Scientific Journal of the Military University of Land Forces
ISSN: 2544-7122 (print), 2545-0719 (online)
2021, Volume 53, Number 2(200), Pages 236-244
DOI: 10.5604/01.3001.0014.9779

Original article

Towards informational safety: quality of information and uncertainties of fact machining

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INFORMATION

Article history:

Submited: 14 November 2019

Accepted: 27 January 2020

Published: 15 June 2021

ABSTRACT

The paper considers the problem of information credibility. Currently, such a problem is affecting scientists, as well as ordinary people who are dependent on information networks. Hence, the Author formulates three postulates that should be observed in dealing with the quality of information: P1 – identify the source of information, P2 – determine the level of credibility of the information source, P3 – recognize the purpose of information dissemination. The first two postulates are universal because they are applicable to all the users of information. The third becomes more and more important in the social and political choices of citizens. In scientific work, empirical facts are being transformed to empirical data (increasingly, to the form of big data) which are results of advanced registration and processing by means of technical and information science tools, such as: a) technical transforming the empirical signal into information; b) statistical selection of signals, and, next, statistical processing of the received data; c) assessment of results for suitability in applications. Other "epistemic" factors, however, are also involved, as: d) conceptual apparatus used for idealization (and then for interpretation), e) assessment of the results in terms of compliance with the epistemological (sometimes, also commercial or ideological) position. All these factors should be the subject of careful study of errology proposed by P. Homola.

KEYWORDS

truth, facts of natural and technical sciences, data processing, responsibility of researcher

Introduction

The modern era of post-truth is developing in contemporary rich democratized societies. Here, opinions influence social and political decisions. Thus, the majority's voice is shaped today by mass media, and the information reaching the recipient is to bring about the effect of consumer or political choices being those expected by powerful media clients. The traditional researching of the reliability of information, the arguing in favor of seeking truth about phenomena, the considering options for problem-solving, etc. cease now to be relevant in the assessing and the determining social and political facts.

Empirical facts that are the subject of natural and technical research seem to be free from information manipulation. However, it turns out that they are also exposed to numerous distortions and misinterpretation. The article mainly discusses the conditions of reliability of this type of scientific empirical facts.

The problem of elaboration and interpretation of empirical facts was already taken up in the 20th century in the logical considerations of neopositivists, as well as within the concept of the social context of science development. Now these issues become important again in connection with access to the so-called big data and with the transformation of the purpose of sciences from cognitive to purely utilitarian and applicative ones. A next noteworthy reason for the lack of reliability of scientific information is the full institutionalization of scientific research and its commercialization in the framework of global business.

1. The truth and the credibility of information

The development of the information society [1; 2] needs careful using of information. This should be reliable. What does *reliable information* mean? Is it the same as true information? According to the classical (correspondence) conception of truth [3][1], true information is given by means of such a statement, the content of which is consistent with the state of affairs of some reality. According to the coherent conception of truth [4], true information requires the consistency of the content of the sentence expressing information with other sentences that are accepted. In turn, the pragmatic conception of truth [5, p. 716-720] reduces the truth of information to the effectiveness of the use of what is claimed in it.

Advantages and disadvantages of the three conceptions of truth are the subject of metalogics. An ordinary user of the Network is, however, not able to apply one or other criterion of truthfulness effectively. He must rely on the authority of the source of information. Thus, the first postulate to care for the quality of information is:

P1 – to identify the source of information.

The identification of the source of information only transfers the problem of assessing the credibility of information to a different level, i.e. from the verifying the truth of the information to:

P2 – to determine the level of credibility of the information source.

The latter type of verification is not at all simpler and more accessible to the ordinary Network user. But at this level, i.e. at the level of credibility of the information source, the information certification process could be used more profitably. It is at this level that one could make an effort to define a strategy in maintaining the quality of information [6; 7].

Piotr Homola proposed a way to certify scientific information. He writes about it in the following way.

> "At the moment we are speaking about nothing less than possibility of insertion certification based on some, collegially acknowledged, standards of quality of scientific information. Let's say that result repeated by two independent research teams on two independent instruments would have A category, while result repeated by two

[1] Explication of the classical conception of truth is the semantic conception of truth, in: A. Tarski. *Semantic conception of truth*. In: I.J. Lee (ed.). *The language of wisdom and folly*. New York: Harper and Brothers; 1949, p. 67-71.

independent research teams on the same instrument could receive B category at most" [7, p. 115].

The condition of information certification, given by P. Homola can be satisfied only in some cases, because the use of a second instrument, which is not properly calibrated with the first one, generally brings a further distortion of the obtained results.

2. The credibility of the results of natural and technical research

In the case of scientific information, the task of certifying information seems easier due to objective scientific criteria, i.e. intersubjective availability and repeatability. But here also the matter is not simple because of applying the methods of data elaboration and difficulties with calibration of instruments used to obtain empirical data[2]. Any act of reality cognition is immersed in the mental processing. In science, the products of this process are models, in all the variety of their classification. Traditionally, the scientific model in natural science is a linguistic and mathematical interpretation of so-called empirical data[3] [8, p. 55-67] (as it is in theoretical modeling of physical phenomena). Let us, therefore, consider how the interpretation and whether only the interpretation affects the quality of information about empirical data [9].

Empirical data in the natural sciences (in the social sciences this matter looks different) should be treated as signals coming from the natural environment, perceived by human senses (mediated or not by detection apparatus) and recorded in appropriate parts of the brain. After this registration, they are subjected to processing by the human intellect and receive a linguistic form of the statement about the state of affairs it describes. Intermediary between the so-called *naked* empirical fact and its transformation into a sentence stating the occurrence of the fact is a natural (or artificial) apparatus of perception (or registration), a natural or artificial measuring apparatus, an assumed algorithm of selection data, and a conceptual (theoretical) apparatus in which the incident of the fact receives a linguistic (and possibly mathematical) interpretation.

Whenever a fact is not just an unexpected or spontaneous observation, then observation of it is already previously targeted, i.e. the studied reality is previously prepared at the so-called stage of conceptualization, in accordance with the purpose of the study and the existing formulation of preliminary knowledge about the research subject[4] [10, p. 118-121]. At the

[2] Distinguishing the structures of the large-scale distribution of matter in the 1970s to the 1980s is a perfect example of the dependence of research results on the observation and measurement apparatus and statistical methods used. Cf. J.N. Fry. *On statistical searches for filaments. Report NSF-ITP.-85-83*. Santa Barbara: Univ. of California; 1983; T. Grabińska, M. Zabierowski. *Does multiclustering of galaxies aggregates appear as specific coil of extragalactic data unseparated from interpretation of the role of interstellar obscuration?* Astrophysics and Space Science. 1987;129:403-6; T. Grabińska. *Wybrane zagadnienia filozofii przyrody. Kontekst bezpieczeństwa personalnego i ekologicznego* (*Selected issues of the philosophy of nature. Context of personal and ecological safety*). Wrocław: Wydaw. WSOWL: 2016, p. 21-3.

[3] The simulation models used more often require a separate discussion of the reliability of the results obtained on their basis.

[4] There the special metaphysics has been defined. It is identified there with "world's image or world's scientific perspective (in the sense of Ajdukiewicz's concept)". It is "put forward by the mathematical cognitive apparatus of the theory, is not given explicitedly, and is nor embedded in the very mathematics. It has to be reproduced within the framework of the full conceptual apparatus of the theory". The special metaphysics also has a heuristic function because "the empirical material has to be prepared (conceptualized) in the way

stage of conceptualization, cognitive treatments of abstraction, idealization and analogy[5] [Cf. 10, p. 112-118] are performed. First, the object under investigation is subject to i) an abstraction separating it from the background in which it naturally occurs, and, secondly, ii) an idealization, i.e., transforming it into an appropriate theoretical object.

The analogy occurs at every stage of the processing of empirical data. Initially, it is found at the stage of abstraction due to the necessity to choose such an object (objects) from the background that matches with the reference object of research. In this way it generates an appropriate idealization. This selective function of analogy is then enriched with a different function of analogy – already at the level of data preparation, both statistical and demonstrative – that is, with reference to the adopted research hypotheses, the epistemological position, as well as to the possible application of research results.

This second stage of analogizing data process ends with their interpretation, i.e. presenting it within the conceptual apparatus used in the subject knowledge. Interpretation, therefore, which provides the thesis about the fact, does not refer to the so-called *naked* fact. Between the *naked* fact and the element of empirical knowledge about the fact, which is colloquially called data, there is still a chain of cognitive procedures – intellectual, mathematical and technical, which convert this fact into the data. At each stage of this processing, various kinds of disturbances may occur, caused by the difference of natural and artificial (mathematical and technical) registration and processing tools that are used.

It is not, however, just about technical instrumentation, because, as it has been presented, other actors are also involved in transforming a fact into an empirical data. These are the following:

a) the conceptual apparatus used firstly for idealization and then for interpretation,
b) statistical selection of signals and, in the final phase, statistical processing of the received data [Cf. 11],
c) technical standard of transforming the empirical signal into information,
d) assessment of the results in terms of compliance with the epistemological (sometimes also ideological) position,
e) assessment of results for suitability in applications.

In cases (a), (b) and (c), the errors of registration, preparation and interpretation of the fact cannot be ruled out definitively, but when defining the research methods, the course of the experiment elaboration can be objectively controlled and the validity of the results to the chosen methods and technical instruments can be relativised[6]. In turn, in cases (d) and (e),

it can become the subject of theoretical description". Cf. K. Ajdukiewicz. *Weltbild und die Begriffsaparatur*. Erkenntnis. 1934;4:259-87.

[5] There are presented three types of idealization conditions: c^F – corresponding with searched object (phenomenon) and c^T – inherited in the very theory. The two determine the way the theory is associated with the object conceptualized in its conceptual apparatus "and the fact that the phenomenon considered is contained in the applicability range included in the explanation of the conjunction" of some theoretical laws. If the theoretical model is expressed in mathematical language, then idealization conditions c^A should be applied to perform necessary approximations.

[6] The so-called grain structure of the Universe has been the subject of astronomical research, developing especially in the 1960-80 years of XX century. The same empirical (observational) facts provided different empirical data, e.g., the de Vaucouleurs group, variously separated groups and clusters of galaxies, superclusters etc. Until now, the distribution of large-scale visible matter is not finally identified. Cf. M. Demiański, A. Michalec. *Struktura Wszechświata w dużej skali*. Postępy Astronomii. 1978;26(2):145-7; S. Paul, R.S. John,

the voluntary-decision factor of a particular researcher or group of researchers is involved. Here, different personal, ambitional, ideological and commercial [12] interests can play a role. Intentional or unintentional scientific abuses[7] may also exist.

Factors (d) and (e), i.e. these of psychological and socio-political provenance, are the real obstacle in determining the credibility of the data and the information formulated on their basis. They mainly cause disinformation, often introduced intentionally. In the cases (d) and (e), criteria of results evaluation are close to the criteria for coherent and pragmatic conception of truth.

3. The importance of voluntary-decision factors for the quality of information

Voluntary-decision factors are more and more present in the information provided on the Network. The pressure of information coming from various sources cause an unceasing lack of possibility to fulfill the first postulate of care for the quality of information – P1, i.e. *to identify the source of information*. All the more so it is impossible to check the credibility of the information source (condition P2). While in the natural empirical sciences, the fulfillment of P1 and P2 is, after all, possible, social or political information are exposed to manipulation and historical information knowingly or unknowingly can come from simply forged facts. The identification of the source of falsification and the assessment of the degree of forgery is often impossible. *Fake news* are used to manipulate casually the behavior of recipients and shape their opinions (most often consumer and political ones [13]).

The popularity of the concept of post-truth[8] [Cf. 14] begins to supersede the concept of truth, especially in the social and political discourse. This situation arose from the difficulty of eliminating the voluntary-decision factors of (d) and (e). It even parasitizes them, and, therefore, the so-called social consensus would decide to accept such or other theses widely propagated, as in Facebook.

That is why P. Homola's appeal to extend human rights for the right to reliable information [7, p. 112-3] is as current as possible. In the case of information about the so-called the *hard* facts of the natural sciences, a certain (but not total) credibility is guaranteed because of an objective insight into the factors (a), (b) and (c). In the case of the *soft* facts of the social and partly historical sciences, the selection of factors (a), (b) and (c) is marked not only by

P. Gupta, H. Kumar. *Understanding 'galaxy groups' as a unique structure in the universe*. *Monthly Notices of the Royal Astronomical Society.* 2017;471(1):2-11.

[7] In the history of scientific knowledge development the conscious forgery of empirical data is known as those allegedly confirming, for example, the theory of interspecies evolution or, in turn, in a methodologically unauthorized way falsifying the theory of relativity or genetic laws. Cf. J.E. Walsh*. Unraveling Piltdown: the Science Fraud of the Century and its Solution*. New York: Random House; 1996; Ch. Schremph. *Die Welt-aether als Grundlage eines einheitlichen Weltbildes*. Leipzig: Otto Hilmans Verlag; 1934; D. Joravsky. *The Lysenko Affair*. Chicago – London: Univ. of Chicago Press; 1986; F. MacRitchie. *Scientific Research as Career*. Boca Raton, FL: CRC Press – Taylor & Francis Group; 2011. In particular, archaeological research is exposed to falsification of historical evidence. Cf. J. Olko. *Fałszerstwa w przeszłości i wobec przeszłości* (*Counterfeits in the past and in the past*). Warszawa: Wydaw. TRIO; 2012.

[8] Post-truth is not simply a denial of truth, it is as in the classical logic – falsehood, colloquially called a lie (i.e. a claim incompatible with the existing state of affairs). Post-truth is a publicly (socially) agreed system of the applicable narrative about reality. It is applicable not because of (classical) truthfulness, but because of immediate social consensus (socially agreed consent) regarding what is assumed about the state of current or past reality. Whose inspiration does this assume?

the cognitive goal. In this case, the ideological or utilitarian goals are often as in (d) and (e). Voluntary-decision factors become crucial here, because the methodological status of social sciences is different from that of natural sciences. Therefore, factors (a) and (b) are often inoperable when verifying information about social facts.

4. The problem of individual responsibility or co-responsibility for the quality of information

Bearing in mind the importance of voluntary-decision factors in creating information, ensuring the quality of information demands the research on the purpose of which dissemination of information is to serve. So the third postulate of care for the quality of information is as follows:

P3 – to set the purpose of disseminating information.

It is worth considering one more factor that nowadays has an ever-increasing influence on the quality of information about the scientific fact, i.e. a rapid increase in the number of authors publishing together the same one scientific paper. Publications from empirical studies of natural and technical sciences usually require the cooperation of several people. So far in research teams involving from a few to a dozen people, it was possible to distinguish the research manager – and he/she was usually responsible for the reliability of research work results and for the quality of the information contained in the publication. Nowadays, however, the number of people who publish the same one paper reaches monstrous values – even several thousands[9]. The community of scholars has already given this phenomenon the name of *hyperauthorship*. Is it possible to talk about authorship in this case, or about branding a publication by name? The branding by author's name loses yet its meaning because of the loss of individual credibility: what and how to make the team of several thousand people credible? Each of them is involved merely in a small part of the research activity.

The International Committee of Medical Journal Editors (ICMJE) recommends differentiating co-authors from contributors. In order to be a co-author of scientific work, the following four criteria have to be met [15]:

1) to have a significant contribution to concept or project of scientific paper, or to be involved in the acquisition, analysis or interpretation of the empirical material,
2) to participate in the development of the intellectual message of scientific paper or in the intellectual polemics regarding its content,
3) to approve the agreed final version,
4) to accept responsibility for the whole and the reliability of its message.

If the person purportedly submitting input does not meet even one of these conditions, then he is not the co-author of it, but the co-worker of those who meet all four conditions. In the case of several thousand authors, nobody or almost no one is a co-author. Who is able to "embrace" such a complex whole? Who is responsible for the reliability of work and for the quality of information contained in it?

[9] In one of the recent research reports from the Large Hadron Collider Laboratory, CERN (LHC), there are 5154 authors listed: G. Aad, et al. *Combined Measurement of the Higgs Boson Mass in pp Collisions at √s=7 and 8 TeV with the ATLAS and CMS Experiments*. Physical Review Letters. 2015;114:191803-1-33, DOI: 10.1103/PhysRevLett.114.191803. Others reports are also branded by about 3 thousand authors.

The considerations taken on the quality of information clearly indicate that, regardless of whether one are dealing with scientific information about *hard* or *soft* facts, ultimately the quality of information depends on the responsibility of the creators of information. The logic of scientific research is not enough, because the actual research is always performed by a single person or group of people. Voluntary-decision factors ((c), (d)) affecting the quality of information prove the ethical and social [16] context of scientific information about the fact.

Final remarks

This work has been devoted to the reliability of information as such. The considerations have been focused, however, on the quality of information in empirical natural sciences. Such information should be easily verifiable due to reference to *hard* empirical data. It turns out, however, that because of data processing, information on scientific facts is also exposed to numerous errors and distortions.

The three postulates P1, P2, P3 listed in the paper provide the criteria for assessing the quality of all kinds of information. Thus, they also apply to information about social and political facts. This extensive subject, however, requires separate research. Indeed, it is touched upon in many contemporary studies on the preparation of facts, on so-called fake-news, misinformation, etc., and on the detecting them [Cf. 17]. It should be underlined that the manipulation of historical, social and political facts is also the basic tool of a new kind of war – the so-called information war [Cf. 18] is very effective in mediatized society on a global scale [Cf. 19].

Acknowledgement

No acknowledgement and potential founding was reported by the author.

Conflict of interests

The author declared no conflict of interests.

Author contributions

The author contributed to the interpretation of results and writing of the paper. The author read and approved the final manuscript.

Ethical statement

The research complies with all national and international ethical requirements.

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References

1. Castells M. *The Rise of the Network Society. The Information Age: Economy, Society and Culture*. Vol. I. Cambridge, MA – Oxford, UK: Blackwell; 1996.
2. Barney D. *The Network Society*. Malden, MA – Cambridge, UK: Polity Press; 2004.
3. Aristotle. *The Metaphysics*. Jones RB (ed.). Ross WD (transl). CreateSpace Independent Publishing Platform; 2012.
4. Bradley FH. *Essays on Truth and Reality*. New York: Cambridge Univ. Press; 2011.

5. Peirce ChS. *Truth and Falsity and Error (in part)*. In: Baldwin JM (ed.). *Dictionary of Philosophy and Psychology*. Vol. 2. New York, The Macmillan company; 1902.
6. Homola P. *Introduction to Discoverology*. In: Jankowska M, Pawełczyk M, Kulawiak M (eds.). *AI: Law, Philosophy & Geoinformatics*. Warsaw: Wydawnictwo Polskiej Fundacji Prawa Konkurencji i Regulacji Sektorowej Ius Publicum, Instytut Prawa Gospodarczego; 2015.
7. Homola P. *O konieczności uzupełnienia listy praw człowieka o prawo do informacji o jakości informacji*. In: Grabińska T, Kuźniar Z (eds.). *Bezpieczeństwo personalne a bezpieczeństwo strukturalne VI. Bezpieczeństwo w cyberprzestrzeni*. Wrocław: Wydaw. AWL; 2018, p. 111-23.
8. Grabińska T. *Wybrane zagadnienia filozofii przyrody. Kontekst bezpieczeństwa personalnego i ekologicznego*. Wrocław: Wydaw. WSOWL: 2016.
9. Grabińska T. *O niejednoznaczności procedur interpretacyjnych w naukach empirycznych*. In: Musiał G (ed.). *Twórczość naukowa Michała Kaleckiego i jej znaczenie w teorii ekonomii*. Katowice: Wydaw. Akad. Ekon.; 2006, p. 359-70.
10. Grabińska T. *Philosophy in Science*. Wrocław; Ofic. Wydaw. Politechniki Wrocławskiej; 2003.
11. Fry JN. *On statistical searches for filaments. Report NSF-ITP.-85-83*. Santa Barbara: Univ. of California; 1983.
12. Fang FC, Steen RG, Casadevall A. *Misconduct accounts for the majority of retracted scientific publications*. Proceedings of the National Academy of Sciences of the United States of America. 2012:109(42):17028-33.
13. Marr B. *Fake News: How Big Data And AI Can Help*, [online]. Forbes. Mar 1, 2017. Available at: https://www.forbes.com/sites/bernardmarr/2017/03/01/fake-news-how-big-data-and-ai-can-help/?sh=b8c4c0070d56 [Accessed: 24 September 2018].
14. Tesich S. *A Government of Lies*. The Nation. 1992;January:12-14, [online]. Available at: https://drive.google.com/file/d/0BynDrdYrCLNtdmt0SFZFeGMtZUFsT1NmTGVTQmc1dEpmUC1z/view [Accessed: 21 September 2018].
15. *Defining the Role of Authors and Contributors*, [online]. ICMJE. Available at: http://www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html [Accessed: 23 September 2018].
16. Fleck L. *Genesis and Development of a Scientific Fact*. Bradley F, Trenn TJ (transl.). Chicago – London: The Univ. of Chicago Press; 1981.
17. Asr FT, Taboada M. *Big Data and quality data for fake news and misinformation detection*. Big Data & Society. 2019;January–June:1-14. DOI: 10.1177/2053951719843310.
18. Taddeo M. *Information Warfare: A Philosophical Perspective*. Philosophy and Technology. 2012; 25(1):105-20.
19. Hjarvard S. *The Mediatization of Culture and Society*. London – New York: Routledge; 2013.

Biographical note

Teresa Grabińska – PhD in physical sciences, habilitated doctor in humanities, competences in security sciences attributed by the Polish Accreditation Committee. She is the author of about 300 scientific publications that have appeared in the country and abroad. Her scientific achievements include 17 original scientific monographs and editing or co-editing several series of collective monographs. She is a laureate of two minister's awards and the Nicolaus Copernicus Award of the Polish Academy of Arts and Sciences, and is a founding member and current president of the International Scientific Society "Fides et Ratio", based in Krakow. Her most important monographic publications are: *Teoria, model, rzeczywistość* (*Theory, model, reality*), *Philosophy in Science*, *Filozofia wojny, pokoju i bezpieczeństwa. Od Platona do Clausewitza* (*Philosophy of war, peace and security. From Plato to Clausewitz*), *Teorie bezpieczeństwa państwa w myśli filozoficznej i politycznej. Od Sun Tzu do Józefa M. Bocheńskiego* (*Theories*

of state security in philosophical and political thought. From Sun Tzu to Józef M. Bocheński), *Bezpieczeństwo osoby i wspólnoty. Ochrona bytu osobowego w obliczu ideologii i praktyki transhumanizmu* (*Security of the person and the community. Protection of personal existence in the face of ideology and practice of transhumanism*), *O filozofii Karola Wojtyły i nauczaniu Jana Pawła II w kontekście ochrony osoby i wspólnoty* (*On the philosophy of Karol Wojtyła and the teaching of John Paul II in the context of the protection of a person and community*), *Bezpieczeństwo personalne. Koncepcja trzech warstw* (*Personal safety. The concept of three layers*). At present, every year, she presents the volume from the series *Bezpieczeństwo personalne a bezpieczeństwo strukturalne* (*Personal Safety and Structural Security*).

W kierunku bezpieczeństwa informacyjnego: jakość informacji i niepewność związana z obróbką faktu

STRESZCZENIE Rozważany jest problem wiarygodności informacji. Problem ten dotyka zarówno naukowców, jak i zwykłych ludzi zależnych od sieci informacyjnych. Sformułowano zatem trzy postulaty, które są niezbędne do dbania o jakość informacji: P1 – zidentyfikowanie źródła informacji, P2 – określenie poziomu wiarygodności źródła informacji, P3 – ustalenie celu rozpowszechniania informacji. Pierwsze dwa postulaty są uniwersalne, ponieważ dotyczą wszystkich użytkowników informacji. Trzeci staje się coraz ważniejszy w wyborach społecznych i politycznych obywateli. W pracy naukowej fakty empiryczne przekształcane są w dane empiryczne (coraz częściej w postaci tzw. big data), które są wynikiem coraz bardziej zaawansowanego rejestrowania i przetwarzania za pomocą narzędzi technicznych i informatycznych, takich jak: a) techniczne przekształcenie sygnału empirycznego w informację, b) statystyczny dobór sygnałów i dalsze przetwarzanie statystyczne otrzymanych danych, c) ocena wyników pod kątem przydatności w zastosowaniach. W grę wchodzą jednak także inne czynniki „epistemiczne", takie jak: d) aparat pojęciowy wykorzystywany do idealizacji (a następnie interpretacji), e) ocena wyników pod kątem zgodności z pozycją epistemologiczną (czasem także komercyjną i ideologiczną). Wszystkie te czynniki powinny być przedmiotem dokładnego studium tzw. errologii zaproponowanej przez P. Homola.

SŁOWA KLUCZOWE prawda, fakty nauk przyrodniczych i technicznych, przetwarzanie danych, odpowiedzialność badacza

How to cite this paper

Grabińska T. *Towards informational safety: quality of information and uncertainties of fact machining*. Scientific Journal of the Military University of Land Forces. 2021;53;2(200):236-44.

DOI: http://dx.doi.org/10.5604/01.3001.0014.9779