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Knowledge Monitoring For Strengthening Competitiveness: The Case of Higher Education and Research Institutions

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This paper deals with a question very little or only partially examined by the literature; that of universities and research institutions for which the concept of competitiveness is being applied. To be competitive, it is largely recognized that knowledge has to be procured, processed and exploited, thus the need for knowledge management or monitoring (KM). Researchers who wrote about this issue, in the past, have focused on either particular aspects, such as the theoretical background and impact of data mining, or on specific country case studies. On the KM process itself, there is almost nothing and the author wishes to modestly fill the gap. The case in question is quite particular; it is so because the concept of competitiveness has originally been applied to industry. Since no modern organization is capable of truly improving its performance without new knowledge, this later is considered as the real source of competitive advantages. Understanding how the process of KM works in the higher education and research sector could help in dealing with the gaps and deficiencies and allow it become productive. Depending on whether financing is publicly or privately provided, its appropriate and ethical use will then determine the efficiency of the system and its durability. The main objective of this paper is to argue that as the new environment imposes on higher education and research institutions to be also competitive, this cannot be achieved without controlling or taking care of the different phases and components of knowledge. The need for monitoring knowledge to secure its continuous flow does really matter and for both national and international competitiveness. Specifically, absence of strategic vision, mechanisms and resources will leave chances for performance weak and competitiveness away from expectations.

Field of Research: Knowledge Management, Higher education institutions

1. Introduction

The broad objective of this paper is to support the idea that globalization and the move towards a knowledge-based economy impose on higher education and research organizations to be engaged in the practice of knowledge management or monitoring (KM). The main argument is that KM could provide both industrial and non industrial organizations with real competitive advantages, thus allowing for growth and competitiveness. Specifically, the purpose of this paper is to reveal the importance of looking after the different phases through which knowledge is flowing in organizations. Accordingly, the accumulation of knowledge itself through learning is considered out of the scope of this paper and will not be discussed.

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Monitoring, in the sense of controlling the flow of knowledge inside and from outside an organization, is a capability that becomes nowadays very essential to keep relevant processes, systems and sources alive and efficient. Absence of specific strategies, mechanisms, tools, infrastructures, and organizational cultures and motivations will leave performances weak and socio-economic contributions below expectations. However, if these elements are not all maintained at a certain level of quality and efficiency, the impact will be limited and therefore the degree of competitiveness low.

The remaining parts of this paper are as follow: After the introduction, section 2 is devoted to the relationship between information, knowledge and competitiveness. It will be pointed out that only scientific and technological knowledge can transform raw materials into output. Section 3 introduces an original description and brief analysis of the process of knowledge monitoring. Section 4 discusses the specific case of universities and research centers. Section 4 concludes the paper, followed by a list of references at its end.

2. Information, knowledge and competitiveness

At the outset, it would be useful to emphasize a basic difference between information and knowledge. Plausibly, it would be quite clearer to describe information as of a nature used mainly in decision-making processes, whereas knowledge as of a different nature with a content transformable into concrete output. This is true particularly in the case of scientific and technological (S&T), i.e., non general knowledge that can be hold by anybody looking for greater enlightenment, brain development and curiosity satisfaction. The major implication, here, is that information management differs from knowledge management (Al-Hawandeh, 2005). As knowledge management consists of dealing with both knowledge and people who create it, information management deals with transformed data, which is usually kept in hardware or other physical storages.

Imminently, Rosenberg (1982) had made a major distinction between two main types of knowledge, i.e., know-how and know-why. According to him, know-how refers to that knowledge allowing to do or produce and use things, while know-why allows to understand why they are done, produced or used in a particular way rather than any other. Significantly, both these types contribute to learning and increasing value added. While know-why helps in brain development and enhance critical thinking, know-how helps in practical doings. Neither of these types of knowledge would, of course, optimally be utilized, unless stored and shared among employees within organizations. Not only that, but it will also depend on how it is shared whether formally or informally, voluntarily or involuntarily (Lee, 2004). Whatever the case, a motivating environment is needed to maximize the benefits to all parties.

Clearly then, it is the application of S&T knowledge, rather than the use of general knowledge nor even information as such, that allows improving performance, thus growth leading to competitiveness. The strong relationship, between S&T knowledge and innovation, can be proved by the fact that only theoretically and/or practically proven knowledge could be used to improve performance and create new things. As a concept, knowledge itself may need to be clearly clarified before initiating the process of its management (Lee, 2006). But, the fact again is that only S&T knowledge is characterized by correctness and exactitude, and could be transformed into applied knowledge or know-how, thus giving concrete form to new goods and tangible outcomes or services.

Accordingly, it could be advanced that for competitive organizations, production of materialized, soft and sophisticated outputs cannot effectively and efficiently take place without S&T knowledge. Its absence or discontinuous availability would, therefore, result in stagnation or even backwardness. Hence, companies and institutions producing it will be comparatively more advantageous, with a capability of making things, and changing or improving them. In cases where knowledge diffusion is voluntarily restricted, it provides concerned organizations with a primacy over others, namely by holding stronger bargaining power.

Central to the supporting idea of this paper is, therefore, the argument that the move towards a knowledge economy, namely involving high levels of knowledge intensity, is a serious matter to consider. Taken as an integrated system, it will require a great deal of attention from all parties within a network for the choice of strategies, means and practices of implementing the process of KM, as will be further discussed later on. Establishing any system for its own sake is not, therefore meaningful. This means that its development, or acquisition and adoption must target increasing production, productivity, performance and competitiveness; otherwise, it will be costly and remain purely imitative and organizationally not really effective.

According to Malhotra (1998), KM involves a search for a synergy between data and information that are the used and electronically retrieved by human beings. Organizational culture, technological tools and human beings are, thus, key elements required for managing knowledge effectively. For his part, Smith (1998) has asserted that too much emphasis on intangible assets on behalf of tangible ones in KM is counterproductive. Instead, he proposed a new approach of KM called systemic KM, arguing that such a system will help in keeping under control the whole process. Assistance from inside as well as from outside organizations (networking) may also be required for successful implementation of KM (Daghfous et, al. 2006). This can particularly be true for freshly established or small organizations that have limited experience and knowledge production capacities. Truly,

the spontaneous rush to establish KM systems could be costly to organizations. On the other hand, when knowledge is produced or acquired but not used, it becomes a waste with costs to organizations and societies.

In higher education and research institutions, performance is mainly measured through their graduates' attractiveness by the market and their faculty publications' impact. Usually, academic accreditation is solicited for checking these and other features, measuring their level and granting world-wide recognition to successful parties. In the case of such entities, competitiveness would, therefore, involve primacy ranking on the basis of volume and quality of knowledge produced, patenting activity, faculty and researchers' publications, quality education of graduates, and social contribution. Where research activities are dominating, this usually proves priority given to advances in S&T outputs. In the opposite case, institutions step back to lower levels and provide teaching, whose quality depends on that of available sources and instructors.

3. Understanding KM process for effective control

Understanding how the process of knowledge monitoring works could help in dealing with the gaps or deficiencies, particularly with regard to the adopted strategy, the employed resources and the selected tools. Given the pressures from the external environment to keep constantly improving performance and productivity, these may not be achieved unless all sort of bottlenecks and shortcomings are removed.

Sources of applied knowledge are various. The major recognized one is S&T, through research and development (R&D) activities. For these activities to be effective and efficient, a certain organizational setup needs to be established. In general, centralization is not in favor of high productivity in research establishments. Individual researchers or teams cannot be managed the same way as other employees either. Usually, research and researchers flourish where environments for exchanging ideas and sharing acquired knowledge are enhanced.

At the origin, S&T activities are the privileged domain of either universities and/or research institutions. R&D activities are, practically, carried out in all sectors. Economically, carrying out these types of activities is not usually efficient unless if the impact is precisely at points of production. The value of relevant published academic work can accordingly be measured by the so-called impact factor. Organizationally, R&D activities span through a spectrum involving basic research, invention, applied research, experimentations and innovation. The sequence of the process may not necessarily be always linear, since improvements may not always need extra original knowledge. Invention itself is abstract, theoretically descriptive and usually the product of higher education and research institutions employing researchers and competencies. Innovation, by contrast, is

practical, and its content is transformable into goods, products or processes. For innovations to be usefully produced, higher education institutions need to make them marketable in response to the demand.

As long as financing is procured, the further the above activities are carried out, the eventually greater the knowledge production of universities and research centers. However, outputs in the form of principles, ideas and rules, patents and simple innovations are not all of the same importance. Among all, patents and advanced theoretical knowledge are of far greater value. Specifically, linkages with industry get further reinforced whenever innovations, whether patentable or non patentable, and practical solutions are produced or developed by the above institutions.

In its wide sense, the process of monitoring S&T knowledge involves getting access, treating and preserving, exploiting or using and diffusing every bit of knowledge that allows making improvements and changes, leading to higher productivity and consequently better performance. Bassi (1997) presented a slightly different definition of KM, considering it as any process or practice that involves "acquiring, creating, capturing, storing, sharing and using knowledge to enhance organizational performance". In any case, all types of organizations will need to develop capabilities of disposing of up-dated knowledge that procure them competitive advantages.

The basic characteristic of a KM process is its functioning nature. In maintaining the existing body of knowledge, an efficiently operating process has to secure its acquisition and diffusion, both time and place wise. On the other hand, to continuously steering the accumulated volume of knowledge, the process will require monitoring or management responsibilities. In both the embodied and disembodied knowledge, these responsibilities would involve designing appropriate structures, procedures, policies, systems, networks and allocating resources and personnel. If such a management does not proceed for coordination and introduces improvements or changes, it will put the institution at risk of obsolescence.

The above picture may also be completed to pin point that while the various information technology functions are centered, there are other extremely important tasks that support the whole process. Upstream, there is the active and passive access to new information and knowledge from external sources. Access may also be formal or informal, individual or collective, through official channels. Downstream, there is the outflow or diffusion of newly accessed and treated information and knowledge to different organizational structure. Delays in the diffusion to the different departments, colleges and centers will obviously cause waste of time with all the negative consequences.

It should normally be now clear that the process comprises three main phases, extending from external sources of inputs to operational treatment to application or diffusion. The various external sources may provide with different inputs in the form of new information, knowledge and ideas. The second phase, which is central, deals with the availably and accumulated knowledge and thoughts. Normally, structuring search for new knowledge should help more easily in achieving goals and objectives. The third phase would include all interested parties in need for the output, as either direct or indirect users.

To recall, it is these characteristics that render the process of strategic importance to universities and research institutes. Mutual exchange with others as well as feedbacks from potential users will, however, become necessary in order to strengthen the dynamics of the whole process and maintain it for further growth. In such situation, parties which are more active in the relationship will tend to show greater superiority, resulting in leadership.

The volume of knowledge out flow will then depend on the speed and efficiency with which the internal or local acquisition and assimilation take place. Expectedly, the greater the efforts and volume of inputs are, the greater the output. Quality wise, the type of competencies in charge of the transformation will be determinant. And, so does the quality of working conditions. Worth noting, here, is that drops or losses of bits of knowledge are possible at the entrance as well as at the exit phases, reflecting weaknesses in knowledge capturing and exploitation capabilities. Knowledge may be applied to multiple ends.

Furthermore, the volume of output is not always and necessarily quantifiable and tangible. Learning, as a process of greater enlightening, for instance, is critically important, to the extent that without it further developments may not be possible. When the output could be measured, it may be either of high or low value, substantial or incremental. Basically, the faster the accumulation of incrementally added bits of knowledge is, the more dynamic the process would be. When the case is of disruptive and breakthrough inventions, involving advanced thinking and knowledge, a major shift in the activity would be expected. For incremental and more important value knowledge to be validated, information production has then to be transformed into knowledge production, through sub-processes, where criticism and testing are to take place (Firestone, 2000, p. 89). Intelligence and brain storming may also become necessary. Where they are reduced or badly used, instability of the concerned personnel may be revealed.

The critical outcome from the above discussion is that, gaps are created when weaknesses prevail either internally, within the process itself, or externally, i.e., in the broader education, training and industrial R&D system. Very plausibly, this is why national innovations

and R&D systems cannot be really effective when linkages and objectives are not set with other entities, in the same and/or different sectors. No university or research institute could, therefore, claim true performance and competitiveness if weaknesses and bottlenecks, including organizational and structural ones prevail within and/or outside. For a university CEO to render the working environment favorable for highest productivity with positive consequences, he would, therefore, need to have himself a clear understanding of the knowledge production, clear out all the hurdles and secure the necessary tools and motivate his human resources. Above all, he will need a system of surveillance and scanning the both the internal and external environments for new things, including strategic information and advanced theories and knowledge (Dou, 1992). The relevant means could range from academic and text books, papers, patents, soft wares, programs, seminars, etc.

4. The Specific case of higher education and research institutions

Higher education and research institutions engaging in R & D activities aim deliberately at increasing the body of scientific and applied knowledge. The more advanced the later is, the higher the chances it could become patentable. In any case and once it is commercially diffused, it will allow industry to maintain and improve its output, and hence the general economic and social welfare. To a competitive end, S&T knowledge will constantly be required. To survive, let alone be a leader, the search for it would then follow all various possible strategies. Under given pressures and threats, all methods would be considered, namely recruitment of high caliber and costly faculty and researchers. Universities and research centers that are capable of fully integrating them would be in a better position to face challenges and competition.

Historically, universities traditional role has been almost free diffusion and transfer of knowledge to students and the public in general. However, functional evolution has made these institutions becoming strategic providers of not only theoretical but also applied knowledge. When this takes the form of solutions to particular problems or procedures of doing something scientifically proven, costs become important and therefore counter payments are necessary. This necessity is what has given birth to "contract research", by which knowledge is commercialized on a supply-demand basis. The most important of its advantages is the contribution to solve specifically identified problems, which make financing rather worth.

In order to keep abreast of latest knowledge, a relatively new function that was originally born in industry has emerged in higher education and research institutions. Different terms are used to describe it, spanning from scanning to tracking to monitoring and environment

watching. Whatever the name is, the task consists of actively searching for prompt awareness about every new bit of knowledge or anything produced by anyone world wide. To stay vigilant, talented scientists are, generally, recruited to alert concerned units or researchers about anything that may be exploitable. By default, entities remain vulnerable to all possible downgrading and dependency.

With this evolution, universities and research institutions keep providing society, at large, and the economy, in particular, with new knowledge through a variety of ways, including specific training, e-learning, consulting, research contract, joint collaboration, and partnership. The place most advocated for fruitful cooperation is where incubators are established within Science and Technology parks. These, being themselves very close to knowledge-producers or research institutions; cannot be efficient if they are unable to help in the creation of new businesses. The factors determining linkages between research institutions and industry have, consequently, to do with the quality of knowledge provided and industry's demand. Mostly, it is practical or applied knowledge that renders that relationship more and more fruitful.

5. Conclusion

If information is power, S&T knowledge provides organizations and societies with more economic strength. Well monitoring this kind of knowledge and the involved competencies allows guaranteeing their constant availability to deal with threats and reinforce competitiveness. Internally, efficient KM will help reducing underutilization and loss of knowledge. For many universities and research centers, it is the problem of poor management of KM and competencies that mainly explains their low performance and poor international ranking.

Higher education and research institutions are typically different from other organizations namely those in industry. For their survival in the new era, they too became concerned with competitiveness. Given their important role in modern societies and economies, it can only be positive when specific policies, organizational cultures, appropriate systems, adequate tools and mechanisms of surveillance are adopted. By default, their contributions to knowledge accumulation and its socio-economic application may be maintained but at a non competitive degree.

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