

# Transition From Observation To Knowledge To Intelligence (TOKI)

## **Editors**

**Dr. Victor ODUMUYIWA, Dr. Olufade ONIFADE,  
Prof. Amos DAVID & Prof. Charles UWADIA**

Victor ODUMUYIWA  
Department of Computer Sciences,  
University of Lagos  
Nigeria

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# **Transition from Observation to Knowledge to Intelligence**

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Editors

Dr. Victor ODUMUYIWA  
Dr. Olufade ONIFADE  
Prof. Amos DAVID  
Prof. Charles UWADIA

## **Decision Support System such as the Observatory and Related Issues**

**Fleur Nadine NDJOCK**

*Advanced School of Mass Communication (ASMAC)*

*University of Yaounde 2*

*fnadine.ndjock@univ-yaounde2.org*

**Abstract.** This article aims to highlight the concept of observatory as a tool for decision support and new issues associated. To do this, we start from the work of Amos David who highlighted the issues related to risk in the production process and in that of the use of information. More than a decade later, we find in the light of the evolution of the different researches, that the problem related to the process of production of the information found answer, but the problems related to the use of the information remain. After justifying this by relying on current research, we try to highlight the new issues that can be the future challenges of researchers.

**Keywords:** Decision support tools, observatory, decision-making process, human factor, indicators.

## **1. Introduction**

The work of Amos David has contributed to a considerable advance on the processes of Competitive Intelligence (CI) and the decision-making process. By deepening his research on issues and approaches to solutions, the researcher presents three models on the implementation of the CI process: the presentation of a decision-making problem, the translation of the decision-making problem into problems of information retrieval and the functional architecture to facilitate the use of an information system in an CI context (David, 2005). He concludes: "Despite the considerable progress of the proposed solutions to facilitate the use of information to solve decision-making problems, there are unfortunately problems that still do not attract enough attention: process of production and use of information ". We start from this conclusion to lead the reflection of this article which aims to highlight the concept of decision support tool such as the observatory and the new associated issues. We start from the previously cited work that highlights the issues related to risk in the production process and in that of the use of information. More than a decade later, we find in the light of the evolution of the different researches, that the problem related to the process of production of the information found answer, but the problems related to the use of the information remain. After having justified this by relying on current research, we will then try, if possible, new problems generated during the research.

Indeed, decision support tools aim to guide the decision-maker towards a fast and risk-free decision-making process, or at least minimizing uncertainty in decision-making. To automate such a tool, three human actors are essential: the decision-maker, the watchman and the system engineer. The human being happens to be at the beginning and end of any decision-making process. At first by the decision problem that triggers the problem of finding the information and at the end of the process when making the decision. As a result, the impact of the human factor deserves to be studied in order to better apprehend decision-making tools and thus make them more effective.

## **2. Evolution of research**

Following on from the work started in 2005, some researchers have looked at the process of producing information. Thus, in 2008, (Goria, Knauf, David, & Geffroy, 2008) worked on the problem of information retrieval. In continuation of the previous works, these establish that there are 4 stages in the search for the information:

- the understanding of a request for information: The person who faces a problem of search for information is not necessarily the one who will go in search of it. In this case, the person who expresses the informational need must transfer knowledge to the person responsible for solving the information search problem. It happens in simpler cases that both people, the applicant and the researcher being one person. In which case, the problem would not arise since the one who is needed is also the one who seeks. He has the skills and abilities to achieve his goal;

- the understanding of an information search problem. Researchers here raise a problem of interpretation of the statement. Indeed, despite the good will of both actors (the one who poses the problem and the one who goes in search of information), it happens that the transfer of knowledge is not obvious thus leading to a misunderstanding of the problem. Also, the person who has a problem finding information has a representation of the problem which is not the problem itself. The solution will only be found through dialogue;

- support for an explicit formulation of needs: by passing the dialogue and a good communication, the two actors manage to follow to ensure a better formulation of the needs. The researchers call it "the principle of cooperation" which would require that in the framework of a cooperation, the actors contribute as much as possible to the interpretation of their statements by the other;

- integration into the decision-making process. The principle behind CI (Revelli, 1998) is that the information obtained helps to reduce uncertainty in decision-making.

From the foregoing, the researchers conclude that any information search problem is not identified in the same way, depending on the context in which it is specified. However, the process of solving an

information retrieval problem is identical regardless of its operational framework.

We start from the fact that it is the information available that guides the process and the choice of solving a decision problem (Ndjock, 2017). In addition, the decision-making process involves the processing of a greater or lesser mass of data. Researchers have thought through the various platforms that the information to which one adds value and presented in the form of an observatory, sort of dashboard would reduce the share of uncertainty in the decision making. This hypothesis was conclusive by the implementation of two dedicated platforms ODSE (Dynamic Observatory applied to the Educative System) and ISKO MMS (International Society for Knowledge Organization's Membership Management System): The first application deals with the use of information from the domain of the education system in Cameroon to produce indicators that can be used by decision-makers in their decision-making processes. For example, the decision-maker will be able to obtain changes in enrollment rates and cross-check them with changes in the teacher's rate of supervision to guide the recruitment strategy and / or the school training strategy. The system was the subject of a doctoral dissertation by Nadine Ndjock (Ndjock, 2017). The system is informed by the various services of the educational system.

The second application concerns a membership management system of a scholarly association - ISKO (International Society for Knowledge Organization). A database is created from the profiles of the members of the association. The organization is structured around chapters. Thus, the profile of the member integrates both his personal data and the monitoring of its status within the association. The system provides the statistics of the number of members by chapter, the evolution of the number of members per chapter over several years and the geographical distribution of chapters in the world and the number of members. Not only can the executive office and chapter administrators create and edit member profiles, they can get value-added information from visualization tools to develop development strategies.

Based on the work of (Ndjock, 2017) - work guided by the CI process and the approaches to satisfying choice and the rational

decision process outlined by (Falque & Bougon, 2013) - the observatory is a tool offering transparency in processing, clarity in the collection process and the communication of information and precision in decision-making. It serves as a monitoring and control instrument through which the decision-maker observes, analyzes and directs his decision according to the behavior of one or more indicators.

The major scientific challenge of using information to assist in decision-making is the methodologies to be developed to produce the indicators from the large volume of information and the decision-making method to best ensure a "good" decision. Indeed, in their work, David & Ndjock (2017) believe that both in the IE process and in management, the use of information for decision-making requires the collection of information related to ongoing decision-making problem, therefore relevant information. One of the methods to demonstrate the relevance of information is to highlight the attributes of these and their relationship to the decision problem. These attributes and associated values thus obtained are considered value-added information because they are derived from the basic information. To make the information comprehensible, graphic tools are used, based on techniques known as "visualization of information". Basic information or value-added information is often not presented in a form that is understandable to the decision-maker. For example, a list of results in tabular form is hard to understand, especially when the list is long. This is why researchers (David & Ndjock, 2017) use various forms of information presentation as part of their studies depending on the type of result, we want to demonstrate - geographic map, graphs (lines, histogram, sector), etc.).

It is from these visual presentations, also from the indicators, which in turn are derived from the basic information, which allow a better interpretation of all the information collected.

However, they draw attention to the fact that it is from the decision problem that the indicators are specified and that the visual presentations are based on the indicators. It is therefore essential that the decision-maker, who interprets the indicators and directs the decision to be taken.

### **3. The aspect of unresolved work: the problem of using information**

In a decision-making process, as we have already said above, it is the information available that guides our decision choices and it is up to it, we must choose one or the other of the choices which are offered to us.

Contrary to what some people still seem to think, free information does not exist. No information is made public for anything. Naudet (2016) states that "there is free and free". The author goes on to say that free education "exists in human relationships, it takes form through charity, or personal, family or community solidarity. But in all these cases it is the voluntary use of a legitimately earned income, which will be used to help others. This gratuity is not here in question and has a certain moral value. But there is also and above all an artificial free. Here, the approach is the opposite: one displays the gratuitousness of a good and one makes it pay by someone else, without asking him his opinion: the moral value of this forced charity is null. (Naudet, 2016). To say that there is always someone to benefit from the publication of information. Since life in itself is only a succession of choices, the refusal to make a choice is already a choice. Whether one decides to take the risk of making or not choosing is based on the information available. Sometimes this decision is a difficult but decisive choice. Therefore, some authors believe that the use of decision support tools would facilitate decision-making. Decision Support System (DSS), based on (McNurlin & Sprague, 1989), are "computer-based systems that help decision-makers deal with poorly structured problems through interaction". directly with data models and analysis models ". These systems are usually highly quantitative and allow users to explore the consequences of different decisions based on different data. However, in his work, (NDJOCK, 2017) taking up the work of Robert (2007) thinks that the user should understand the mechanism of operation of a DSS for a better analysis. This mechanism is summarized in the figure below

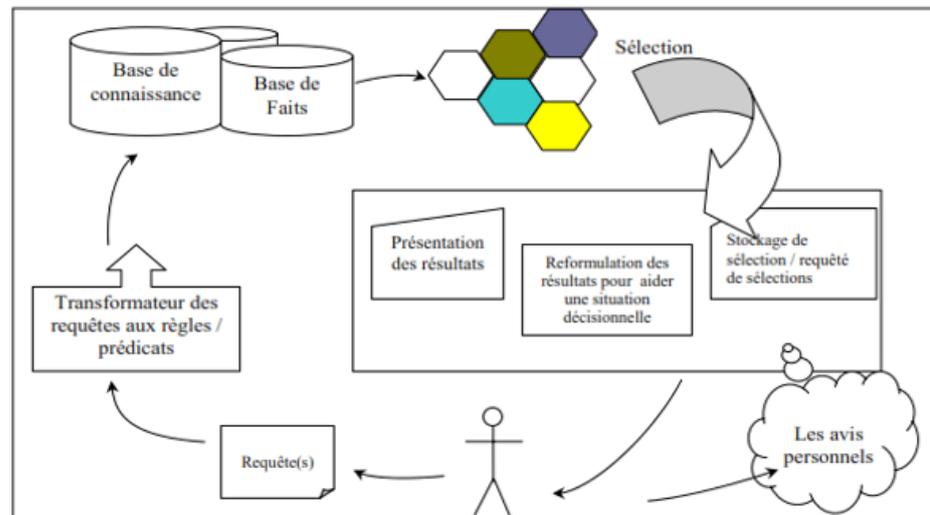


Figure 1 : The stages of Robert's information search (2007: 65-68)

The processing of information benefits from the computing power of computer machines called DSSs which process information at high speed and at the same time reduce the possibilities of manipulation of information. However, the problem is not at the level of treatment and even less the manipulation of the data but of their use. Indeed, starting from the fact that each information is oriented, the question to be asked is what is done of information as final data allowing to decide. We said above that the human being is upstream and downstream of the decision-making process. He is the one who is initially confronted with a problem of decision-making, he transforms it into a problem of search for information, and once the information is found, he is the one who must make the decision. Whatever the decision support tool, it is the human being who interprets the indicators and makes the decision according to the objectives to be achieved. The whole problem is there: the interpretation of the results and the decision-making according to the objectives to be achieved.

For example, in a car, if the dashboard shows the running speed, the fuel level, the oil level in the engine, the lighting of the high beam and the direction lights, the driver is immediately informed and can trigger an action based on the indicators on his dashboard. Nevertheless, even if the behavior of an indicator requires action, nothing obliges the driver

to decide and even less to act in the sense to remedy a defect, an insufficiency. This is the same function that a DSS performs. It informs the decision maker at any time on the status of the performance of his system.

Here is an example to support my theory that whatever the tool, the decision maker at the end of the process is the only master of his decision which can go one way or another. The example is the VAR (Video Assistance Referee) used at the last football world cup in 2018. It only applies to four different scenarios:

- Validation of a goal
- A red card
- Possibility of a penalty in the penalty area
- In case of altercation to identify the offender.

Just like an observatory, the VAR is a set of sensors (here cameras) placed strategically and connected by an optical fiber network to a central dashboard where the indicators are analyzed and interpreted to lead to a decision.

Though controversial, the VAR is however very appreciated when it is advantageous for a team. If European countries have benefited from this technology, observers of this world cup will tell you that millions of Africans have kept a bitter aftertaste. A column of Fouad Laroui published in the newspaper "JeuneAfrique" says: "The VAR has been used only to the advantage of European countries. It has never been used to the advantage of Tunisians, Senegalese, Nigerians or Moroccans. The Morocco-Spain match was such a blatant example. However, when a Spaniard scores at the last second but the referee signals that he is out of play, the field referee suddenly discovers the VAR, shows on the screen the toe (I do not exaggerate ) of a Moroccan player who seems to clear the Spanish striker - and he decides to validate the goal. "<sup>1</sup>

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<sup>1</sup>[http://www.jeuneafrique.com/mag/586295/societe/chronique-mondial-2018-maroc-la-var-la-nouvelle-arme-anti-meteques/?utm\\_source=jeuneafrique&utm\\_medium=flux-rss&utm\\_campaign=flux-rss-jeune-afrique-15-05-2018](http://www.jeuneafrique.com/mag/586295/societe/chronique-mondial-2018-maroc-la-var-la-nouvelle-arme-anti-meteques/?utm_source=jeuneafrique&utm_medium=flux-rss&utm_campaign=flux-rss-jeune-afrique-15-05-2018) 7-7-18 – Consulted on 12/04/2018

The experience of the VAR proves several points:

- The central referee (the decision maker) remains master of the game, even if his video assistants do not agree.
- The problem of human perception, of interpretation of the indicators: The decision taken can be justified but the interpretation is never unanimous.
- A problem of field of vision: because we do not show everything or we do not show anything.

Our decisions are based on partial information, everything is a question of angle of view. For example, on April 26, 2018, the press published a photo of Prince William of England leaving the hospital after the birth of his son. Seeing the first image, some were quick to interpret the gesture as a "finger of honor" Prince. However, it was necessary to see this same image from another angle of view to find that the interpretation given to the gesture was wrong.



Image 1



Image 2

Figure 2: Prince William's gesture after the birth of his son. Photo REUTERS / Peter Nicholls<sup>2</sup>

As stated above, the VAR is appreciated when it is advantageous for a team. The same is true for all decision support tools. Some see it as a

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<sup>2</sup> <https://fr.sputniknews.com/societe/201804261036115362-prince-william-geste-message/> - Consulted on 10<sup>th</sup>/04/2019

facilitator in decision-making, while for others it is a tool that limits abuse and unofficial manipulation.

#### **4. From perception to decision-making**

The human being learns from the birth by observation and the specialists of the education think that the observation plays an important role however, this one must be organized. There are different reasons for observation and the context of the observation must be well defined at the risk of getting lost. For example two people including a parent who is observing a child. While their observation is focused on the same target, the reasons are necessarily different and the approaches will be different. Depending on the role of the observer, the objectives may be:

- Understand the child's behavior in everyday situations of interaction;
- Decrypt the child's skills and abilities;
- Discover the specific needs and desires of the child;
- Modify your educational environment.

In the 1900s, Herbert Simon (1957) developed the theory of decision and the concept of limited rationality. According to this, in a given situation, managers do not choose "the best solution" but the most satisfactory solution given their level of information, their motivation and their real capacity for action.

There are some points in Simon's theory that we would like to point out and it would be wise to come back to this point:

...managers do not choose "the best solution" but the most satisfactory solution. This position is in line with the theory of (Falque & Bougon, 2013) on decision-making models: the rational and the satisfactory choice models.

Indeed taken up by (Ndjock, 2017), the rational model is based on an economist vision and makes it possible to identify all the possible options, to rank them, to evaluate the consequences and their optimization. This model assumes that goals and objectives are well defined and accepted in advance. As a result, the optimal use of the

information available to the decision maker makes the decision or final choice more efficient. The listed steps in the decision-making process from this method are as follows:

- 1) Recognize the need for decision making;
- 2) Diagnose the problem and set a goal;
- 3) Identify the alternatives;
- 4) Gather information;
- 5) Adapt a method of weighting the criteria;
- 6) Assign the coefficients to the selected criteria;
- 7) Assign a mention, a grade for each option considered
- 8) Choose an option;
- 9) Implement the decision and ensure its follow-up.

As for the model of satisfactory choice, the decision-maker "accepts the following reasoning: I look for possible solutions by referring to what is familiar to me. I choose the first option that corresponds to criteria that I must comply with, or objectives that I have given myself" (Falque & Bougon, 2013). It is a very familiar model around a standard procedure and determined by the experience of past events and the anticipation of those to come: it is reasoning by case.

The decision-making process therefore becomes rational, because of the intrusion of cognitive and emotional biases in each of its phases. This is where the utility of AFIS comes into play, which minimizes the various intrusions and presents information that is free of constraints. They guide decisions and ensure good management of the work program. Given their **level of information**, their **motivation** and their **real capacity for action**, the observatory puts at the disposal of the decision maker, the information he needs for his action. The latter being the result of efficient and effective treatment, there should no longer be the problem of "information level" or "motivation" because the indicators presented on the scoreboard are consecutive to the original objectives.

In more than most aircraft accidents, investigations show that when it is not a question of technical failures, in 97% of cases, it is human interference, a misinterpretation of indicators despite the level of

sophistication of equipment. If the indicators are misinterpreted, the result is undeniably wrong and can to some extent lead to disaster. These examples amply demonstrate the predominant factor of "trust" in the interpretation of indicators.

Herbert is not wrong to emphasize this because everything is played when interpreting the indicators. It is obvious that the decision-maker's ability and abilities have an effect on the direction of the decision. What should be done in this case to limit the impact of the approximate interpretations of the decision makers?

## **5. Conclusion**

It is obvious that to trigger an action, it is necessary that the indicators are interpreted and to do this, the decision-maker needs to have knowledge about his environment. Based on the work of Stephen R. Brubaker (2007), the authors (Okae, Bremang, Akerele, & David, 2014) have highlighted the close link between knowledge and decision-making. We interpret on the basis of the knowledge we have about the observed environment.

To decide is to take a risk and the methodology offered by the process of economic intelligence makes it possible precisely to minimize the share of uncertainty for an effective decision. However, our study shows that we do not take enough into account the impact of the human factor in the process and relying more on different tools.

We think it is time to investigate it and deepen it. The questioning may be to identify the elements of the environment of these tools with for example the problems related to Big Data or as much as possible, the anticipation of human behavior. This is not obvious, but with all "decision support tools", the decision maker explodes the number of his tasks. Indeed, it is now necessary to add technical and computer know-how for mastery of manipulation and the amount of information to manage and master is such that it becomes normal that some perhaps crucial go unnoticed.

## List of References

- Agrawal, D., Bernstein, P., Bertino, S., Davidson, U., Dayal, F., & Michael. (2012). Challenges and Opportunities with Big Data: A white paper for the Computing Community Consortium. A white paper prepared for the Computing Community Consortium.
- Bontems, T., Goulin, S., Censier-Calmus, C., & Taillebot, F. (2013). Cloud Computing, a response to the issues of quality management of projects of geographically dispersed teams: cases resulting from project management for administrative teams and geographically distant research. <https://halshs.archives-ouvertes.fr/halshs-01402592>, Accessed April 04, 2019.
- Data Academy. (2019, 03 24). Retrieved from What is Big Data ?: <https://www.datacademie.com/blog/what-is-the-big-data/>
- David, A. (2005). Economic Intelligence and Problem Information Systems and Solution Approaches. Strategic watch: Implementation and valuation of business intelligence, Algiers, Algeria, <inria-00000255>.
- David, A., & Ndjock, F. N. (2017). Value-added information to improve the decision-making process. Interdisciplinary Symposium of Corte, Università di Corsica. Corsica.
- David, A., & Ndjock, F. N. (2018). Big data, Knowledge Organization and decision making - Opportunities and Limit. 15th International ISKO Conference, Faculdade of Letras da Universidade do Porto (FLUP), Portugal.
- Falque, L., & Bougon, B. (2013). Decision Practice: Develop your discernment skills. Dunod-Paris, 3rd edition.
- Falque, L., & Bougon, B. (2013). Decision-making practices, developing one's discernment skills - 3rd edition-. Paris: Dunod.
- Goria, S., Knauf, A., David, A., & Geffroy, P. (2008). The process of Economic Intelligence: A study according to the point of view of the infomediary and problems of search of information. European Benchmark of Practices in Economic Intelligence, Pierre LARRAT <halshs-00311486>, pp. 115-138.
- McNurlin, & Sprague. (1989). Information systems in practice. Upper Saddle Miner, US: Prentice Hall International - 2nd Edition, 109.

- Naudet, J. Y. (2016). "There is no free meal." the aleps, counterpoints, 35-37.
- Ndjock, F. N. (2017). Dynamic observatory as a tool of decision support applied to the education system: case of Cameroon: approach of the Economic Intelligence. PhD thesis of the National Conservatory of Arts and Crafts (CNAM), pp. 5 <NNT: 2017CNAM1088>. <Tel-01591093>.
- Ndjock, N. (2017). Dynamic observatory as a tool of decision support applied to the education system: case of Cameroon. Paris: Thesis, CNAM.
- Okae, P., Bremang, A., Akerele, O., & David, A. (2014). Decision Support System on the Concept Observatory and Competitive Intelligence. Case Studies in Health System and Green Development Project. Transition to organization from knowledge to intelligence, Lagos, Nigeria, pp. 157-170.
- Ollion, E., & Boelaert, J. (2015). "Beyond big data" The social sciences and the multiplication of digital data. *Sociology*. No. 3, vol. 6 | 2015, Online January 20, 2016, Online - Accessed April 04, 2019. URL: <http://journals.openedition.org/sociology/2613>.
- Revelli, C. (1998). Strategic intelligence on the Internet. Paris: Dunod Editions.
- Simon, H. (1957). A behavioral model of rational choice. J. Wiley, York News: In H.A Simon Edition.
- Sun, Q., Wu, S., Hovland, M., Luo, P., Lu, Y., & Qu, T. (2011). The morphologies and genesis of mega-pockmarks near the Xisha Uplift, South China Sea. *Marine and Petroleum Geology* Volume 28, Issue 6. Elsevier, pp. 1146-1156.