Analogy of intelligence with other disciplines

Nicolae Sfetcu

April 4, 2019

Sfetcu, Nicolae, "Analogy of intelligence with other disciplines", SetThings (April 4, 2019), MultiMedia Publishing (ed.), URL = https://www.setthings.com/en/analogy-of-intelligence-with-other-disciplines/

Email: nicolae@sfetcu.com

A partial translation of:
Sfetcu, Nicolae, "Epistemologia serviciilor de informații", SetThings (4 februarie 2019), MultiMedia Publishing (ed.), DOI: 10.13140/RG.2.2.19751.39849, ISBN 978-606-033-160-5, URL = https://www.setthings.com/ro/e-books/epistemologia-serviciilor-de-informatii/

Analogy of intelligence with other disciplines

Science

Intelligence analysis has many important epistemological resemblances with science (problem solving, discovery, skillful use of tools, knowledge verification) and is more interested in *a posteriori* than *a priori* knowledge, (Agrell and Treverton 2015) on how or the basis on which a proposition may be known. (Greco and Sosa 1999, 243–70) Both intelligence analysis and science focus on knowledge gained from empirical observations, knowledge that is typically *a posteriori*. (Ormerod 2018) Regarding the intelligence analysis, epistemological considerations are sometimes implicitly considered in the management of prejudices and uncertainties within complex intelligence systems. (Smith 2017)

Stephen Marrin and Jonathan D. Clemente note that intelligence is "subject to some amount of both random and systematic error resulting from built-in limitations of the collection instruments themselves, and as a result the information that feeds into the subsequent analysis is never an exact representation of reality." (Marrin 2012a) In order to compare the methods used in intelligence with the scientific methods, three epistemic pivotal criteria can be used: sample size, observation point and data integrity. (Pritchard and Goodman 2009)

Scientific methods involve collecting huge amounts of information to achieve meaningful results. Small sets of data are usually rejected due to statistical uncertainty. In intelligence, the size of the relevant samples is extremely small, often only a few separate sources. Gigantic data volumes are collected, but selecting relevant information is a difficult process.

In science, researchers usually keep the original data, which is examined directly, thus ensuring a high degree of reliability and certainty. In intelligence, data and information rarely come to analysts at first hand. Even the identity of certain people may be uncertain.

In science, researchers are mindful of their own prejudices, but in general the data is not consciously affected. In the intelligence world, the situation is very different: data and information are deliberately and on a large scale manipulated with the intent of distorting reality. Sometimes even members of the same organization included in the intelligence cycle have reason to distort data or even to input false data, often for money or other benefits.

After the September 11 attacks in the United States, efforts have been intensified to make more "scientific" the methods used in intelligence. (Marrin and Torres 2017) Some of the earliest works in the field, including of Sherman Kent, have supported scientific methods not only in understanding certain issues but also in making verifiable evaluations. (Agrell 2012, 130) R. A. Random wrote in 1958 that the rejection of scientific methodology in favor of intuition would be like abandoning rationality in favor of "guessing." (Marrin 2012b, 2) Other researchers in the field of intelligence have argued that the scientific method is fundamental for the intelligence analysis. (Marrin 2012b, 531)

The characteristics of such a "scientific method" are data collection, hypothesis formation, hypothesis testing, and obtaining conclusions that can be used as reliable predictive sources. (Platt 1957, 75)

This analogy is generally considered to be correct insofar as the process is "systematic" and "logical": (Ylikoski 2017) "As a science, intelligence analysis is a systematic process, which generates and tests hypotheses objectively. Following the scientific method, analysts adhere to rules to develop sound and logical judgments." (Martin 2011, 30)

Both science and intelligence refer to "verifying" as well as "falsifying" the assertions of knowledge. (Shrager et al. 2010) Efforts in the field of intelligence to align the analysis with the objectives of science, especially with "falsification", have been promoted by several scientists. (Shaikh Muhammad and Jiaxin 2006) As Polanyi explains, centralizing understanding of knowledge in science is a sufficient recognition of personal knowledge, partly because there are no "rules" in the field of science. (Ormerod 2018) For this reason, according to Polanyi, the scientist must rely on personal knowledge to make decisions about, for example, whether the evidence or clues must be accepted or rejected, just like the intelligence analyst. Polanyi's arguments have an impact both on the field of national security and on law enforcement from intelligence analysis, as these areas use empirical observations to develop and understand the assertions of knowledge. (Peters and Cohen 2017) In the field of national security, empiricism can be observed in the existence of large systems of intelligence gathering. Polanyi contests the epistemological basis of excessive faith toward the supposed central role of empiricism and the logic of induction in science: "The part played by new observations and experiments in the process of discovery in science is usually over-estimated," (Polanyi 1964, 29) a vision opposed to conventional understanding of the science promoted by Karl Popper. (Popper 1972, 23–27)

Archeology

The puzzle metaphor is used in both information and archeology. Both disciplines involve collecting evidence to build as complete a picture as possible. (Pritchard and Goodman 2009) Some tracks are not seen from the beginning, and others are deformed and cannot contribute to the logic of assembling. Maybe it would be useful to use the reverse engineering, in order to understand how the original image split, what are the stages, and what happened to the missing pieces.

David Clarke highlighted a theory of archeology based on the relationship between the ancient known culture and the remains discovered by the excavator, a completed puzzle and the missing pieces to be analyzed.

The necessary steps in any archaeological interpretation are:

1. The range of patterns of social and environmental activities and processes that once existed, that is, what the archeologist is trying to understand (ie, the total activity relevant to requesting the intelligence service).
2. The sample and remnants that were stored at that time (intelligence analysts are trying to find out what elements of their opponent's activity becomes intelligence, what is to be collected and from what sources).
3. Sample of that specimen which has survived and is to be recovered (fragments of intelligence held by certain sources, considering their possible distortion).

4. Sample of the specimen which is recovered. (intelligence gathered through different collection systems and sources of primary importance) (Clarke 1968)

The archaeologist might use the intuition for interpretation, but he can make it very easy. The intelligence analyst, in turn, tries to understand the problem using what is available, that is, a part of the sample.

After identifying the accuracy of the intelligence activity for each step, the following applicable theory types can be considered:

Theory of suppositions and depositions: The link between 1 and 2. Determining the relationship between the divided total activity and the sample that is potentially accessible to the collection systems. Which sources should be used? What are the prejudices?

Post-depositional theory: The relationship between 2 and 3. To what extent can the passage of time distort the sample?

The theory of restoration: The link between 3 and 4. To what extent the data collected represents all that it is possible? How much material has been gathered and what nature? Which similar activities could take place elsewhere where access is easy?

Analytical theory: The link between 4 and 1. The intelligence collector must select the relevant information, depending on the analyst's understanding of the intelligence requirements. At the same time, constraints (technological or other) may limit the capacity of the collector to transmit certain types of data for further analysis. In this case, certain prioritization decisions can be made by giving up some information.

Theory of interpretation: The analyst provides his/her assessments to decision-makers. Here, cognitive biases appear, and methods are used to contract them by questioning hypotheses and generating alternative assumptions.

The archaeological analogy is far from perfect. But it illustrates the steps by which a picture is fragmented into fragments for analysis. Analysts should be aware that their data is incomplete, but the nature of this incompleteness may not be fully understood, leading to the possibility of serious implications. (Pritchard and Goodman 2009)

Business

Intelligence is traditionally characteristic of governmental organizations involved in national security issues. But innovative private companies are increasingly adapting the model of intelligence services to the business world to help plan their own strategies. The process of converting raw information into actionable processed intelligence is almost identical for governmental and business organizations, the latter developing the intelligence gathering and analysis system with its own methodologies. (Krizan 1999)

The two activities seem to be two independent areas, but the approach to the challenges is quite similar, depending on warning capabilities; (Miscik 2017) decision makers in both cases are expected to find out about threats and opportunities in advance. Academic research has demonstrated that it is possible to perform a comparative analysis of the two areas (government and business) and identify possible parallels between them. (Barnea 2018) In both areas, the product of the intelligence activity is the one that supports the decision-making process as a result of information about changes in the external environment caused by specific threats. But the ontological, epistemological and methodological study of this process is much better developed today in business (Busenitz and Barney 1997) so that national intelligence services can take on many of the theories and techniques developed in the field of competitive intelligence.

A fundamental resemblance between national intelligence and competitive intelligence is that both operate based on an "intelligence cycle," (Omand 2011) a multi-stage systematic process that ensures the conduct of intelligence under control.

Competitive intelligence (CI) is a domain whose work consists in defining, collecting, analyzing and distributing information on product, customers, competitors, and any environmental aspect needed to assist executives and managers in strategic decision-making for an organization. It is a legal business practice, unlike industrial espionage, which is illegal. (SCIP 2014) The CI focuses on the external business environment, (Haag 2012) being a process involved in collecting information, transforming it into processed intelligence and then using it in decision-making. (McGonagle and Vella 2003)

CI is often seen as synonymous with competitors' analysis, but it is more than just analyzing competitors; includes the entire environment and stakeholders: customers, competitors, distributors, technologies and macroeconomic data. Organizations use CI to compare with other organizations ("competitive comparison") to identify the risks and opportunities in their markets and to test their plans for market response. ("Business Warfare") (Kurtz 2018)

Strategic intelligence focuses on long-term issues, analyzing aspects that affect the competitiveness of a company over a few years. The real time horizon for strategic intelligence ultimately depends on industry and how fast it is changing. This type of intelligence involves, among other things, the identification of weak signals and the application of a specific methodology and process initially developed by Gilad. (Gilad 2014)

In *tactical intelligence*, the emphasis is on providing information to improve short-term decisions, most often related to the intention of increasing market share or revenue.

The technical advances of massive parallel processing offered by the "big data" architecture have allowed the creation of multiple platforms for the recognition of target entities. (Krapohl 2013)

CI was influenced by national strategic intelligence. Fleisher suggests that business intelligence has two forms. Its more limited (contemporary) shape focuses more on information technology and on internal focus than the CI, while the broader (historical) definition is more comprehensive than CI. Knowledge management, when specifically designed, is seen as an organizational practice based on information technology that uses data mining, corporate intranets, and organizational asset mapping to make it accessible to decision-makers. The CI share some aspects with knowledge management; contains human and experience-based information for a more sophisticated qualitative analysis. Knowledge management is essential for effective change. An effective key factor is a powerful IT system dedicated to the execution of the entire intelligence cycle. (Barnea 2009)

Business intelligence (BI) is "a set of methodologies, processes, architectures, and technologies that transform raw data into meaningful and useful information used to enable more effective strategic, tactical, and operational insights and decision-making." (Evelson 2008) BI *technologies* can handle large amounts of unstructured data to help identify, develop, and create new business strategic opportunities. The *purpose* of BI is to allow easy interpretation of these large volumes of data. (Sfetcu 2016) The BI technologies offer historical, current and predictive perspectives of business operations. Common *functions* of BI technologies are reporting, online analytical processing, analytical research, data mining, process mining, complex event processing, business performance management, benchmarking, text mining, predictive analysis and prescriptive analysis.

BI can be used to support a wide range of business decisions, from operational to strategic. When combined, internal and external data can provide a more complete picture that creates "processed intelligence" that cannot be inferred through any single set of data. (Feldman and Himmelstein 2013)

Often, BI scenarios revolve around distinct business processes, each built on one or more data sources. These milestones of business intelligence include, but are not limited to:

- Data sources to collect the necessary data
- Transform the data into intelligence and present it appropriately
- Querying and analyzing data
- Act on collected data.

A notable similarity between government and business intelligence is the goal of maximizing the profits of customer intelligence products. Changes are difficult to monitor due to the difficulty in assessing the significance of signals and noise in predictions to reduce uncertainty. (Rafii and Kampas 2002) Also, based on the processed information, both proactively act and attempt to obtain information that can send alerts about the relevant changes and their meanings. (Prescott 2012) In both areas, the intelligence provided to decision-makers can often be a catalyst for future action and a new initiative to gain benefits.

Medicine

The medical practice of diagnosing identification, collection, analysis and dissemination is similar to that of intelligence. (Converse 2008, 1) Marrin and Clemente argue that both disciplines apply similar general approaches to obtain information. (Marrin and Clemente 2005, 709) In order to better understand the data and intelligence gathered, the analyst calls for related disciplines, similar to doctors in the diagnosis of patients.

According to Owen Ormerod, another similarity occurs in the challenges faced both by integration of diagnosis or analytical assessments in a wider context, ranging from alternative hypotheses to evidence that invalidate, and using deductive and inductive judgments to distinguish relevant intelligence from noise. (Marrin and Clemente 2005, 715)

"Underlying the perceived similarities between intelligence analysis and the medical profession is the belief that as more information is collected, the practitioner will become more confident in their assessment.” (Treverton 2011, 40) But this is not always true. Under certain circumstances of the medical profession, the diagnostic process involves considerations that are not "scientific" or structured in a typical way, but are related to doctor bias, craftsmanship and what Polanyi would call "personal knowledge." Post-structuralist Michael Foucault presented a similar argument that the work of the doctor is influenced by the surrounding culture, as it does not "discover" the truth "there" but rather assembles it in the mind, which is partly a product of its environment. It is too simplistic to understand the activity of the doctor or intelligence analyst as neutral observers who only collect and analyze "the facts." (Ormerod 2018, 28)

Some intelligence experts have argued that intelligence analysis can benefit from adopting models similar to those in the medical field. (Manjikian 2013, 1) Richards Heuer has indicated the medical field as a profession that could be imitated by the intelligence. As he states, (Heuer 1999, 62) the physician observes the symptoms of the patient and, by using his expert knowledge of the body, a hypothesis is generated to explain such observations, followed by tests to collect additional information to evaluate the hypothesis and apply a diagnosis. This medical analogy emphasizes the ability to correctly identify and evaluate all plausible assumptions. In this sense, the collection is focused on information that might reveal alternative assumptions: "While analysis and collection are both important, the medical analogy attributes more value to analysis and less to collection than the mosaic metaphor." (Heuer 1999, 62)

Bibliography

Agrell, Wilhelm. 2012. “The Next 100 Years? Reflections on the Future of Intelligence.” *Intelligence and National Security* 27 (1): 118–32. https://doi.org/10.1080/02684527.2012.621601.

Agrell, Wilhelm, and Gregory F. Treverton. 2015. *National Intelligence and Science: Beyond the Great Divide in Analysis and Policy*. Oxford, New York: Oxford University Press.

Barnea, Avner. 2009. “Intelligence Solutions Through the Use of Expert Tools_CIM_March_April_09 | International Politics | Israel.” Scribd. 2009. https://www.scribd.com/document/17752171/Intelligence-Solutions-Through-the-Use-of-Expert-Tools-CIM-March-April-09.

———. 2018. “Nationak Strategic Intelligence and Competitive Intelligence: How a Comparative View and Mutual Learning Can Help Each?” ResearchGate. 2018. https://www.researchgate.net/publication/323884850_Nationak_Strategic_Intelligence_and_Competitive_Intelligence_How_a_Comparative_View_and_Mutual_Learning_Can_Help_Each.

Busenitz, Lowell W., and Jay B. Barney. 1997. “Differences between Entrepreneurs and Managers in Large Organizations: Biases and Heuristics in Strategic Decision-Making.” *Journal of Business Venturing* 12 (1): 9–30. https://doi.org/10.1016/S0883-9026(96)00003-1.

Clarke, David L. 1968. *Analytical Archaeology*. Methuen.

Converse, Ray. 2008. “Intelligence and Medicine: Parallel Cognitive Traps.” http://www.pherson.org/wp-content/uploads/2013/11/03.-Intelligence-and-Medicine-Parallel-Cognitive-Traps_FINAL.pdf.

Evelson, Boris. 2008. “Topic Overview: Business Intelligence.” 2008. https://www.forrester.com/report/Topic+Overview+Business+Intelligence/-/E-RES39218#.

Feldman, David, and Jason Himmelstein. 2013. *Developing Business Intelligence Apps for SharePoint: Combine the Power of SharePoint, LightSwitch, Power View, and SQL Server 2012*. 1 edition. Beijing: O’Reilly Media.

Gilad, Ben. 2014. “CI Education Harvard Style?” http://www.academyci.com/wp-content/uploads/2014/09/CI_Harvard_Style.pdf.

Greco, John, and Ernest Sosa. 1999. *The Blackwell Guide to Epistemology*. 1 edition. Malden, Mass: Wiley-Blackwell.

Haag, Stephen. 2012. *Management Information Systems for the Information Age: Ninth Edition*. McGraw-Hill Higher Education.

Heuer, Richards J. 1999. *Psychology of Intelligence Analysis*. Lulu.com.

Krapohl, Don. 2013. “Working .NET Entity Extractor Using OpenNLP Models.” *A | I – Augmented Intelligence* (blog). 2013. http://www.augmentedintel.com/wordpress/index.php/augmented-intel-free-online-analytics-applications-for-corporate-intelligence/working-net-entity-extractor-using-opennlp-models/.

Krizan, Lisa. 1999. "Intelligence Essentials for Everyone." ResearchGate. 1999. https://www.researchgate.net/publication/235073074_Intelligence_Essentials_for_Everyone.

Kurtz, Jay. 2018. "What Is A Business Wargame?" 2018. http://competitive-intelligence.mirum.net/competitive-intelligence-methods/what-is-a-business-wargame.html.

Manjikian, Mary. 2013. "Positivism, Post-Positivism, and Intelligence Analysis." *International Journal of Intelligence and CounterIntelligence* 26 (3): 563–82. https://doi.org/10.1080/08850607.2013.758002.

Marrin, Stephen. 2012a. *Improving Intelligence Analysis: Bridging the Gap between Scholarship and Practice*. Routledge.

———. 2012b. "Is Intelligence Analysis an Art or a Science?" *International Journal of Intelligence and CounterIntelligence* 25 (3): 529–45. https://doi.org/10.1080/08850607.2012.678690.

Marrin, Stephen, and Jonathan D. Clemente. 2005. "Improving Intelligence Analysis by Looking to the Medical Profession." *International Journal of Intelligence and CounterIntelligence* 18 (4): 707–29. https://doi.org/10.1080/08850600590945434.

Marrin, Stephen, and Efren Torres. 2017. "Improving How to Think in Intelligence Analysis and Medicine." *Intelligence and National Security* 32 (5): 649–62. https://doi.org/10.1080/02684527.2017.1311472.

Martin, Kirsty. 2011. "The Paradox of Intuitive Analysis and the Implications for Professionalism." ResearchGate. 2011. https://www.researchgate.net/publication/258839553_The_Paradox_of_Intuitive_Analysis_and_the_Implications_for_Professionalism.

McGonagle, John J., and Carolyn M. Vella. 2003. *The Manager's Guide to Competitive Intelligence*. Greenwood Publishing Group.

Miscik, Jami. 2017. "Intelligence and the Presidency How to Get It Right." ResearchGate. 2017. https://www.researchgate.net/publication/319978753_Intelligence_and_the_presidency_how_to_get_it_right.

Omand, David. 2011. *Securing the State*. UK ed. edition. London: C Hurst & Co Publishers Ltd.

Ormerod, Owen. 2018. "Advancing the Epistemology of Intelligence Analysis: A Polanyian Perspective." ResearchGate. 2018. https://www.researchgate.net/publication/328232543_Advancing_the_epistemology_of_intelligence_analysis_A_Polanyian_perspective.

Peters, Adrienne M. F., and Irwin M. Cohen. 2017. "The Mandate and Activities of a Specialized Crime Reduction Policing Unit in Canada." *Police Practice and Research* 18 (6): 570–83. https://doi.org/10.1080/15614263.2017.1363970.

Platt, Washington. 1957. *Strategic Intelligence Production: Basic Principles*. F.A. Praeger.

Polanyi, Michael. 1964. *Science, Faith and Society*. Later Printing edition. Chicago: University of Chicago Press.

Popper, Karl R. 1972. *Objective Knowledge: An Evolutionary Approach*. Revised edition. Oxford Eng. : New York: Oxford University Press.

Prescott, John E. 2012. "The Evolution of Competitive Intelligence." *Revista Inteligência Competitiva* 2 (2). https://doi.org/10.24883/ric.v2i2.45.

Pritchard, Matthew C., and Michael S. Goodman. 2009. “Intelligence: The Loss of Innocence.” *International Journal of Intelligence and CounterIntelligence* 22 (1): 147–64. https://doi.org/10.1080/08850600802487018.

Rafii, Farshad, and Paul J. Kampas. 2002. “How to Identify Your Enemies Before They Destroy You.” *Harvard Business Review*, 2002. https://hbr.org/2002/11/how-to-identify-your-enemies-before-they-destroy-you.

SCIP. 2014. “Code of Ethics - Strategic and Competitive Intelligence Professionals (SCIP).” 2014. https://www.scip.org/page/CodeofEthics.

Sfetcu, Nicolae. 2016. *Cunoaștere și Informații*. Nicolae Sfetcu.

Shaikh Muhammad, Akram, and Wang Jiaxin. 2006. “Investigative Data Mining: Connecting the Dots to Disconnect Them.” Intelligence Tools Workshop. http://www.huitfeldt.com/repository/ITW06.pdf.

Shrager, Jeff, Dorrit Billman, Gregorio Convertino, J. P. Massar, and Peter Pirolli. 2010. “Soccer Science and the Bayes Community: Exploring the Cognitive Implications of Modern Scientific Communication.” *Topics in Cognitive Science* 2 (1): 53–72. https://doi.org/10.1111/j.1756-8765.2009.01049.x.

Smith, Michael Douglas. 2017. “A Good Intelligence Analyst.” *International Journal of Intelligence and CounterIntelligence* 30 (1): 181–85. https://doi.org/10.1080/08850607.2016.1230708.

Treverton, Gregory F. 2011. *Intelligence for an Age of Terror*. Reprint edition. Cambridge ; New York: Cambridge University Press.

Ylikoski, Petri. 2017. “The Illusion of Depth of Understanding in Science.” https://doi.org/10.31235/osf.io/qz7sg.