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# A Review on Knowledge Audit Process

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## A REVIEW ON KNOWLEDGE AUDIT PROCESS

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### Abstract

*Knowledge audit output helps organizations to make recommendation of KM strategy which later can be used for better managing the knowledge. This paper reviews literature on knowledge audit process with the aim to understand the process, the data gathering techniques employed and the roles of knowledge audit. It aims to report the research gaps and propose directions for future research in this domain. A comprehensive three-stage method for extracting, analyzing and reporting the literature-based findings was applied in analyzing the literature survey. The literature survey is based on a search for the keywords “knowledge audit”, “knowledge audit process”, “knowledge audit output” and “knowledge audit roles”, first on the ISI Web of Knowledge online database, followed by Association of Information Systems basket of top journals and other reputable literatures. The paper concludes with an understanding on how knowledge audit is conducted, the data gathering techniques used and its contributions to the organization. However no literature was found on knowledge audit practices for inter-organization. Future research on how knowledge audit could be extended for inter-organization is suggested at the end of the paper. However, this paper only covers literature that discussed in depth the knowledge audit process published in certain journals. Never the less, it is believed that the findings provide a valuable understanding of the current situation in this research field.*

*Keywords: knowledge audit, knowledge audit process, knowledge audit technique, knowledge audit output*

# 1. INTRODUCTION

Knowledge management is a process of creating, storing/retrieving, transferring, and applying knowledge. It consists of a dynamic and continuous set of processes and practices embedded in individuals, as well as in groups and physical structures (Alavi & Leidner, 2001). Knowledge can be categorized into two types: tacit and explicit (Nonaka & Takeuchi, 1995). Both types of knowledge exist in an organization. Tacit knowledge can be defined as knowledge embedded in the human mind through experience and jobs; and explicit knowledge is defined as knowledge that is codified and digitized in books, documents, reports, white papers, spreadsheets, memos, training courses and the like (Awad & Ghaziri, 2004). A well-structured and mature organization will have both types of knowledge in balance. It simply means that the tacit knowledge confined in the staff are actively captured and transformed into explicit knowledge. However for most of the organizations, the tacit knowledge is the main knowledge type as the activity of transforming the knowledge into documented and digitized form are not easily done. This knowledge is an asset in today's modern organizations. Thus it is critical for the organizations to manage their knowledge through various KM initiatives.

However, before engaging into any KM initiatives, it is strongly advised that the knowledge audit is performed. Many KM best practices highlighted the knowledge audit activity as an important initial activity that must take place before any KM initiatives started. Researchers (Cheung et al., 2007; Gourova et al., 2009; Hylton, 2002; Liebowitz et al., 2000) agreed that knowledge audit is an important activity that organizations should look into, before launching their KM initiatives. The knowledge audit is important as it helps to determine the state of knowledge inventory of an organization, which later could be used to assist organization to achieve their targets.

In measuring the knowledge asset at the organization, Skandia is considered the first large company to have made a truly coherent effort in doing such activity (Bontis, 2001). According to the Skandia's model, there are three types of asset owned in organizations known as human capital; structural capital; and intellectual capital (Bontis, 2001). The human capital is defined as the combined knowledge, skill, innovativeness and ability of the company's individual employees to meet the task at hand that includes the company's values, culture and philosophy. Structural capital is the hardware, software, databases, organizational structure, patents, trademarks and everything else of organizational capability that supports those employees' productivity. Human capital cannot be owned by the company, in contrast with the structural capital, that can be owned and thereby traded. The intellectual capital sums both human and structural capital. It can be in the form of the applied experience, organizational technology, customer relationships and professional skills that the organization owns. In the case of organizations, this is the asset that needs to be audited and served as input of the knowledge audit process.

Wu & Li (2008), stated that knowledge audit would support the leaders of organization by providing accurate information, avoiding risks in order to help them to make correct decision; and could guarantee the organization knowledge management activities running on the right track and under the modern management mode. In the case study conducted for Special Communities, Sukiam et al. (2009) stated that the knowledge audit processes helped to identify the available, required and missing knowledge and the subsequent recommendation of KM strategy that can be used for better managing the knowledge.

On the other hand, Henczel (2000) opined that in any knowledge management program, the first step one need to do is to identify where knowledge is being created, where it already exists and where it is needed to support decisions and actions. The whole process of identifying, locating and marking the knowledge consistent with what the knowledge audit is doing. Thus her remark proved that knowledge audit is important and must be done at the early stage of KM initiatives and this review will discuss the process involved, the roles that knowledge audit output holds and how it contributes to organizations. The remainder of this paper proceeds as follows. The next section presents the research method. The findings are presented and discussed in the subsequent section. The paper concludes with a summary of the findings and future research.

## 2. RESEARCH METHOD

This study aims to search and review the literatures on the knowledge audit process including the output and technique used to gather the knowledge. A three-stage method to extract, analyze and report the literature-based findings by Levy & Ellis (2006), was employed. The first stage of this method was the identifying the articles to be included in this review. The second stage involved designing and executing a detailed protocol that prescribed how to analyze the data. The third stage involved reporting the research findings.

The first process is to extract the literature from the ISI Web of Knowledge basket. Then the extracting continues by looking into the Association of Information Systems basket of top journals. As there were not many literatures on knowledge audit found based on these two baskets, reputable literatures from any published journals or conferences were also taken into consideration. The literatures were examines based on the keyword search of knowledge audit, knowledge audit process, knowledge audit output and knowledge audit roles. The search has resulted into 62 literatures that fit into the above criteria dated from 1994 to the most recent in 2010, which include papers that mentioned any of the keyword, anywhere in the body-text.

Author	Date	Theme	Unit of analysis
Debenham & Clark	1994	Output	N/A
Liebowitz et al.	2000	Output, Process & Data Gathering Techniques	Single organization
Hylton	2002	Output	N/A
Burnett et al.	2004	Output & Process	Single organization
Choy et al.	2004	Output & Data Gathering Techniques	N/A
Schwikkard & du Toit	2004	Output	N/A
Liebowitz	2005	Output	N/A
Thomas	2005	Output	N/A
Cheung et al.	2007	Output & Process	Single organization
Dattero et al.	2007	Output	N/A
Perez-Soltero et al.	2007	Output, Process & Data Gathering Techniques	Single organization
Sharma & Chowdhury	2007	Process	Single organization
Mearns & du Toit	2008	Output & Data Gathering Techniques	N/A
Roberts	2008	Output	N/A
Levantakis et al.	2008	Output, Process & Data Gathering Techniques	Single organization
Wu & Li	2008	Output & Process	Single organization
Ganasan & Dominic	2009	Process	N/A
Gourova et al.	2009	Output, Process & Data Gathering Techniques	Single organization
Sukiam et al.	2009	Output, Process & Data Gathering Techniques	N/A
Gourova	2010	Process	Single organization
Levy et al.	2010	Data Gathering Techniques	N/A
Sharma et al.	2010	Output & Process	Single organization

*Table 1. Distribution of Literature*

The second phase requires detailed protocol to be devised. However these literatures need to be filtered for their relevancy to the three theme which are process, output and technique (data gathering techniques used) namely. Only literatures that mentioned “process”, ”output” and ”data gathering technique” somewhere in the text of the paper in a meaningful manner are chosen. Thus 42 papers were excluded and only 22 literatures that discussed the theme in great details were kept. The literatures were systematically coded and analyzed by mapping relevant sentences/statements in the literatures to the “process”, ”output”, “knowledge audit roles” and “data gathering technique” nodes. Not only the literatures were mapped for their content based on the above theme, unit of analysis of each related literature were also analyzed. The distribution of the literatures is shown in Table 1.

### **3. DATA ANALYSIS AND FINDINGS**

Using the above approach, had pointed to papers that discussed in meaningful manner on the knowledge audit “process”, ”output” and ”data gathering technique”. As a result, 12 literatures were found discussing on the knowledge audit process 18 on the knowledge audit output and 8 on data gathering techniques. Figure 1 illustrates the mapping. Based on the distribution, the literatures were further analyzed. The literatures were used to define knowledge audit, understand the knowledge audit process, identify the data gathering technique used and pointed out the possible output produced out of the process.

#### **3.1 Definition of Knowledge Audit**

Knowledge audit is defined as KM activity which investigates and analyses organizational knowledge states and mechanism, reports the knowledge gap of organization according to the knowledge need of organization (Wu & Li, 2008). Cheung et al. (2007) defined knowledge audit as a process that involves a complete analysis and investigation of the company in terms of what knowledge exists in the company, where it is, who owns it and how it is created. In another literature Debenham & Clark (1994), defined knowledge audit as “well-defined, highly technical, structured report containing an overall, high-level description of a restricted section of an organization’s knowledge resource and a description of identified individual ‘chunks’ of knowledge in that section”. Another definition by Tsui (2005) is that knowledge audit as a technique that is often applied by organizations to ascertain what knowledge the organization already has what else is needed to accomplish corporate objectives. Another conclusion was made by Hylton (2002) whereby the author quote that “Knowledge audit helps to determine what it knows, who knows what, what it does not know, what it needs to know, and how it should go about improving the management of its existing knowledge”.

Thus, to best describe knowledge audit, the following understanding established: knowledge audit is step-by-step process that enable organization to have an inventory report of its knowledge assets, which will lead them in better decision making especially in knowledge sharing environment.

#### **3.2 The Knowledge Audit Process**

Knowledge audit methods vary from expert to expert and there is no unify standard for knowledge audit which limit the development of knowledge audit (Wu & Li, 2008). Ganasan & Dominic (2009) proposed a six-stage process of knowledge audit that include the followings: accessing organizational strategic information and culture; obtaining and prioritizing organizational core processes; measuring the current knowledge health; knowledge audit reporting; recommendation of knowledge management strategies; and continuous knowledge re-auditing. Authors Cheung et al. (2007), listed eight phases in the knowledge audit process. Those processes were carefully designed based on the background study done before deploying the Knowledge Management System (KMS) at the organization. This resulted into eight phases in knowledge audit activities that start with the background study of the organization and end with re-auditing. Meanwhile Wu & Li (2008), suggested the knowledge audit could be done from three groups of capital: human knowledge capital; structure knowledge capital; and external knowledge capital. There are six stages of knowledge audit processes that cover these groups, which include planning, data collection, data processing, data analysis, reporting and summary. Another process is by Liebowitz et al. (2000), that identified three major steps in knowledge audit processes: Identify what knowledge currently exists in the targeted area (typically select a core competency that is cross-departmental/functional; Identify what knowledge is missing in the targeted area; and provide recommendations from the knowledge audit to management regarding the status quo and possible improvements to the knowledge management activities in the targeted area.

However Perez-Soltero et al., 2005 summarized that those processes could be generalized into followings: identifying of knowledge asset; developing of knowledge inventory; identifying where knowledge reside; identifying the repositories; used and relevancy; analyzing the knowledge flow; and reporting the knowledge gap. Both Gourova et al., 2009 and Gourova, 2010 divided the knowledge audit activity into three phases: preparation; implementation; and finalization. According to them, the

first phase of the knowledge audit process defines the main parameters of the knowledge audit. This is done by conducting eight steps, at their respective stages. Before the process of knowledge audit actually begins, one must really know the direction of the knowledge audit activity by stating a clear goal, through scope, the activities to be conducted and time frame.

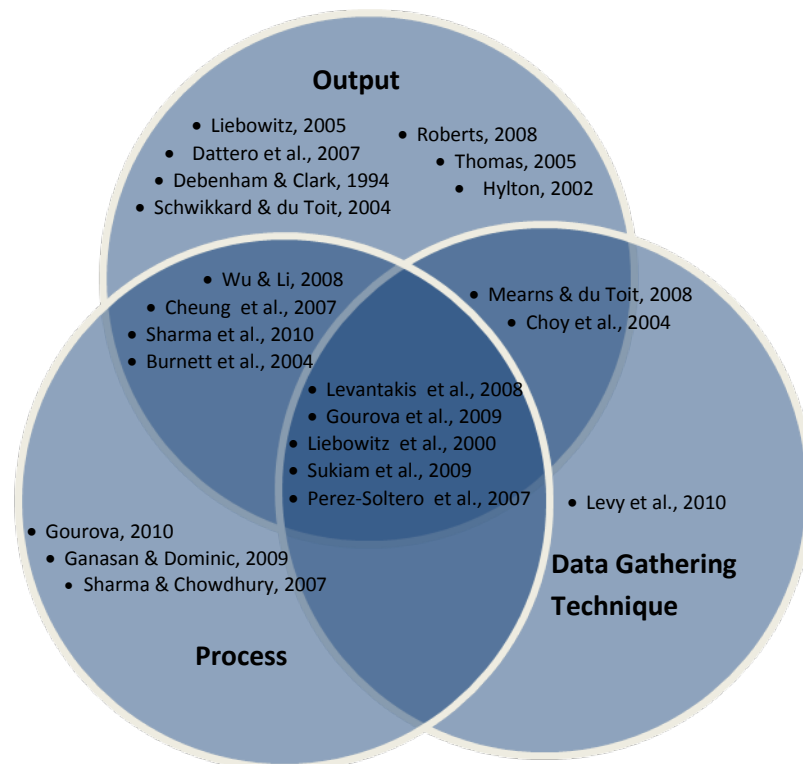


Figure 1. Literatures according to theme

In 2007, Sharma & Chowdhury, (2007) proposed a four-step knowledge audit process that consists of the following components in sequential: knowledge needs analysis; knowledge inventory analysis; knowledge flow analysis; and knowledge mapping. Another analysis of knowledge audit process is based on the work by Sukiam et al. (2009). They adapted work done by Sharma & Chowdhury(2007) in conducting the knowledge audit process by introducing the Community of Practice (CoP) into the process. It is suggested that the CoP is first identified before performing the processes, and the knowledge audit processes must be conducted for each CoP identified. Then in 2010, Sharma et al., improved on the four processes of knowledge audit. The changes made mainly because there was a difference in the method used in analyzing the knowledge audit. Sharma & Chowdhury (2007) used the Boston Box and SWOT analysis to map the knowledge inventory. In the 2010 research, the mapping was done using the KM Maturity Assessment and Knowledge Benefits Tree. There rest of the activities are almost the same even though they are some addition and changes of name, as they still serve the same purpose as before.

In their work, Burnett et al., 2004 explained about the knowledge audit methodology by using the case study. The methodology is as follows: setting the scene; learning day; measurement criteria; audit interviews; development of knowledge map; feedback event; implementation plan development; and implementation. They explained in great details on how the knowledge audit was conducted at a tax department. Their knowledge mapping technique is somewhat different from the color-coded Boston Box techniques applied by Sharma & Chowdhury (2007). Apparently Burnett et al., (2004) technique is less attractive but this is due to the fact that at there was very little literature on carrying out the knowledge audit and knowledge map, when he first started with his research.

Lastly work of Levantakis et al., 2008 was examined. They introduced an inventory of 25 activities of knowledge audit steps. Based on the analysis of the K-A processes of 13 literatures dated from 1994 to 2007, they concluded on what they claimed as most comprehensive of inventory list comprises of

eight main activities that was further decomposed into sub-activities. The main activities are: promote audit, in-depth investigation, collect data, analyze data, evaluate data, conclude audit, and re-audit. For this study Perez-Soltero et al., 2005 generic process is considered with an addition of re-audit as followings:

1. identifying the knowledge asset
2. developing the knowledge inventory
3. identifying where knowledge reside
4. identifying the repositories, used and relevancy
5. analyzing the knowledge flow
6. reporting the knowledge gap
7. re-audit

Almost all literatures that discussed on the knowledge audit process had carried out their proposed process in the organizational set-up. Only two did not test their proposed process. All ten literatures that had their processed tested were conducted in a single organization. The current demand requires information sharing activity to occur at the interpersonal, intra-organization or inter-organization (Yang & Maxwell, 2011). According to Canestraro et al. (2009) and Pardo et al.(2004), different organizations have their respective operation procedures, control mechanisms, and work flows that increase the difficulty to information sharing. Knowledge audit activity among inter-organization is a form of information sharing between different organizations. This activity helps to determine the knowledge inventory of the respective organizations and enable them to assess their 'knowledge strength'. Thus we believe that the existing knowledge audit process presented in the previous literatures do not address the inter-organization's needs.

### 3.3 The Data Gathering Techniques Used

It was found that there are various techniques used to gather knowledge for the knowledge audit activities. The analysis showed that almost all of the researchers would employ more than one technique. This is due to the fact that acquiring the correct knowledge is crucial and they want to make the best of it. Based on the study, there are four commonly used techniques employed by the researchers as follows: questionnaires, interviews, document review focus groups and observation. The summary is as depicted in Table 2.

Techniques applied	Researchers
Questionnaires (7)	Liebowitz et al., 2000; Sukiam et al., 2009; Levy et al., 2010; Gourova et al., 2009; Levantakis et al., 2008; Perez-Soltero et al., 2005; Mearns & du Toit, 2008
Interviews (8)	Liebowitz et al., 2000; Sukiam et al., 2009; Levy et al., 2010; Gourova et al., 2009; Choy et al., 2004; Levantakis et al., 2008; Perez-Soltero et al., 2005; Mearns & du Toit, 2008
Document Review (3)	Gourova et al., 2009; Sukiam et al., 2009; Perez-Soltero et al., 2005
Focus Groups and Observation (3)	Gourova et al., 2009; Liebowitz et al., 2000; Perez-Soltero et al., 2005

Table 2. Data Gathering Technique

Evidently interviews and questionnaires are most widely used techniques when eliciting the knowledge assets. Interviews are mostly done as semi-structured interview as it helps to better understand the underlying facts. It permits both parties to explore on the subject in-depth. Using the same technique will also enable them recognize their knowledge asset. These techniques could be engaged at the first four stage of the knowledge audit process. No evidence of automated tool is used in these four phases, except on the phase five and six when mapping the knowledge flow and reporting the gap.

### 3.4 The Knowledge Audit Output

There are the five most significant roles and contributions of the knowledge audit output Abdul Rahman & Ahmad Shukor (2011). The output is mainly used to produce the knowledge asset or inventory and to identify the knowledge flows through the knowledge exchange path. The role of the

knowledge audit output in serving the top management is clearly stated by its role as diagnostic tool. And lastly it is also used to identify the experts in the organization and skills that one possesses. The output helps in ensuring continuous quality improvement in the organization, as they provide accurate identification, qualification, measurement and assessment of the tacit and explicit knowledge of the organization.

**Expert directories.** Expert directories are directories that contain the list of expertise organizations have. knowledge audit activities produce an expert directory that enables staff to refer to when they need expertise in certain area in solving their day-to-day operation or when having more complex problem to be solved.

**Training needs analysis.** Having the knowledge audit exercise will also help organizations in planning their expert directories by examining the training needs analysis. This is possible as the knowledge audit will audit the knowledge one possess, and what skill or knowledge that they are still lacking. This resulted into a production of the training needs analysis.

**Knowledge asset/inventory.** Knowledge audit process can be defined as a stock-take activity of the knowledge owned by the organizations. It produces an inventory list. This inventory list tells the organization the asset they own in terms of knowledge. It shows how wealth organizations are when it comes to knowledge. This is apparently the main role of knowledge audit activities as all researchers mentioned them in their literature.

**Knowledge exchange path.** The knowledge audit activities will also help organization in the identification of knowledge user, supplier, broker and also the knowledge flow. This is known as knowledge exchange path as it tells the origin of the knowledge and who use it.

**Diagnostic tool.** Strategically, the knowledge audit output is also used as diagnostic tool. It helps organizations to strategize as it provides report on the knowledge gap and also act as an assessment tool. Organizations could act upon the report of their knowledge gap to bridge the gap. It could also be used to assess the performance of organizations' KM initiatives.

Knowledge Audit Output	Authors
Expert directories (4)	Dattero, et al., 2007; Hylton, 2002; Roberts, 2008; Wu & Li, 2008
Training Needs Analysis (2)	Sharma & Chowdhury, 2007; Thomas, 2005
Knowledge Asset/ Inventory (18)	Mearns & du Toit, 2008; Burnett et al., 2004; Schwikkard & du Toit, 2004; Choy et al., 2004; Gourova et al., 2009; Hylton, 2002; Levantakis et al., 2008; Liebowitz, 2005; Liebowitz et al., 2000; Perez-Soltero et al., 2005; Roberts, 2008; Sharma & Chowdhury, 2007; Sharma et al., 2010; Sukiam et al., 2009; Thomas, 2005; Wu & Li, 2008; Cheung et al., 2007; Debenham & Clark, 1994
Knowledge Exchange Path (15)	Burnett et al., 2004; Cheung et al., 2007; Schwikkard & du Toit, 2004; Choy et al., 2004; Levantakis et al., 2008; Perez-Soltero et al., 2005; Liebowitz, 2005; Roberts, 2008; Liebowitz et al., 2000; Mearns & du Toit, 2008; Sharma & Chowdhury, 2007; Sharma et al., 2010; Sukiam et al., 2009; Thomas, 2005; Wu & Li, 2008
Diagnostic Tool (7)	Dattero, et al., 2007; Debenham & Clark, 1994; Gourova et al., 2009; Liebowitz et al., 2000; Mearns & du Toit, 2008; Sharma & Chowdhury, 2007; Sharma et al., 2010

Table 3. Knowledge Audit Output

The various use of knowledge audit output, are very much depending on the organizations' needs and most importantly, they are mostly aligned with the organizations' goals and objectives. The knowledge audit process explicitly demonstrates that the output would provide the knowledge gap report for the management to consider. The knowledge audit as it is defined is a process that enables the organization to have some reflections of its knowledge inventory 'state of health'. Authors also believed that the output can help in continuous improvement at the organizations. For example the



training needs analysis produced can help top management to assess the current skill possess and skill needed for their staff. Thus the continuity of the organizations' 'knowledge health' can be assured. Furthermore, all five categories of output would be very helpful to the organizations and they can be optimized with the use of ICT as the delivery platform. The classification of the knowledge audit output is summarized in Table 3.

#### 4. CONCLUSIONS

This study helps to understand the nature of knowledge audit. It is a process that enables organization to have an inventory report of its knowledge assets, which will lead them in better decision making especially in knowledge sharing environment. It is strongly suggested for organization to have this exercise done before embarking into any KM initiatives. The input of this process is the organization's intellectual capital that consists of applied experience, organizational technology, customer relationships and professional skills that the organization owns. This intellectual capital will then processed to produce useful outputs such as expert directories, training needs analysis, knowledge inventory, knowledge exchange path and diagnostic tool. Even though literatures showed different steps of performing knowledge audit activities, it could be generalized into seven major activities. This step-by-step activity will help to produce the desired output as mentioned earlier.

Based on the analysis of the literatures that fit the searching criteria, it was found that not all processes engaged the re-auditing activity in their knowledge audit steps. If the knowledge audit activity is not done repetitively, then it is not possible to maintain the actual knowledge 'health'. Thus it is important to have the re-audit phase at the end of the process. The absence of automated tool to assist in the knowledge audit process in the eliciting the knowledge asset is observed. It is believed that with the help of automated tool, it is possible to address the issues of inadequate reliable participation and the tedious and time consuming process. Further research could be engaged to explore on how role of ICT could partially overcome the issues raised. This study also opens up to an opportunity to explore more on the knowledge audit activities for inter-organizations. Evidently, all literatures were focusing on single organization. However, it is common between different parties to share their knowledge in delivering their tasks and achieving their target goals. Thus, a study on how the knowledge audit process for the inter-organizations environment could be designed with the help of ICT, is something to be explored. There is a potential role of ICT in making the knowledge audit process smoother and more systematic. Especially when it involves inter-organization that operates on the event or ad-hoc based.

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