNCIL OF FOREIGN RELATIONS	
COPDAB01	Voluntary unification into one nation	COTCFRA	DDOS
COPDAB02	Major strategic alliance (regional or international)	COTCFRB	Espionage
COPDAB03	Military, economic or strategic support	COTCFRC	Defacement
COPDAB04	Non-military economic, technological or industrial agreement	COTCFRD	Data Destruction
COPDAB05	Cultural or scientific agreement or support (non-strategic)	COTCFRE	Sabotage
COPDAB06	Official verbal support of goals, values, or regime	COTCFRF	Doxing
COPDAB07	Minor official exchanges, talks or policy expressions--mild verbal support		
COPDAB08	Neutral or non-significant acts for the inter-nation situation		
COPDAB09	Mild verbal expressions displaying discord in interaction		
COPDAB10	Strong verbal expressions displaying hostility in interaction		
COPDAB11	Diplomatic-economic hostile actions		
COPDAB12	Political-military hostile actions		
COPDAB13	Small scale military acts		
COPDAB14	Limited war acts		
COPDAB15	Extensive war acts causing deaths, dislocation or high strategic costs		

Figure 2a. *The items of COPDAB (COPDAB, n.d.) and Cyber Operations Tracker (Cyber Operations Tracker, n.d.)*

	Dominate/Submit/Settle/Deadlock										
	Flexible Expansion							Massive Expansion			Weights
	COPDAB01			...	COPDAB15			COPDAB01	...	COPDAB15	
	COTCFRA	...	COTCFRF	...	COTCFRA	...	COTCFRF	...	...	...	
Civil society	r_{101A}^{FE}	...	...	...	r_{115A}^{FE}	...	...	...	...	...	w_1
Government	r_{201A}^{FE}	...	...	...	r_{215A}^{FE}	...	...	...	...	...	w_2
Military	r_{301A}^{FE}	...	...	...	r_{315A}^{FE}	...	...	...	...	...	w_3
Private sector	r_{401A}^{FE}	...	...	...	r_{415A}^{FE}	...	...	...	...	...	w_4
Final choice	FC_{01A}^{FE}	...	...	...	FC_{15A}^{FE}	...	...	...	...	...	

Figure 2b. *The poliheuristic decision matrix which integrate the three approaches the hegemonic war - the neoliberal Hobbesian anarchy - the poliheuristic paradigm of foreign policy*

CONCLUSIONS

We had as the starting point of this article the approaches of a rationalist type or based on the theory of games that we mention are the majority now in cyberpolitics research. We specified the limit of their predictability as quantitative systems of prediction and their limits as theories with a limited number of actors that do not take into account the Hobbesian anarchy that characterizes the international online environment.

As a result of this fact I proposed the integration of three basic paradigms - the hegemonic war - the neoliberal Hobbesian anarchy - the poliheuristic paradigm of foreign policy with four levels of analysis that encompass both the foreign policy of the states, the constraints or opportunities offered by online cyberpolitics and the decision limits treatment of foreign policy through the four levels of uncertainty proposed by Hugh Courtney in the business world.

The research proposes a new model of interaction between two states exemplified in figure 1, which takes into account the opportunities or constraints offered by state or non-state actors through the Internet, critical infrastructures, internet of things and IT&C revolution. The research takes a big step forward in the field of international relations research, presenting a very original approach through a new approach in the neorealism-neoliberalism dialogue by integrating into the four levels of analysis the adoption of neoliberal Hobbesian anarchy on a global level, of hegemonic Gilpinean approach on the state system level and the poliheuristic paradigm on the levels of domestic and individual analysis.

This article uses the concept of uncertainty as a link between the three paradigms of study of international relations and foreign policy and the role of each of the four levels of analysis used. Through the scheme of interstate interaction proposed in figure 1 as well as the tools of poliheuristic analysis mentioned in this study, we managed to express how through the contact between the national critical infrastructures or the Internet of things objects state or non-state actors can create opportunities or constraints over national critical infrastructure as a mechanism for executing foreign policy decisions creating conditions of level 4 uncertainty.

This work brings as a novelty a new approach in the discourse of neorealism-neoliberalism by integrating the poliheuristic school and a new vision in the research of the concept of

cyberpolitics as an alternative to the current approaches of a purely rationalist type, which can be extended to other areas of research of international relations.

The novelty of our research opens the possibility that this integrative approach can use the various predictive methods based on scenarios that can thus allow the modeling of cyber threat at the state and international level in predicting future crisis models involving cyberpoltics. Thus in this research it will be expanded as an approach and it will also involve research what the Johnatan Lockwood's LAMP approach (Lockwood, 2013) is and will thus make the step towards predictive intelligence in international relations theory.

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Political Psychology of International Relations and Foreign Policy Analysis – skifull in Operational Code Analysis; international actors' image, perceptions, biases motivations, learning and resilience; rational vs bounded rational decisión making; poliheuristic paradigm of foreign policy analysis; offensive realism; Machine Learning - prolific in AGENT BASED MODEL based on: Neural Networks, Fuzzy Logic, Bayes Analysis, Statistics, Optimal Programming, Time Series, Emotional Agents and BDI Agents;

Cyber Intelligence and Cyber Security of National Critical Cyber Infrastructure – applications of Kali Linux audit in various IT computer network equipments for colllection of experimental data. Building of dynamic models of computer networks using queue theory and PID controls. Cyber Intelligence skills based on Political Psychology of International Relations, Foreign Policy Analysis and Predictive Intelligence.

Cyberwarfare involved in International Politics – study the cyber component of relations among USA-Russia, USA-China, NATO-Russia and Est-European countries and Russia. Try to identify relations between cyber behaviors and political statements.

Cyberwarfare in Knowledge Based Society – using the automation theory of PID control in the cyber security of "lights out" plants and Internet of Things industrial or governmental facilities.

Artificial Psychic/ARTILECT - skilfull in research and simulation of human psychic with computational psychology using predictive and classifier machine learning. Useful in Threat Modeling of cyber attacks over national IT infrastructure.