A Practical Framework for Documentation of Experience and Knowledge Acquisition of Experts in Organizations

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Abstract— **Now a day one of the main concerns of organizations is the issue of high experienced managers and experts who are transferring from their company imposes a big loss on organization. while effective performance of an organization in a competitive situation depends highly on awareness of past mistakes and learning from them .Documenting intangible experience of the expert paves the way for organizational learning and consequently better performance of organization.**

In order to acquisition, documentation and codification, transfer, share and use of the organizational experience, we need to have a suitable and practical model with high validity. This article offers a practical framework to acquisition and document knowledge from experience of the experts in the organizations. This model has experimentally been used by institute for international energy studies (IIES) for acquisition and documenting experience of 45 experts and managers of Islamic Republic of Iran's petroleum industry and necessary modifications of the model have been done based on obtained results. this model includes five main stages: 1 - recognition, 2 –training, 3 - knowledge acquisition, 4–knowledge editing, 5 – knowledge management data base designing and knowledge electronic packaging.

Keywords: Knowledge, experience, knowledge acquisition, knowledge management, documentation, petroleum industry, I.R.Iran.

I. INTRODUCTION

An important managerial event, from its emergence, examining its different aspects, organizational realities, assumptions, concepts, questions to decisions and investigating its effects, should be considered as an historical event and analyzed correctly. Moreover, the shortest way to improve management level is to upgrade managers' ability and knowledge, learning from valuable experience and mistakes of other managers. Its clear that documentation and experience transmission play an important role in organizational learning, [16] it is necessary to use explicit and implicit knowledge of organizations in a proper and sensible way.

Human resources aren't able to keep all the information in mind spontaneously and completely and since personal experience is no longer considered as a personal property, documenting methods and learned material is the best strategy to transfer social and personal experience to other people. In this regard, leading organizations value collective knowledge (instead of personal one)because keeping valuable experience and transferring them correctly to staff will bring many advantages including time reduction , non-repeating previous tests ,reducing software and hardware costs to achieve an experience [12].

Manager's experience in an organization is considered as intellectual capitals of that organization which increase by the time.

In general, the most important goals of documenting experts' experience in an organization are as follow:

1. Increasing organizational synergy due to use of obtained results.

2. Learning from others' experience.

3. Creating common perspective due to documentation and experience transmission [17].

4. Recording experience, successes, failures, development stages and other important events of organization historically and practically and evaluating them.

5. Teaching culture of organization to next generations of managers and staff [11].

6. Creating insight .knowledge, power and creativity among managers and staff.

7. Revolution in the organization by transmitting experience.

8. Increasing productivity by documenting norms related to efficiency, affectivity and conducting them [4].

9. Facilitating information cycle and experience.

10. Providing a suitable condition to exchange thoughts and experience by teams [9].

II. EXPERIENCE AND DOCUMENTATION

Experience is defined as an influence on judgment and feeling by any kind of event, whether person has observed it or participated in, as well as describing an issue or material, personal acquaintance, enjoyment or real pain [14]. Davenport and prusak in their book (Knowledge Management) state that experience refer to past events and since words "Experience –Expert" derivate from a Latin word meaning test , experience and expert can be used interchangeably .Expert refers to a person who has knowledge in a specific field and practically tested it . They believe initial benefit of experience is creating historical image in mind .Using this image , we can observe new

events and that knowledge-based experience help people to create a relationship between what has happened past and what is happening now .

Here, writers have mentioned to the definition of experience in an organization from experts' point of view: experience of the expert in an organization describe a real situation which includes expert's understanding from organizational operations and surrounding events with the aim of providing wide personal and organizational perspectives for them as well as learning capability, skills of reusing and transferring them to others (knowledge creation).

Examining organizational theories shows those different theorists, from scientific management classic school to contemporary experts, all value organizational experience and documentation [8]. State (1989) believes that organizational learning realizes through creating common perspective , knowledge and subjective models and is based on past experience. Moreover, people and organizations learn through their own successes, failures and regular evaluating of them [7].

Process documentation refers to collection, adjustment, formulation and classification. These concepts show that all above factors emphasize on keeping information and that commonality of documentation is based on recording part of human knowledge. Documenting methods and techniques is a confident strategy to transfer personal and social experience to others [11]. Leading organizations therefore follow collective knowledge and try to document their own organizational knowledge. Documenting experience also change subjective knowledge of people to explicit one (documented knowledge) and this way organization achieves new knowledge through exchanging experience and explicit knowledge .Turban believes that documenting experience of organization is a methodology to introduce and transfer work experience for other people to use it.

III. CHALLENGES IN KNOWLEDGE ACQUISITION OF EXPERTS

A state above, to validate this model , formulated stages to achieve experience of 45 experts were followed in Iran's petroleum industry by institute for international energy studies. Conducting this process, we made a model (please see figure 1.) and applied it to mentioned 45 experts (managers), the results showed some challenges for documenting experience which may be seen in similar projects. The main challenges are as follow:

1. Complexity of knowledge in companies (especially technical knowledge) and therefore unfamiliarity of engineers with that field
2. Short time of experts with acquiring human-based knowledge as a time-consuming task
3. Inability of knowledge engineer to communicate properly with experts
4. Inability of knowledge engineer in classification of experience
5. Multiple knowledge fields of experts
6. Difference of work methods of expert with what he really does

7. Character of experts and the way they communicate with knowledge engineers

As stated, some experts have different characters which make interview sessions hold differently. These characters are as follow:

1. Doubtful: he thinks his position in the company depends on his knowledge and that he will no longer be needed if he reveals his experience. Therefore, he rarely answers your questions correctly.
2. Captious: he hates his work situation and company itself and may give false information.
3. Conceited: he considers himself as the best person in his field.
4. Compassionate: extracting knowledge from him is difficult because he talks eagerly about his marginal successes but not main points
5. Laconic: he doesn't talk much about details of his work
6. Indifferent: he doesn't object with comments made by the engineers. This may result from his timidity or indifference to project.

As an important result, we needed a KM approach to documentation of experts experience, which will explained in next section of the paper.

IV. KNOWLEDGE MANAGEMENT APPROACH TO DOCUMENTATION EXPERTS EXPERIENCE

Some scientists define knowledge as an organized combination of rules and opinions, procedures and information. In other words, knowledge is a mixture of experience, values, current information and organized expert attitudes which gives a framework to evaluate and use new information [10]. Knowledge was regarded as an advantage for organizations which brings the ability of continuous innovation and competitive power. Documenting experience and distributing them will be considered as knowledge management if knowledge is a product of information, experience, skills and attitudes people have in a specific time and place [1]. Moreover, experience documentation changes implicit knowledge of people which is related to their perception and conduct into explicit and general one and thus by exchanging explicit knowledge and experience new knowledge is obtained. This article, therefore offers a documentation model for experience of experts in an organization with an approach to knowledge management.

V. PRACTICAL FRAMEWORK

Knowledge acquisition methodology in this research is based on valid methods of Human Driven Knowledge Acquisition (HDKA). After examining current techniques including protocol-analysis, protocol-generating, protocol-classification, diagram –driven techniques and etc, Institute for International Energy Studies (IIES) with cooperation of outstanding consultants created a combined technique to acquire knowledge of experts of Islamic Republic of Iran's petroleum industry which includes following stages:

1. step of recognition

This stage is the first part of KA during which necessary preparations are made to acquire knowledge from experts. The importance of this stage is due to the formation of knowledge bank as well as common belief between knowledge management's experts, experts and managers.

Subsections:

1.1. Formation of knowledge management team

Since all activities should be approved by management and there should be positive interaction between experts, experts and managers, the above-said team is formed by the presence of representatives of all 3 sections whose responsibility is monitoring and guiding the plan and decides on important and sensitive stages of the project.

1.2. Formation of information bank

At first, a complete information bank of experts under study is created which includes knowledge parameters of these people based on standard Personal Knowledge Questionnaires (PKQ), (Appendix 1).

1.3. Recognition and modeling knowledge fields

Knowledge fields of organization based on methodology of knowledge planning are modeled after examining organizational documents, conducting recognition interviews with experts and managers, holding common meetings between managers and KM experts and concept tree is drawn by identifying classes, knowledge fields as well as knowledge levels and ultimately is approved by Knowledge Management Team (KMT).These classes and knowledge levels are of great importance when interview questions are chosen and knowledge is coded. For example, after doing pilot plan in IIES, concept tree for knowledge fields of petroleum industry with over 160 general and technical items was drawn.

1.4. Designing questionnaire

Organized and semi-organizes questionnaires in different knowledge fields are designed based on key organizational questions as well as discussions made by KM experts and managers (regarding interview opportunities in knowledge extraction stage)and then approved by KMT.

1.5. Questioning schedule and expert assignment

Questioning schedule is approved at the end of this stage and experts are assigned to classes based on current information found in experts' information bank .In this stage , one expert may be questioned in one or more classes, thus a separate code will be allocated to him.

2. step of training

This stage, after obtaining results of recognition stage, is an opportunity to prepare executive teams of interview as well as justify experts under study with the following sections:

2.1. Stating importance of plan to experts under study

This activity is done for stating importance of plan to experts and that experts play an influential role in project. This stage is initiated by holding training workshops and meetings with experts using methods based on knowledge sharing of implicit and forgotten instructions of experts and ultimately tacit knowledge or knowledge extraction warm up

is formed. People are given standard forms in these meetings, so that they can better prepare themselves for interview.

2-2.Training interviewers and editors

Interviewers (partly includes members of KMT's consultants and partly a few personnel of participated organization in interviews) and knowledge editors are trained specifically for organizational purposes and modeling knowledge fields of that organization is properly explained.

3. step of knowledge acquisition

This stage is the most important part of project and all processes done in previous stages help to upgrade this stage. This stage includes extraction of knowledge from experts and time dedicated to each expert is nearly 3 two-hour sessions.

3.1. Communication

In this stage communication is made based on information bank and interaction with experts and questions are sent together with short explanations.

3.2. Interview

Interviews with experts are done based on known knowledge tree with predetermined goals .In this part, interviewers as teams consisting 3 or 4 members (at least one expert as selected by KMT) ask questions. In interview sessions, each expert answers his own question based on interview techniques such as diagram, laddering, teach back, etc.

In each questioning session and by stating experts' responses, knowledge acquisitions reach to its maximum level. Moreover, experts' responses are saved as audio files and transcribed at the end of each session and then technically edited by KM' experts. After each session and after examining interview points by knowledge management team, remaining questions for the next session are determined and knowledge fields are revised and formulated. Experience demonstrates that proper time between each interview session would be nearly 7 days.

3.3. Classification in standard forms

After doing interviews, edited texts are placed in special forms suitable for coding by KM experts. In this stage, materials related to each topic and knowledge title obtained from different interview sessions are arranged as a "Knowledge Table".

4. step of editing knowledge

The purpose of this stage is that extracted knowledge as a knowledge package obtains the capability to enter knowledge bases .It consists of 3 following sections:

4.1. Knowledge coding (preparing initial knowledge notebooks)

All previous interviews include tens of various knowledge instructions. In this stage, KM experts together with other outstanding experts, separate and code instructions and refer them to specific knowledge fields using interview content analysis method and subsequently experts' knowledge packages are formed . Each package consists of knowledge title, knowledge text, knowledge fields and remaining questions for enrichment of knowledge.

4.2.Editing initial notebooks by experts

In this stage, initial knowledge notebooks are given back to experts for editing and then they are asked to answer the questions in a written form .Subsequently, modifications are made on notebooks and are finalized. In this stage, all finalized notebooks should be revised and edited by supervisor of the plan .Knowledge packages, therefore are defined regarding knowledge class, knowledge level and code of expert.

4.3.Knowledge shaping

In this section, various knowledge is shaped and molded with respect to standard codes prepared by software team and approved by KMT and consequently is arranged to enter to the system.

5. Design of data base for knowledge management and knowledge building package

By this stage, knowledge is in the form of mass of paper texts with various codes and class indexes which should be sorted using Information Technology (IT). Thus in this stage information is entered to system, in addition to designing and practicing an organized information bank (which mostly includes modules from designed software system of information bank).Its stages are as follow:

5.1.Designing system

Software system of knowledge bank is designed based on RFP prepared in recognition stage. This stage includes recognition, designing system structure, designing information bank, system coding, and documentation and testing.

5.2. Information entry and electronic package-making

In this stage, all previous information is entered to system and system automatically and with correct recognition distributes needed reports among users. At the end of this stage, all targeted reports of KMT are extracted, packed and produced easily by the system itself and activities like searching; knowledge marketing and even obtaining comments and scoring become possible. Since this system has the capability of increasing knowledge level and its respective documents and even experts, it can properly be used in creating a comprehensive knowledge bank for all staff of the organization.

In general, IIES's combined model of knowledge acquisition in petroleum industry is as follows:
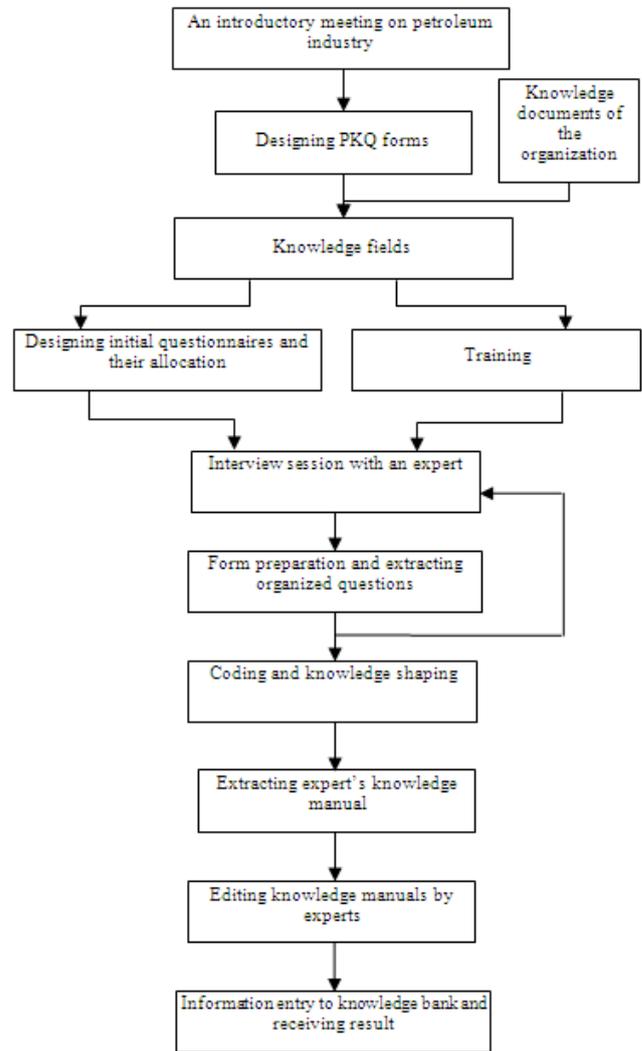

Figure 1. IIES's combined model for knowledge acquisition

VI. CONCLUSION AND SUGGESTIONS FOR ORGANIZATION

Despite emergence of knowledge management concepts in organizations for about 2 decades, they have recently considered in Iran and academic communities. For this reason, knowledge management concepts are regarded theoretically .Moreover, intangible knowledge and intellectual capitals of the organizations are hidden in experts' mind and factors like retirement, transfer and modification of experts make organizations to lose such knowledge. Knowledge management systems are executed in these conditions with the goal of identification, creation, storage, retrieval, sharing and using needed knowledge in an organization.

Since implicit knowledge and intellectual capitals play an important role in organizations, experience documentation is regarded as a tool which enables organizations to make effective decisions encountering serious problems, get

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immunity against past mistakes and subsequently obtain stable competitive advantages.

The purpose of this article was to study experts' experience documentation in petroleum industry and subsequently offers a combined technique for knowledge acquisition by IIES to organizations. Obtaining other goals related to knowledge acquisition requires the following:

1-Forming a committee consisting experts of that organization (Sagacity Committee) to guide designed knowledge bank and take actions to complete and enrich knowledge of organizations continuously.

2-Persistently following activities regarding experience documentation in the form of analysis and enriching knowledge

3-creating current procedure for documenting experts' experience on the threshold of retirement permanently

4-Formulating knowledge strategy and determining KM road map in the organization.

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