ISSN 0798 1015

REVISTA ESPACIOS

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Vol. 40 (Number 25) Year 2019. Page 11

# The role of knowledge management in organizational development

## El papel de la gestión del conocimiento en el desarrollo organizacional

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Received: 28/02/2019 • Approved: 11/07/2019 • Published 22/07/2019

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**ABSTRACT:**

This document is dedicated to the conceptual and terminological challenges in knowledge management in project-oriented organizations. This research contains a historical analysis of the creation and development of the theory of knowledge management. Similarities and differences have been identified with the main notions of knowledge management, such as "data", "information" and "knowledge", and author definitions have been formulated. The main research techniques used in this work are general scientific methods, analysis and synthesis, generalization, experts experience in formalization methods, cryptanalysis of registry markers, heuristic methods for information processing, data search in large amounts of bad information formalized, modular programming, graphic drawing, statistical methods, hypothetical-deductive methods, etc. The results obtained will contribute to the development of skills for the early acquisition of managerial competencies by managers.
**Keywords:** data, information, knowledge, knowledge management, text products, project management, Insight-DNA technique.

**RESUMEN:**

Este documento está dedicado a los desafíos conceptuales y terminológicos en la gestión del conocimiento en organizaciones orientadas a proyectos. Esta investigación contiene un análisis histórico de la creación y el desarrollo de la teoría de la gestión del conocimiento. Se han identificado similitudes y diferencias con las nociones principales de la gestión del conocimiento, como "datos", "información" y "conocimiento", y se han formulado las definiciones del autor. Las principales técnicas de investigación utilizadas en este trabajo son métodos científicos generales, análisis y síntesis, generalización, expertos experiencia en métodos de formalización, criptoanálisis de marcadores de registro, métodos heurísticos para el procesamiento de información, búsqueda de datos en grandes cantidades de información mal formalizada, programación modular, dibujo gráfico, métodos estadísticos, métodos hipotético-deductivos, etc. Los resultados obtenidos contribuirán al desarrollo de habilidades para la pronta adquisición de competencias gerenciales contemporáneas por parte de los gerentes.
**Palabras clave**: datos, información, conocimientos, gestión del conocimiento

# 1. Introduction

A review of recent literature has shown that knowledge management plays a key role in the global economy and is crucial for improving the competitiveness of large-scale companies, as well as small and medium-sized enterprises. In fact, currently, there is more and more evidence that companies may use knowledge management for promoting significant innovations in business, environment and social justice contexts (Centobelli, Cerchione, Esposito, 2017).

In 1597, Francis Bacon stated that “knowledge is power”. As project management experts, we should use any opportunity based on our knowledge, and therefore knowledge management, to achieve best results in our project endeavors (Levin, 2010).

# 2. Literature Review

Knowledge management is now considered as one of the pressing challenges in economic development related to the world of industry, studies in services and information. The adoption and implementation of knowledge management practices may be considered as a breakthrough factor for companies willing to integrate in the knowledge-based economy. Evidence shows that organizations and companies are paying increasingly greater attention to knowledge management systems for ensuring their possession, exchange and use of productive knowledge in order to improve the training level and increase productivity. However, literature does not provide any universal definition of “knowledge management” (Margilaj, Bello, 2015).

The genesis of knowledge management started in the 1950-60s. The first forming stage of this theory was in recognizing the key importance of knowledge management in economic processes by scientists mainly from western countries. The well-known economist and author of multiple scientific works on management P. Drucker predicted a sequence of changes in social development due to rapid information dissemination. He defined knowledge as a key source of growth in the global economy, highlighting that in future organizations will have to be information-intensive (Martynova, Tsymbal, 2014). He introduced the concept of “knowledge worker” implying any employee capable of processing information and presenting his/her final thoughts to other people (Drucker, 1988; Handzic, Durmic, 2015; Sokhanvar, Matthews, Yarlagadda, 2014; Asiedu, 2015; Enshassi, Falouji, AlKilani, Sundermeieri, 2016).

During the 1970s, the number of activities related to the transition to a new “information” society increased. In 1973, D. Bell, an American sociologist, presented his research promoting a theory of "post-industrial society", in which information, knowledge, and technology are key resources (Bell, 1973; Martynova, 2014). The booming growth of information and communication technologies following the invention of the transistor radio provided an impetus for new forms of professional activities – data processing and programming. Bell’s ideas were developed by his successors, including Alvin Toffler, an American futurologist, who published his book “Shock of Future” in 1970 and its continuation “Third Wave” in 1980, suggesting a theory of informational society (analogue to Bell’s theory of "post-industrial society") replacing industrial society and built on economic, political and social knowledge-based relations. According to Toffler, science has converted into an independent industrial force driving the development and survival of society (Toffler, 1970; Toffler, 1980).

Thus, by the end of the 20th century, the academic and business community had formed a general understanding of the fundamental role of knowledge in the development of world society in its entirety and individual organizations in particular. The competition between the creators of this concept began to shift towards the predominance of new values, the significance of man as a carrier and creator of knowledge, the priority of scientific research in the manufacture of high quality products and the conquest of new markets. Recognizing the universal importance of knowledge, economists and managers went on to the next stage – searching for an answer to the question that remains relevant even nowadays: whether it is possible to manage knowledge and how to do it most effectively.

The contemporary stage of knowledge management is specified by the integration and combination of the above listed approaches resulting from the perception of this management area as a combination of interrelated processes (Ajmal, Helo, Kekäle, 2010). In our opinion, the reason for this is that knowledge management is focused on systematic and innovative methods, practice and mechanisms for controlling processes of generation, procurement exchange, distribution and usage of knowledge, intellectual capital and intangible assets. As a rule, knowledge management synthesizes ideas from various subjects such as psychology, philosophy and sociology, and may be comprehended as an "umbrella" for a wide range of academic disciplines. Knowledge management provides processes based on which organizations create value using their own intellectual and knowledge-based assets.

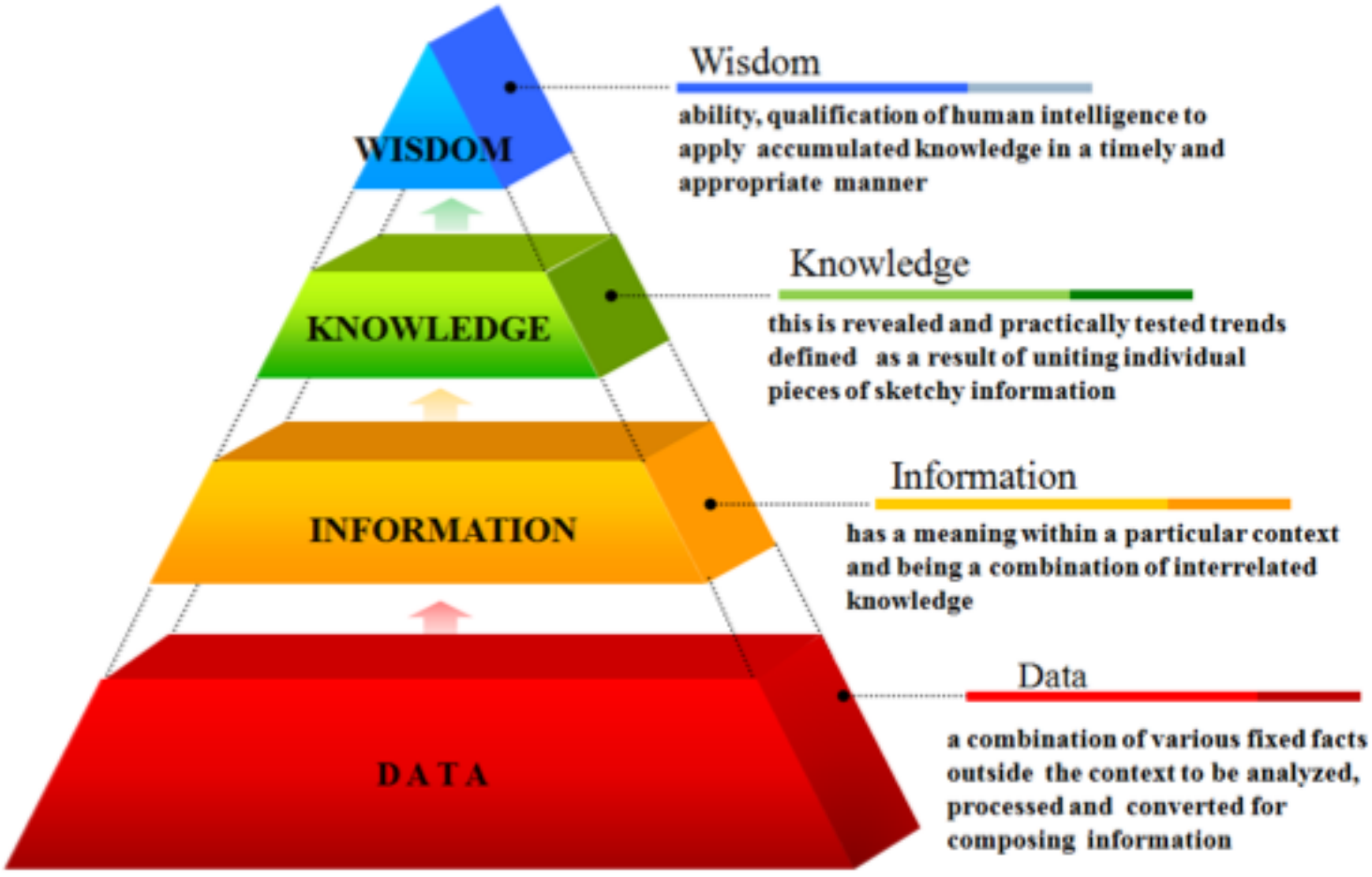
This value includes possessing everything that is known to employees, partners and clients, as well as sharing this knowledge among employees, departments and even other companies in pursuance of creating best practices. Nowadays, knowledge management is a "main challenge and shall be a basic skill for a modern manager". Organizations failing to handle their knowledge are exposed to shrinking organizational memory and knowledge resources, since they do not support their employees and prevent them from being knowledge workers (Polyaninova, 2011).

Whereas resource-based management is primarily focused on increasing the "total mass" of knowledge within an organization, increasing its intellectual assets but not always resulting in competitive solutions, process-based knowledge management is more focused on creating new knowledge that stimulates the overall innovation process and makes it possible to achieve a competitive advantage in the long run.

During the knowledge management process, particular importance is given to the difference between the definitions of "data", "information", and "knowledge", interrelated and interacting through various hardware-software technologies providing organizations with the opportunity to convert data into information and further information into knowledge.

*Essence of knowledge and its classification.* When considering different types of knowledge, it is important to study how knowledge is managed (Ekore, 2014). "Knowledge" as a definition was a subject of discussion among ancient philosophers. The basis for this definition was laid by Plato, whose ideas about the universality and authenticity of true knowledge (as opposed to opinion) remain relevant (Koulopoulos, Frappaolo, 2008). Currently, the information hierarchy – Data, Information, Knowledge, Wisdom (DIKW) – has become a frequent practice, risen to popularity after R. Akof's speech in 1989 (see Figure 1). A more advanced analogue to this hierarchy is the model proposed by Microsoft manager D. Campbell, who outlined 5 levels: signal, data, information, knowledge and understanding (Lankow, Ritchie, Crooks, 2012).

**Figure 1**
Information hierarchy DIKW




*Note: compiled by the authors using information sources (*Asgari et al., 2012; Ozhegov, 2012).

Based on this hierarchy, one may note that knowledge management is intended for acquiring wisdom by an organization.

F. Kiss believes that the most applicable definition to use nowadays is the one provided by Sveiby: "Knowledge is the ability to act – to solve a problem, to interfere with a process, or to create something new" (Kiss, 2016).

The Japanese scientists Nonaka and Takeuchi specified similarities and differences between knowledge and information. They analyzed three assumptions. Firstly, knowledge, unlike information, provides for the availability of beliefs and commitment. Knowledge is "a function of a particular stance, perspective, or intention". Secondly, knowledge, unlike information, implies action. It is always knowledge "to some end". Thirdly, both knowledge and information are about meaning and have a relative situational sense. Nonaka and Takeuchi defined knowledge as "a dynamic human process of justifying personal belief toward the 'truth'" (Nonaka, Takeuchi, 2011).

Deming stated that information is not knowledge. He explained that there is so much information, and people may even drown in it; however, people acquire knowledge very slowly. At the same time, he pointed out that there is nothing to replace knowledge. In his comments, he outlined the importance of transformation of this information into knowledge via expansion (Levin, 2010).

For further study, the issue of knowledge classification shall be analyzed from the perspective of management. The definitions of implicit and explicit knowledge may be traced back to Gilbert Ryle (1900-1976) and Michael Polanyi (1891-1976). Ryle basically analyzed the notions of "lack of knowledge" (implicit or tacit) and "knowledge" (explicit). Polanyi proceeded from the same background as Ryle; his contribution to the concept of tacit and explicit knowledge narrows down to the idea that "we know more than we can tell" (Oluikpe, Sohail, Odhiambo, 2011).

M. Polanyi describes four states of tacit data: functional, or an active awareness of purpose; phenomenal, knowledge in formation and appearance; semantic, meaning through application or hands on experience; and ontological, or a comprehensible understanding or proximal and distal relationships in forms (Spangler, Skovira, Kohun, 2015). Smith defines tacit knowledge as automated knowledge which requires very little time for taking a decision. One might as well say that this is collective behavior and collective consciousness

of an organization. Explicit knowledge is academic or technical data (or only information) described in formal language (Kozjek, Ovsenik, 2017).

The Russian researcher Barancheev proposed distinguishing between reflexive knowledge (as a result of the transformation of available knowledge) and intuitive knowledge (emerging with significant lack of the accumulated knowledge pool) (Barancheev, 2007). The most considerable contribution to this issue was made by Nonaka and Takeuchi, proposing first of all dividing knowledge into formalized (explicit) – fixed and kept in the form of documents, reports, books, data on electronic carriers, and non-formalized (tacit) – intuitive knowledge kept not on paper but in the minds of people: their experience, crafts, skills, impressions, anticipation and opinions. They also offered a model to represent the knowledge creation process, called SECI Model (Socialization, Externalization, Combination and Internalization). This model presupposes that total knowledge is created by the interaction between tacit and explicit knowledge. Therefore, the model provides for four ways of knowledge transformation:

• Socialization: transforms tacit knowledge into tacit knowledge – people communicate knowledge through immediate experiences.

• Externalization: transforms tacit knowledge into explicit knowledge – conversation is an effective method for formulating this process.

• Combination: transforms explicit knowledge into explicit knowledge – Explicit knowledge transformation is formulated in the form of explicit knowledge through the combination process. This type of knowledge is acquired inside and outside organizations. Thus, this knowledge is processed and combined to become shared knowledge.

• Internalization: transforms explicit knowledge into tacit knowledge – Explicit knowledge is created and shared within an entire organization; then it is transformed into the tacit knowledge of people through the internalization process (Oluikpe, 2012; de Nadae, de Carvalho, 2017).

In project management, knowledge is divided into “explicit” (knowledge that can be immediately encoded with words, images and numbers) and “implicit” (knowledge that is individual and hard to express, such as judgments, special knowledge, experience and know-how). Knowledge management refers to the management of both “implicit” and “explicit” knowledge through two goals: the repeated use of knowledge and the formation of new knowledge. The main activities intended for achieving these two goals are knowledge sharing and knowledge integration (knowledge acquired from various activity areas, contextual knowledge and knowledge in the project management area).

S. Gasik presented a model of project knowledge management and distinguished two basic types of project knowledge. Micro-knowledge is a piece of knowledge required to perform one task (or its part) or to solve a problem (or its part). Examples of such knowledge include a record of price list, the name of a person who may accomplish some task or the method of fixing particular types of software bugs. Macro-knowledge is the total knowledge of a given person. Providing training for a single team member in order to supply them the general knowledge required for taking part in a project is an example of a process fulfilled on all the knowledge possessed by an individual person (Gasik, 2011).

In his study, S. Gasik also analyzed the approach to knowledge management in PMBOK Guide® 5th edition. He found out that this edition of the Guide to the Project Management Body of Knowledge does not cover certain issues such as the mobilization of knowledge required to fulfill a project as a whole or gather all new knowledge (Gasik, 2015).

PMBOK Guide® 6th edition contains information on the knowledge management process. This document includes inputs, tools, techniques and outputs. The definitions of “knowledge”, “information” and “data” are specified as follows: “**Knowledge** is a mixture of experience, values and beliefs, contextual information, intuition and insight that people use to make sense of new experiences and information”. “**Information** consists of organized or structured *data,* processed for a specific purpose to make it meaningful, valuable, and useful in specific contexts”. “**Data** are discrete, unorganized, unprocessed measurements or raw observations”. In our view, these definitions may not be understood by many readers.

Therefore, we offer to make the following corrections to the definitions of "knowledge" and "information". **Knowledge** is a mixture of subject matters* *(experience, values, beliefs, contextual information, intuition and insight)* used by people to gain new experience or information. Knowledge may be explicit and implicit. **Information** includes organized and structured *data* processed for a specific purpose, which are considered as *data* to be used for extracting knowledge.

# 3. Materials and methods

The methodological basis of the research is composed of fundamental works on studying intellectual information systems, systematic and structural approaches, modular programming, categories and principles of vision philosophy, etc.

The main research techniques used in this paper are general scientific methods, analysis and synthesis, generalization, expert experience formalizing methods, crypto-analysis of record markers, heuristic methods for information processing, searching data in bulks of poorly formalized information, modular programming, graphic drawing, statistical methods, hypothetico-deductive methods, etc. (Ford, Gioia, 2000; Conlin, 2007).

Knowledge representation and designing knowledge-based systems are principal areas in the modern design of digital intelligence. They refer to the creation of knowledge representation models through the knowledge basis forming the core of expert systems. This area includes models and methods for extracting and structuring knowledge and merges with knowledge engineering. In our case, this is a notation, crypto-analysis of the subject-oriented base of the company head's personal records (the company's "brain"), and the formalization of his/her experience and attempt to not only keep but also gain knowledge based on heuristic algorithms. Project managers develop a conceptual information system modeling method to manage organizations on the basis of representing three-component subject-oriented records: "the essence of entities – the quanta of thoughts – the recording of attributes". In the context of this method, material costs and time consumption are reduced, the hazard of forgetting ideas is smoothed over, knowledge and clues are extracted, and the alternate solutions of complicated management challenges are formed by managerial patterns intended to reduce the time spent for adopting managerial solutions (Olson, E., Eoyang, 2001; Wester, Christianson, Fouad, 2008; Blanchard, Peale, 1988).

The systemic approach is a total of general scientific methodological principles (requirements) underlying with considering entities as systems. These requirements include: a) detecting the dependency of each element on its place and functions in the system, since properties of the whole are irredundant to the totality of properties of its components; b) analyzing the extent to which the system behavior depends on properties of its individual components and its structural properties; c) investigating the mechanism of the system and environment interaction; d) studying hierarchical patterns typical for a given system; e) ensuring a comprehensive description of the multiple-aspect system, f) revealing the empirical regularities of synergism occurring in complicated systems.

The structural approach suggests a description of interrelations (using a certain system of symbols and rules for their combination) among different sides (components) of the phenomenon under study. The chosen systemic and structural approaches ensure the comprehensiveness of information traffic analysis (Del Giudice, Della Peruta, 2016).

Modular programming is a programming method that helps to divide the entire program into a group of components called modules, each of which has its controlled size, distinct purpose and elaborately developed interface with the external environment (Nekrassova, Bolatzhanuly, 2013).

# 4. Results

It is difficult to disagree with the fact that the activity of any organization or enterprise includes a process-based search for required procedural decisions within the system of the distributed information of knowledge which is related to the transformation of information traffic types, maintained as records, texts, and documents, into knowledge. We understand

that information transforms into knowledge where it is in demand and resolves specific tasks. The term "knowledge" has many definitions in scientific literature. Although within the framework of our study the definition complies with ST RK ISO 9001, knowledge is regarded as information repeatedly used in the process of activity.

Therefore, the knowledge of an organization or enterprise is corporate knowledge, and it may not come into existence on its own. Today's publications have a lot of arguments in favor of enterprise knowledge systems (Samad, Kazi, Raheem, 2014; Milovanovic, 2011; Kliem, 1999; Idris, Richard, Waziri, 2016). However, there are almost no publications showing the mechanism for creating an enterprise knowledge system or when it needs to be created.

Enterprise knowledge is a system integrating the knowledge of individual entities constantly taking part in the formation of a corporate database.

The issues of organizing the process of thinking and intellectual activities within an organization generate interest in people occupied in managerial business. It is important that they have the new knowledge making this process controllable and productive.

To resolve this challenge, we offer a technology of digitalization of the entity's knowledge Insight-DNA – a technology of transforming thoughts into intellectual products (Tsechovoy, 2016).

In 2016, our academic paper on INSIGHT-DNA technology to transform spontaneous thoughts into intellectual products with a wide application range was registered as a copyright object by the Ministry of Justice of the Republic of Kazakhstan. In this paper, we are going to disclose one aspect of this technology application – creation of textual products within the framework of Information Management System for creating Text Products (IMS TP). We believe that well-organized and structured knowledge is transmitted and perceived in textual products, i.e. in textual forms making it possible to perceive, interpret and understand it resulting in adopting managerial decisions (Tsechovoy, Zholtayeva, 2017).

A review of the meaning content of the key definitions of "***data", "information"*** and ***"knowledge"*** used in knowledge management showed that the implementation of Information Management System for creating Text Products (IMS TP) requires bringing it into correlation with the categories of information objects such as "***records"***, "***textual products"***, "***source materials"*** and "***documents"*** used by us.

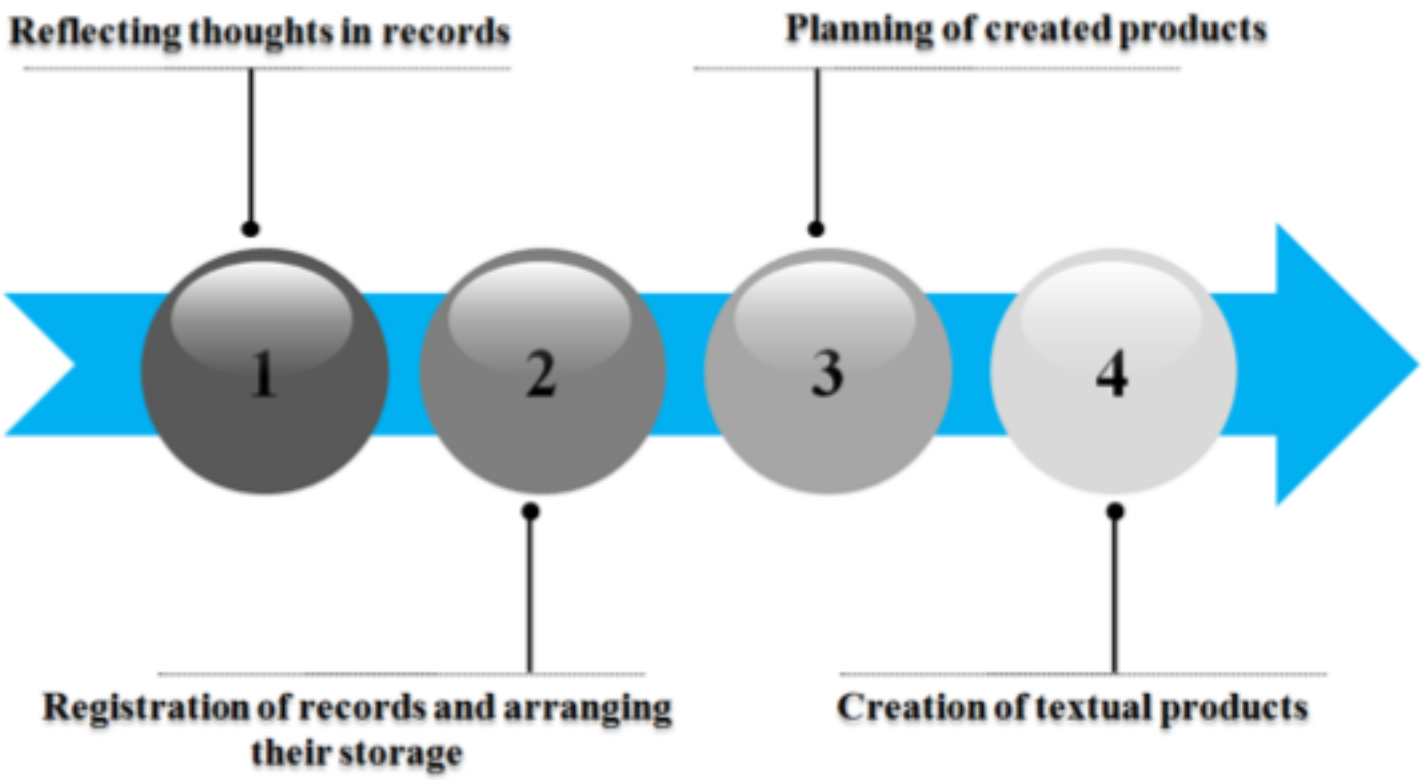
One can see that the definitions of "***data", "information"*** and ***"knowledge"*** do not reflect the process of converting the components of the *stream of consciousness* (thoughts, feelings, associations) of the subject in permanent forms to external storage media used by us in the introduced IMS TP. Firstly, this process was studied by us in the academic paper "INSIGHT-DNA Technology" to transform spontaneous thoughts into intellectual products.

According to practical results, this technology reveals breakthrough opportunities for subjects to acquire new results in processes related to transforming spontaneous thoughts into intellectual products (documents, regulations, publications, reports, etc.) and develop a triangle of talents of entities. **This technology** includes an information storage unit receiving information accordingly from records and their attributes, as well as characteristics required for the effective extraction of required information. This unit is an analogue of the human's long-term memory and material for creative work with fixed spontaneous thoughts. The base itself is formed by the knowledge of a person being continuously replenished via Internet or cloud service. Emerging thoughts are fixed in the form of small records on individual sheets as spontaneous loosely bound phrases SLF (analogue to instantaneous sensory memory). Based on them ideas are formed on the conceptual and theoretical basis of SLF – MBZ (analogue to short term memory but kept in a written form). Further, an operator transforms MBZ – BDZ and sorts out DNA characteristics with the help of the record's author and enters them into the database. The next stage includes the publically accessible records storage system and acquiring higher-class forms in the activity of IMS TP team.

The author's technology for transforming spontaneous thoughts into intellectual products in the context of the pilot project of creating textual products includes four groups of processes

(See Figure 2) (Tsechovoy, 2018).

**Figure 2**
Groups of INSIGHT-DNA Technology processes




Here is their brief description:

• Displaying the process and result of "thought movement", emotions, feelings and associations arising to the subject occupied in intellectual activity (creative work, science, managing sophisticated objects in a dynamic environment and so on) on external media in the form of personal records. Personal records shall create assumptions for the further prompt finding of the required relevant ones, subject to the rules and diagram of such a display designed by us.

• Registration and storage of records reflecting the components of the stream of consciousness in the base of knowledge structured in a special way which guarantees the prompt finding of the most demanded records;

• Planning of delivered textual products based on an open principle of the natural evolution of desires and conceptions into smart objectives and activity through continuous increase of the cognitive values of personal records carried out via transformation using INSIGHT-DNA technology;

• Creation of textual products (publications, reports, designs and documents) on the basis of personal records and textual products previously introduced to IMS TP and using own publications created earlier or publications created by other authors (source materials).

A key notion of our engineering research is the "stream of consciousness". Today this notion is used in a contemporary version, following Bono's conceptual framework (Bono, 2006). However, he did not consider and define the notion of the "stream of consciousness". After a literature review, a definition was found in Big Soviet Encyclopedia offered by James Williams in 1890. In his research paper "Foundations of Psychology", the stream of consciousness is interpreted as a complex river in which thoughts, feelings, emotions and associations are grotesquely mixed. Now the function of our digitalization technology of the subject's knowledge becomes understandable.

The digitalization technology of the subject's knowledge "Insight-DNA" is intended for:

• transformation of spontaneous thoughts, feelings, and associations into ideas;

• enhancement of the idea survivability rate;

• reinforcement of ideas in permanent forms;

• development of ideas into intellectual products (decisions, publications, developments,

etc.);

• synthesis of ideas and products isolated over time and becoming relevant.

It is very important that one of the intended purposes of the system should be to ensure the reinforcement of ideas. On pragmatic and practical levels we always feel that our thoughts may jump into our mind in a spontaneous way and go, and we remember something already forgotten. Our technology assists in the survivability of spontaneous ideas which may be formed in the process of the systematized and ordered, to some extent, transformation of spontaneous ideas into useful ideas.

The technology also provides for the reinforcement of ideas in permanent forms, which are specially designed and recommended by us for using as tested through practice. We elaborated a whole system of notions and rules. Since the reinforcement of ideas in permanent forms shall be carried out not once at a certain moment, this process is distributed within a rather long period.

Firsthand experience within the scope of Insight-DNA technology starting since October 10, 2012 has showed that the idea itself might form depending on its profoundness during one month or a few years. At the same time, the idea forming process provides for specifying some formulations of conceptual matters emerging as the subject receives information from outside during the reading process, and all this is reinforced in real life. A basic requirement for the permanent members of this process is to keep records at all times. Significant flashes of thoughts, important days end summaries (so called 'out-put') should be registered on a daily basis. This is an obligatory requirement to become a further internal need for the subject keeping records. The essence and value of our technology are well-illustrated with one of 25 citations of Nikola Tesla: "Had I some difficult task before me which was exhausting I would attack it again and again until it was done. So I practiced day by day from morning till night. At first it called for a vigorous mental effort directed against disposition and desire, but as years went by the conflict lessened and finally my will and wish became identical. They are so to-day, and in this lies the secret of whatever success I have achieved." (Tesla, 2008). So this technology makes it possible to develop ideas into intellectual products. This includes a whole set of algorithms, behavior rules, processing procedures to connect and develop a particular idea orientating it to the current goals, conceptions and responding any changes.

Finally, the main feature of this technology is that it is designed for the synthesis of ideas and products isolated over time and becoming relevant in the current situation.

The key notions (categories) used in IMS TP are the following types of categories of the information object:

1. **Records in the IMS TP system –** spontaneous thoughts, feelings and associations of the **subject** registered on external media and emerging in the course of life, which may be included in the enterprise knowledge system using a designed technology with future routing, based on five types of recording intended for creating a new textual product along the trajectory of phased development. There are the following types of records:

1.1 Written primary records (SLF) – A8 format records not registered in IMS TP (INSIGHT).

1.2 Written secondary records – A4 format records prepared for inclusion in INSIGHT either in full or in outlined fragments.

1.3 Electronic primary records – records entered or dictated to IMS TP by the subject.

1.4 Electronic secondary records – samples taken from electronic primary records made by the subject (with assigning individual numbers).

1.5 DNA records – electronic records assigned with codes for their automatic sorting out, extracting and storing of attributes, as well as recording background.

**2. Textual products / fragments of textual products in the IMS TP system** – products of intellectual activity (publications, designs, standards, regulations, presentations, etc.) created by the subject, a group of persons or an organization, registered in the Register of delivered textual products. A mandatory requirement for registration is the availability of an abstract and content of a textual product.

**3. Source materials in the IMS TP system –** a type of *information object* in which some information is disclosed, and knowledge first appears (materials published from the network including one's own publications (personal or developed by a work team) on the Internet or in printed media).

**4. Documents of organization** – a type of *information object* containing information related to the workflow management process as far as it concerns the Association of Project Managers of RK and **Project documents in the IMS TP system;** a type of *information object* containing information related to the work arrangement process under project or if it is approved by CEO for execution.

# 5. Discussion

The IMS TP concept consists in applying Insight-DNA technology to transform the subject's spontaneous thoughts into intellectual products, used by the duad CEO-team as the basis for developing the enterprise knowledge system (accelerated creation of medium-, big-, and mega-sized textual products) of a project-oriented company and contributing to the development of leadership skills at the fifth management level with the company CEO. IMS TP is required to replenish and develop a corporate knowledge database through texts created according to the Register generated by CEO in the system "CEO – IT specialist – Financial Director – a team for making text synthesis from records". Developing and replenishing records to be extracted are used by CEO (in collaboration with teams for "Strategic development" and "Business management") for the formation, reinforcement and development of leadership skills at the fifth management level as well as self-correction of personal qualities affecting one's own management style, decision-making techniques and involvement in the change stream dictated by the dynamics of environment factors.

# 6. Conclusion

The knowledge digitalization technology entering the market and inspiring the creation of domestic robots helping CEO promote scientific research and development in the machine intelligence area. The development of universal management tools will have a multiplicative effect on all branches of the national economy and on the system of higher education institutions as a whole. The potential users of future research results are heads of small and medium-sized enterprises, middle-rank managers, heads of large-scale corporations and representation offices of foreign companies, scientists, teachers, PhD students and Master's students holding studies in the area of project management and information systems.

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Revista ESPACIOS. ISSN 0798 1015
Vol. 40 (Nº 25) Year 2019

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