



MANAGEMENT OF MEDICAL EQUIPMENT WARD IN HOSPITAL: THE USEFUL METHOD FOR BUSINESS MANAGEMENT OF MEDICAL EQUIPMENT

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Abstract: Today, the critical role of science in getting access to competitive advantage is evident. Hence both academics and industry practitioners are seeking to find methods of better management of science capital. Science and its management reiterate cooperation among a wide range of participants including individuals, processes, and supporting technologies in an organization. Intelligent knowledge-based management in the field of medical equipment is one the necessities in management of such categories. Utilizing the mentioned knowledge and also being smart and up to date in the field, we can continue our business in medical equipment. These concerns led to hospital managers seek to reduce costs by choosing strong managers to take effective measures in this field. Therefore, by entering the realm of medical equipment management, medical equipment companies can experience a growing increase in their sales; they can also provide more secure conditions for the consistency and the longevity of most devices. This is done by regular monitoring and calibration and if necessary, repairing the equipment. This way, they win the trust of the hospitals. Furthermore, in the next call for hospitals, they overtake their rivals and they will be able to sell their devices to the hospitals again.

Key Words: Medical Equipment, Hospital, Management

KNOWLEDGE MANAGEMENT FOR BUSINESS MANAGEMENT IN HOSPITAL EQUIPMENT

Today, the critical role of science in getting access to competitive advantage is evident. Hence both academics and industry practitioners are seeking to find methods of better management of science capital. Science and its management reiterate cooperation among a wide range of participants including individuals, processes, and supporting technologies in an organization (1). The field of business processes is, therefore, an appropriate ground for organizing science management efforts. On the contrary, the reservoir of business processes includes current processes science documented as business rules (2). This science includes policies and trends, career explanation, applied forms and codes of organization, and management system rules of relational database. Therefore, science management should be performed considering processes which are organizational science resource (3). A wide variety of problems occur when dealing with science management issue in different business processes. As an example, the debate of sharing science among process members is especially important in case of implementing science management in the process of developing new product, while the challenge of science storage is more confronted when implementing science management in a contact center (4-7). Such a variety in different aspects of science management for different businesses results in a kind of confusion in recognizing priorities and obstacles in the way of implementing science management. On the other side, it is not

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possible to separately study priorities and obstacles for a high number of different businesses. Therefore, if the business process could be categorized in a way that each group of processes are faced with similar subjects in the implementation of knowledge management measures, these measures could be done in more specific ways and thus the implementation success could be increased by considering the kind of business processes (8-11).

BUSINESS PROCESSES FROM THE PERSPECTIVE OF KNOWLEDGE MANAGEMENT

From knowledge management standpoint, business processes are divided into four categories namely work, decision, information, and cooperation - oriented processes. Findings show that in work-oriented processes, the lack of motivation, inappropriate use of technology, and the lack of adequate time negatively affect knowledge storage, as the most important capability of knowledge management required for such processes. In addition, the lack of motivation, inappropriate use of technology, lack of interactional mechanisms, and lack of time have negative influence on knowledge creation. Moreover, the lack of motivation, inappropriate use of technology, lack of interactional mechanisms, lack of time, and fear of losing job have negative influence on knowledge sharing. In decision-oriented processes, the most important capability of the required knowledge management is knowledge sharing, in which such factors as the lack of motivation, avoiding the



expressions contradictory perspectives, relational problems, lack of time, and lack of empowerment have negative impact on knowledge sharing (12-15). In information-oriented processes, cultural factors such as the lack of trust, lack of support from senior management, lack of learning, lack of locational proximity between the colleagues, fear of losing job, fear of being perceived as stupid, fear of intellectual property loss, not knowing who knows what, and low absorptive capacity for knowledge have negative effect on knowledge sharing, as the most important capability of knowledge management required by the information-oriented processes. In cooperation-oriented processes, knowledge sharing is the most important kind of required knowledge capability, which is affected by inter-organizational trust and similarities, risk, personal similarities, technical infrastructures and leadership (16-17).

BUSINESS INTELLIGENCE AND MANAGEMENT OF MEDICAL EQUIPMENT

Modern technologies are progressing with stunning speeds such that societies in general and markets in particular are hastily looking for tricks which could guarantee their survival in this turbulent and disturbed environment. Organizations have to accept the fact that their philosophy of existence has changed and merely struggling to stay alive and survive does not mean sustained profitability anymore. Therefore, these organizations have to pursue competitions and the required instruments and approaches to do so. Nowadays, it is almost impossible for an organization to run a business traditionally and without following the modern rules of the game. In order to survive the competition or surpass the competitors, the organizations have to dominate these new rules of the game. Therefore, dominating modern technologies such as business intelligence is an inevitable necessity (18-22). Today, economic organizations are exposed to external forces and they have to show appropriate reactions to the increasing complexity of competitors, customers, and suppliers in order to survive business globalization in an atmosphere of international competition. The most crucial condition for the success of the modern organizations is perhaps their ability to implement all the available information, both internal and external. The concept of business intelligence is defined as a systematic and organized process used to achieve, analyze and publish important information. Organizations use business intelligence to predict customer and competitor behaviors and to learn various trends and phenomena related to their activities in the market area. According to Royle (1998), business intelligence is "the process of purposeful providing, behavior and dissemination of information and reducing uncertainty in making strategic decisions". Business intelligence was developed by Hans Peter in 1958, who

wrote, "Business is a set of activities to achieve a goal in the fields of science, technology, business, industry, etc." Means of communication apply a set of business behaviors that might be referred to in an intelligent system. The concept of intelligent system is the ability to understand the interrelations between the existing facts, which lead the practical intelligent activities toward the intended goals. In 1989, Harvard Dersener defined business as an umbrella term that applies concepts and methods in order to make business decisions through fact-based backup systems. In a new business, using standards, automation, and specialization of software and adding analysis tools allow the extraction, transformation and saving of large volumes of data, which generally increase the speed of decision making. Business intelligence refers to technologies, practical programs, and activities applied for collecting, integration, analysis, and display of business information. Business intelligence means, "Having a comprehensive knowledge of all effective factors in a company". In fact, having a deep knowledge of all the factors including the customers (society, audience and clients), the competitors, the economic environment, the organizational operations and processes (financial, sales, production, human resources, etc.) is a necessity that affects the quality of managerial decisions and enables you to make decisions regarding all the effective factors in the organization and companies(23-26).

MANAGEMENT OF MEDICAL EQUIPMENT WARD IN HOSPITAL

Intelligent knowledge-based management in the field of medical equipment is one the necessities in management of such categories. Utilizing the mentioned knowledge and also being smart and up to date in the field, we can continue our business in medical equipment.

Nowadays, medical equipment play a significant role in diagnosis, treatment and medical education, and a big part of annual expenses of hospitals is spent over purchasing domestic and foreign medical equipment [27]. Efficient maintenance management and optimum utilization of medical equipment can guide us to strategies that not only do they lead to the proficiency of medical equipment and economy, but also they result in correct diagnosis and treatment, hence shorter hospitalization of the patients. Besides, such strategies improve the performance of hospitals and increase the useful life of medical equipment [28]. Creation of medical engineering management units responsible for maintenance and prevention, medical equipment controlling, and equipment selection and purchasing can decrease main medical equipment impairments. It can also prevent any unfavorable performance of such equipment and also guarantee the security of their

users and treated patients. Aidin Aryankhesal concludes in his dissertation that each part of medical equipment maintenance units within the studied hospitals turned out to be in a statistically poor condition. Nassaji, in his article "management of medical engineering in hospitals" states that "this type of management possessing experienced specialized personnel and taking up the responsibilities for purchasing, providing and distributing all the medical and laboratory equipment, will be very economical for the hospital [32]. The Inter-American Development Bank studies show that 50% of the medical equipment purchased in South American countries is defected and unexploitable due to a lack of maintenance, lack of maintenance management or lack of needed parts [29]. In another study, carried out by Maxwell in Latin America, it turned out that there is a huge lack of experts for working with medical technical equipment, their repairing, and their maintenance. Based on the examination, 44% of the available medical equipment lacked even one engineer or medical technician, who could work with them [30]. Hasper conducted a study in St. Joseph hospital; the hospital conducted an eight-year comprehensive management program of the medical equipment. The results of this program included an increase in customer satisfaction and reducing costs. The amount of saving was estimated as 1000 dollars for a bed in a year. The total amount of saving for carrying out this program was estimated to be 5 million dollars. The cost of each equipment was 30% lower than the average cost of other hospitals [31]. In a study, titled as The Maintenance and the Useful Life of Medical Equipment in Developing Countries, Hall Poches examined the effect of regular and planned maintenance of medical equipment on their useful life. He concluded that the useful life of the equipment under regular maintenance was twice as much as the useful life of the equipment that was not included in this program [32]. According to the conditions of medical equipment management in Iraq, the World Health Organization called for the establishment of the office of buildings, the office of service equipment maintenance, the office of medical equipment maintenance and medical equipment parts warehouse in Iraq's Ministry of health. The first important factor in medical equipment maintenance is the maintenance and prevention program. Although maintenance and prevention program is costly, it can reduce the repairing costs 45-50% [33]. In a study carried out by Rakhshani Nejad, it is concluded that since the cost of buying, repairing and maintenance of medical equipment is jointly paid by the hospital and the university, the mentioned costs cannot be calculated precisely. Since 2001, the World Health Organization has made great efforts to develop and promote medical equipment management policies. The WHO experts have crucial recommendations about accuracy in the buying process and medical equipment maintenance.

On the other hand, the World Health Organization emphasizes and supports the country rules regarding medical equipment management; moreover, it considers establishing national standards for medical equipment as necessary [34]. These concerns led to hospital managers seek to reduce costs by choosing strong managers to take effective measures in this field. Therefore, by entering the realm of medical equipment management, medical equipment companies can experience a growing increase in their sales; they can also provide more secure conditions for the consistency and the longevity of most devices. This is done by regular monitoring and calibration and if necessary, repairing the equipment. This way, they win the trust of the hospitals. Furthermore, in the next call for hospitals, they overtake their rivals and they will be able to sell their devices to the hospitals again.

REFERENCES

1. Abecker A, Papavassiliou G, Ntioudis S, Mentzas G and Müller S. Methods and Tools for Business-Process Oriented Knowledge Management-Experiences from Three Case Studies, in 9th International Conference of Concurrent Enterprising, Espoo, Finland, 16-18 June 2003.
2. Abramowicz W, Haniewicz K, Kaczmarek M, Zyskowski D. Semantic Modelling of Collaborative Business Processes, eknow, International Conference on Information, Process, and Knowledge Management, 2009.
3. APQC. 2008. Process classification framework, American productivity and quality center.
4. Baloh P, Uthicke K, Moonb G. 2008. A business process-oriented method of KM solution design: A case study of Samsung Electronics. International Journal of Information Management, 28 (5): 433-437.
5. Bjorklund Robert L and Holt Svetlana S. 2012. Overcoming Barriers to Participation in Diverse Strategic Decision-Making Groups: A Leadership Perspective, International Journal of Business and Management, 7 (6).
6. Bosilj V. 2005. Modeling Knowledge in Business Processes: a Case Study of Croatian Banks, in 27th Int. Conf. Information Technology Interfaces ITI, June 20-23, Cavtat, Croatia, pp. 409 - 415.
7. Brachos D, Kostopoulos K, Sonderquist KE and Prastacos G. 2007. Knowledge effectiveness, social context and innovation, Journal of Knowledge Management, 11 (5): 31-44.
8. Choi I, Jung J and Song M. 2004. A framework for the integration of knowledge management and business process management, International Journal of Innovation and Learning, 1 (4): 399-408.
9. Dalmaris P. 2006. A framework for the improvement of knowledge intensive business processes, Ph.D. thesis, University of Technology, Sydney February 2006 Sydney, Australia.
10. Dalmaris P, Tsui E, Hall B and Smith B. 2007. A framework for the improvement of knowledge-intensive business processes, Business Process Management Journal, 13(2): 279-305.

11. Daneshgar F. 2004. Awareness net: An integrated modelling language for knowledge sharing requirements in collaborative processes. *Journal of Conceptual Modeling*, Issue: 32
12. Ganon Martin. 2007. *Understanding Global Cultures*. Sage, Thousand Oaks.
13. Hakimipour Aboalghasem. 2007. *Decision Making in Management*. Mashahad: Astan Ghodes Razavi Publication.
14. Jazni Nasrin. 2001. *Human Resource Management*. Tehran: Ney Publication.
15. Krither Robert, & kinikj, Angelo. 2004. *Organizational Behavior*. McGraw, pp: 432.
16. Len, Nixon. 2004. *Change Management: Theory and Practice*. 1:1-4.
17. Osterwalder A, Pigneur Y. 2002. An E-business Model Ontology for Modeling E- business. *Proceedings of the 15th Bled Electronic Commerce Conference*, Solvenia, June 17-19.
18. Robbins, P., Stephen. 2001. *Management: Theory and Techniques*. San Diego State University. Prentice Hall International, Inc. (Translated by Allaghebandan). Tehran: Hoda Publication.
19. McAvoy J, Butler T. 2009. The role of project management in ineffective decision making within agile software development projects. *European Journal of Information Systems*, 18 (4): 372-383.
20. McLaughlin S, Paton RA, Macbeth DK. 2008. Barrier impact on organizational learning within complex organizations, *Journal of Knowledge Management*, 12 (2): 107-123.
21. Mertins K, Heisig P and Alwert K. 2003. Process-oriented knowledge structuring, *Journal of Universal Computer Science*, 9 (6): 542-550.
22. Morley C, Hugues J, BLeblanc and Hugues O. 2005. *Process metrics: evaluation and modeling*.
23. Mottonen M, Belt P, Harkonen J and Lin B. 2009. Managing requirements in ICT companies, *Business Process Management Journal*, 15 (6): 968-989.
24. Popper K. 1972. *Objective knowledge: an evolutionary approach*, Oxford University Press, New York.
25. Raghu TS and Vinze A. 2007. A business process context for Knowledge Management, *Decision Support Systems*, 43(3): 1062- 1079.
26. Raimann J, Enkel E, Seufert A, von Krogh G and Back A. 2000. *Supporting Business Processes through Knowledge Management-A Technology based Analysis*, Technical report, Research Center Knowledge Source, University of St. Gallen.
27. Rajsiri V. 2009. *Knowledge-based system for collaborative process specification*, Ph.D. dissertation, National Polytechnic Institute of Toulouse.
28. Inter-American Conference. *Health technology assessment. Report*. Brasilia, pan American health organization 1983.
29. Maxwell RJ. *Resource Constraints and the quality*, *Lancet*, 1985, 34(2):936-9.
30. Hasper K. Jr. *Centralized maintenance responsibilities a case study: J clin eny*, May-Jun; 1991, 16(3) :191-206
31. Halbwachs H. *Maintenance and the Life expectancy of health equipment in developing economies*, *Health Estate*, Mar, 2000, 54(2) ; 26-31.
32. WWW.Emvo.who.int/rd/Annual Reports/1997/Chapter 3.htm.
33. Topham, sonford. *Preventive Maintenance and Repair: clinical Engineering principle and practice U.S.*
34. Department of medical physics and clinical engiering. *Annal report*. 2005-2006.p.2-14
35. World Health Organization. *Quality of care: patient safety, provisional agenda item.13.9.23 march 2003*.

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