THEORETICAL INTERPRETATIONS OF THE CONCEPT „INFORMATION"

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Abstract: *Information has always played a decisive role in the history of civilization development and has served as the basis for decision-making at all levels and stages of society and state development. In the history of societal development, several information revolutions can be distinguished, associated with cardinal changes in the sphere of production, processing, and transmission of information, leading to radical transformations of social relations. As a result of such transformations, society has in a certain sense acquired a new quality. The article present the specific range of social relations related to the role and importance of information on the field of national security.*

Keywords: *data, information, security, societal development.*

Introduction

Our modern times are characterized by increasing globalization, dynamics of social processes and information accessibility. With the constantly emerging problems and challenges of a different nature worldwide, all countries strive and make efforts to improve and improve the policies, means and methods to master, control and limit their negative impact on their safety and security.

Information has always played a decisive role in the history of civilization development and has served as the basis for decision-making at all levels and stages of society and state development. In the history of societal development, several information revolutions can be distinguished, associated with cardinal changes in the sphere of production, processing, and transmission of information, leading to radical transformations of social relations. As a result of such transformations, society has in a certain sense acquired a new quality.

Information revolution

The first information revolution was associated with the creation of writing, which led to a giant qualitative and quantitative leap in the information development of society. It became possible to fix knowledge on

53

a tangible medium, thus separating it from the producer and allowing it to be transmitted from generation to generation.

The second information revolution (around the middle of the 16th century) was triggered by the invention of book-printing by Johannes Gensfleisch zur Laden zum Gutenberg (German: Johannes Gensfleisch zur Laden zum Gutenberg), the founder of modern book-printing. His invention of mechanical movable-type printing marked the beginning of a revolution in printing and is often referred to as one of the most important events of the Modern Age. His invention strongly influenced the development of the Renaissance, the Reformation, and the Scientific Revolution and laid the material foundations for the modern knowledge-based economy and the democratization of education, creating further opportunities for the inclusion of large segments of the population in cultural values.

The third information revolution (the end of the 19th century) was conditioned by the invention of electricity, thanks to which the telegraph, the telephone, and the radio appeared, which made it possible to transmit and accumulate information in significant volumes. As a consequence of this revolution, better dissemination of information and an extension of the informational "reach" of the population by communication means were achieved. The role of the mass media as a mechanism for disseminating messages and knowledge over large territories and providing the citizens living there with them has increased, and the accessibility of members of society to messages and knowledge has expanded. The role of information as a means of influencing the development of society and the state has grown substantially, and the possibility of better, faster, and more immediate communication between people has emerged.

The fourth information revolution (mid-twentieth century) was associated with the invention of computing and the appearance of the personal computer, the creation of communications networks, and telecommunications. Opportunities arose to accumulate, store, process, and transmit information in electronic form. The operability and speed of information creation and processing have increased, virtually unlimited amounts of information can be accumulated in computer memory, and the speed of information transmission, retrieval, and receipt has increased.

Today, the world is experiencing the fifth information revolution, which is influencing the formation and development of cross-border global information and telecommunication networks spanning all countries and continents, penetrating every home and impacting each individual as well as vast masses of people. The most striking example of such a phenomenon and

the result of the fifth revolution is the Internet (as well as social networks). The essence of this revolution consists in the integration, in a single information space around the world of software and hardware, telecommunication tools, information stocks or stocks of knowledge as single information and telecommunication infrastructure in which legal entities and individuals, public authorities and local governments are active. As a result, in today's information age, the speed and volume of information processing are increasing enormously, new unique opportunities for information production, transmission and dissemination are emerging, and new types of activities are taking place in these networks.

We are witnessing a significant increase in the role, place, and impact of information in the life of the individual, society, and the state. Information today has become a powerful tangible resource of even greater value than natural, financial, labour, and other resources. Information has become a commodity to be bought and sold. Information in the present plays a primary role as a non-traditional weapon, information wars are emerging, developing, and being terminated. A cross-border information network, the Internet, is rapidly developing and entering our lives.

Information, information data... these words are mentioned by all of us daily. At the same time, it is a well-known fact that until today there is no universally accepted definition of the term "information". And it is a methodological tool not only for communication science but for all human sciences. And if the method by definition is the general knowledge applied to the study of the particular or concrete, it turns out that private questions about man, among which cognition and communications, cannot be studied with an objectively worked out and generally valid method. Accordingly, the results of research on the particular questions of cognition and communications would hardly be able to establish themselves as an objective scientific argument. Here are some attempts to define the concept.

- Information includes all data, received and transmitted, stored in various sources.
- Information is the totality of data about the world around us, about all the various processes that take place in it, which can be perceived by living organisms, electronic machines, and other information systems.
- Information is all that can be added to our knowledge and assumptions.
- Information means data about anything, regardless of the form in which it is presented.

- Information is the data perceived by a person and (or) special devices as a reflection of facts in the material and spiritual world in the process of communication.
- Information is data organized in such a way that it makes sense to the person working with it.[1]

The same information message (a newspaper article, an advertisement, a letter, a telegram, a reference, an oral story, a drawing, radio or television broadcast, etc.) may contain different amounts and qualities of information for different people, depending on their prior knowledge, their level of understanding of the message and their interest in it.

The cases that refer to automated handling of information using some technical devices, it is not so much the content of the message that is of interest, but how many characters that message contains.

As applied to computer processing of data, information is understood to be some sequence of symbolic notations (letters, numbers, coded graphic images and sounds, etc.) carrying meaning and presented in a form understandable to the computer. Each new symbol in such a sequence of symbols increases the information volume of the message.

Obviously, at present, there is no single definition of information as a scientific term. From the point of view of different fields of knowledge, this concept is described by its own specific set of attributes. For example, the concept of "information" appears mainly in the specialized literature of computer science and it is impossible to define it by other, "simpler" concepts (similarly in geometry, for example, it is impossible to express the content of basic concepts such as "point", "line", "plane" by more elementary concepts).

The content of basic, fundamental concepts in any science must be explained with examples and shown by their comparison with the content of other concepts. In the case of the concept of "information", the problem of its definition is even more complicated, since it is a general scientific concept. This concept is used in different sciences (informatics, cybernetics, biology, physics, etc.), and in each science, the concept of 'information' is associated with different systems of concepts.

Two types of information are considered in modern science:
- Objective (primary) information, it is a property of material objects and phenomena (processes) to bring forth a variety of states, which through interaction (fundamental interactions) are transmitted to other objects and are imprinted in their structure.

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[1] Information - what is it? https://economic-definition.com/Media/Informaciya_Information__eto.html

- Subjective (semantic[2], notional, secondary) information, that is, the notional content of objective information about objects and processes in the material world, formed by human consciousness with the help of notional images (words, images, sensations) and fixed on some tangible medium.

When the word information is used, it is usually understood as information about the world around us and the processes taking place in it, perceived by humans or by special devices.

Due to the lack of a uniform definition of information, in terms of different fields of knowledge, this concept is described with a specific set of attributes. According to Claude Elwood Shannon's concept, information is a resolved uncertainty, i.e. information that should, to one degree or another, resolve the user's uncertainty until they receive it, to expand their understanding of the object with useful information.

According to some computer scientists, the elementary unit of information is the "indistinguishable difference" or the actual difference for some large perceptual system. Differences that are not perceived are called "potential" and the perceived ones "actionable". From this point of view, "any perception of information necessarily appears to be the acquisition of information about differences" from previous states.

In terms of informatics, information has many fundamental properties: novelty, relevance, reliability, objectivity, completeness, value, etc. The science of logic deals, first of all, with the analysis of information.

The word "information" originates from the Latin word *informatio*, which means explanation, exposition, and awareness.

The concept of information has been considered since ancient philosophers. Until the beginning of the industrial revolution, philosophers were primarily concerned with defining the nature of the information. Later, the discussion of information theory issues became the prerogative of the new, for the time, science of cybernetics.

Sometimes, to get to the essence of a concept, it is useful to analyze the meaning of the word that concept denotes. Elucidating the internal form of a word and studying the history of its use can throw unexpected light on its

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[2] Semantics (Old Greek: σημαντικός [semantikós] - significant, σημαίνω [semaino] - to signify, indicate, σήμα [sema] - sign) studies meaning, usually in language. In this sense, semantics usually means linguistic semantics (as opposed to, for example, computational semantics), that is, the science studying the meaning of words, phrases, and other linguistic objects.

meaning, obscured by the habitual "technological" use of that word and modern connotations[3] .

In European languages, the word information has appeared since around the 14th century. In Russia, it was fixed for the first time in the so-called "Spiritual Regulation" in 1721 with the meaning "idea, the concept of something".

Based on this etymology, information can be considered any significant change of form, or in other words, any materially fixed traces formed by the interaction of objects or forces, and amenable to understanding. Information, in this way, is a transformed form of energy. The bearer of information is a sign, and the mode of its existence is the interpretation: the bringing to consciousness of the sign or sequence of signs.

Meaning can be recovered by the sign of the event that served as the cause of its occurrence (in the case of "natural" and involuntary signs, such as traces, clues, etc.), or by the message (in the case of conditional signs peculiar to the domain of language). It is the second variety of signs that constitutes the body of human culture, which, according to one definition, is "a totality of non-inherently transmitted information".

Messages may contain information about facts or interpretations of facts.

The living being receives information with the help of the organs of sensation and also through reflections or intuition. The exchange of information between subjects is interaction or communication (from Latin *communicatio* - message, transmission).

In practical terms, information is always a type of message. An information message is associated with a message source, a message recipient and a communication channel.

Information is the knowledge that can be stored, and transmitted and is the basis for the generation of new knowledge. The forms of knowledge conservation (historical memory) are various: from myths, annals, and pyramids to libraries, museums, and computer databases.

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[3] Connotation (from Late Latin connotatio, from Lat. con - together and noto - note, indicate) - a concomitant meaning of a linguistic unit. Connotation includes additional semantic or stylistic elements persistently connected with the main meaning in the minds of native speakers. Connotation is intended to express emotional or evaluative overtones of utterances and reflects the cultural traditions of the society. Connotations are in turn pragmatic information, reflecting not objects and phenomena themselves, but a certain attitude towards them. https://nbu-rechnik.nbu.bg/bg/obsht-spisyk-na-ponqtiq/konotaciq

Information is the knowledge about the world around us, about the processes taking place in it, which are perceived by living organisms, controlling machines, and other information systems. As was already mentioned, the word "information" is Latin. Over its long life, its meaning has changed by expanding and narrowing its boundaries. Originally, the word "information" meant: "representation", "understanding", then "knowledge", transmission of messages".

Information theory has been brought to life by the practice needs. Its emergence is associated with Claude Shannon's work "A Mathematical Theory of Connections", published in 1946. The foundations of information theory rest on results obtained by many scientists. By the second half of the twentieth century, the globe was buzzing with transmitted information running over telephone and telegraph wires, and radio channels. Later, electronic computing machines appeared and spread for processing the information. And for that time, the main task of information theory was primarily to increase the efficiency of the functioning of communication systems. The complexity in designing and operating the means, systems, and channels of communication is that it is not enough for the designer and engineer to solve the problem from physical and power positions. From this point of view, the system may be the most perfect and economical. But it is important to address, even in the design of transmitting systems, the amount of information that will pass through that transmitting system. Information can be quantified, it can be calculated. In such calculations, scientists proceed most ordinarily - they set aside the meaning of the message, just as they renounce concreteness in the arithmetical operations we are all accustomed to (as from adding two apples and three apples, they proceed to add numbers in general: 2+3).

Some scientists have stated that they "completely ignore human appreciation of information." On a series of 100 letters, for example, they attribute a certain meaning to the information, paying no attention to whether that information makes sense, and on the other hand, what the meaning is for its practical use. The quantitative approach is the best-developed branch of information theory. According to this definition, a set of 1000 letters from a newspaper, a Shakespeare play, or an Einstein theorem have exactly the same amount of information.

Such a definition of the quantity of information appears to be highly useful and practical for some. It corresponds exactly to the communication engineer who must convey all the information contained in a message, regardless of the value of that information to the addressee. The

communication channel is soulless. For the transmitting system, one thing is important: to transmit the right amount of information at the right time. How to calculate the amount of information in a particular message?

The estimation of the amount of information is based on the laws of probability theory, more precisely, it is determined by the probability of events. This is understandable. A message has value and carries information, only when one learns from it about the outcome of an event that has a random character when it is in some sense unexpected. A message about something already known contains no information. For example, if someone tells us that "Sofia is the capital of Bulgaria", such a message can only astonish you by the statement of something obvious and known to everyone, and not the novelty it contains. For example, the result of a competition is another matter. Who will arrive first? The outcome is hard to predict. The more random outcomes the event we are interested in has, the more valuable is the message about its outcome, and the greater is the information. A message about an event that can have two equally possible outcomes contains one unit of information, called a bit. The choice of the unit of information is not random. It is related to the most common binary way of encoding it for transmission and processing. Let us try, albeit in a simplified form, to imagine this general principle of information quantification, which appears to be the cornerstone of the whole information theory.

Obviously, the amount of information depends on the probability of one or other outcomes of the event. If an event has two equally likely outcomes, this means that the probability of each outcome is 1/2. So is the probability of hitting a head or a tail on a coin flip. If the event has three equally probable outcomes, then the probability of each will be 1/3. Note that the sum of the probabilities is always equal to one: one of all possible outcomes will necessarily happen. Events can also have unequally probable outcomes. For example, in a war between a strong, large state and a weak, small state, the probability of the strong state winning is very high, and the probability of its defeat is very low.

The amount of information is a measure of reducing the uncertainty of a situation. Different amounts of information are transmitted over communication channels and the amount of information passing through a channel cannot be greater than its throughput. And it is defined by the amount of information that passes through here per unit of time. An increase in throughput can only be obtained if the information is encoded reasonably, and an economical, sparing language is found for the transmission of messages.

The information is minimized most accurately. Already when the Morse code was created for telegraphic messages, the most frequent letters in the respective language were transmitted with a minimum number of "dots" and "dashes", and those that occurred less frequently with a greater number of these symbols. In cases where the length of the codeword decreases for the more frequent characters and increases for the less frequent ones, there is talk of efficient encoding of the information. But in practice it often happens that the code resulting from a precise "sifting" of information, a code convenient and economical, may distort the message because of interferences that always, unfortunately, exist in communication channels: distortion of sound in the telephone, atmospheric interference in the radio, distortion of the image or "snowflakes" on television, errors in data transmission. These disturbances, or as the specialists call them, noises, degrade the quality of the information, and from this follow the most unlikely and, naturally, unpleasant surprises. Reliability in the transmission of messages deteriorates, and it is this characteristic that assesses the degree of correspondence of the received message with the transmitted one, i.e. this characteristic assesses the quality of the link.

Therefore, to increase the reliability of information transmission and processing, redundant symbols, a kind of protection against distortion, have to be introduced. These extra characters do not carry any actual content in the messages, they are redundant. Of course, if people would use this kind of code without redundancy in messages, the latter would be extremely short. But, unfortunately, security would be lost in their transmission.

Conclusions and suggestions

Modern threats to national security are not only conventional, whether they are external such as terrorism, human trafficking, economic or political migration, smuggling or internal such as political, economic, demographic crisis, corruption, crime, natural disasters, etc. Modern threats are related to the information and communication needs of the individual, from which arise humanitarian, social, political and military crises.

In our modern times, when carrying out the various legally granted activities for the protection of security and the preservation of public order, the specialized state structures may handle the following types of information: Intelligence; counterintelligence; operational-search; investigative; agent-operative; exploratory; informative; operational-technical; ascertaining; expert; processing; establishing; systematic;

thematic; indicative; schematic; raw; incomplete; insufficient; fragmentary, etc.

The following criterion for classifying the types of information was also pointed out by the researchers, namely according to the contribution to strategic direction. We distinguish information-norm; information-custom; information-tradition; information-assessment; information-expertise; information-trend; information-law; information-perspective; information-decision; information-methodological instruction and others.

In all cases, the security and public order services, according to their functional assignment, should not be allowed to take harsh repressive (overt) measures based on insufficient and unverified data, facts, and data obtained from the use of Special Intelligence Means (SID) and data retention.

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