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Assessment of Shared Knowledge Using Balanced Scorecard

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Abstract: The aim of following study is to implement a model in order to evaluate shared knowledge in Organizations. The usefulness of shared knowledge as a decision making resource, however, is only as good as the quality of the knowledge that it contains. In order to improve the quality of knowledge, a set of useful method is required. The purpose of this paper is to define a practical method for organizational knowledge validation using the balanced scorecard perspectives, which is more closely related to the ways motivated people acquire, retain and use knowledge to enumerate, select and execute goal-directed actions at work. Finally, the proposed method is investigated in four Iranian organizations and the results are measured.

Key words: Knowledge Validation Method · Assets · Perspective · Knowledge Management

INTRODUCTION

Knowledge has become the main value driver for modern organizations. In particular, knowledge-based organizations allocate resources to intangible assets in the rapidly changing and highly competitive business environment in order to gain competitive advantages. Therefore, knowledge management is extremely significant for organizations, primarily because it helps to manage a key organisational resource - intellectual capital with the potential to produce a competitive advantage.

The issues of knowledge management and knowledge measurement have become even more critical to knowledge-based organizations in the era of knowledge economics [1]. Many competitive advantages result from intangible assets, rather than traditional tangible assets and a significant part of the value of the commodities or services provided depends on the underlying intangible knowledge. Indeed, it is fair to say that intangible knowledge has become the main value driver for organizations [1]. Knowledge evaluation has been considered specifically as one of vital stages of success for performing knowledge management in quantitative models and knowledge management system. Without evaluating knowledge, only a wide extend of knowledge may be entered into knowledge management system, but they may not enjoy sufficient quality. These kinds of knowledge not only will not lead to organizational improvement but also will lead to error, because their accuracy and effectiveness are not investigated. So the accuracy of shared knowledge is taken in to account as one of the most important stages in success of knowledge management process. In this paper it's defined a practical method for organizational knowledge validation using the balance scorecard perspectives, which is more closely related to the ways motivated people acquire, retain and use knowledge to enumerate, select and execute goal-directed actions at work.

LITERATURE REVIEW

Where Knowledge Can Be Validate: It is necessary to know where knowledge can be validated in knowledge management life cycle. The management of explicit or tacit knowledge consists of performing one or several of the knowledge processes such as transferring, creating, integrating, combining and using knowledge [2]. Knowledge transfer includes both planned, institutionalised transfer as well as spontaneous knowledge exchange. The key issues in the transfer phase of the KM life cycle include cost, security and transfer time. The cost per quantity of information communicated from one point to another may be significant, especially if there isn't an existing networked infrastructure [3]. In addition, the security of information is always an issue and it is especially critical when the information is being transferred across a public network. Transfer time often defines the usability of a KM system. In most cases, the shorter transfer time is the most usable the information. Knowledge creating focuses on the development of new knowledge. In the creation and acquisition phase of the Knowledge Management life cycle, information is authored internally by knowledge workers, acquired through outsourcing, or purchased from an outside source. Knowledge integration makes existing (internal or external) knowledge available throughout the company.

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This includes both acquiring knowledge from external sources and integrating knowledge that already exists within the company. Knowledge combination is often resulting in core competencies, which can be described as entrepreneurial excellence in a particular field and are generally the result of extensive interaction between (groups of) experts and/or knowledge holders. This combines the knowledge in the corporate knowledge base and other resources to form a unique combination of skills and expertise [4]. There is no longer any doubt of the increasing importance played by knowledge in value creating processes. Comprehensive knowledge management should ensure that "knowledge" is used as effectively and efficiently as traditional factors of production in achieving organizational goals [5]. People use procedural knowledge (know how) to interact with their environment through action. In comparison, organizations use appropriate knowledge (procedures, processes) to generate activities and interact with their environment. Briefly it can be expressed that knowledge is valid able when one type of knowledge is converted to another type (e.g. from tacit knowledge to explicit knowledge or from individual knowledge to collective knowledge).

Balanced Scorecard Perspectives: Knowledge is an intangible asset composed of many factors that contribute to create the foundation of a company's market value. The purpose of assessing intellectual capital is to get an overview of these intangibles consisting of all knowledge and experience in the company, both explicit and tacit. It deals with how it is systematically captured and how efficiently it is shared. The assessment creates new value because by measuring intellectual capital the company can better build a dynamic, structured knowledge management system and therefore increase the ability to use and exploit knowledge thus increasing efficiency and creativity, ultimately to increase financial profit .

It is recognized that knowledge is an intangible asset, but some see it as equally important as the physical assets of organizations. The argument goes that, given the right circumstances, tacit knowledge can be converted into better practice, new products or services. In other words, creativity can convert knowledge into innovation, the lifeblood of a viable enterprise.

Many companies have suffered from concentrating on what they had done.

They paid much less attention to the intangibles that determined what they have to do now and in the future. That's why there's been little emphasis on managing intangible assets which can be the knowledge that exists in an organization to create differential advantage.

In order to create value for shareholders and customers, they must use strategy maps to identify their critical processes and to measure how well aligned their intangible assets are to these processes. These strategy maps translate the strategy and open it up for discussion and fine tuning. In combination with the Balanced Scorecard, it enables focusing and measuring the various components of the strategy [6].

Robert Kaplan and David Norton declare that strategy is a set of hypotheses about cause and effect. Making strategy work in organizations demands that we take advantage of all the competencies within the organization and articulate strategy with several perspectives in mind to ensure that balance is maintained. Kaplan and Norton articulated four perspectives that can guide companies as they translate strategy into actionable terms.

Financial Perspective: The revenues, margins and expenses are very important to an organization seeking to achieve its goals. A common mistake with organizations is that they forget the link between the financial goals and the non-financial strategy of the company. The financial perspective gives respect to the relationship between stated financial goals and other goals that feed the machine to create the result.

Customer Perspective: The customer perspective is viewed as the set of objectives the organization must achieve to gain customer acquisition, acceptance and perpetuation. Objectives are an outgrowth of assumptions made about the customers and their habits, the markets they represent and the value they perceive in a relationship with the organization.

Internal Perspective: The internal perspective reminds us that the background works, driven by objectives and goals, must be in place to ensure that the customer and financial objectives are achieved. Internal processes, mores, cultures and procedures in all departments and business units support the value proposition to the target market segments.

Learning and Growth Perspective: This perspective is the basis for all other perspectives and serves to remind the practitioner that the basis for all other results in the internal, customer and financial perspectives are found in the learning and growth of the people.

Learning dictated how people absorb new ideas and turn them into action [7].

Balanced Scorecard: The resources are limited in every organization and their condition is competitive environment so codify the correct and competitive strategies are very important, because the penalty of spend limited resources on extraneous issues is abandon competitive market to adversary who focus their limited resources on the elementary issues. So people after implement a wrong strategy said that "if I knew these things formerly, I worked in different way".

There is a strong assoiling in strategy approach is called focus. If we will want strong in every thing, we won't be strong in any things. This assoil derive competitive environment and limitation resources. So organizations can't implement all of the strategies which are codified in strategy codification stage and must to focus on the strategies that have the most effects on organization. Plus, more organizations usually look at their organization with investigating financial performance. While alone financial measures can't present a comprehensive image from future. Especially in order that financial measures like to past measurement and if organization know "what was happen" but don't know "why was happen" this knowledge won't beneficial.

In 1992, kaplan and norton after complete their research project in order to investigation success reasons the top twelve organizations in the U.S. and study performance measurement methods in these organizations, declare Balanced Scorecard as a new management approach for performance management in the article. The BSC focus on four perspectives: Financial perspective, Customer perspective, Internal Process perspective, learning and growth perspective. When this Plan was codified to have a comprehensive image of organization was observed that this comprehensive measurement system has more abilities. First, these perspectives are integrated in a series of cause and effect relationships, in other words, effective and worthy inappreciable resources cause design and make suitable processes and processes lead to customer satisfaction and customer satisfaction lead to financial growth for organization. Accordingly a series of cause and effect interconnected these fields and if organization wants do something in order that own financial performance is presented, organization can do it in this series of cause and effect format. Second, if performance of organization is important in these layers and if it is possible that quantifies this performance in every layer then it will be better that the organization strategies break to a group measures in every layer for proposed the organization path [6].

Also, Kaplan and Norton emphasize that the first step for coming off the goals of BSC is clarify organization vision [8]. So, in the 2001, Kaplan and Norton explain the five primary steps for connect the performance measurement system to the strategies of organization: change the strategies to action plans, create organization synergy, change strategies to daily work of everybody, change strategies to continuous process and change management to direction of executive management.

Surprisingly, the Map Strategy described strategies logic, shows internal vital processes, which create worth, also inappreciable resources, which need for supporting them. BSC translate Map Strategy into measures and goals and then organization has to make a set of action plans and implement them until it's possible that the goals come off. The strategy-focus organization use BSC method until puts strategies in the center of its management processes. BSC method give unique help to management by presents clear and consistent explains about strategies. Before introduce this method, managers do not have any acceptable general framework for describe their strategies and they was not capable of implement something which did not describe it.

Process of apply BSC lead to organization be capable of focus whole resources on their strategies. In addition, this method fill the gap between codify strategies and workforce daily operation level. In fact, BSC is a management method system that explains vision and strategies of organization clearly and translates them into action plans. This method obtains feedbacks about two matters, internal business processes and external consequences, in order to continuous improvement in the results and strategic performance. When this method is extended completely, the strategic planning is altered from an academic experience into a central power in organization.

METHOD FOR ORGANIZATIONAL KNOWLEDGE VALIDATION

Diagram of knowledge validation method is illustrated in Figure 1.

It is necessary to form a committee comprising of the Chief Executive Officer, knowledge engineers and selected experts from each department. This committee is

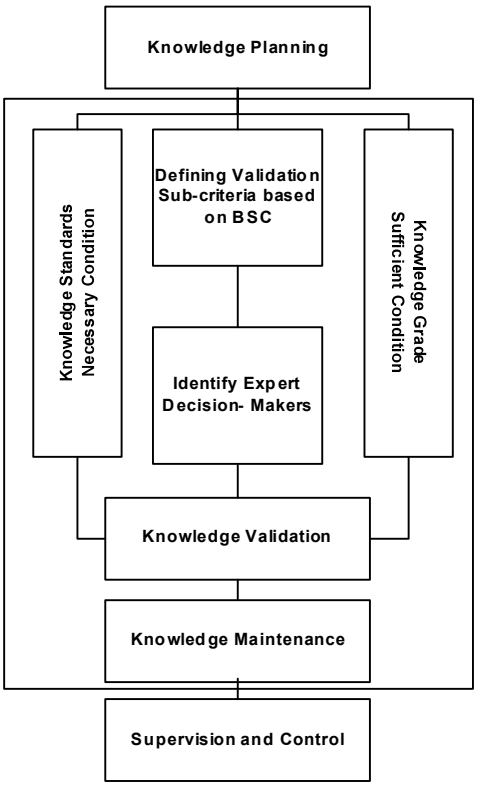

Fig. 1: Knowledge validation method

responsible for planning validation process and defining necessary and sufficient conditions of knowledge to be validated. Afterwards the committee conduct and steer remaining steps consist of defining validation sub-criteria based on BSC, identify expert decision makers, knowledge validation and knowledge maintenance. The steps of proposed method are described as follow:

Knowledge Planning: knowledge-planning activities include the definition of knowledge management goals and strategies. A strategic orientation in knowledge management should not only ensure that all related activities are based on general corporate goals; it should also help to continually improve and institutionalise the knowledge management processes themselves [4].

Knowledge planning is of paramount importance for any knowledge management initiatives.

Defining Validation Sub-criteria Based on BSC: Each of BSC perspectives can have literally hundreds of sub processes that create value in some way. Executives practicing the art of strategy must identify the critical few processes that are the must important for creating and delivering the differentiating customer value proposition [6]. The company's financial performance gets improved through two basic approaches - revenue growth and productivity. The customer perspective typically includes several common measures of the successful outcomes from a well-formulated and implemented strategy such as customer satisfaction, customer retention, customer acquisition and etc. Norton and Caplan grouped organizations' myriad internal processes into four clusters: operations management processes, customer management processes, innovation processes and regulatory and social processes. The learning and growth perspective processes are organized into three categories:

- **Human Capital:** The availability of skills, talent and know-how required support the strategy.
- **Information Capital:** The availability of information systems, networks and infrastructure required to support the strategy.
- **Organizational Capital:** The ability of the organization to mobilize and sustain the processes of change required to execute the strategy.

Knowledge Standards-necessary Condition: Any knowledge undoubtedly must enjoy specific characteristics to be called in this name. In fact they must have a comprehensive standard. Its most prominent usage is Transmission of knowledge in a similar from for assessors and knowledge storage. This standard must compile according to organization condition. For example:

- Knowledge category must assign (creative knowledge, experimental knowledge, narrative knowledge and other in proportion organization need)
- To specify field of specialization related to knowledge (Field of specialization is an instrument for classifying knowledge according to organization specialities).
- Complete explanation about referred points in knowledge
- To notify knowledge resource or other related documents and attachments these standard are composed with consideration of organization conditions.

Knowledge Grade - Sufficient Condition: Any knowledge realizes sufficient condition proportionately. In other words, realization of sufficient condition is equivalent to knowledge score. Knowledge can acquire low score in this kind of condition but it is registered with this low amount as knowledge in organization. Sufficient condition

consists of satisfying indexes of organizational aims. The most knowledge satisfies indexes. The highest score it achieves.

Knowledge validation should be performed by considering both conditions. If knowledge has necessary conditions, it will validate according to sufficient conditions. Sufficient conditions lead to testing because necessary one is relatively crisp. Therefore we can explain them as a group of software rules in knowledge management system and prevent any knowledge without necessary conditions.

But sufficient condition must be determined by a group of experts and assessors because it is based on 2 dimensions of Flexibility in people position and in amount of knowledge.

- Knowledge management systems ask sufficient condition from a group of assessors and determine knowledge grade according to degree of knowledge sufficient condition realization.
- This process is performed in resource and intermediary agents and helps user's attitude toward information and knowledge.

Identifying Expert Decision Makers: We need to identify the people who have the knowledge about organizational processes so that we can properly plan the project and avoid wasting effort in gathering the required knowledge for validating the knowledge. For each particular topic, it is very useful to understand two things: (i) Where it will be gathered from; and (ii) Which expert can validate (check) the knowledge in each BSC perspective after it has been captured.

Validating Knowledge Based on Balanced Scorecard Perspectives: The selected expert decision makers in field of balanced scorecard give grade to knowledge from 0 to 5. The considered mark by expert decision makers is calculated according to index weight.

Final score is computed from in ratio with knowledge weight average to mastery score of assessors.

Knowledge Maintenance: Knowledge maintenance activities ensure obsolete out-of-date knowledge is identified, updated or even forgotten [10]. It involves:

- Storing knowledge in a form and format that will survive the elements and time and still be accessible and usable by knowledge workers in the organization
- Knowledge modification to suit the immediate and likely future needs of knowledge workers and management
- A method for identifying the knowledge which should be saved or destroyed to follow corporate policies as well as governmental rules regarding business records.

Supervision and Control: Finally after completing the above processes, all of them are compared and evaluated then controlled, after passing of time and controlling by system and knowledge management team, deficiencies are recognized and solve by training users. We also can identify executive weak and strong point and put in to action for improving them.

CASE STUDY

The proposed method has been used in 4 Iranian organizations such as ministry of Road and transportation, petrochemical research and Technology Company, Iran Pasteur institute and in an engineering consulting company. It is mentioned that if these steps and processes are used in a knowledge management software system, they will be simple, accurate and systematic and can be compared and controlled easily. This matter leads to using computer for performing works and doing calculations without interfering human element. As a result, if knowledge becomes up-to-date, the abilities of "autonomy", "mobility", "proactively" will be realized. For example, in an executed sample in roads and transpiration ministry, at first validating sub-criteria base on BSC perspectives were assigned for validation during 4 month of pilot project. Knowledge requirements in form of knowledge's standard were approved and sharing knowledge obliged to observe the standards.

RESULTS

Necessary measures for performance of shared knowledge validation methodology performed during 20 months according to mentioned steps. The approach of implementation project of shared knowledge validation methodology is related simultaneously to both area of structure and culture by technology and it paves the way for complete implementation of KM. The mentioned indexes before project accomplishment have been categorized in 2 groups. The first category includes

Table 1: Indexes that any changes in them is adequate from KM view

Culture	• lack of individual tastes in encountering with individual's knowledge is prevented by validating process in Admin system
Structure	• Rewarding system was carried out by considering financial resource • Fields of specialty are recognized from up to down
Technology	• Organizational knowledge categorized in fields of specialty

Table 2: Acquired results of implementation of knowledge sharing system from technological dimension in organization

Technology	Change percentage
Effective relation with organization experts	31.10
Recognition of organization of knowledge weak points in fields specialty	18.10
Recognition of produced knowledge in past and prevention from reproducing of existing knowledge	10.06
Improvement of work processes by using a codified knowledge bank	14.45

Table 3: Acquired results of implementation of knowledge sharing system from cultural dimension in organization

Culture	Change percentage
Validation of organization according to worker's knowledge	38.00
Awareness from colleague's knowledge	16.25
Recognition of best responder to problems	13.41
knowledge increase because of working in organization	12.16
Team work performance	10.656

indexes that any changes in them are adequate from KM view and this is the reason of their accomplishment. Second category consist of indexes that the percent of their changes have been evaluated by questionnaire.

The indexes of first group are explained according to Table 1.

The percent of changes in indexes of second group has been measured through 2 series of questionnaire, one before and the other after implementation of methodology. Statistical society in each 2 steps consists of 100 employees from areas in which implementation have been carried out completely. The validation degrees of questionnaire are 0.9879 and 0.9897 in order. It should be mentioned that choices are presented according to 5 points and turned from qualitative to quantitative form (very low = 1, low = 2, average = 3, high = 4, very high = 5) .

For comparing the average between 2 categories of inputs it has been used from thypothesis test in which all cases have been sig >0.05, statistical hypothesis that includes quantitative indexes growth (and in 1 case of decrease that individual experiences in doing works) were accepted after methodology implementation. In Table 2 and 3 changes percentage and the degree of indexes growth have been referred.

DISCUSSION

As the indexes are mainly based on the four Financial, Customer, Internal and Learning and Growth perspectives of an Organization, so by paying attention to acquired results of each index in Table 2 and 3 and considering increasing level of indexes after methodology implementation, it seems that initiating knowledge based on BSC and creating motivation by it in addition to have focus on culture and structure domains have a great impact on creating a knowledge-oriented culture gradually which is the significant point of acceptance on behalf of employees. Of course, it should be considered that in implementation of shared knowledge validating processes we should act according to cultural and structural conditions of organization. In words of the authors, ‘‘financial measures are inadequate, however, for guiding and evaluating the journey that information age companies must make to create future value through investment in customers, suppliers, employees, processes, technology and innovation’’. In particular, these authors consider four perspectives: Financial perspective obviously, measuring the financial performance of the company, customer perspective, measuring the satisfaction of the customers’ preferences, internal business process perspective, measuring internal business results against measures from financial and customer perspectives and innovation and learning perspective, measuring the ability of the company to adapt to changes.

CONCLUSION

In our proposed methodology, giving score to knowledge done in distributive form. With high security of system and unnoticeable validating, interference of individual views and organizational relations minimize.

The key innovation of the BSC is, as opposite to traditional approaches, which only consider the financial data, to supplement this information with additional non-monetary measures. The main purpose of knowledge

validation is prevention from entering non-proficient knowledge in organizations.

Determining validation indexes and standards based on balance scorecard perspectives is the most important step in promotion of knowledge validation proposed method. Indexes determination must correlate with characteristics, purposes and strategies of consistency during experimental project period.

The mentioned method is a proper one for assessing knowledge and preventing people tastes. It is dynamic and according to organization conditions. This method also includes all validation necessities and suitable tools for qualitative management of knowledge.

Finally it is understood that it is impossible to create effective changes in organization without appropriate cultural preparation especially in information technology usage, attention and enforcement of changes are necessary in structural and cultural areas.

REFERENCES

1. Wu, L.C. *et al.*, 2007. Knowledge-based organization evaluation, Decision Support Systems, doi: 10.1016/j. dss. 2007.06.013.
2. Bechina, A.A. and Bommen, 2006. Analysis of a Global Scandinavian Consulting Company, Electronic Journal of Knowledge Management, EJKM, Volume 4 Issue 2(109-116), http://www.ejkm.com/volume-4/v4-i2/Bechina.pdf, 978-1591391340.
3. Iraj Koohi, 2006. E-Commerce implementing requirements in Iran, Information Technology Journal, ITJ, 5(1): 128-137, http://www.ansijournals. com/3/detail. php?id=1andj id = itj and theme = 3 and issueno = 168 and article no = 55141.
4. Rollett, H., 2003. Knowledge Management Processes and Technologies, 1st Edn, Boston, Kluwer Academic Publishers, 978-1-4020-7169-0.
5. Argyris, Ch., 1994. On Organizational Learning, 2nd Ed, Oxford, Blackwell Publishers, 1-55786-663-5.
6. Kaplan and Norton, 2004. Strategy Maps Converting Intangible Assets Into Tangible Outcomes, 1st Ed, Boston, Harvard Business School Publishing Corporation, 978-1591391340.
7. Mohan Nair, 2004. Essentials Of Balanced Scorecard, 1st Ed, New York, John Wiley and Sons, 978-0471569732.
8. Kaplan, R., D. Norton, 2000. Strategy-focused organization, 1st Edn, New York, McGraw-Hill Ryerson Agency, 978-1578512508.
9. Schein H. Edgar, 1992. Organizational culture and leadership. 2nd Edn, San Francisco, A joint publication in the Jossey-Bass management series and the Jossey-Bass social and behavioral science series, 1555424872.
10. Bryan Bergeron, 2003. Essentials of Knowledge Management, 1st Edn, New York, John Wiley and Sons, 978-0471281139.