Indigenous Knowledge Management Framework for Coffee Production in Ethiopia

Tewodros Genanaw* Workshet Lamenew**

Abstract

The paper discourses about the importance of Knowledge, specifically the indigenous type, to the
Ethiopian economy in agriculture sector. The study identifies the sources where the indigenous knowledge resides and examines the current knowledge sharing culture between different stakeholders in relation to coffee production; then adapts different concepts from pre designed allied Knowledge Management(KM) models to design an Indigenous Knowledge Management Framework(IKMF) tailored to Ethiopian context. Qualitative approach is used to investigate existing gaps that may likely be initiated by different contextual attributes. This investigation substantiated by different sources to gather data, analyze and finally developed an IKMF that encompasses a cyclic Indigenous knowledge model with six states of create, validate, store, share, innovate, and validate with the consideration of different variables extracted from collected data.

Key words: Indigenous Knowledge, Knowledge Management, Knowledge Management Framework

HiLCoE School of Computer Science and Technology, Tel: +251911874848
Email:tgenanaw@gmail.com

1. BACKGROUND TO THE STUDY

Ethiopia's economy is heavily dependent on the agricultural sector, which accounts for about 40% of national GDP, 90% of its exports, 85% of employment, and 90% of the poor [1]. Agriculture is the dominant sector of the economy; and the largest source of foreign exchange earner. The local farmers use the enormous amount of Indigenous knowledge transferred from parents locally tested for generations till this point of time; the indigenous knowledge has been the major tool of producing coffee across the country however there are some indigenous knowledge proven to be wrong by scientists working in the Ministry of Agriculture bureaus; on the other hand, most of the indigenous knowledge are only known by local people at specific area helping to grow the coffee plant in a very suitable and environmentally fitting condition. Farming knowledge has been the major key value in the agriculture sector in Ethiopia, it may include from the way seeding to production to selling in the whole agriculture value chain.

From the outset coffee production has been rooted in the small-scale farming communities as a means for earning cash income for the farming households. The IK in coffee plantation and production process is still intact among indigenous (local) Kebele communities in many parts of Ethiopia.

The knowledge transfer has always been under threat in the absence of preserving the knowledge and passing it to farmers in different parts of the nation. Hereafter the development of IKM framework enabled by appropriate technology helps to efficiently make best use of the coffee production; the technological solution can establish nationwide knowledge retention, sharing and innovation platform.

2. THE PROBLEM PUT INTO CONTEXT

Making relevant knowledge and information available to farmers is still extremely poor in developing countries [2] inclusive of Ethiopia. , most coffee producers lack the improved production know-how and know-why. Also, they do not have the means to even share and learn from best practices within their respective communities. Experts like agricultural extension workers and other technical experts appointed by government are usually not readily available to provide sufficient knowledge and information in improved production, processing and marketing mechanisms, which implicates the need of technological appliance to widely disseminate knowledge.

The importance of the Indigenous knowledge obliges for a need in managing the indigenous knowledge for effective leverage of the IK and continued innovation, supported with technological solution. Several countries has developed a framework based technological solution for capturing the Indigenous Knowledge in Agriculture; however the contextual nature of fitness for specific area differs from others which makes the adaption unproductive to explicitly imitate the framework and use it for somewhere else.

On the whole, it is safe to sum-up the problematic context in Ethiopia by indicating the fact that most Ethiopian farmers lack adequate knowledge on current farming affairs and the fact that it is very dependent on contextual characteristics making it unable to adopt IKMs developed in other countries.

The main objective of this study is to develop an Indigenous Knowledge Management Framework.

This research questions the following three enquires for investigation:

1. Where does the indigenous knowledge, useful experience and codified knowledge reside within the coffee producers'?
2. How do stakeholders inside the coffee production phase share Indigenous knowledge among them?
3. How do we network with, and disseminate knowledge for the broader agro-producers and other stakeholders found along the coffee production phase; and show impact of ICT on the indigenous knowledge sharing, innovation of new approaches and devising a prototype for the proposed IKMF?

3. LITERATURE REVIEW

Different Knowledge Management Models are reviewed to assess and adapt ideas and practices in related works in knowledge management domain.

3.1 Reviewed KM Models

IKM model for rural communities in developing countries: A study conducted in Tanzania proposes an understanding conceptual KM model for rural communities in developing countries; based on findings, this study proposes a KM model for rural communities, which indicates that the potential of knowledge for agricultural development should be conceptualized within the framework of the targeted community (see Figure.1 [8] below).
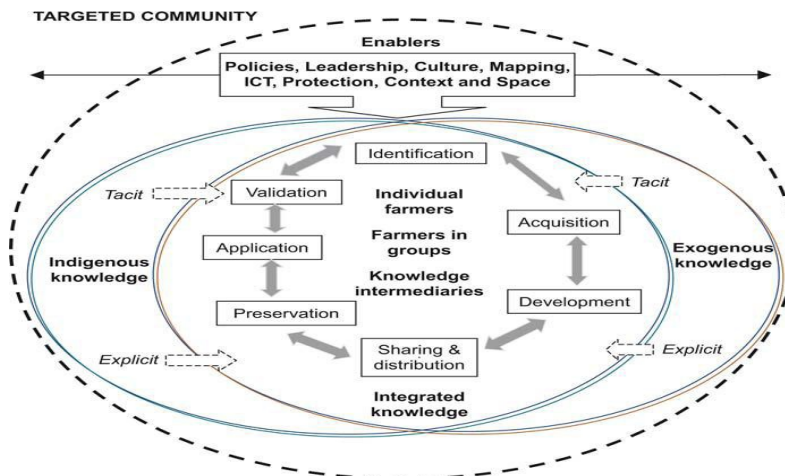

Figure 1: IKM Model for Rural Communities [8]

Nonaka and Takeuchi: Nonaka and Takeuchi (1995) with their SECI (Socialization(tacit to tacit), Externalization(tacit to explicit), Combination(explicit to explicit), Internalization(explicit to tacit)) model look at the process of knowledge management as a knowledge creation process .The model indicates spiral arrangement of four sub-sections

revolving from exchanging of tacit knowledge to codifying the tacit knowledge using several mechanisms and showing the possibilities of how the explicit knowledge can be combined with support of different technological methods and to understand the codified knowledge.

There are four kinds of 'ba' (context in which knowledge is shared) supporting these four processes as stated by Nonaka & Konno 1998: **Originating 'ba'**: focuses on socialization, **Interacting 'ba'**: the place for externalization, **Cyber 'ba'**: virtual world for combination, **Exercising 'ba'**: the place for internalization. Nonaka has explained the importance of cyber ba for combining explicit knowledge with usage of information technology, which in this research; the IKMF is shown to be reflected with a prototype system.

The different variable, concepts and theories which likely influence the problem situation are logically associated to each other to reflect the existing reality, observations and the literature survey.
Reviewing the models from different angels leads for designing a conceptual framework which:
•   It simplifies and generalizes the research problem for readers to understand easily
•   It clearly shows the problem of the statement
•   Research questions can easily be constructed for further investigation
•   It gives direction for the research design

3.2 People Process and technology as pillars to KM

People, processes and technology are three key aspects that have to be addressed when planning the approach to knowledge management [3]. All the three important facets are important for the implementation of good IKM however they all shouldn't be distinguishing in the application rather tied together as one for better outcome and benefits.

The active participation of the stakeholders in the indigenous knowledge management gives life for the whole system and evolves to address the knowledge demand of farmers in time. The people are the one who help and design the KM process and the technology for efficient implementation of KMS. In developing ICM and KM strategies, the people and the processes must be considered first [4], technology would come at fairly last to foster the strategic plan.

3.3 KM Processes Models

The **Probst et al. model** (2002) has identified cyclic steps calling them "The building blocks of knowledge management" where the inner cycle lists the following components; Identification, Acquisition, Development, Distribution, Utilization, and Preservation. Probst has identifies six core building blocks for knowledge management, it is designed for companywide KM development but the blocks raises important consecutive steps of concepts to investigate knowledge management for community based crop farming.

Heisig model presents similarities with the components of the inner cycle of Probst et al. Although, the Heisig model is composed of four processes which

are similar to the previous
'Building block of knowledge management' components, it has introduced the Create stage.

Despite the fact, learning and communication help receive new conception from others, the model emphasizes and brings the notion of the connection b/n ideas and building cross- connection with other topics to originate new knowledge.

3.4 Anticipated IKMF-Application Outcomes

1. The IKMF may serve as a useful systemic tool; with particular attributes and features devised in it; for codifying tacit knowledge. Similarly, it can be a useful tool to help others to get the information they need easily and to make use of it whenever required.

2. knowledge-sharing between farmers, extension-experts, locally involved supportive agencies, and local administrations, results in higher productivity within the agriculture sector.

3. If its systemic tools and the knowledge of the key players are improved; then it can lead for further expansions; and it can even reduce the existing high unemployment rate in most rural areas leading to have increased human resource development of Ethiopia

4. Catalyzing the innovation of new practices in the industry through existing research communities will also provide far quicker access to any anticipated sources of information in the desired subject areas for conducting future researches

5. Utilizing an improved and accessible knowledge management framework creates an opportunity for developing; a better facilitated knowledge management system

6. Additional benefits include, awareness creation, accessibility of information, innovation and availability.

7. Creating the awareness about the importance of Indigenous knowledge management by making weak linkages between stakeholders strong and pave a way for innovation of efficient farming technique; which has a tremendous effect on the development of the nation's economy towards meeting the country's Growth and Transformation Plan.

4. RESEARCH METHODOLOGY

In this study we aim to select concepts that has been used in similar knowledge management researches and added additional concepts that has meaning to express the existing indigenous knowledge sharing in Ethiopia, then design an understanding conceptual framework to show the existing gaps; following the conceptual framework design the research proposes a strategic roadmap adaptable for conducting indigenous knowledge management research in Ethiopia, which basically used in this research and resulted to design an Indigenous Knowledge Management framework .

In this research it follows the design science in creating IKMF for better KM practice in coffee production in Ethiopia, which directly ends up proposing a framework that makes enable the different stakeholder to store and share knowledge extending the traditional knowledge management practice by supporting with technological solutions.

This research mainly uses qualitative research type which makes it flexible and compliant to the research's objective. The research analysis categorizes the collected data under different thematic sorts to understand the knowledge sharing aspects to some depth between farmers and extension workers.

This research implements purposive sampling by selecting cases that would help to understand and learn deep enough the social aspects of the IKM in local contexts. An experienced moderator was there to help identify the ones who yield the most valuable information about the IKM investigation, three extension workers was chosen from six different kebeles of Checho woreda.

4.1 Data Collection and Instruments

Overall, both primary and secondary data sources are used for the data collection brought from the regional agricultural departments, Woreda offices, and from those selected sample Kebeles to carry out the actual field study. Firstly, the primary data were collected mainly through well- devised questionnaires that are constructed by using both the open ended and close-ended questioning techniques; secondly, identified key informant interviews were made particularly by using a semi-structured interview technique; thirdly, in this study, secondary qualitative data was collected by reviewing available documents, questionnaires and unstructured interviews conducted during field investigation.

5. DATA ANALYSIS

In the Data Analysis process, the conceptual framework framed the understanding of the current climatic situation in the IKM in coffee production; which helped to identify the important variables to focus on together with the variables from different reviewed KM models. The data then organized and reduced in to themes though coding, by continuing to interpret the presented data by comparing with the different related ideas retrieved the reviewed KM models though a process called interprevitism to design the IKMF.

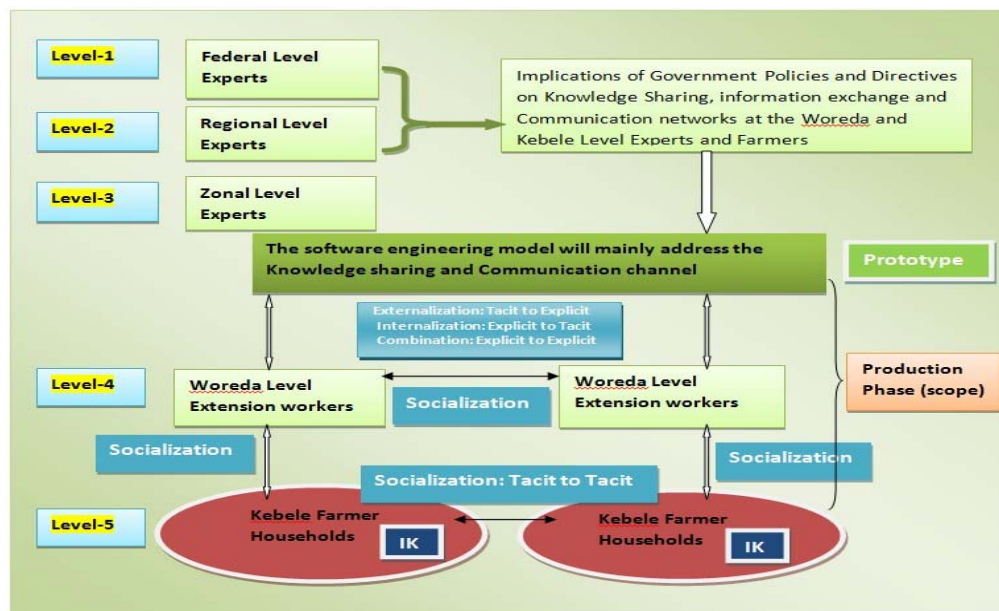## 5.1 Conceptual Framework for the study

Figure 2: Conceptual Framework

Level1: Government policies, regulation and directives regarding knowledge and information sharing are likely to be decided in the federal and regional levels.
Level2: Decentralization is an outcome of the adoption of a federal system of government in Ethiopia. The regions are given the authority to legislate the policy

in their respective concerns where by need.

Level3: property rights (IPR), data protection and security, and freedom of access to information. The legal and regulatory environment pillar of the policy also aims to ensure the protection of IPR in ICTs [5] woreda administration offices reports to zones.

Level4: Extension workers are assigned by the government to mediate between the farmers and the governmental institutions. The extension workers socially exchange the indigenous knowledge and implicates to explicit form without losing the contextual nature of the knowledge.

Level5: The indigenous knowledge in coffee production resides in the minds of farmers in kebele and household level.

Viewed from the Agricultural Knowledge and Information Systems perspective, ICTs can be seen as a useful tool for improving the already existing linkages between: (a) farming, (b) research and (c) extension systems [2]. In fact, as attempted in Figure-2: IKM Conceptual Framework sketch above; when knowledge is successfully transformed; then, it can yield innovation; which, in turn can enhance the competence, productivity, competitiveness of the livelihoods of stakeholders in the coffee production sub-sector.

Looking at the policy and regulative perspectives, as shown in Figure-2, government institutions are also relevant, including those related to agricultural policy and the dynamics of power. However, the challenge is: How is it possible to build the trust necessary to support collaborative innovation? A hindrance, in this respect is that, there is large power differentials among actors and stakeholders involved in the framework [7].

Strategic Roadmap: There are numerous types, levels, and styles of roadmaps for business use as well as everyday [6]The roadmap approach used in this research follows three major steps; I) where are we now II) where do went to be III) how do we get there. Different metaphors are considered in the first step and transits to the consecutive steps to show how metaphors are used to show the gap (problem), the proposed solution and in the implementation of the proposed procedures. The three pillars of KM; people, process and technology are mapped with the three steps to clearly identify the different issues raised under classified and assessable section.

5.2 Data Presentation and Interpretation

Total of nine people were participated in the data collection process; among them, three extension workers working on crops are from three different kebeles of Gedio Zone Checho woreda. Three farmers were from three different kebeles of the checho woreda in Gedio Zone and the remaining three were federal level experts.

The data presentation represents the data gathered from different farmers, extension workers and Agricultural experts pertinent to the study subject; the data is presented in meaningful descriptive way to understand the collected data by comparing to other related theories. The meaningful data then interpreted by comparing and contrasting with the reviewed knowledge management models. The themes are classified in to twenty one categories; then the data collected from respondents under the different thematic codes are organized depending of the nature of respondents' response and in a way the results to give baseline information to understand the existing knowledge management situation so that a framework can be designed to solve the existing incompetent knowledge storage and sharing practice.

The data interpretation follows the interpretation of the data in each sectioned themes. The interpretation discourses the presented data in relation to the previously mentioned KM models. It basically uses 'interpretivism' research

design technique.

6. INDIGENOUS KNOWLEDGE MANAGEMENT FRAMEWORK

The Indigenous Knowledge Management Framework relies to solve and enhance on what has been seen in the interpretation of the presented data and understanding the values and gaps incorporated in the conceptual framework showing the existing knowledge sharing practice. The framework has brought relevant issues in to consideration and shapes the management of the Indigenous Knowledge in the coffee production practice in Ethiopia with technological support. It additionally consists of the different stakeholders under seven levels, which the top five levels have direct interaction with IKMS under different privileges.
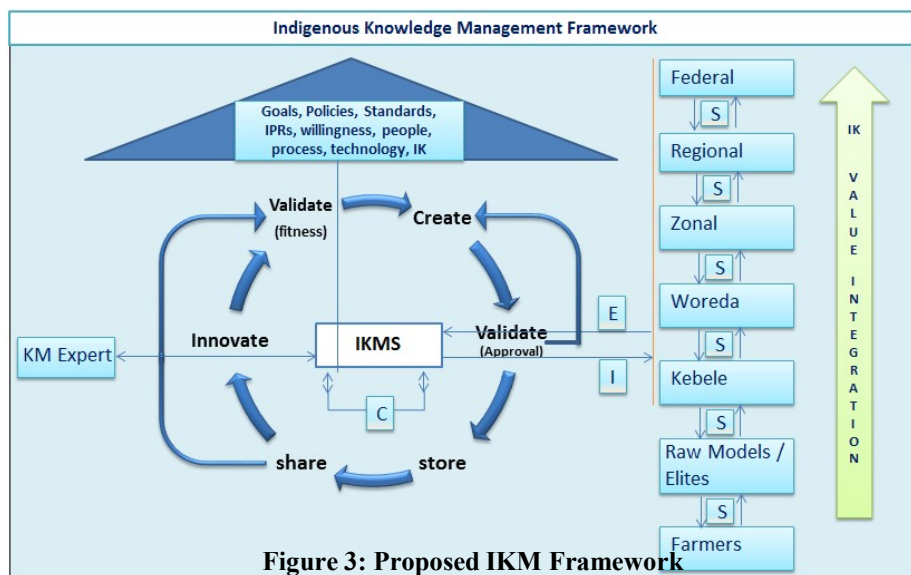

Figure 3: Proposed IKM Framework

The **SECI** model concepts are incorporated to the framework with the letters **S** for **S**ocialization, **E** for **E**xternalization, **C** for **C**ombination and **I** for **I**nternalization. The stakeholders exchange knowledge to each other by social events then they would able to externalize their knowledge to a central system in order to others Internalize back from the system which indirectly creates an opportunity for the Internalizers to combine a new knowledge and store back to system.

> The framework is envisaged to embrace the feature to create IK from the local community and EKs evolved from IKs; then it is validated before it is stored because there are IKs which believed to be absolutely useful by the local people but the extension workers sometimes need to made modification or consider it as noisy information; the modified IK then need to be discussed with the IK holder not to lose contextual information about the IK. The validated IK then stored for sharing between the stakeholders; although the IK is validated it needs to be taxonomized for easy filter and structured storage.
>
> The shared knowledge is validated to check it's environmentally fitness to be successfully applied at the destination area. The knowledge receiver is the one having information about the environment and about the area where the shared IK is expected to be applied and bring values.

Or the shared IK can also be combined with other information inside the head of the IK reader from the system then come up with a new Endogenous Knowledge which again shall be validated for its environmental fitness.

Up on externalizing IK to the IKMS and Internalizing IK from the IKMs creates a facilitated environment for individual stakeholders to develop their learning behavior and experience, paving the way for collective learning to accomplish nationwide organizational learning to result wide intellectual capital.

Finally the Evaluation of the framework was made through phone with interview respondents; however practitioners were available to discuss in person for the applicability of the Indigenous

Knowledge Management Framework which proves the framework is viable.

7. CONCLUSION AND FURTHER WORKS

The developed Indigenous Knowledge Management Framework is to enhance the IK storage; sharing and innovation practice in the agriculture sector to use best production mechanisms in order to grow the nation's economy by utilizing the dispersed Intellectual capital in the nation, and promote development in many aspects.

IK is still and underutilized resources in the development process of Ethiopia, It is therefore very important that a national IK database and sharing networks shall be created to help innovators share their innovations with potential users and other innovators to both gain recognition and to increase knowledge generation for further innovations [9].

The researcher hopes for full development of Indigenous Knowledge Management System by investigating the building blocks of the Indigenous knowledge Management Framework. Since there is a shortcoming in knowledge representation of the current widely used content management and database management system, there is a huge opportunity for making research in knowledge engineering for knowledge representation especially of Indigenous knowledge. In addition, the proposed IKMF is limited to the scope of coffee production; henceforth it is vital to extend this research to develop an integrated IKMF for the whole agriculture sector.

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