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Development of Human capital through Intellectual Competencies and Decision Support Systems

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Abstract

The paper deals with the development of human capital by developing decision making systems which depend on activating intellectual skills of decision makers. Decision support systems have been developed recently and are considered essential to enable organizations to make decisions especially the ones that consider human capital as the basic element of their success. Decision support systems aim at assisting decision makers to make ideal decisions, in addition to saving time and effort. The paper depicts the basic intellectual skills and how to utilize them when developing decision making support tools. It also describes concepts and characteristics of human capital in addition to the tools and characteristics of decision support systems and it recommends required procedures to develop decision support systems.

Keywords: Human Capital, Decision support systems, Intellectual Competencies

1. Introduction

This paper deals with the new concept known as human capital which demonstrates that knowledge is as important as the capital for the concept of human capital demonstrates that the organization needs to benefit from the knowledge of the employees to avail value-added to the organization. Knowledge and ideas have no value unless they are utilized and applied. They will not acquire tangible value without taking positive steps to implement and employ them. Hence, they deserve to be considered human capital (Hijan 1995). The source of most human scientific achievements has been the human capital represented in the individual's ability to discover effective solutions for problems and to enhance the quality of life.

Human capital is represented in the thinking process which is one of the highest knowledge-based mental processes behind the development of human life. This process is the most prominent human mental activity. Thinking is the innate natural talent each human enjoys which enables him/her to acquire, develop and utilize skills to solve problems.

Organizations need to use decision support systems due to the change of the concept of the manager's function in the new age of information system. Formerly, the manager's duties and responsibilities were confined to performing duties, applying statutes, giving instructions, enhancing employees' performance and motivating them. In the information age, however, the manger's responsibilities extend to include introduction, activation and application of knowledge within the organization by utilizing information systems such as decision support systems, in particular.

2. Human Capital

Human capital is considered one of the most important resources an organization has. It consists of the following three main components: work system within the organization, employees and customers (Stewart 1997) as shown in figure (1) below. The information and mental (thinking) stockpile contained in the knowledge these components have can be invested to achieve the winning edge by utilizing the decision support system which assists decision makers in attaining constructive ideas to solve problems and provide ideal solutions to ensure realization of the organization goals. The benefits of developing human capital are manifested in upgrading the level of employees' productivity and facilitating their innovation, development and competitiveness which lead to the development of the organization (Brennan 2000).

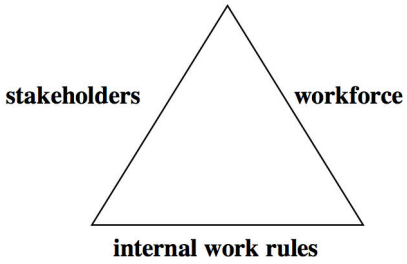


Figure 1. Components of human capital.

The organization human capital can be considered as the total workforce and stakeholders who have the knowledge and experience which enable them to contribute to the development of the performance of the organization. They, unlike others, possess organizational and knowledge capabilities (Abbas 2004). On the other hand, development of human capital should not be confined to experienced employees only, but should include the young and old categories which represent the genuine human resource treasure.

The concept of human capital drew attention since the beginning of the 1990s when Stayer, Johnson's CEO, came up with the term "human capital." Prior to that, natural resources were considered the most important component of the national wealth and the most important assets of organizations. After that, capital meant the moneys and fixed assets organizations have. Now, human capital has substituted natural resources, money and fixed assets and is considered the most important component of national wealth and the most precious asset companies have." Koeing pointed out that at the beginning of the 1990s human capital was businessmen main topic of interest. But this interest declined since it was difficult to measure. Later, it resurfaced when the concept of knowledge-based management appeared and was based on human capital (Mafraji & Saleh 2003). Brown emphasized the importance of investing in human capital and compared failure to invest in it to gold which is not mined. Organizations can benefit from the elements of this component and, at the same time, enhance their innovative abilities. Human capital is the main driving force behind research, development and productivity in all fields of performance in an organization and is considered by stakeholders in modern management as its most precious asset.

3. Thinking Skills

Thinking is basic for discovering the true nature of Belief and the greatness of God in His creations. A number of Quranic verses call for the investment of the mind. God says: {Do they not reflect in their own minds? Not but for just ends and for a term appointed, did Allah create the heavens and the earth, and all between them: yet are there truly many among men who deny the meeting with their Lord (at the Resurrection) (Surah Al-Umran, 191).

The science of thinking is considered a relatively modern discipline which permeates across four other major disciplines: medicine, logic, psychology, and artificial intelligence. Thinking is a natural and continuous everyday process that human beings undergo, and is a form of internal dialogue with the ‘self’ while working on something, watching scenery, or listening to an opinion. Thinking can be distinguished as an evolutionary behavior which increases in complexity with the individual’s growth and accumulation of his/her experiences. It is, broadly, a chain of mental activities that the brain performs when stimulated by any of the five senses: touch, sight, hearing, smell, and taste. Thinking is the process through which ideas are generated, analyzed and judged (Zaytoon 1997).

Debono defines ‘thinking’ as a clever experimental attempt with a particular purpose such as comprehending data, making a decision, or finding a solution. Mayer defines it in terms of what happens when an individual tries to disentangle a certain problem. Roggiero considers thinking a theoretical concept describing an internal process which pertains to a purposeful mental interactive and selective knowledge-based activity, directed towards discovering a solution to a problem, taking a certain decision, fulfilling a need for comprehension, or finding a certain meaning or reasonable answer to a question.

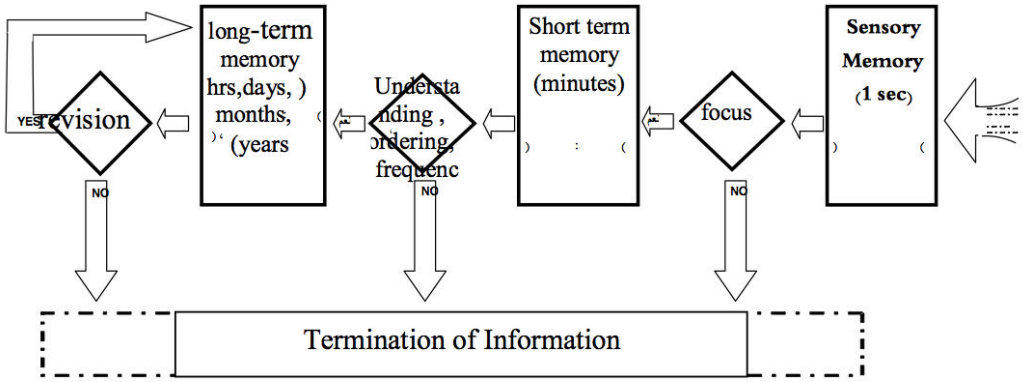
It is unnoticeably acquired from the individual's procurable environment and may only be observed through one's internal or external behavior. In addition, Sternberg and Grigorenco consider 'thinking' as a mental knowledge-based process which directly affects one's ordering and approach to the information and mental knowledge-based constituents inside the human brain. Abu Ala'a considers 'thinking' to be the highest form of mental activity in which the mind creatively regulates experiences to serve as solutions to certain problems or to form new relations with. Habeeb considers 'thinking' to be the planned investigation of experience for a certain purpose such as understanding, decision-making, planning, providing solutions, or judging. There are several mental processes which are called 'thinking skills.' These can be divided into three major levels: basic, intermediate and advanced. Some of the most important thinking skills which require simple and basic mental activities are: remembering (recollection of past events), rephrasing, questioning, demonstrating, comparing, classifying, applying, explaining, predicting, imagining, and summarizing, as illustrated in the table below (1).

Table 1. The most important thinking skills.

Skill	***Description***
Remembering	A skill used to recollect information memorized prior.
Rephrasing	A skill used to put similar meanings in different forms.
Questioning	A skill used to interrogate and inquire about information.
Demonstrating	A skill used to simplify, break-down and explain information.
Comparing	A skill used to study the differences and similarities.
Classifying	A skill used to gather & categorize information according to certain features or properties.
Applying	A skill used to apply prior experiences in new situations.
Explaining	A skill used in justifying or giving reasons for a happening.
Predicting	A skill used in assuming future happenings according to present information.
Summarizing	A skill used in combining information; extracting its main ideas and briefing them.

The skill of remembering is considered the mother of all skills and inevitable in the process of decision-making. If human beings are able to memorize and remember all of what they learn and research about, their knowledge and information would be infinite. However, the facts are different, since little information can be fulfilling acquired by decision-makers per year when only relying on memory. Research in the field of memory and memorization classifies 'memory' into three kinds: sensory, short-term, and long-term memory; as shown in figure (2) below.

Figure 2. Memory types.



4. Decision support systems

Decision support systems are considered some of the most important information systems for organizations. These systems have snowballed recently and new applications to support decision-making have appeared based on proper approaches and methodology that provide accurate data. Decision makers in any organization spend most of their time in acquiring data and analyzing these data before a decision is made. So, they need support systems to assist them in decision making. The decision support system can be defined as the interactive system which provides decision makers with the required information to support making these decisions (Faguo et al. 2008; Kai et al. 2008).

There are many factors which led to the development of decision support systems, most important of which is the enormous development that took place in the field of information systems and technology. This facilitated the development of these systems, detailing procedures to be followed and assisting hesitant decision makers when a decision is made. In the age of globalization, there is a need for decision makers who have the capabilities and support tools which enable them to achieve the organization's objectives. Utilizing decision support systems has many positive results, most important of which is to enable decision makers to make mature decisions by arriving at acknowledged results. In addition, this enables them to look for alternatives and to assess them objectively, and to take their time and be unbiased when they make decisions.

There are several theories that deal with the formation of decision support systems. One of the notable ones is Anthony's taxonomy of managerial activities which deals with the three levels of decision-making: operational control, managerial control and strategic planning. Simon's theory states that decision-making has two levels: the first deals with structured problems that can be solved using known methods, and the second one deals with highly unstructured ones. Gorry & Scott's framework for decision support the first one is the structured decision which deals with expected known problems; the second is the semi-structured decision which deals with almost unexpected problem; and the third is the unstructured decision which deals with an unstructured problem and is not known to the system (Rushdi 2000).

The decision maker can take the proper decision depending on his personal experience and the support provided by the support systems which bridges the gap and enhances the quality of the decision. In fact, decision support systems do not make the decision, but provide the decision maker with the available tools and information to make the decision. Decision support systems types depend on the problem itself, whether it is structured, semi-structured or unstructured. Solutions for structured problems are known and repetitive. Solutions to these problems are obtained through managerial control systems. Solutions to unstructured problems are not clear to the decision maker which requires supporting him in this area. Support systems support all levels of leadership by providing proper solutions to problems. They provide the user with proper solutions especially when he cannot determine what he wants in addition to providing him with extra information about the problem. The degree of certainty in decision making varies. In certain cases, the support system has full knowledge of the details that it can provide us with the ideal solution especially when the decision is based on a set of scientific steps and procedures which are based on mathematical equations. In some cases, the decision may not be the ideal one while in others, when conditions and information are uncertain, more intelligent support systems are needed (Rushdi 2000).

5. Decision support system tools:

Decision support systems include various application and information related to decision making which assist in data analysis and decision making in an organized manner that can be adapted to any work environment. These tools include data base linked to the required types of decisions in addition to the tools which support decision making, such as electronic tables , illustrations, and applications used in planning and analysis (Rushdi 2000).. Decision support systems tools consist of several tools as shown in figure (3) below. These are:

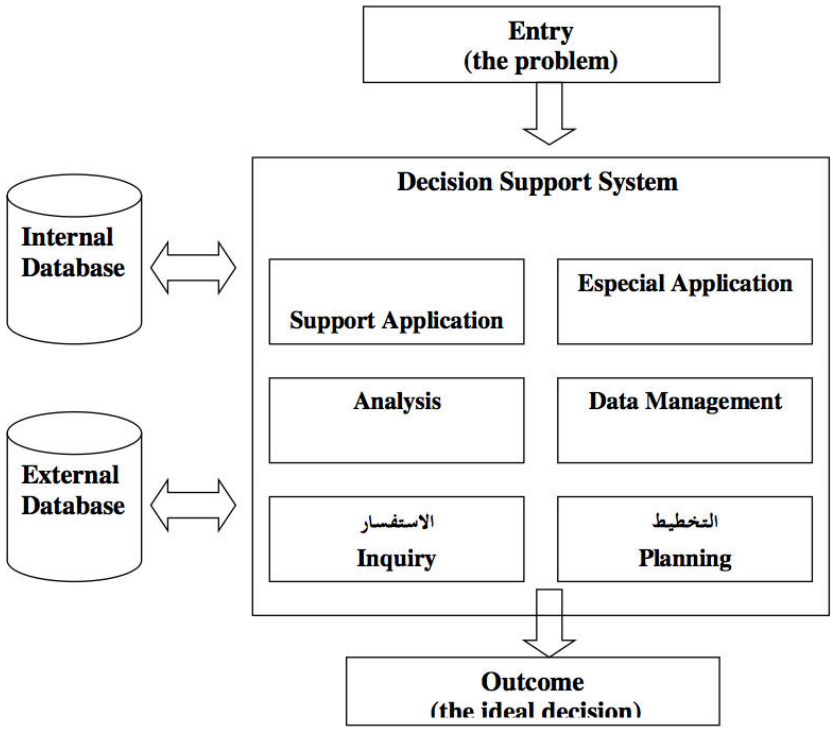
1. Special Application: consists of the internal applications developed by the organization according to the organization's descriptions and conditions with regards the information and decisions required. These applications should be in agreement with the decision-makers' needs within the organization, and is thus considered basic in decision-making.

2. Support Application: consists of the external applications, and is useful in supporting decision-makers in, for instance, financial analysis.

3. Data Management: consists of the applications responsible for the organization and compatibility of information received from the organization's internal and external databases, including information evolving from any intelligent decision support system's tool.

4. Analysis: consists of the applications representative of mathematical and statistical analysis, including charts, graphs, and modules which illustrate data.

5. Planning: consists of the applications related to planning, which makes it easier for decision-makers to expect, predict, and make future plans.



6. Inquiry: consists of the applications which put forward any questions regarding the in-hand database.

Figure 3. Intelligent decision support systems' tools.

6. The relationship between human capital, thinking skills and decision support system tools

The relationship between human capital, thinking skills and decision support system tools needs to be emphasized because it represents the knowledge and creative ability the organization has. This relationship needs to be maintained, invested and enhanced since it contributes to upgrading the organization's capabilities and, accordingly, enable us to achieve the desirable results. Positive steps can be taken to develop human capital, such as disseminating and activating thinking skills across the organization which will result in the development of employees' abilities and enhancement of work procedures in addition to gaining customers' satisfaction and trust.

Table (2) shows the expected relationship between thinking skills and decision support tools and the feasibility of activating all thinking skills. In spite of the fact that decision makers have capabilities and experiences, they still have soft spots exemplified in their failure to utilize all thinking skills and, at times, utilize only one skill when they make a decision which results in coming up with a decision which is not the ideal one. An example of this is using the skill of remembering and explaining only when they want to reach a decision whereas using the comparing skill may lead to change this decision. On the other hand, there are some thinking skills, within the decision support system tools, which are difficult to utilize and benefit from. Research is being conducted regarding utilization of thinking skills and how to benefit from them to enhance the capabilities of the decision support systems' tools. There are several levels of thinking, each shows the individual's ability to organize and

utilize the information and experiences to realize a relationship, solve a problem or make a decision. It is necessary, therefore, to know how the brain executes this skill so that it can be used in computer applications.

Table (2): Relationship between basic thinking skills and decision support systems' tools.

	Special Applications	Support Applications	Data Management	Analysis	Planning	Inquiry
Remembering	•	•	•	•	•	•
Rephrasing	•			•		
Questions	•					•
Demonstrating	•					•
Comparing	•		•	•	•	
Classifying	•		•	•		
Applying	•					
Explaining	•	•				•
Predicting	•				•	
Summarizing	•					

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7. Recommendations

This study shows the importance of developing human capital by utilization of the thinking skills and the decision support systems and the necessity to incorporate it across the organization. Accordingly, the following recommendations need to be considered when developing decision support systems. These are as follows:

1) The necessity to develop decision support systems due to the benefits gained and to achieve the objectives of the organization.

2) The fact that crucial decisions must not be made independently by decision makers without being supported by a decision support system.
3) The necessity to enhance the capabilities of the decision support system tools by activating the thinking skills.
4) Promoting utilization of the thinking skills within the organization by holding meetings and initiating decisions to support that.
5) Fostering cooperation, participation, dialogue, and freedom of expression within the organization to develop the human capital.

8. Conclusion

The paper deals with the development of human capital by developing decision making systems which depend on activating intellectual skills of decision makers. Recent studies have emphasized that knowledge, thinking and experience should be cultivated within the organization and that human capital represents a valuable wealth. This includes the workforce of the organization, the stakeholders and the work rules within the organization.

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