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A Systematic Approach for Knowledge Audit Analysis: Integration of Knowledge Inventory, Mapping and Knowledge Flow Analysis

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Abstract: Knowledge audit lays a concrete foundation for any knowledge management programs. The central topic of this paper is to integrate various knowledge audit related techniques into pre-audit preparation, in-audit process and post-audit analysis in a systematic manner. Culture assessment, in the form of surveys and radar charts, along with orientation program make up the pre-audit preparation. Structured interviews are carried out to capture process-critical knowledge. Knowledge inventory, knowledge maps and knowledge flow analysis compose of post-audit analysis. Knowledge inventory is then built for stocktaking knowledge assets and thus revealing the key knowledge assets by measuring them against four performance criteria. Knowledge mapping together with social network analysis are to show the knowledge exchange path and make the key knowledge suppliers and customers visible. They are then being further applied into knowledge flow analysis, which serves to reveal the strength and weakness of the current knowledge flow. A case study of applying the designed instruments in the Engineering Division of the Hong Kong Dragon Airlines Limited and the related analysis are also present in this paper.

Key Words: knowledge audit, knowledge inventory, knowledge map, social network analysis, and knowledge flow analysis
Category: A

1 Introduction

Knowledge plays a strategically important role to the success and continuous growth of an organization. Despite the popularity and importance of Knowledge Management, KM, to an organization, there is no universally accepted definition of KM or generic model for carrying out KM initiative. As a result, various models for implementing a knowledge management initiative have been proposed by both researchers and practitioners. In order to design a proper roadmap for implementing KM program and determine the strategy for implementing such program in a particular organization, an understanding of the organization including its culture, relationships as well as

communication networks is critical [Susan 2000; Jay 2000]. In order to gain such kind of understanding, knowledge audit is the key. With reference to the concept of knowledge audit [Edwin and Edward 1996; Ann 2002], a 3-stage, namely, pre-audit preparation, in-audit process and post-audit analysis, systematic approach is developed.

Most organizations launch KM initiatives without firstly measuring whether the organization is ready for doing so or not. Such initiatives often end up with failure or not to up to the initiative expectation in the end. Viewed in this light, culture assessment alone with orientation program makes up the pre-audit preparation. Structured interview with the help of designed questionnaire is the method chosen for carrying out the audit process. Last but not least, the post-audit analysis is composed of knowledge inventory, knowledge maps and social network analysis.

2 Methodology

The audit approach as shown in Figure 1 starts with an orientation presentation provided to the business units affected in an organization. The objectives of the orientation are firstly to brief the people involved about what the knowledge audit is about in order to clear their fears and secondly to align on what area the focus of knowledge audit should be on and gain the management support from the business unit affected.

Figure 1: Audit Roadmap

Adjacent to the orientation, it comes to the assessment of the culture readiness of the organization. Therefore, a 360 degrees Knowledge Management Culture Assessment Model serving to review the culture readiness of launching KM initiatives and to reveal the gaps between management level and operational level is designed upon studying the strength and weakness of various culture studies tools [see Claudia et al., Kim and Robert 1999, Human Systems Assessment, KOPE, Hubert]. This model derives itself from five components namely Control, Coherence, Information and Communication Landscape, Alliance and Partnership as well as Innovation [as shown in Figure 2].

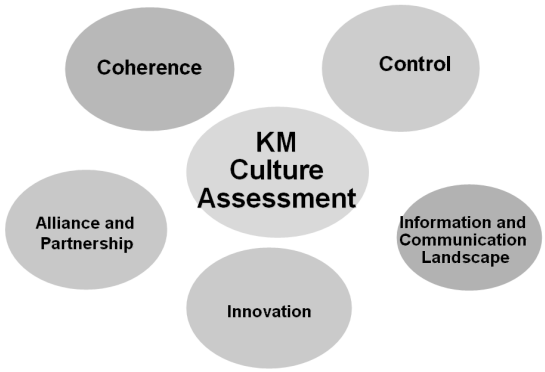

Figure 2: Model of KM Culture Assessment

Each of the components is made up by 4 dimensions, while each of the dimensions is reflected by 3 close-ended questions rated on a five-point scale. The culture of an organization is classified into 5 zones, Unprepared, Barely Acceptable, Acceptable, Well Prepared and Ready for Change based on the scales [as shown in Table 1].

The ways the model differentiate itself from others are in two aspects. It takes both internal and external issues into consideration, this goes in line with nowadays business environment that most organizations either Acquire/Merge with others or establishing strategic partnership with others to gain competitive advantages. Secondly, the focus of the model is to encourage the generation of new knowledge assets, which enables the continuous growth of the knowledge capital of an organization, through innovation and other components. In order to make the results more reliable and the respondents feel more comfortable, they do not need to state their names in this survey.

Carrying out the knowledge audit is the most critical process of the whole process [see Figure 1]. Therefore, a comprehensive knowledge audit protocol should be well designed to accomplish the objectives. Upon reviewing the weakness and strength of various audit questionnaires [see Jay et al., Christer 2002, Shah et al. 1998, Linda and Mark], a new knowledge audit protocol is designed. In this protocol, questions are asked in three sections about the decisions that the interviewees need to make in their responsibility areas. In the first section, respondents are required to state what knowledge, expertise or skills that the respondent masters for making the related decisions so as to stock take the knowledge assets and organize them into a knowledge inventory. In the second section, they are asked to list out their knowledge source and what kinds of knowledge they get from their knowledge sources. The aims of this section are to again keep the knowledge assets in the area of the audit scope in the knowledge inventory and also to visualize the knowledge exchange path among different parties in the business unit involved. In the remaining section, respondents are required to rate on the expertise that they consulted from the knowledge sources based on criteria including significance, complexity, credibility and response time on a scale from one to five. With the rating provided, social network analysis can be carried out to get a clear picture about who are the main knowledge providers by

calculating its emission degree and out-degree value, knowledge customers by calculating the reception degree and in-degree value, and knowledge brokers by referring to the sociometric value. The higher the value, the more likely one is to be a knowledge supplier, customer or broker accordingly.

Score (*10)	Zone	Implications
<=25	Unprepared	The organization should strive hard to change the value or structure before launching any KM initiatives
25-30	Barely Acceptable	The organization should pay critical attention in the culture issues otherwise it will fall into DANGER zone easily
31-37	Acceptable	The culture is ready for implementing knowledge management however, much effort still need to be paid for change management
38-45	Well Prepared	Not much effort is required for an organization to change its value and it is ready for launching KM initiatives
46-50	Ready for Change	Only little effort is required and the focus of this stage is to maintain and capitalize the knowledge assets

Table 1: Classification of Culture Profile

To sum up, the methodologies adopted in the knowledge audit are firstly, surveys for revealing cultural profile. Secondly, in-depth interviews to get a clearer picture on the knowledge resources in the selected critical process of selected interviewees. Lastly, knowledge inventory, knowledge mapping, and social network analysis to analyze the knowledge flow in the audit scope.

3 Case Study

In order to evaluate the applicability of the designed instruments for carrying out the systematic knowledge audit in real practice, they are applied in the Engineering Division of the Hong Kong Dragon Airlines Limited (Dragonair), which is a young and dynamic Hong Kong based airline serving 29 passenger destinations across Asia. The Division consists of 7 departments, namely, Maintenance Operation, Engineering Purchasing, Engineering Planning, Quality Assurance, Fleet Team, Engineering Services, and Line Maintenance. After the preparation stage, it comes to an agreement that the focus of this audit is on Fleet Technical Management (FTM) of Dragonair, which is a strategically important aspect to an airline company.

3.1 Pilot Test

Before the full launch of the questionnaires, pilot tests on the KM Culture Assessment Model and interview protocol were carried out to find out the suitability of the questions and to check whether the respondents understand the questions as well as to

check the time taken for doing the surveys and undertaking the structured interview. After these pilot tests, modifications including the wordings used, the relevance of questions asked as well as the comprehensiveness of the interview are made.

3.2 Launch of Knowledge Audit

Adjacent to the small-scale pilot experiments, it then comes to the full launch of knowledge audit. Before the full implementation of audit, an orientation presentation was given to mangers from various departments in order to seek their support in this audit. The culture survey was then administered to managers, and then the managers distributed the surveys to their subordinates.

3.3 Results and Discussion

The overall return rate of the culture readiness survey is about 80%, which is considered to be high. Data were entered into SPSS to check their reliability using Cronbach Alpha Factor and then to MS Excel to draw the culture profile [see Figure 3].

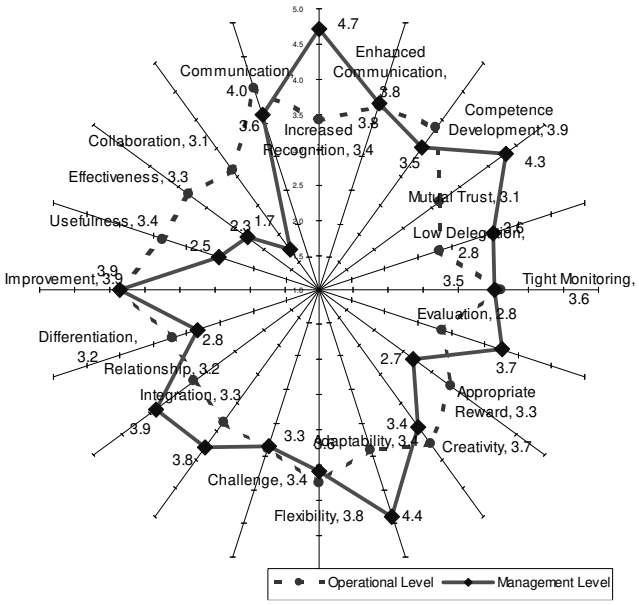

Figure 3: Culture Radar Chart

According to the predefined culture profile, it falls into the Acceptable zone according to the overall average [see Table 2], which means the organization is ready for implementing knowledge management initiatives provided that sufficient change management should be put in place to ensure the success.

Component	Operational Level	Management Level	Average
Coherence	3.5	4.1	3.8
Control	3.1	3.4	3.25
Innovation	3.6	3.7	3.65
Alliance and Partnership	3.4	3.6	3.5
Information and communication technology	3.4	2.5	2.95
		Overall average	3.43

Table 2: Results of Culture Readiness

After checking the readiness of the current culture, interviewees are selected for doing in-depth interviews. The information gathered from interviews is organized into knowledge inventories for identifying who are the key knowledge holders [see Figure 4]. This knowledge inventory can be interpreted as WHO at WHICH department is responsible for WHAT process with what KNOWLEDGE and the RANKINGS of knowledge items. By doing so, the knowledge items can be stock taken and prioritised. Further KM strategy can be proposed and executed with reference to the priority of the knowledge items stored in the inventory.

Figure 4: Knowledge Inventory

Upon knowledge inventories have been built, the information gathered is then organized into knowledge maps (example of dealing deferred defects is shown in Figure 5) to show the knowledge exchange path and social network analysis (example of dealing deferred defects see Figure 6) to bring the critical knowledge provider and customer to surface by calculating their respective emission degrees, reception degrees and sociometric status. in this case, Maintenance Controller is the critical knowledge holder, Mr. Chan is the main knowledge customer and broker.

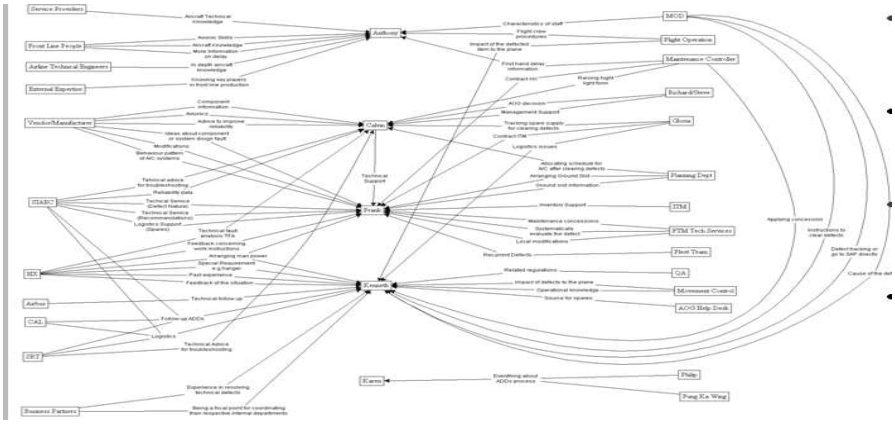

Figure 5: Knowledge Maps of dealing with Deferred Defects clearance

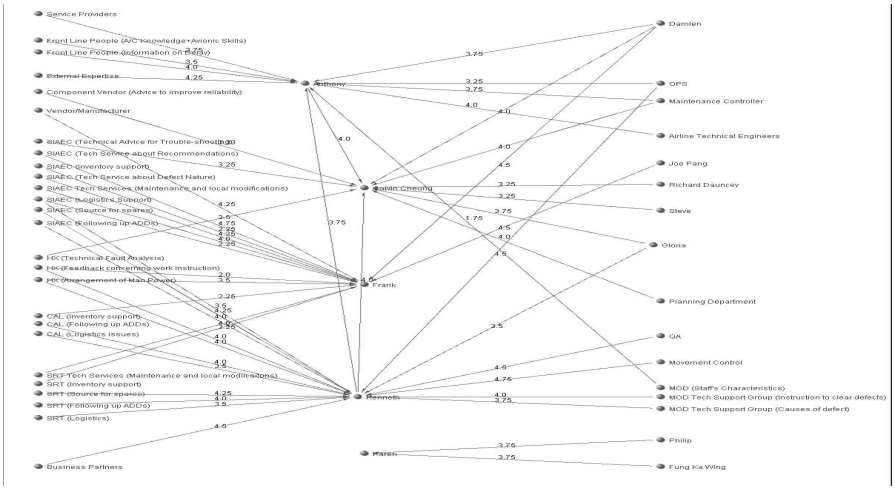

Figure 6: Social Network Analysis of dealing with Deferred Defects clearance

Apart from these analysis, it was found that for dealing with Deferred Defects, DD, people have to handle the work referring to both manuals and own experience, and they also need to record what they have done for resolving DD issues. Therefore, it is proposed to design a centralized system e.g. a knowledge portal, so as support staff, who has part to play in this process, to share the related experience and capture what they have done to clear the defects. Besides, statistical analysis for showing the trend of the delay situation should be adopted. By doing so, causes can be analyzed and improvement can be made.

4 Conclusion

Knowledge audit is the step to in any KM initiative. The systematic approach for knowledge audit present in this paper is a three-step one. First of all, Knowledge Management Culture Assessment Model is proposed to check the culture readiness of an organization, followed by in-depth interviews using designed interview protocol and lastly, performing knowledge flow analysis with the help of knowledge inventory, knowledge maps and social network analysis. A case study has been carried out to evaluate the validity of the designed instruments.

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