# ASSIMILATION OF ECMS IN ETHIOPIAN HIGHER EDUCATION INSTITUTIONS

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**Abstract** - Higher Education Institutions (HEI) produce vast amount of digital data on their day to day tasks. The large volume of content in organizations today necessitates the beginning of Content Management Systems (CMS). CMS helps in facilitating the creation, retrieval and editing of information/knowledge either raw, semi or fully-processed contents. ECMS have essential features towards integrating these processes to the whole institutions. However, HEIs in developing nations such as Ethiopia seem not well understood value of ECMS and are not seen integrating them to their routines. Therefore, the objective of this paper is to show the extent of ECMS usage in HEIs, to analyze assimilation of ECMS in EHEIs, to study the value of content and ECMS, and to analyze the perceptions of top management team and IT professionals that exist on the same working environment. To address this, an interview and observation was done to develop the theoretical model. Considering factor identified have theoretical and practical contribution on Assimilation of specific Information Systems, in this case ECMS.

**Index Terms**— Content Management Systems (CMS), Content Management Systems Assimilation (CMSA), Enterprise Content Management Systems (ECM), Higher Education and Information Technology.

## 1 INTRODUCTION

Globalization has changed the structure of HEIs and the way they offer services to the local and inter/national community. HEIs perform various activities such as teaching learning, research, and community services. At the time they perform these activities, they create, classify, and archive large amount of content. Content implies what an organization publishes, captures, and reproduces in a communication medium [1]. Content can be any kind of paper or electronic information [2]. Electronic contents further can be categorized as structured or unstructured [3] [4].

As far as contents are produced, there should be proper CMS, i.e. a system used for generating and consolidating contents to facilitate their reuse and retrievals [1]. CMSs may vary in terms of their functionality, vendors, reliability, costs, and code openness [5]. Due to this, choosing one from the available CMS is a difficult task [6]. CMSs help organizations to manage and integrate their content [7] [8]. CMSs also help to facilitate interactions through social network sites [9],

When a CMS is applied to a whole institution, that institution is said to have an Enterprise Content Management System (ECMS). ECMS comprises "the strategies, tools, processes, and skills an organization needs to manage its information assets over their life cycle", including all digital assets such as documents, data, reports, and web pages as well as software [10]. Therefore, ECMS focuses on the entire organization rather than on a single unit or department [3]. Based on an intranet 2.0 Global survey, about three quarter of the organizations are using ECMS [8].

Assimilation can be defined as "the extent to which the use of a technology diffuses across organizational work processes and becomes routinized in the activities associated with those processes" [11]. It is the magnitude to which an innovation has become a norm and regular part of organizational activities. The concept assimilation extends from the initial awareness creation to full institutionalization process. Likewise, the assimilation of ECMS in HEIs can be considered as integrating ECMSs in their routine activities.

The assimilation of ECMSs can contribute to organizational success. Jackson & Chang [12] found that, proper web technology assimilation enhances an organization's participation in a society. In particular, assimilating ECMS in HEIs routines contributes to their goals [7]. It also offers considerable value in the effectiveness and efficiency of institutional performances [7]. We focus ECMS assimilations on HEIs because, HEIs affect the Gross Domestic Product of a country; are positively associated with economic growth of a country; are backbones to getting good citizens; promote nation building; serve as sources of skills for labor market and growth, and foster innovation [13].

However, developing countries are far behind in exploiting ECMS for educational purpose [14]. A survey done by Hare [15], Base [16] show that IT in Ethiopian universities is at infant stage. However, these days penetration is growing and most of EHEIs are using ICT. For example, among the available Ethiopian universities listed under Webometrics [17], more than half of them use CMSs to develop their websites. A closer inspection of the current use of ECMSs in Ethiopian HEIS, reveals that beyond disseminating their information over the intranet and extranet, most do not exploit the full -e-[1] features and functions of the ECMSs. This shows that HEIs are underutilizing ECMS and are not taking full advantage of the opportunity created for them. As a result, they are wasting resources; are not getting actual return on their ECMS investment; continue to face problems in their day-to-day activities that could have been minimized by using the technology, and are not properly managing their contents too. Therefore, it is important to have a study of ECMs on HEIs.

### Statement of Problem

This research intends to address two main and interrelated problems - technology underutilization and technology value.

[1] -e- stands for the E in ECMS

Although EHEIs have various IT resources (Such as computer, printer, scanner, and Internet) and various systems (such as digital library, human resource system, registrar systems, financial systems, data centers, websites, and e-resource sharing) they do not seem to exploit the features of ECM i.e. Find, Distribute, Re-use, Track and Associate content [18]. They also do not integrate their resources to their routine activities [19], and do not seem to be aware of what values ECMS provides for them. This shows a paradox in EHEIs, On the one hand, they face scarcity of resources. On the other hand, they even do not exploit the technological opportunity created for them. Due to this they are getting little use of the available ECMS. Because of this, the expected result from their investment, and the effort they exert remains less worthy on achieving their objectives. Therefore, analyzing this problem and alleviating it, will have tremendous benefits for the assimilation of ECMS in HEIs.

Researchers didn't give much attention to the values, assimilation, and impact of ECMS in HEIs in general and Sub-Saharan Africa in particular. A review of the literature shows a number of studies about IT assimilations (see tables 1-2). However, ECMS is not well addressed beyond graduate level research in Africa [20]. Different scholars do have their own background to depict assimilation of IT in their own context; however, none of them addressed the assimilation of ECMS for academic environment as well as the perception of top-level managers and IT professionals on HEIs. Overall, the following points can be observed from the review of the extant literature:

- Absence of a research on assimilation of ECMS for HEIs.
- Most of the previous studies were on commercial and cross-sectional settings. It is difficult to generalize those contexts for HEI and for the situation of ECMS assimilation.
- There is no research done showing value of ECM assimilation as a solution to HEI of developing or developed country context.
- Assimilation of IT shouldn't be only on the technology, environment and organization. Previous researches didn't consider the recognition content value, so while specifically addressing certain system the solution will be detailed too.

Therefore, there is a need for a study focused on the antecedents and benefits of ECMS assimilation in EHEIs as such, the extent ECMS can serve HEIs is not well-studied. The level of readiness of HEIs and the factors affecting ECMS in HEIs is not well-known. Besides, the value of content and value ECMS assimilation didn't get much research attention. The extent, role, and participation of top managers and IT professionals in assimilating ECMS for HEI is also another feature which is not well-known.

With this respect, addressing these problems will contribute to HEI stakeholders in various perspectives. The study helps for identifying extent of use of ECMS for HEIs, helps for identifying available technology and factors that affect ECMS assimilation. It will also show the functionalities of ECMS and the values that HEIs can obtain from them. It can help to understand the role and participation of top managers and IT professionals towards ECMS, and shows content as a resource should be integrated on the assimilation of ECMS too.

**RESEARCH QUESTION**

To address ECMS assimilation in EHEIs the following research question is formulated:

- ❖ What hinders/facilitates the assimilation and value of ECMS in Ethiopian Higher Education Institutions?
  - o To what extent EHEIs integrate ECMS in their day to day tasks?
  - o What is the recognition level of HEIs about the content they produce?
  - o What is the extent of technological readiness in HEIs to assimilate ECMS?
  - o Which factors affect ECMS-Assimilation?
  - o What are the benefits of assimilating ECMS?
  - o Do EHEIs generate value out of their ECMS towards achieving their objectives?

**4. OBJECTIVE OF THE RESEARCH**

In order to address the research, question the following general and specific objectives are set.

**2.1 GENERAL OBJECTIVE:**

The general objective of the study is to design a framework of ECMS assimilation in HEIs and recommend how to enhance successful implementation of ECMS Assimilation in EHEIs.

**2.2 SPECIFIC OBJECTIVES**

The following specific objectives are also designed in accordance with the general objective:

- To conduct detailed evaluation of the existing ECMS, its functionality and extent of use in EHEIs
- To assess the level of institutional readiness on ECMS assimilation and analyze value of content
- To assess factors affecting ECMS-Assimilation in EHEIs, based on various IS theories.
- To develop a framework for ECMS assimilation based on the theoretical perspectives
- To identify what organizational values ECMS assimilation has for EHEIs.
- To evaluate the framework on ECMS-Assimilation.

## 5. RESEARCH METHODOLOGY

As a research design, the researcher will apply a qualitative approach and document analysis to identify the gap. this helped to analyze the current situation and status of ECMS in HEIs. At this time, the type of ECMS used, its extent, additional factors that affect assimilation of ECMS will be identified. Besides, this approach also helps to analyze what unique features ECMS has for HEIs, what benefit and values ECMS can derive on the performance HEIs was assessed. This step also helped to know the recognition of HEIs about the content they produce. Therefore, the step filled the literature gap on

identifying factors that affect value of content and value of ECMS for HEIs. Doing this helped to strengthen/modify the proposed preliminary model of ECMS assimilation.

### 5.1 SAMPLING SIZE

The population of the research will be all top management team and IT professionals of selected EHEIs. Geographically convenient HEIs, private and public, as well as all new and old HEIs was included in the study. As a sampling frame employee at top IT positions (named either CIO, IT Director, or IT head) in these universities was included in the study. a case-based pilot study was conducted using purposive sampling approach on HEIs.

### 5.2 DATA COLLECTION

The research used detailed analysis through recorded interview and closer observation, which helps to have a better understanding of the problem under study. It also helped to see the current functionalities and usages of ECMS for EHEIs. Besides, it also helps what value HEIs expect from ECMS. By doing this the existing system/s was understood from top managers and IT experts of HEIs.

### 5.3 RELIABILITY AND VALIDITY

As mentioned in the literature review, assimilation was addressed by various researchers. To maintain its validity, tools already used by previous researchers was adopted for the existing constructs. For the newly added as well as for the existing variables another research, as second phase of the study, will be done. This is because overall ICT assimilation, ICT assimilation for ecommerce purpose, ICT assimilation for other public sectors and IT assimilation for Academic centers may have a difference.

The study will remain reliable because, primarily the contexts of ECM assimilation in all EHEIs will be tested based on the theoretical backgrounds where they emanate from. Secondly, an exploratory study will fill the missed gaps in the model building.

### 5.4 DATA ANALYSIS

The case based qualitative study supported the researcher on providing detail understanding and overview of the ECMs in EHEIs. At this step, the evidences gathered from EHEIs will be arranged in such a way that they provide understanding of the phenomenon under study. To analyze an ECM on EHEIs, an open code thematic technique was applied. This approach helped get categories or concepts from the data to be collected.

## 6. LITERATURE REVIEW

The review part of the paper summarizes concepts in relation to ECMS, assimilation of ECMS, and value of ECMS for HEIs.

### 6.1 ENTERPRISE CONTENT MANAGEMENT SYSTEMS

In order to have a clear view of ECMS, the misunderstanding and certain degree of overlapping between RMS, DAM, DMS, CMS, ECM, and other similar concepts (Browning & Lowndes, 2001 ) should be clear (see Appendix six).

Record, content, and document are similar words interrelated with each other but have different concepts. Record is defined as data that is regarded as complete and unchangeable (Kiriti-e-Office, 2014 ). It may exist as paper, scanned or electronic image. A document is defined as information, stored on either paper, scanned image, or other electronic that may be subject to revision. Whereas a content (web content) is the information (which can be graphic or textual) provided by a web site. The term web content includes both texts and multimedia (Animation, Images, Sound, and Video) (Kyrnin, 2014).

Records cannot be modified or deleted except in controlled circumstances. Records have retention controls and they are arranged in a structure. With this context "Records Management", is the field of management responsible for the systematic control of the creation, maintenance, use, and disposition of records (National_Archives, 2014). On the other hand, Document Management (DM) applies specifically to the management of discreet documents and images throughout their lifecycle; typical functionality includes acquisition, organiza-

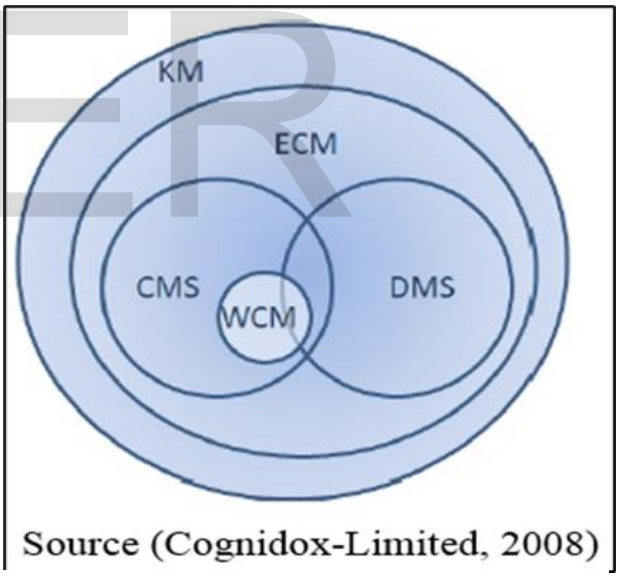
tion, versioning, access control, and archiving" (Roe, 2014). So, a document may be a record, but not all documents can be records. Whereas CMS focuses on the management of the data within a document, typically a web document (Web, 2014). Therefore, CMSs vary from DMSs in one key area – the type of information they manage. DM solutions are designed specifically for data contained in structured documents and files like Word, PowerPoint, Excel spreadsheets, PDF, and other popular formats. CMS on the other hand, are more about the logical organization and improved accessibility of various types of structured and unstructured electronic information (Business-Software, 2014).

CMSs can be applied in different organizational contexts, such as Chatterjee et al (2002) studied the benefits of Web technologies for E-Commerce. An overview of CMS for higher education is also addressed by Powel and Gill (2003). The current trends about Web Content Management Systems (WCMSs), skill, knowledge needed, and future websites is also discussed by Farkas (2008). Therefore, the term WCMSs or simply CMS are the latest approach that facilitate the day-to-day activities of enterprises and need through investigation (Farkas, 2008). CMSs serve a role of Document Management Systems and Knowledge Management Systems too (Vitari, Ravarini, & Rodhain, 2006).

ECMS is a young concept aimed to gather tools and processes to handle different types of contents. Some examples of content are documents, e-mails, blueprints and pictures. ECMS increase efficiency and minimize costs of organization by resuming control of the content and secure its compliance with the business (ULLBERG, 2007). The basic focus on ECMS is the look from "E" point of view, instead of looking from single CMS. Organizations should strive towards integrating holistic Enterprise systems (Duhom, 2003). Therefore, ECMS is not a standalone concept in organizations (Katuu, 2012). The areas mentioned by ULLBERG, (2007) on ECMS processes are also integrated in organizations with people and data/information available. This shows that ECMS systems truly act as ecosystems where people, processes, and information connect (AvePoint, 2011).

ECM is a system which facilitating work processes using text, images/graphics/animation, audio/video and integrate concepts of all DM, RM, BPM, Portal, KM, DAM, WCM (Katuu, 2012). See (appendix six) for the detail comparison of these concepts. Therefore, the concept of ECMS is holistic, and it goes beyond the individual view of all these concepts.

Researchers categorize the importance of ECMS to various basic tasks. According to ULLBERG (2007) ECMS has five main areas: capture, manage, store, preserve and deliver contents. In one way or the other, organizations address all the above issues while using different approaches with certain degree of differences. ECMS is a new way of organizing these functions and serves as a means to avoid redundancy of tasks if any.



Source (Cognidox-Limited, 2008)

**Figure 1 CMS and related Terms**

Ma functions the first is management of content life cycle and the second is management of metadata and corporate taxonomy (Munkvold, Päivärinta, Hodne, & Stangeland, 2006). The flourishing of the Internet ended the traditional isolation of documents and records management (Alsup, 2004). The latest concept ECMS handles the two concepts, content life cycle and metadata, together.

Organizations may have a number of reasons to start ECMS,

among them, cost savings, knowledge management, fulfilling compliance requirements, quick information search, higher collaboration, and error minimization can be mentioned (Alsup, 2004). Because of these wide ranges of rationales, ECMS has high relevance for different concerned organizations (Nilsen, 2012). ECMS with its components (shown on Fig. 1), can play a vital role for these generations' higher education institutions. ECMS can also address various features institutional wide including tasks of KM and DMS (Vitari, Ravarini, & Rodhain, 2006).

### 6.2 CONTRIBUTION OF IT/ECMS FOR HIGHER EDUCATION

Contribution of IT in HEIs as source of scientific, technical, and analytical skills is increasing (World-Bank, 2011). HEIs are backbone of economic growth, sources of innovative ideas, and places that provide skills for good citizens of a country (World-Bank, 2011). Besides formal education, HEI graduates prepare themselves for adult life, in this respect technology provides them additional skills necessary to join a society (Pedró, 2009).

The availability of Wi-Fi and computer facilitate skills, knowledge sharing, and interactivity in college and university campuses. Goffe & Sosin (2005), showed that IT tools can be productively and easily used to teach at a relatively low cost to instructors. IT supports those who are less likely to be satisfied with conventional approaches to teaching and learning. IT also increases usability of content and satisfaction to users by delivering various types of content on various devices (Petter, DeLone, & McLean, 2012) including laptops, tablets, and mobile phones; IT easily minimizes plagiarism. Besides this, IT also helps for designing FAQ, online video, group working, as a means of connection for people who are far in distance (Goffe & Sosin, 2005). IT supports to demonstrate and integrate theoretical concepts to practical sessions too (Ron, 2008). Therefore, we can say that the contribution of IT for our generation HEIs process is not unforeseeable.

Besides, by using IT, new learning environments, e-learning system, can be developed to shape the interactions of researchers, teachers, and students (Kirschner, 2004). Due to this, all stakeholders are positioned as knowledge producers rather than reproducers (Rybacki, 2009). Assimilation of ECM for higher education is integration of ECM into formal educational practices.

IT can also help organizations to address pressures that comes from external environment and align such pressures with their internal working conditions (Wang, 2008 ). IT plays important role as the institution moves from simple accumulation to integration of the technological resources (Zhu, Kraemer, & Xu, 2006).

A number of researchers show the importance of IT assimilation. Such as LI (2005) study the importance of knowledge fit between top managers and middle level mangers is essential for IT assimilation; Bogale, et al (2009) showed the importance of moderating effects of Top Management Competence in Assimilating ICT; factors of IT assimilation for Knowledge Management Systems (KMS) is also done by Hecht, et al. (2011).

Though, there is lack of literature on academics' environment, the assimilation of ICT for business areas got focus from different researchers too. Matthews (2007) explained the contribution of ICT for the growth of SMEs; Bharati & Chaudhury (2012) highlight multiple intermediary roles that different institutions must play for SMEs on IT assimilation. The assimilation of IT on service sector SMEs is also studied by Uwizeyemungu & Raymond (2011).

ECMS as one IT tool can contributes much to the operations of knowledge management and e-learning environments. ECMS can help with the creation of knowledge (Pedró, 2009), facilitate search and retrieval (Dishawa & Strong, 1999), and allow archiving and revision of contents (Powel & Gill, 2003). ECMS allows automation of processes and administration of content without detailed HTML programming knowledge (Farkas, 2008), de-skill the knowledge of web development (Chin, 2008), helps to create pages of content with a simple form lay-

out of WYSIWYG editor, can be easily accessed (Blue_Oryx, 2012), remove the bottleneck of a single Web Administrator (Chin, 2008), avoids time and space limitations, it helps to log 24/7 anywhere (Hudson_Horizons, 2013). These features make ECMS more appropriate to EHEIs where it is difficult to have much IT experts skilled to support their much population. Therefore, having an ECMS in HEIs can bring an effective workflow for many parties (Students, Academic and administrative staffs) in EHEIs environments (Martis, ND).

### 6.3 VALUE OF ECMS ASSIMILATION FOR HEI

*Enterprise content management can maximize the value of unstructured content in institutions. HEIs have much unstructured contents in their activities such as modules, outlies, texts, notes, research outputs, discussions, and slides.* ECM can provide a way to understand the content, recognize its value, and apply it in such a way that businesses can perceive their outcomes. ECMs can lower costs of risk in institutions and improve efficiency (IBM, 2015).

Content is designed to address organizational issues and to reach to the customer. In order to provide value for their ECM, institutions should look in to their audience (Rockley & Cooper, 2012 ). Customer is always the first priority, institutions should write content with the customer in mind. With this respect, the value of ECM depends on the value of content object designed for customers. If the given object becomes "findable", "distributable", "reusable", "traceable", and "associable" it can be said that it has value on these respects (O'Callaghan & Smits, 2005).

According to Koumpan & Fresnillo (2013 ) ECM has four values for institutions. ECM helps to understand the enterprise information architecture through various decision making principles and standards; ECM establish information governance by showing chains of responsibility, authority, and communication; ECM establish organizational change management by providing large scale adoption of technical solutions; and ECM define requirements at an enterprise level and describe how the ECM components will be utilized by end users and how they will interact with related systems.

Since there is shortage of references in relation to specific value of an ECM for HEIs, an expanded literature and thorough analysis with respect to HEIs needs to be conducted to clearly know value of ECMS in HEIs.

However, HEIs can observe the value of ECMS from their objectives point of view. Their objectives are again achieved through the list of tasks they perform. Organizational performance is a function of the extent to which the business processes of the firm are integrated and coordinated through the technology (Harris & Katz, 1991 ). In order to measure the value of ECM, its contribution and the type of business performances that an ECMS supports should be known.

Value can be measured based on the business performance it improves (Raymond, Bergeron, & Blili, 2005). Business performances may also be measured from different perspectives. Firms may measure their performance at organizational performance level or business process level. The organizational performances level considers performance in terms of achievement of the planned outcomes i.e. customer satisfaction, operational efficiency, or customer service performance may be included. The business process level looks performances as achievement of intended outcomes and the ratio of resources used. It is measured using organizational growth, profitability, or financial performance and market share (Kassahun & Molla, 2011). Further study avoids the gap on determining the type of performances an ECMS addresses and what value it derives for HEIs.

### 6.4 CONCEPTUAL FRAMEWORK and HYPOTHESES

#### THEORETICAL DEVELOPMENT

There exist various theories used in the assimilation of different technological and organizational processes from IS researchers (Schneberger & Wade, 2013). ECMS assimilation being one assimilation domain in IS, a number of theories from different angles can be used to study it. Scholars discussed the available theories in information technology adop-

tion, diffusion and assimilation (Hecht, Maier, Seeber, & Universi, 2011). Among the theories used: Institutional, Structuration, Adaptive Structuration, Diffusion of Innovations, Knowledge-based, Business Process Management Theories, & Resource based view theory can be mentioned. The following tables show details of reviews on assimilation. While table one shows the theories and related researches applied on assimilation, table two shows additional view of related studies and theories applied on these studies.

Based on these theories and other concepts, different scholars came up with various models for the assimilation of ICT in different environments (see table 2). In order to address the assimilation of ECMS for EHEIs, the awareness and use of content and technology should be clearly known. HEI with their complex environment should be thoroughly seen, and ECM assimilation in HEI should be considered. For this study Institutional Theory (INT), Resource Based View of the Firm (RBV), Technology Organization and Environmental (TOE), and Diffusion of Innovation (DOI) are proposed theories to address ECM assimilation.

The RBV is important because it helps to recognize content as a resource of HEIs, and evaluate the performance and value of ECM. RBV helps to see how far EHEIs view and use the content they generated and how they analyze the performance of ECM too. The DOI helps to see the readiness, extent of use of ECMS, and how far ECMS is understood and used in HEIs. INT is important because, it helps to understand how Institutional managers, regulatory agencies, and decision makers at the organizational and national level affect ECMS assimilation. The TOE theory is important because, as a framework it helps to further strengthen and view the application of these theories in HEI. Therefore, these theories help to develop the framework for ECMS assimilation in the context of EHEIs.

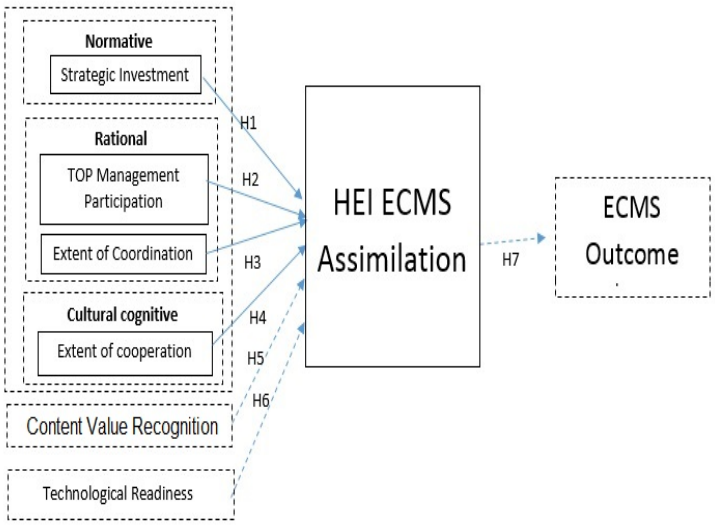



**Figure 2 An Initial framework for ECM Assimilation**

## 9. SIGNIFICANCE

As a research done in South Africa about ECMS witnesses, there are few researches that address ECMS in low income country context [57]. The study shows, even South Africa, most advanced in ECMS, there are limited researches concerning ECMS in the country. Browsing the key word "Content Management Systems Assimilation" there is no evidence that ECMS assimilation study has been conducted so far in academics centers of developing countries, such as EHEIs. Therefore, the area is not yet assessed and studying the assimilation of ECMS will have a number of significances for both practical implementation and theoretical dimensions.

First, the study shows how ECMs can be integrated in academic institutions and how those institutions can derive value from these systems. As a theoretical framework, the model to be developed gives insights to analysis of the assimilation of ECMS and what factors should be considered while studying ECMS assimilation in HEIs. Without looking at those factors, it is difficult to address issues faced and values derived in relation to ECMS.

Secondly, it will show the top management belief and participations, which matter most on the existence of IT implementa-

tion. Unless there is a will from top managers, it is difficult to run IT in the institution. Plus, to this, it helps to know about IT professionals who: recommend best solution for the institution, implement IT solutions in the environment, and bridge the gap between top managers and the remaining community. Unless both of these parties are well-equipped and aware, IT professional and top managers can also be bottlenecks for IT implementation. Therefore, doing this research will have a contribution towards understanding the role and/or perception of top managers as well as IT professionals on ECMS assimilation

Thirdly, IT professional and top managers are the one who first believe in the implementation of IT and should take the initiative. Doing this study helps to know the relationship between top managers and IT experts in their working environment. Whether they are striving together as a unit in higher institution environment or have different views on the same working environment.

Finally, previous researches were on cross-sectional organizational setting and most are on private sector. They didn't focus on single organizational setup and academic environments too. Therefore, the research will show the level of recognition of content as a resource, the detailed view of ECMS assimilation and how it can be affected in the context of similar organizational setup, and what values it can create for EHEIs context.

Looking deep in to the practical domain, higher educations shifted from tight centralized control to less restrictive control [58]. Similarly, most EHEIs these days include various disciplines under them and follow flat organizational structure. EHEIs are organized in the form of colleges, institutes, schools, and faculties and each of them handles its own content. However, the interdisciplinary collaboration between them weights more than hierarchical relations among them. ECMS, can support much on this environment. This is because, ECMS address collaborated working environment. Using an ECMS efficiently and effectively for HEIs should be considered as a good solution [59] and its value for them should be considered.

To use ECMS effectively in the HEI, there should be this type of study which points out the detailed analysis on what level it exists, what factors to be considered, what values to be derived from assimilating ECMS.

Proper ECMS also has much contribution for organizational knowledge development, which emanates from the organizational content [60]. With this regard, Votsch [61] shows ECMS is the nuts-and-bolts capture layer of Knowledge management.

Studying the perception and role of top managers and IT experts will help ease the work of these groups and create easier role on HEIs e-learning environment. Which again will help for the assimilation of ECMS, this is because ECMS is helpful for both students and teachers in creating blended learning. The blended learning (traditional instruction, and e-learning) on ECMS gets advantage of the integrated: content, process (publish and share) and technology/software together. Therefore, integrating ECMS helps to watch the workflow of tasks, to reach course content and to submit assignments easily [55].

Finally, the research will serve as a basement for other related works to be addressed in HEIs, by paving the direction of designing ECMS assimilation for their organizational activity. It shows that, the utilization of ECMS can facilitate the record keeping, retrieval, and the external relations processes too. By doing this, HEIs can achieve the maximum functionality from ECMS. Knowing decisive factors can help designers to see the directions in which ECMS can further be utilized to serve much in developing countries. This again may help as a working ground for others and further integrating their systems with ECMS.

## 10. SCOPE OF THE STUDY

The research is delimited to only public and private HEIs. Due to this, any training centers, technical schools, and experi-

mental and research institutes are not included in it. The research also focuses from the system implementers' point of view; due to that, it doesn't include the users' perspectives. Besides these, the research is delimited to address assimilation of an ECMs due to that, other IT related issues are not the focus of the research.

Due to this, it may have a limitation on directly concluding the result for other sectors or all other academic institutions. Besides this, generalizing to other low-income countries will be difficult unless they are on the same status to EHEIs. Lack of literature is another constraint on the study, to avoid this an exploratory study will be conducted to fill the gap observed. Since the study focuses on institutional assimilation, the users' attitude and interest towards ECMs is not included.

## 7. EXPLORATORY STUDY

### 7.1 AIM AND OBJECTIVE OF THE EXPLORATORY RESEARCH

The assimilation of ECMSs in public sectors, especially in HEI, doesn't get much focus by researchers. Due to this it is difficult to come up with a detailed literature review which can describe factors affecting ECMS assimilation. The aim and objective of the exploratory study is to better understand the status and usage of ECMS in EHEIs; by conducting this it is possible to identify factors that affect assimilation of ECMSs in EHEIs and to know the values it has for those institutions. Based on this the exploratory study answers the questions:

- To what extent ECMs are assimilated and for what purpose they are used in EHEI??
- What are the factors that affect the assimilation of ECMs in HEIs and what value they brought for these institutions?

### 7.2 RESEARCH METHODOLOGY

At the time where researchers face little knowledge about a certain phenomenon, the qualitative research approach is recommended to gather detailed information and get detailed overall understanding of the case under study [1]. This exploratory study was conducted using interview with different IT experts in EHEIs. Interview was selected as a means of gathering data for the conceptual model development because, it contributes to identify perceived causal inferences [1].

Based on this, the researcher applied semi structure interview as primary data collection from HEIs. Structured equations were used to get background information about the respondents' and description of systems background whereas, the unstructured equations were used for identifying factors that affect ECMS assimilation in EHEIs and values of ECMS. Among the available systems in HEIs three content management aspects (Library management systems, Learning Management systems, and Web content Management systems) were explored in each HEIs. Totally six EHEIs were selected for the exploratory study based on their proximity, convenience and access to information [1] and categorized in to three groups.

These universities are categorized according to their age of establishment and years of experience.

**Table 1 six universities considered**

| Earlier | Medium | New |
|---|---|---|
| Addis Ababa, Gondar | Bahirdar, Jimma | Debre Markos, St. Marry |

### 7.3 DATA COLLECTION

All the data was collected by moving to all universities, taking interview notes and using recorded face to face interviews in all cases, except one university, where the interview was conducted using Telephone conversation. The reason behind conducting face to face interview is, this approach allows to gather both verbal and nonverbal data. The participant in each university are three based on the three categories of CMS, totally 15 respondents' patriciate. This is because on three HEIs

the same person is assigned on two positions (such as Learning Management and Web content Management).

The data collection has taken almost a month and half. Since the interview was conducted to fill the gap on the literature, understand the current status, recognize the value, and identify the problems encountered on CMSs, Due to this, the interview was conducted using Amharic Language. Making the interview in the local language makes the respondents feel more comfortable on expressing their idea and emotions.

### *7.3.1 USER EXPERIENCE IN ECMS*

On all the six universities, where the exploratory study was conducted, almost all persons conducted have more than two years of experience in their current position except on LMS position. This shows that they are already familiar and can clearly explain the system they are working with.

Looking at the background of all respondents they have more or less similar background to IT profession. This can enable them to easily understand the technology and easily communicate about assimilation of ECM in the area they are working with. Having a minimum qualification level of first degree and the maximum qualification of second degree with ICT or related field, they can easily communicate with the interviewer about the phenomenon under study.

**Table 2 Detailed background of Respondats**

| Department | Participant position | Year of IT Experience | Educational level | Experience in Current Position | Gender | Interviewee ID |
|---|---|---|---|---|---|---|
| Library | Assistant | 7 | MSc | 7 | M | 1a |
| | Librarian | | | | | |
| Library | Library Director | 10 | MSc | 1 | M | 2a |
| Library | Library & information Director | 7 | MSc | 4 | M | 3a |
| Library | Library ICT Team Leader | 15 | MSc | 3 | M | 4a |
| Library | Library Head | 8 | MA | 6 | M | 5a |
| Library | Library Director | 9 | MSc | 2 | M | 6a |
| Leaning MS | ELearning Team Leader | 8 | MSc | 3 | M | 1b |
| Leaning MS | Technology process Leader | 9 | MSc | 2 | M | 2b |
| Leaning MS | IT Director | 10 | BA | 2 | M | 3b |
| Leaning MS | Web developer and Master | 5 | MSc | 3 | M | 4b |
| Leaning MS | System Administrator | 5 | BSc | 2 | M | 5b |
| Leaning MS | ELearning coordinator | 11 | BSc | 4 | M | 6b |
| WCMS | Web Admin | 8 | MSc | 3 | M | 1c |
| WCMS | Technology | 9 | MSc | 2 | M | 2c |

| | | | | | | |
|---|---|---|---|---|---|---|
| | process Leader | | | | | |
| WCMS | IT Director | 10 | BA | 2 | M | 3c |
| WCMS | Web developer and Master | 5 | MSc | 3 | M | 4c |
| WCMS | System Administrator | 5 | BSc | 2 | M | 5c |
| WCMS | System Developer | 5 | MSc | 2 | M | 6c |

### 7.4 DATA ANALYSIS

The next step after conducting the interview was analyzing the data. Each interview conducted was translated to English with the support of English Language instructor from Bahirdar University. It takes more than two weeks to work together to understand the Amharic interviews and transcribe to equivalent English description. All interview data were analyzed similar to the following sample from respondent 2A. The interview data were first transcribed, then translated, and finally code generated to subcategories and categories. This is the original data from interview respondent 2A its transcription and the code generated.

"›"Æ "ÇMŸ<I cŸ=M Òý '¬:: c^}—¬ ÁK¬ cŸ=M u×U ›e†Ò] '¬:: LÃw^] ¬eØ "ÅU¾¬ w²< ›Ãc=+ ²<]Á LÃ ¬k~ ¾K?L†¬ c‹ "†¬ ¾T>SÖ<ƒ:: "‟ ÅÓV u¾Ñ>²?¬ cŸ=M ÁL†¬ c‹ "ƒ" ›K:: }`" *y` ›K u¾Ñ>²?¬ "³ c‹ c=KI "ÅÑ‟ "Å ›Ç=e Á" c=e}U ›eËU[I KSH@É ›e†Ò] '¬ ¾T>J'¬ u²=G< U¡"Áƒ '¬ ¨Åe^ KSÓvƒ ÁM}‰K¬:: u ›Ãc=+ ²<]ÁU LÃ w²< øaôg="KA‹" ›KSpÖ` Ã¾ÁM:: w²< Ñ>²? u?} Sélõƒ LÃ e¾Ã ŸMUÉ '¬ Ÿêçƒ Ÿ}KÁ¿ ¾e^ ¡õKA‹ uU"U" u¾ÉÑƒ '¬ LÃw^] ¾T>SÖ<ƒ:: "‟ ÅÓV "²=I" ¢UúÄ}` eMÖ‟ ›cØ}I ¨Å²=I e^ SÓvƒ ÃŸwÇM:: ¾ƒUI`ƒ 'ÓÍ=ƒ u²=I ›?`Á LÃ ÁL†¬ K=J'< ÃÑv 'u`:: ƒMI ‰K?"Í= ÃH@ '¬:: ¾ ›Ãc=+ vKS<Á u=kÖ` ¾uKÖ ÃJ"M vK¬ c^}— TekÖM ›e†Ò] ÃJ"M:: ›G<" vK¬ ¾c¬ HÃM TekÖM ÃŸwÇM:: "

The transcribed data to equivalent English is as follows:

"As I told, one is skill gap. Skill of employees is one difficulty. As you can see, most employee assigned to the library do not have enough ICT skills. Besides, there is issue on those skilled, there is turnover. At the time these employees leave it is difficult to start the system from scratch that is why we couldn't fully go in to the work.

There is tendency of not employing professionals in the field of ICT. Most of the time employees with experience are transferred from janitors, other departments with promotion. Due to this it is difficult to get these employees trained with ICT and join the work. They were expected to have educational background in this area. This is the big challenge. It will be better if ICT professionals are employed. With the current manpower it is difficult to address the work. It is difficult to work with the current man power"

Key words and phrases generated from the above interview and represented with codes:

- Technical Skill Resource – (skill gap)
- Knowledge transfer - (Employee Turnover)
- Human Asset - (ICT professionals' employment)
- Top management Perception - (unskilled employees assigned to wrong positions)

The data was analyzed using an approach called, Content analysis, which is suitable for the simple reporting of common issues mentioned in data exploratory study. Content analysis helps to provide knowledge and understanding of the phenomenon under study and describe the phenomenon in a conceptual form. Qualitative content analysis can be conducted either conventional, directed, or summative approaches [2]. According to Hsieh & Shannon [3] conventional content anal-

ysis is generally used with a study design whose aim is to describe a phenomenon. The researcher followed an inductive conventional content analysis, where categories are derived from data during data analysis. Because, this approach is appropriate for the environment where there is no enough former knowledge about the phenomenon [2]. This approach helped the researcher to get a richer understanding of ECMs in EHEIs.

Content analysis passes through a number of phases starting from formulating research questions and ending up with analyzing the results of the coding process. The three main phases of qualitative content analysis are preparation, organizing and reporting [2].

In the preparation phase, the first activity was selecting the unit of analysis. During this phase the researcher designed whom to interview, what the interview questions are, and also decided to consider both manifest content and latent content. The manifest content contributes for the understanding of the text itself whereas the latent content contributes for triggering other interview questions for further understanding. With this context the researcher selected the respondents from each system in the universities (Library management systems, Learning Management systems, and Web content Management systems), designed the questions to be addressed, and conducted the interview with a recorder, and noted attentively.

In the organizing phase, activities like open coding, creating categories and abstraction were done. Open coding means that notes and headings are written in the text while reading it. According to Saldaña [4], "A code in qualitative inquiry is most often a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data". Therefore, at this stage categories from literature review are aligned and the lists of categories are grouped under higher order headings. The reason behind creating categories is to provide a means of describing the phenomenon under observation. Based on this during this phase the researcher transcribed the interview and generated categories based on open coding thematic approach. (See table 7 for detail).

In the reporting phase, abstraction was done by formulating a general description of the research topic through generating categories. The abstraction process can continue as far as reasonable category is created. With this regard the necessary codes are generated and supported with literature from table 4 and discussed accordingly.

Therefore, in accordance with the above explanation, there exist a number of steps to be conducted on analyzing interview data [5]. After identifying the six HEIs, designing the necessary interview questions, and the identifying top level officials under each category the interview was conducted using a recorder. Then after, the researcher performed coding which is part of the analysis of the interview [6].

The researcher conducted an iterative process of coding which helps to increase the understanding of the phenomenon [6]. The first step of coding was performed daily based on notes taken at the time of interview. At this time meaningful quotes and phrases were summarized. The second coding was done by transcribing of words and phrases from the full interview and integrating the notes with the records. As mentioned above, the interview was in Ethiopian Language, Amharic, the transcription was done by translating the interview with the help of foreign language instructor from Bahirdar University.

### 7.5 FINDINGS AND DESCRIPTIONS

The following topics describe the current trends of ECMS in EHEIs and the users involved on the systems. After describing the current state the systems are analyzed using the method of qualitative content analysis which is appropriate for textual data analysis.

#### *7.5.1 CURRENT TRENDS OF ECM IN EHEI*

To understand more about current trends in EHEI, the researcher collect data about the following basic categories:

Overview and background of the interviewee, Overview and background of current systems, Functionality and system utilization, and System users and benefits (see appendix 7 for detail of each category):

**Overview and background of the interviewee**

Understanding the respondents is essential for understanding the system. Their background experience and educational qualification can contribute to lay a background about the system. Interviewees' profiles based on the specific systems they are engaged in, are summarized in Table 5. From the tables we can easily understand that all the respondents do have a related or direct educational background to understand, run, and explain the systems in their day to day activities.

**Overview and background of current systems**

The system background considered the time where they system is implemented for the first time, the system developer, the cost incurred, the version and upgrade done, the platform it runs, the maintenance cost if any, and the maximum users on the system too.

Based on the exploratory study it is difficult to know the first time most systems are implemented. Based on the interview the oldest age of system implementation is seven years and latest system implemented is 2 years old. The systems implemented run on Linux and window platforms. Except one case, all of them are customized from open sources. Due to this it is difficult to know or estimate their initial costs. Almost all of them doesn't face initial cost except internal experts' engagement to develop the systems. On all cases considered, it is the internal staffs who customized the open sources. However case one and case six face exceptional investment as initial cost on WCMS, and case five had initial cost on Library Management Systems.

In all the cases considered the systems implemented can run in various devices from desktop computers to handheld devices. All of them are web based applications that can be accessed using various browsers on these devices ranging from intranet to extranet. On all the cases considered there is no as such maintenance cost incurred but, being an open source they kept upgraded from one version to the other.

The systems observed can also support the participation of various users on the back side. However, among the cases considered in WCMSs, it is only case two which has many users participating at the back side as administrator, editor and publishers. In all the cases considered on Library Management System, almost all of them have considerable number of users participating on these systems. In almost all cases considered on the Learning Management System there are either one, two or three persons assigned to work on the systems. This shows that there is critical problem related to users' participation on the systems. The Open Source software used to implement the ECMS for all three categories is presented under Table 6.

Since all the cases considered are on similar industry environment, Higher Education Institutions, the targeted users of the systems identified are similar in all cases. The users targeted include primarily for students, academic staffs, and researchers. Besides administrative staffs and external community are also mentioned as users and beneficiaries of the systems.

**Functionality and system utilization**

Under this topic the researcher considered who the target users of the system are, the functionality of the system, what inhibitors are there, and what and who benefit from the system. Since all the cases considered are education environments the users of the systems in all contexts are similar, academic and administrative staffs, students, researchers, and external communities. With the same token the beneficiary of the system are these stakeholders with the parent institution.

The functionalities of the systems can be discussed in detail in the next phase of the research, however the interview data provided with initial view for the facets of assimilation ac-

cording to Massetti & Zmud [7], four facets of assimilation.

**Table 3 Software used to build the system in six EHEIs (as of July 2015)**

| Category | Software used to implement the system | Case No | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 |
| Systems used in library | Koha Library System | x | x | x | | x | |
| | Greenstone | x | x | x | | x | |
| | Dspace | x | X | X | x | X | |
| | ABCD | | | | | X | |
| | | | | | | | |
| Systems used in Learning Management | Moodle Learning Management System | x | X | X | x | X | |
| | | | | | | | |
| Systems used in Web content Management System | Drupal | | X | | x | | |
| | WordPress | x | | | | | |
| | Joomla | | | x | | x | |

*7.5.2 FACTORS THAT INFLUENCE THE ECM USE IN EHEI*

From the literature we had come up with factors affecting the assimilation of ECMS. Those factors mentioned were not enough to analyze the problem domain. Due to this, the interview was conducted for further investigation. According to Massetti & Zmud [7] there are four facets of assimilation (volume, diversity, depth, and breadth). The researcher used these facets to analyze and understand assimilation of ECM. The volume in this context implies the size of data already recorded and handled using ECMS. The diversity helps us to see the type of contents handled using ECMS. The depth helps us to focus on the functional areas addressed using ECMS. And finally, the breadth contributed to get insight to the connection between HEI and their stakeholders.

*7.5.3 FACTORS AFFECTING ECMS ASSIMILATION*

From the notes taken and the transcribed interview the researcher come up with list of key words and phrases. After eliminating redundancies of phrases and words the following are phrases with relevant meaning taken from the interview. The number of similar phrases counted are represented on the last column of the table. The respondents' code with whom the interview was conducted are shown at the end of each phrase.

Besides this, definition and explanation for the codes of words and phrases are given from literature. On the first column of the table their theoretical alignment of TOE framework is also depicted. After the table, categories created are discussed based on quotes and representatives of interview data. (See table )

**Determining themes for clusters**

At this stage more central themes are designed to explain the essence of those clusters. The above categories which directly emanate from the interviewees do have a contribution on analyzing the impact of ECMS assimilation.

The factors identified on this phase will help the researchers to design a conceptual framework for the assimilation of ECMSs in HEIs. The exploratory study conducted in the three departments of the six HEIs generated various inputs to be considered in the assimilation process:

- Regulatory environment
- Standard working procedure
- Top management championship
- Knowledge Transfer
- Human Capital
- ECMS Value Recognition
- Technological Support Infrastructure
- IS Infrastructural Issues
- IS Technical Skill

### *7.5.4 DISCUSSION WITH FACTORS IDENTIFIED ON THE EXPLORATORY STUDY*

**Standard Working procedure**

The absence of standard working procedure is one critical issue in the assimilation of ECMS. According to the exploratory study the absence of rules policies and procedures do have an impact especially on Learning Management System (LMS). Lack of policy prohibited participation, submission of materials, and commitments on the LMS. Most of the cases considered in the exploratory study mentioned the problem in relation to lack of compensation, lack of trust on the system security, and lack of procedures. These couldn't motivate them use the systems or to push others to participate on the systems. As one of the respondent's answer:

> "Especially at the beginning the system adds additional overload on their work because, the content in the Learning Management system is expected to be sharp and teachers are expected to design in that format. There seem looking for some incentive for doing this or reduction in load, unless this is going to be fulfilled, I am afraid the system will fail like it failed before. The other obstacle we faced is copyright. We have done awareness creation sessions in the faculty of education, you know what they said "I have prepared this material for the last 10 to 20 years therefore, who is the one trusted to take care of my materials." Due to this I expect payment procedures for submission of materials like distance learning." [Learning management System 2B]

Institutions without a standard working procedure should use mimetic power to use standards of other institutions while they are under uncertainty. Work standardization is one problem observed in the exploratory study.

> "Standardization is also another problem. Others should share from those who already have the standard." [LMS 1A]

**Top management championship**

The second factor that affect assimilation of ECMS is the participation of top managers and their commitment on the ECMS. The respondents explained this in different ways. One is making skilled employees available in the institution; providing incentives for those engaged in the system; and also facilitating resources availability to the system. Such phrases were examined from respondents:

> "For example, employee needs incentives while they work on the system but it was late to pay them. Therefore, there is lack of management support. Lack of management support is one critical issue for the failure of a system." [Library Management System 6A]

**Knowledge Transfer**

The third factor that affect the assimilation process almost in all institution is knowledge transfer and retention. This is occurred due to employee turnover in the institution, while employees leave the institution the system either stop functioning or changed to other new systems from scratch. According to Chengalur-Smith etal [16] as institutions absorb their IT staff the business value of the technology increase. This shows that,

institutions are expected to retain their IT staff to get business value from the systems they implement. If institutions cannot retain their staff, at least there should be proper knowledge retention and transfer among employees. However, in EHEIs context, employees left the institution without proper consent. Employees left the institution whereas, the system password was locked to and the remaining staffs face problems towards working with the systems. This is especially seen on Library Management system, where they search and change the password from the setting than properly receiving from the one who left. As the library director of respondent 3A:

> "The other thing we faced is employee turnover. This is our fourth time to face this problem. Even we have lost the password, we read and found where the password is located inside one configuration file to recover the system." [Library Management Systems 3A]

## Users' Trust and readiness

The ECMS in HEIs is a service oriented systems where the services are designed to serve the HEIs community. Users participating on the systems will be beneficiary of the systems without incurring cost. Students, teachers, researchers as well as other researchers should participate to say the systems are assimilated. Unless and otherwise we cannot say the systems are supporting the routine activities. Therefore, these stakeholders should be ready to use the systems available in the HEIs. Readiness includes both the firm where the technology is implemented and the partner/s working with the firm [8]. Users understanding and participation is not observed in EHEIs.

> There is negligence on using the service. We had dispatched a questionnaire and some of them even doesn't know the availability of the service. [LMS* 5A]

### Human Capital

The other factor, lack of skilled man power in the institutions is mentioned as on bottleneck of assimilation. Institutions should have the capacity to retain their employees. The absorptive capacity of the IT staff is one important feature in the IS resource [16]. Even if institutions are interested to work with the systems, the absence of skilled manpower in the areas of ICT and Library Science is mentioned as a problem. This is caused because, ICT experts do not stay long in the institution or the positions are occupied with non-experts. Due to this, there is no enough man power to address the job or HEIs have collection of non-experts in the area where their profession does not much with their specific working environment. As respondents confirm this:

> "The first thing to be improved is man power. I think, man power is essential on main colleges and they can diversify the services under each college. In the future we should have a server under each campus therefore, the man power becomes essential with this respect." [Web content Management System 1A]

### ECMSs value recognition

Most HEIs seem not understand the importance of ECMSs. According to the exploratory study another factor that affect the assimilation process is found to be awareness of managers at middle and top level as well as other stakeholders towards ECMSs. They explained lack of awareness, being familiar with the system, and systems value recognition is not well observed. According to the respondents most of the stakeholders do not recognize the value of ECMSs. The respondents explained it in this way:

> "Both the academic staff and the students are big challenge for us. The first thing the teacher is not interested to work with the eLearning system because, they feel it takes time. The teachers are observed to conduct class and run away to their something else. They do not want to waste their time here. If the teacher has some materials to deliver he attached to their email

instead of putting on the Learning Management System. If you see the time to attach on the email and on the system is the same but the issue is a matter of lack of awareness and commitment" [Learning Management System 5A]

**IS Infrastructural Issues**

The other factor that affect assimilation is found to be Information Systems Infrastructure. This includes readiness of the institutions on hardware, software and networking equipment and installations. The lack of enough number of computers poor network installation and other accessories for the technology are mentioned as bottlenecks for the assimilation process. Such as:

> "Both the Learning Management System and the Web Content Management are dependent on network infrastructure. Besides, the website and the eLearning are located in our old server therefore, this server is expected to have high capacity. I think the vertical and horizontal cabling should be re arranged. The other issue is the problem of internet bandwidth. We have to upgrade it. I think it needs improvement on the three dimensions: network infrastructure, internet bandwidth, and IT equipment. " [LMS 1B and WCMS 1C]

**Technological Support Infrastructure**

It is not only the IS infrastructure of the institution that affect assimilation of ECMS. Besides the hardware, software and related technological inputs the other factor that affect the assimilation process is Internet bandwidth, continuity, and electrical power fluctuation. These factors in the Ethiopian context are not controlled by the HEIs themselves instead delivered by the government that is why they are treated as separate infrastructural issues.

> "The problem here is the one that is nationally observed, it is absence of internet. For example, these days there is no internet totally. The other issue I recommend is, if the website is hosted outside Ethiopia, it will be good. Because, there is also power interruption besides the problem of the internet in our country" [Web Content Management Systems 6C]

**IS Technical Skill Resource**

For the assimilation process the existence of information systems skills should exist as a resource in institutions. The absence of this resource is one problem mentioned in institutions observed in the exploratory study. This skill includes the current technical knowledge plus the ability to deploy, use, and manage that knowledge [12]. Libraries in the explored areas are considered as places where sick employees assigned to get rest, demoted employees sent to be punished, or lower level administrative staffs upgraded as better option for them.

> "As I told, one is skill gap. Skill of employees is one difficulty. As you can see, most employee assigned to the library do not have enough ICT skills. There is tendency of not employing professionals in the field of ICT. Most of the time employees with experience are transferred from janitors, other departments with promotion. Due to this it is difficult to get these employees trained with ICT and join the work. They were expected to have educational background in this area. This is the big challenge. It will be better if ICT professionals are employed. With the current manpower it is difficult to address the work. It is difficult to work with this man power too."[Library Management System 2A]

**Regulatory Environment**

The absence of regulatory environment is one issue that hider assimilation. HEI seem to have certain rules and regulations

that push them to use the technology with uniform standard.

> "I think Ministry of Educating should do something with this respect such as having uniform standard for all universities. And if it forces every university to use Learning Management Systems with some standard it will be good." [Learning Management Systems 6B]

On the other hand, the availability of regulatory environment is considered as a negative impact not to use Web Content Management Systems for routine activities. As of a participant on the web mentioned the institution do not want to use the web for routines because they are not still alternatives to other media in this way:

> "Finally, one obstacle is the rules and regulations of the government. It forces all crucial information such as vacancy and bid to be released in mass media like newspaper and television. So, this creates its own impact not to fully use the website. It is redundancy because, it's already on the television or newspaper." [Web Content Management System 3C]

These factors need theoretical background to be integrated to the initial conceptual framework. Therefore, based on the theoretical backgrounds discussed they will be integrated to the model.

### *7.5.5 EXPECTED VALUES OF THE SYSTEMS*

The benefits of the systems in all cases considered is directly related to the efficiency of information dissemination. The researcher followed openness to the phenomenon to get its inherent meaning. After that the concepts are clustered to their subcategory and category identified through the interview. All the cases considered attached the values derived from ECMS are contributing to the efficiency and effectiveness of activities. Saving time of information dissemination, reaching to far areas, easy accessibility and searching, quality information and accuracy are mentioned as values of the systems.

However, the researcher comes up with two different values derived from the systems with two of the respondents. Respondent 1A attached the value of the systems to god reflections of the organization image to external parties due to that the system contribute to the ranking of their institution worldwide. Besides this respondent 5B considered the value of the systems as a means of getting credibility and promotion. As of them the availability of these systems contributes to do advertisement and promotion about their institution.

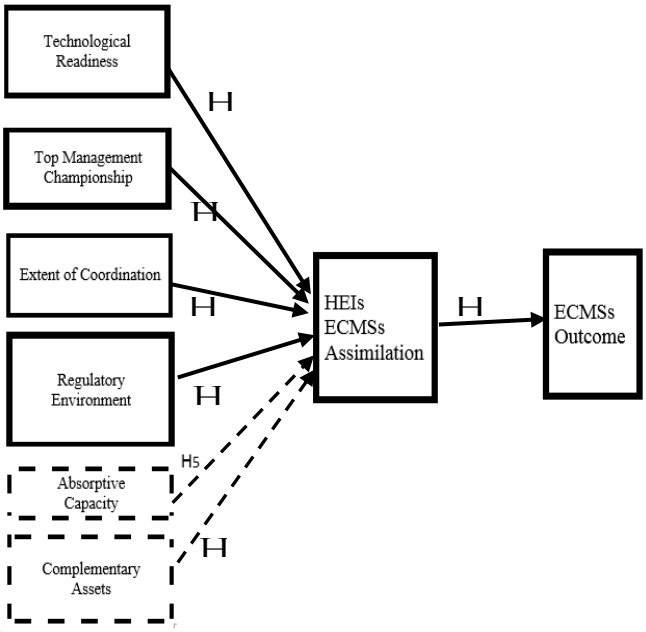
### *7.5.6 IMPLICATION OF THE STUDY*

The implication of this findings is of three-fold, on the first hand it contributed towards understanding the existing ECMS and its operation in in EHEIs. With this context the researcher observed that the systems are implemented but not clearly assimilated to the routines of the institution and not full running with the functionalities expected from the systems.

Secondly the qualitative study showed that there are unique factors that affect ECMS assimilation in the EHEIs. Especially the importance of retaining employees, Knowledge transfer and retention, Human Capital, ECMS Value Recognition, Environmental Infrastructure, and IS Technical Skill are not emphasized before as factors affecting assimilation. The other unique feature observed is the existence of coercive power becomes hindrance to systems utilization than facilitating assimilations.

Thirdly it showed the current value perceptions by EHEIs. On this respect to, the value of ECMS is attached to the immediate outcome than longer or strategic return. Besides, the consideration of systems as image reflection of the institutions is another dimension.

Understanding the current ECMS in EHEIs helped the researcher to add these additional constructs (Knowledge transfer, Human Capital, ECMS Value Recognition, Environmental




Infrastructure, and IS Technical Skill) to be included in assimilation of ECMS which has not been included in the initial conceptual framework.

### *7.5.7 FINAL FRAMEWORK FOR ECMS ASSIMILATION*

The next step is to integrate the initial factors from the review to literature on earlier concepts with the new themes identified on the exploratory study. The initial factors that affect ECMS assimilation and identified through literature were:

- Strategic Investment Rationale
- Top management Participation,
- Extent of coordination,
- Extent of cooperation
- ECMS value recognition, and
- Technological readiness

These were summarized on the review of literature and considered earlier in the initial conceptual framework. All the above factors are supported in the exploratory study, except the extent of cooperation among the environment which is not supported from the respondents.

**New factors added to the framework**

Factors that affect ECMS and not identified through the review of literature are:

- IS Technical Skill
- Human Capital
- Environmental infrastructure
- Regulatory Environment

These factors need theoretical background to be integrated to the initial conceptual framework. Therefore, based on the theoretical backgrounds discussed they are integrated to the model. Based on this the new conceptual model looks like as follows on figure

**Figure 3 final framework for ECMS assimilation on HEIs**

**Hypotheses**

The technological readiness can be seen from various angles it may include but not limited to the availability of hardware, software, and skilled manpower in the assimilation process [17]. The advancement of computing and communication technology has a number of significances on inter-firm coordination such as reduction of cost [18]. Therefore, IT infrastructure is one factor for operation and facilitation [19]. It is also mentioned that advanced information technology (IT) can enhance coordination within and between firms [20].

Since technological readiness are positively related with technological behaviors [21], technological investments are extremely important part of e-business environment. IT infrastructure can be simple infrastructure (such as low bandwidth

network and basic application) or sophisticated infrastructure (such as high bandwidth and complex applications supporting internal and external) to the organizations [22]. Therefore, an IT infrastructure investment should be first laid to have effective ECM in HEIs. The sophistication of IT infrastructure affects the assimilation level [23].

The knowledge of TMT and CIO has positive impact on assimilation of IT [23]. The belief and trust of firms towards technological resources will have positive impact on its investment [8]. Besides this, technological readiness also includes the integration of resources and other stakeholders. Readiness includes both the firm where the technology is implemented and the partner/s working with the firm [8]. The institutions perception on the trust and readiness's of other parties as a technological readiness is not yet assessed on the assimilation of ECMS. Consumers' lack of awareness and knowledge in ecommerce is termed as cognitive barrier in the use of the technology [24]. ECMS as a system is supposed to integrate all CMS in the organization and include readiness of both parties, content providers and content users or receivers. Looking at the readiness of HEIs towards an ECM is a fresh topic that should be considered. Therefore:

> **H1:** The higher the degree & extent of technological readiness of HEIs the positive impact it has on the assimilation of ECMS in HEIs

According to Khan et al [25], if the political leaders favor the technology, ICT in that institution easily blooms. Top managers are important on providing leadership and providing necessary resources for the institution, the participation of top managers is seen as a positive impact on ERP usage too [15]. Researches in other ICT assimilations also witness that the belief and participation of TMT has a positive impact. According to Kshetri [24] the lack of awareness and understanding of top-level mangers is termed as cognitive barrier and has negative impact on the technological usage. Mangers can participate if they believe in the systems and they have awareness about the system. Top management has great power to influence other members' behavior within the organizations [26]. Therefore:

> **H5:** The belief and participation of top management team will positively influence the assimilation of ECMS in EHEIs

Employees resign for a variety of reasons four of the factors discussed according to Tsega [27] are demographic factor, pull factor, personal factor, and push factor, On the other hand Ryan, Prybutok, & Zhang [28] also reasonout why employees leave an instititution. As of them employee leave an institution either when they get an opportunity or when they are not satisfied with the institution they are currently working with.

Employees' turnover which is not managed properly will have an adverse effect on institutions [27]. Employee turnover also has an impact in organizational knowledge transfer and influences information and communication technology (ICT) in knowledge management [29].

Beatty and Gordon (1988) classified barriers into three categories. First, they identified built-in mechanisms that deterred the adoption and successful use of technology, which they termed structural barriers. Secondly, human barriers refer to hindrances caused by employees' perceptions, skills and biases. Thirdly, they identified the technical barriers hindering IS adoption and successful use thereof. With this respect the second barrier employee skill may be affected while a well-trained employee leaves the institution. This is because, the Performance of an organization is negatively associated with employee turnover [30].

Whatever reasons are mentioned as cause of turnover, their movement to another institution or leaving the current institution do have an impact on the current institution they have been working with. So, one of the adverse effects for assimilation of ECMS can be absence of technological cooperation al-

ready diffused in the institution.

While an employee works in an organization s/he shares the knowledge s/he has; this knowledge sharing is directly related to the performance of the institution [31]. Therefore, this Knowledge sharing becomes true if an institution retains its employee. On the other hand, turnover can affect assimilation of ECMs because, learned technical knowledge may be gone with the departure of IT personnel before it can be captured by the institutions or by the team working with her/him. Due to this turnover negatively affects ECMS in HEIs

The Human capital theory and the Intellectual Capital Theory serve as a lens to view the impact of employees' knowledge sharing. The theory suggests that when an employee exits, it implies exiting of specific functional expertise, experience, skills and contact. Intellectual capital theory points out some types of losses experienced by organizations due to voluntary exits and these include; lost human capital, lost social capital, lost structural capital and lost relational capital [32]. This shows that the existence of an employee and her/his skill can foster coordination.

With this respect, one of the factors that HEI are suffering from assimilating IS seems the turnover rate they encounter. The turnover rate of information system professionals is one challenge encountered by organizations. The information technology industry is characterized by high employee turnover [33]. When new members with different experience enter to the institution it may take considerable time or they may not be as efficient as the one who was familiar before. Therefore, turnover of IT personnel is dysfunctional to organizations, causing increased cost in personnel training, work disruption, and delay in critical information system projects. Due to this, retaining IS/IT personnel is important for organizations because, at the time an IS professional leave the tacit knowledge that s/he has about the internal process may misses from the institution too. Success in ERP implementation and post-implementation relies on the collaboration and cooperation of various types of in-house expert. Lack of in-house specialists is a barrier that may prevent firms from effectively maintaining, monitoring and improving the system in the long-term.

With this context turnover implies the movement of employees from their working of ECM environment. Employees either leave to different positions or departments in the same institution or completely move out of the current institution they are working with. The reaction of employees plays a crucial role in determining the success of information system. The higher the rate of turnover in an institution will be the greater problem for an organization to coordinate its activity. This implies the more employees' turnover exist in the institution, the larger the information system remain unused.

With this respect the retaining power of institution could change the way employees' coordinate in the institution.

**H2:** Higher human capital in HEIs will positively affect the assimilation process of ECMS in HEIs.

To be effective ICT needs coordination among internal members. It is just similar to game playing, like the game theory aspect of the INT, address coordination among members is essential for system success [34]. The available ICT infrastructure increases extent of coordination. One of the ICT infrastructures, the Internet seems to be the most popular delivery channel [35]. The Internet has drastically increased the ability to access, store and distribute information and knowledge, and constitutes the basic infrastructure for inter-connecting a combination of information systems for organizations at the operating, tactical and strategic level [36].

Actually, the availability of IT infrastructure by itself will not bring the working together. Members of the institution on the system environment should work together (play together) for its success. Among the principal inhibitors of ICT-enabled expansion one is the availability and participation of skilled IT staffs [14]. IT professionals in EHEIs coordinate with the TMT to perform various tasks such as: they plan and implement

projects, initiate and follow-up projects, prepare and report on implementation performance. HEIs can have mimetic-isomorphism from three perspectives, at the time employees transferred from others, while new HEIs graduates can be employed, and at the time of meetings, experience sharing, and collaborations with peer institutions.

There can be smooth coordination among institution members while there exist a working procedure and knowledge sharing among members of the institution. Therefore, the coordination among TMT and IT staffs has profound contribution for the work of the top managers and ECM assimilation. Therefore, the extent of coordination will help the assimilation of ECM. So,

> **H3:** The existence and high level of coordination in the HEI will positively affect the assimilation of ECMS in EHEIs

The performance of a technology should be clearly known if it is wanted to be used in certain environment. Institutions will assimilate a technology if they have understanding and good perception about that technology [37, 38]. HEIs should understand the available resources around them and the applicability of that technology in their environment.

According to Liang, Saraf, Hu, & Xue [15], external forces will not have an effect on the behavior of an organization without first affecting the behavior of human agents within the organization. Therefore, coercive and normative forces can influence top managers first then it affects the assimilation process.

One key issue in the ECMS is the administration of ECM which consists of policies, standards, regulations, routines, and administrative procedures. Institutions should have these administration guidelines and stakeholders should be aware of them [39].

The availability of coercive power, regulatory environment, can influence the way institutions act up on the environment they belong too [40]. The existence of these power also affects the participation of TMT in an institution [15]. Therefore,

> **H4:** Existence of regulatory environments can moderate the belief and participation of top-level managers on the assimilation of ECMS in EHEIs

In addition to the Technological, Organizational and Environmental contexts, the assimilation of ECM should consider technological context of "Enterprise Content Management Systems". When HEIs think about their ECM, one of the issues to be addressed is content, users and system usability, and accessibility. Without the context of this it is difficult to think about assimilation of ECM in HEI because, content is a valuable resource [41]. This context can be seen in three dimensions (how content is viewed by users, what informational value of a content is seen, and which appropriate system addresses content issues). A research done by Tyrva¨inen et al [42] for developing ECM framework is a vital input to be considered from the content dimension. According to Tyrva¨inen et al [42], ECM can be viewed from four perspectives. These are: content, technology, enterprise and process. Of these factors, the content context is concerned on identification of content items, their semantics, structuring, and organization, as well as the creation and use of content.

The recognition of content and its value is crucial for ECM assimilation. To be assimilated, the technology should fit to the need of the pedagogy [43]. In addition to technology and content, users' interest and involvement should also exist [15]. The users view helps to see, who are the users? How they perceive the content and use it in personalized way to satisfy their expectations and needs (Tyrva¨inen, et al, 2006). Content types, its perception and impact on users should be recognized [44]. ECMS should be usable in the accomplishment of a set of tasks in an efficient and effective way that satisfies the users need [43]. Therefore, HEIs should recognize ECMS, and adjust their work in regard to what content they have, what value it has, and how they can address these contents to users.

Content should be addressed in a fast, accurate, and reliable way. The semantics of the content should be known, its accessibility for users should be identified, the way it is organized, the availability of metadata for the content, and the efficiency of search and retrieval should be recognized [45]. With this respect recognizing the value of content and its impact on HEIs performance will affect ECM assimilation.

Ethiopian HEI had the traditional way of conducting the teaching learning process. However, nowadays they are using the technological innovations in routines. Of them library management, learning management, and web content management can be mentioned. This traditional approach should be integrated with the current available technology. This ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends is critical to its innovative capabilities [46]. Therefore,

> **H5:** The higher the absorptive capacity of the HEIs on ECMS the higher the assimilation of ECMS in EHEIs

The implementation of Information Systems needs various components. Innovations that are partly codified or tacit should be utilized in conjunction with other capabilities or assets. Implementing information systems and getting the expected services from the systems implemented are two different things. Services from Information System innovations are often obtained with the support of complementary assets. For example, a Computer based information system requires software of the operating system and applications, without which it is difficult to imagine it [47]. Similar with this, IS needs various components and complementary assets that work with their components.

According to TEECE [47], complementary assets are categorized to three: generic, specialized, and co-specialized. The Generic assets are those general-purpose assets which do not need to be tailored to the innovation. The Specialized assets are the one, where there exists unilateral dependence between the innovation and the complementary asset. Whereas, the Co-specialized refers to assets that have bilateral dependence with the innovation.

The generic and specialized complementary assets are seen as important elements to get profit from innovation [48]. With these respects, for ECMs as one IS, to be more functional it needs the availability of complementary assets. If not, companies may not get values from their innovations and even could fail from their leading position and, one of the reason is the failure to integrate complementary assets on their innovations [49].

IS should be complemented with various assets of the institution such as work practices, business processes, organizational structures and skills. One of the complementary assets to increasing productivity is human skill. Therefore, firm's productivity in IS should be complemented by IS managerial factors which includes experts in ICT field and the level of ICT training provided [50]. Besides, the intrinsic and extrinsic motivational factors affect sharing of knowledge and the working together of employees. Thus, institutions should have enough incentives, motivations, and rewards for employees working well with the IS innovated [51].

The role of government on cooperating the institution has undeniable impact on technological assimilation. The internet infrastructure and electrical power systems in the Ethiopian context are managed by the government. These technological support infrastructures are one complementary asset to the success of ECMSs. Without electric power it is difficult to think the functionality of information systems as well as without the internet it is difficult to talk about the accessibility of web-based contents and online systems.

IT flattens and decentralizes organizational structure, by doing this, it increases coordination of activity. ECMS are designed to increase the coordination of different organizational units and hence they help to be informed each other, and this further increase the awareness and quantity of information

[20]. The service response time of the software vendor, the existence of qualified consultants with knowledgeable staffs will have an impact on the institution ICT assimilation [52]. Therefore, the traditional culture and work process should be changed to make IS fruitful. Therefore, new business model may have positive role and complement the assimilation of an IS by institutions.

> **H6**: The availability of complementary assets positively affects the assimilation of ECMS in HEIs.

The value of an Information System is one difficult topic to be clearly visualized and quantified. It is hyper-connected, highly volatile, complex world where both private sector and public sector use it. Value of IS can be seen from different angles such as for institution or for stakeholders, monetary or non-monetary, from ex ante or ex post. Due to this, researches focusing on the value of IS become crucial [53]. The value of IS may depend on the context of the enterprise and its business priorities, and on the maturity of the relationship between the CIO, the CEO, and the heads of the Business Units. ECM, as one domain of IS, has its own value for the institution it is applied.

As of Powell & Gill [54], CMS address various tasks in HEIs. It helps for easier information location; serve as sources of information; facilitate task processing and flow; serve as a mediation among students, students and teachers, among faculty members, and the HEI community with the external environment. This may show that, these activities may result in various values for HEIs. Due to this, ECM can bring user satisfaction by increasing efficiency through reaching timely and an ubiquitous nature in campuses, serving as effective learning tool supporting blended learning [55], providing better communication skill beyond formal education, and better decision making. [56]. Therefore:

> **H7:** The assimilation of ECMS can positively support HEIs performance and create value for EHEIs.

## 8. SUMMERY

The main objective of the exploratory study is to further strengthen the conceptual model designed on assimilation of ECMS for HEIs. For this purpose, understanding of the current system and identifying additional factors and values of ECMS were considered.

The findings showed that there is a variety of systems integrated in institution to facilitate their content management systems in the web, library, and learning management systems. Therefore, conducting the qualitative study contributed its own significant contribution for the study to be conducted here after. Besides how to consider the assimilation? What are the facets to be considered is also recognized for further study as facets of assimilation? These facets will be supported with literature and will contribute for the design of the quantitative study

Besides to the new factors involved, the study has also validated the importance of factors identified based on the literature review. Factors for the assimilation of other information Technology environments are also valid to be considered in ECMs assimilation too.

Based on the findings of the pilot study and the literature review, in the next chapter the earlier, initial conceptual model at the time of the proposal development, will be modified to a new conceptual framework and additional hypotheses will be integrated.

Therefore the researcher integrated the earlier review as well as the conceptual framework that serve as basement for the assessment of assimilation of ECMS here after.

## 11. ETHICAL CONSIDERATION

Appropriate acknowledgment and citation will be made for any concepts or ideas taken from the literature. Attempt will also be made not to apply pressure or inducement of any kind to encourage an individual to become a subject of re-

search. In addition, the identity of individuals from whom information will be obtained in the course of the research project shall be kept strictly confidential. No information revealing the identity of any individual shall be included in the final report or in any other communication prepared in the course of the research project, unless the individual concerned has consented in writing to its inclusion beforehand.

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**Table 4 Theoretical base for ECM Assimilation**

| Perspective | Main Argument about assimilation | Seminal References |
|---|---|---|
| Institutional Theory perspective | The isomorphic processes (coercive, normative and mimetic) affect the assimilation process<br><br>In other words, it is the regulative, normative and cultural-cognitive elements affect and replace the beliefs and practices of institutions. | (DiMaggio & Powell, 1983) |
| Diffusion of Innovations Perspective | The characteristics of innovations (relative advantage, compatibility, complexity, Trailability, and *Observablity*) and the way they are perceived affect the rate of adoption.<br><br>In other words, how do innovations (defined as idea, products, and practices perceived as new) can diffuse to members of a social system? | (Rogers, 1983) |
| Resource-Based View | Firms possess resources which enable them to achieve competitive advantage over others and lead to superior long-term performance<br><br>In other words, the rare resources an institution has and the capability of mobilizing these resources affect institution's performances | (Barney, 1991) |

**Table 5 Summary of studies from Assimilation perspective**

| Reference | Method and data source | Technology/innovation studied | Independent variable | Dependent variable | Main finding | Theory used |
|---|---|---|---|---|---|---|
| (Chatterjee, Grewal, & Sambamurthy, 2002) | Quantitative US public and Private Companies | Web Technologies for E-Commerce for type III IS innovation | • Top management championship (Beliefs and participation)<br>• Strategic Investment Rationale<br>• Extent of coordination | Web Based Assimilation (E-Commerce Strategies and Activities) | Senior management advocacy, strategic investment rationale, and extent of coordination in promoting greater assimilation | Structuration Theory |
| (Banerjee & Ma, 2011) | qualitative case based in Hong Kong, | Partial assimilation of third-party business-to-business (B2B) e- | • Independent deployable feature of technology<br>• Independent evaluation | Partial Assimilation | Organizational and environmental characteristics could have significant moderating | Mixed (Diffusion Of Innovation, Technology Organ- |

| | | | | | | |
|---|---|---|---|---|---|---|
| | US, UK | market by four small trading firms | of the technology features<br>• Support of sponsors and stakeholders<br>• proactive involvement of sponsors & stakeholders at initial | | influence on assimilation of a technology | ization Environment, Transaction Cost Economics) |
| (Bharati & Chaudhury, 2012) | quantitative Survey, US, Boston Area | Technology assimilation across the value chain for SME | • Institutional Actors<br>• Firm Characteristics | Assimilation of Aggregate Technologies | Impact of institutional actors diminishes with decreasing firm size so, firm size is an important determinant of technology assimilation | Institutional Theory |
| (Bala & Venkatesh, 2007) | Mixed, Case study, RosettaNet | how dominant and nondominant firms differ in terms of assimilating innovations in their value chains | • Relational Mechanisms<br>• Influence Mechanisms<br>• Inertia Mechanisms | Assimilation of IBPS | Firms may be unable to reach general development stage due to inertial mechanisms, i.e., resource and routine rigidities. | Mixed (Relational View Of The Firm, Institutional Theory, And Organizational Inertia) |
| (Liang, Saraf, Hu, & Xue, 2007) | Quantitative: survey translated to Chinese | ERP on IT assimilation | • Mimetic force<br>• Coercive force<br>• Normative force | ERP Assimilation | institutional pressures are important for IT adoption and Assimilation | Institutional Theory |
| (Raymond, Bergeron, & Blili, 2005) | Canada SME firms | Assimilation of E-business | Network intensity Strategic orientation Managerial context Manufacturing context Manufacturing Technology | Assimilation of E-business | Successful assimilation of e-business contributes for many SMEs in terms of survival, growth and competitiveness. | Mixed (Diffusion Of Innovation, Technology Organization Environment, Resource-Based Theory) |
| (Fichman & Kemerer, 1997 ) | quantitative IT departments US | Assimilation of software process innovations | • Learning-Related Scale<br>• Related Knowledge<br>• Diversity of Knowledge and Activities | Assimilation Stage | Organizational learning-related factors are important on explaining the assimilation of complex technologies | Diffusion Of Innovation |
| (Zhu, Kraemer, & Xu, 2006) | quantitative large scale industries of 10 countries | Three Stages of E-business Assimilation | • Technological readiness & integration<br>• Firm size, global scope, and managerial obstacles<br>• Competition intensity and regulatory environment | E-business initiation, adoption, routinaization | Look in to three stages of Assimilation, Looked TOE factors and the same factors may play different roles at different assimilation stages. Showed multi country contexts (developing & developed) | Technology Organization Environment |

| | | | | | | |
|---|---|---|---|---|---|---|
| (Ranganathan, Dhaliwal, & Teo, 2004) | quantitative Field survey North America | Assimilation of Web Technologies in SCM in internal Management, and external diffusion | • Organizational environment (managerial IT knowledge, Centralization, Formalization)<br>• External Environment (supplier interdependence, competitive intensity, IT Activity Intensity) | • External Diffusion,<br>• Internal Assimilation | Internal assimilation and external diffusion of Web technologies benefits SCM. Supplier interdependence & IT intensity are important environmental factors on diffusion. Organizational factors and managerial IT knowledge, are significant drivers of Web technology assimilation in the SCM function | Diffusion Of Innovation |
| (Temtim, Negash, & Amoroso, 2009) | quantitative, service sectors Ethiopia | Assimilation of ICT in four governmental institutions | • Top management championship,<br>• Extent of coordination,<br>• Strategic investment rationale, and<br>• Technology readiness | ICT Assimilation in organizations | Technological readiness has effect on Assimilation | Diffusion Of Innovation, Technology Organization Environment |
| (Yin & Yang, 2011) | Quantitative in China | IT capabilities and their role in creating competitive advantage in the context of IT application | • IT infrastructure capability<br>• Managerial IT skills<br>• Partnership between IT and business | Business Value of IT | Investment in infrastructure capability and managerial IT skills should be transformed into the partnership between IT and business, and then influence the IT assimilation | Resource Based View |



**Table 6 Summery of Categories based on thematic coding**

| Category | Sub Category | Dimension/ Definition | Sample Interview Logs | No. of Similar Quotes |
|---|---|---|---|---|
| **Technological** | **Technological Readiness** | **IS Infrastructure**<br>The existing technologies in use and new technologies available to the organization. This includes the existence of ICT infrastructure such as hardware and software. | The LMS and the Website are dependent on network infrastructure. We have old server therefore; this server is expected to have high capacity. The network infrastructure and IT equipment should be updated. [WCMS 3A] | 12 |

| | | | | |
|---|---|---|---|---|
| | **Users' Readiness** | **Users' Trust and readiness**<br><br>Readiness includes both the firm where the technology is implemented and the partner/s working with the firm [8]. | There is negligence on using the service. We had dispatched a questionnaire and some of them even doesn't know the availability of the service. [LMS* 5A] | 2 |
| | **Human Asset** | **Lack of Human Capital**<br><br>Organization whose employees have the necessary skills and technical knowledge are more likely to implement [9] | The other big problem is man power. ICT professionals are needed to address various activities. [LMS 1B] | 7 |
| **Organizational** | **Extent of coordination** | **Standard working procedure**<br><br>A step by step procedure of what to do to meet the objective of the institution [10]. | The first case is with teachers, they consider working with Moodle as additional work. It seems they are looking for some incentive or reduction in their load, unless this is going to be satisfied, I am afraid the system will fail like it failed before. The other obstacle we faced is copyright. Teachers are not willing to upload materials freely on the LMS. There should be payment scenario like distance modules. If so, they can submit their materials. [LMS 6B] | 8 |
| | **Top management Championship** | **Mangers awareness, perception and participation**<br><br>Managerial beliefs and support in initiatives and participation in adoption and diffusion of IT innovation [11] | Sometimes there is perception problem from top managers. For example, employee needs incentives while they work on the system but it was late to pay them by the management. Therefore, there is lack of management support. [LMS* 6A] | 8 |

| | | | | |
|---|---|---|---|---|
| | **Extent of coordination** | **Knowledge Transfer**<br><br>"Coordination is required to blend business and IT knowledge as well as the knowledge resident in different functional units of the firm." [11] | The other thing we faced is employee turnover. This is our fourth time to face this problem. Even we have lost the password, we read and found where the password is located inside one configuration file to recover the system. [LMS* 3A] | 4 |
| | **Absorptive Capacity** | **IS Technical Skill resource**<br><br>IS technological skill is the current technical knowledge plus the ability to deploy, use, and manage that knowledge [12]. | As I told, one is skill gap. Skill of employees is one difficulty. As you can see, most employee assigned to the library do not have enough ICT skills. [LMS* 2A] | 5 |
| | | **ECMS value Recognition**<br><br>Organization's ability to learn and act on scientific findings and technological activities outside its limits [13] | Managers do not recognize the difference whether the system is there or not. [LMS* 6A] | 4 |
| **Environmental** | **Technology Support Infrastructure** | **Environmental infrastructures**<br><br>Principal inhibitors of ICT-enabled expansion can be Infrastructural (bandwidth and power). [14] | Users cannot access our website this is because, there is internet interruption and electric power problem in our locality. [WCMS 3C] | 7 |
| | **Regulatory Environment** | **Policies**<br><br>Government exert significant influence on business policies [15] | I think one is lack of policy. If the government force every university to use Learning Mangenmt Systems with some standard it will be good. [LMS 6B] | 5 |

**Note:**
LMS* - Library Management Systems
LMS – Learning Management Systems