

# A hybrid framework for sustaining and managing Somali indigenous knowledge

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## Abstract

This paper represents the important of preserving Somali Indigenous Knowledge for the future generations to come. This paper presents a systematic review of the indigenous knowledge Management Systems deployed for different sectors in Africa and other countries in the world. The acquisition and management of IK is being used to rejuvenate endangered cultural practices and improve domestic socio-economic sustainability of Somali society. This paper presents how social media platforms and their components could be integrated into the KMS to manage and sustain Somali Indigenous knowledge (IK). The discovery of knowledge and its utilization is now fueled by the advancement of technology, which connects users to external sources through different platforms. The rapidly increasing use of SM and mobile technologies creates opportunities to form knowledge networks that can facilitate the process of creating, preserving, and sharing knowledge and skills that are unique to communities in the Somali context. As an oral society with rich IK and other cultural practices, Somali society lacked a framework to organize the existing knowledge in various methods. We used knowledge products from journal articles, policy documents, working papers, policy briefs, and other gray literature. The paper refers to existing methodology E-learning and KM functions. If properly integrated, this method first identifies functional similarities between SM, E-Learning, and KM systems and their interactions. The proposed framework consists of two functional parts; KM and SM. The KM part involves knowledge capturing, validation, formatting, storing, and distribution. SM part of the framework involves knowledge presentation, sharing, and application. Since the Somalis are said to be an oral society, this framework helps to capture and disseminate IK residing in knowledge holders.

**Keywords:** Knowledge Management; Social Media; Tacit Knowledge; Indigenous Knowledge.

## 1. Introduction

Indigenous Knowledge is referred to as local or traditional knowledge and skills that have been practiced or developed by a particular community (Ayaa & Waswa, 2016). Indigenous knowledge is defined as knowledge which is spatially and/or culturally context specific, collective, holistic, and adaptive (Adade Williams, Sikutshwa, & Shackleton, 2020). Indigenous knowledge can be defined as a network of knowledges, beliefs, and traditions intended to preserve, communicate, and contextualize Indigenous relationships with culture and landscape over time (Bruchac, 2014). IK is embedded in the practices of daily life of a given society or location. It forms the fundamental in culture and is unique to a given location or society. It is the basis for decision-making of communities in food, security, human and animal health, education and natural resource management.

There are many forms of IK. It encompasses literature, cultural heritage in the form of poetry, arts, ceremonial events related to spirituality, environment, social structure and justice. It includes potentially patentable knowledge about traditional medicines, foods, farm practices, architecture and construction, handicrafts, artwork and folk music. It includes knowledge about people, places, plants, animals, and historical events associated with a particular community (Hunter, 2005) (Mekonnen et al., 2021).

IK have been common in numerous African communities since time immemorial (Mdhluli, Mokgoatšana, Kugara, & Vuma, 2021). Somali society has with unique traditions, with political, cultural, social organization, and ways of life that are distinct from the dominant societies with which they often share their territories. Somali indigenous knowledge has been passed down through generations and is an essential part of the country's cultural heritage. Advancement of technology is now necessitating and of course pushing us to modernize Somali knowledge management practices. However, this paper explores the integration of social media (SM) systems and knowledge management (KM) technology to improve, capture, organize and deliver large amounts of indigenous knowledge (IK). In recent dates, the development of new technologies has enabled users to retrieve a huge amount of information through unprecedented and most commonly used SM technologies including, blogs, wiki, Facebook, Instagram, Twitter, Youtube, and others are being used extensively in our daily life. These technologies are being used by academia and business institutions to create and disseminate knowledge to learners and employees (Fullwood, Rowley, & Delbridge, 2013). Still the process and methods for retrieving information have limitations and are not valuable to some extent. Many similarities exist between SM, E-learning, and KM platforms and previous generations of information and

communication technologies (González-Valiente, Costas, Noyons, Steinerová, & Šušol, 2021). Knowledge management (KM) is a field that is designated to create, store, transfer, disseminate and utilize knowledge for different purposes (A. Ahmed, Khan, & Ahmed, 2014). Managing knowledge in general and indigenous knowledge in particular has become an important and valuable input in the management of sustainable development programs (Lwoga, Ngulube, & Stilwell, 2011).

SM is the current driving force of the new Internet revolution; it plays a significant role in information dissemination among people. By effectively utilizing SM, the sharing of IK and Somali traditions could also be an innovative strategy to sustain this type of knowledge for the present generation, and the future generations to come. However, the natural relationship between SM and KMS cannot be denied and overemphasized, since they are compatible, complements each other (Jiang & Gao, 2010).

Indigenous Knowledge (IK) is the local knowledge that is unique to a given culture or society (Brondizio et al., 2021). IK differs from formal knowledge work systems produced by education institutions, research centers, business firms, and other professional bodies (Fullwood et al., 2013). IK is the basis for local-level decision-making in agriculture, healthcare, food preparation, education, natural resource management, and a host of other activities in rural communities (Warren, 1991). Even with the advance of Western education (print media) and, increasingly, electronic media, IK is still widely used in East Africa/Somali context for agricultural production, animal husbandry, health care, and conservation of natural resources. Although IK is widely used in rural communities, IK has not been adequately documented or validated and is not readily available outside these communities (Ishtiaq et al., 2021).

IK is defined as a systematic body of knowledge acquired by local people through the accumulation of experiences, informal experiments, and intimate understanding of the environment in a given culture, (Owiny, Mehta, & Marezki, 2014). Explicit knowledge refers to the expression of words, numbers, images, numbers audio, video, or computer programs. While tacit knowledge includes insight, intuition, or a feeling of someone who is usually difficult to express (Schoenherr, Griffith, & Chandra, 2014). As such, Sustaining, retrieving and sharing IK using collaborative approaches are becoming more important today (Alosaimi, 2016).

This paper, however, proposes a new complete application of KMS with functions of SM as complementary support for sustaining and managing the IK. The current pattern of SM development is indicating that it will transform the traditional KM into richer and more accessible. Since the Somali community is said to be an oral society, a hybrid KM would help to access, preserve, and utilize the IK domains residing in the knowledge holders (tacit knowledge).

It can't be ignored that SM has transformed and influenced the knowledge ecosystems amongst various institutions; the re-examination of the key concepts about knowledge work systems will take a new path. All of these SM platforms work together to create a rich set of tools that allows users to find information and stay continuously connected to friends, families, and people with whom they share interests (J. Hemsley & R. M. Mason, 2012). Based on the principles of KM, people with the same interest or in the same knowledge domain tend to be connected and establish a community of practices (CoPs) (Barab & Duffy, 2012). Since SM enables KMs to be more collaborative, interconnected and it increases chances to preserve and share it among the users would be significant (al, 2019). As such, due to the way SM platform function, they might smooth the progress of making IK, information, and ancient events viral, such as viral tweets, or viral videos, in ways that were not possible before (Y. A. Ahmed, Ahmad, Ahmad, & Zakaria, 2019).

Despite the fact that SM supports knowledge distribution and creation, this paper wants to support the existing works of literature that claim KM and SM could be integrated (Chugh & Joshi, 2020). Whereas, the Internet has drastically increased easy access and circulation of information, and knowledge across different channels (Tranos, 2020). However, to successfully implement a knowledge management system (KMS), a technology readiness, especially information-communication-technology (ICT) maturity, is a requisite. Furthermore, a suitable technical platform is also necessary for integrating various technologies for KMS and supporting KM processes. This paper wants to answer two questions pertaining to effective and efficient ways of integrating KM into SM in order to overcome existing barriers within knowledge ecosystem. How to sustain, preserve, and effectively manage IK is another question that this paper wants to address?

Finally, this proposed framework was designed not only to remove existing barriers among SM users, knowledge holders, and knowledge users but also to enrich and enhance IK through linking KM and SM.

The aim of this research paper is to explore the potential of integrating social media platforms and their components into the Knowledge Management System (KMS) for managing and sustaining Somali Indigenous knowledge (IK).

#### Review of Literature

The growing interest in IKM among the researchers is growing with their different perspectives demonstrated to the emergence of various models, theories and conceptual frameworks towards preservation of the IK. Reviews from Zenebe Mekonnen et al. (2021), Paulina Afful-Arthure et al. (2021), Fat-ha Aden Abdirahman. (2020), Geoffrey Otieno Muga et al. (2021), Gracious Zinyeka et al. (2016) and Paulina Afful-Arthure et al. (2021) provide Feola (2015), Loorbach et al. (2017), and Patterson et al. (2017) provide detailed overviews and discussions of these conceptual approaches to transformations that show the diversity of how transformations can be understood within the Western scientific knowledge system. With these different perspectives, existing IKM focus on various aspects of IK related to specific sectors such as health, climate change, education etc. while this study is focused on the creation of a generic framework that could be used for any type of IK through integrating KMS and SM technologies. However, this paper is much inclined with frameworks that incorporate KMS and SM Technologies. Therefore, this paper builds up the existing IKM frameworks but trying to improve the capability of the framework through properly integrating functions of SM technologies. Following Yunis Ali Ahmed et al. (2018), Donovan Maasz. (2018), Funmilola O. et al (2018), Yunis Ali Ahmed et al. (2018), Taiwo Kolajo. (2020), the authors briefly introduce how functions of KM and SM could be integrated to produce a hybrid framework that has the both functions.

Table 1. Overview of four prominent conceptual approaches to IKM based on Patterson et al. (2017). These conceptual approaches to IKM have different perspectives, foci, and aims, which show the plurality of how to manage and sustain the IK are understood within research (Lam et al., 2020).

#### Study Selection Process

After conducting the first and the second review using the mentioned index-words, the review process retained 235 papers. Out of the reviewed papers, 130 papers were duplicate and have been removed by using the Endnote. After the duplicated papers were removed, the inclusion/exclusion criteria were applied to the remaining 125 papers, focusing on each paper's title and abstract. The aim of the process was to select the best results that are useful in the development of the proposed framework through analysis that gags within the selected papers. Once, again, similar procedure was used to narrow down the selected papers. Out of the 125 retained papers, 22 most relevant papers were selected according to their specific focus on IKM about similar context. In this process, the study appointed 8 papers as the most relevant papers that present similar perspective on how to integrate IKM and SM.

**Table 1:** Study Selection Process Results

Online Database used	Initial Results	Relevant Studies
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Science Direct	25	45
ISI Web of Knowledge	70	40
IEEE Explore	15	8
Springer-Link	35	20
Scopus	90	12
Total	235	125

**Table 2:**

Author and Title	Focus	Purpose
Marginalized Knowledge: An Agenda for Indigenous Knowledge Development and Integration with Other Forms of Knowledge (Dennis Ocholla, 2007).	Mapping and auditing IK capacity in Africa (e.g. Health, agriculture and food, trade and tourism).	The purpose of this paper is to re-examine Indigenous Knowledge (IK) in order to suggest an agenda for its development and integration with other forms of knowledge.
Knowledge management models and their Utility to the effective management and Integration of indigenous knowledge with other knowledge systems (patrick ngulube, 2007).	This KM models provide a framework that creates a mechanism for exchanging and creating knowledge within a community or an organization.	This article shows that Knowledge management models may also offer a window of opportunity to manage and integrate indigenous knowledge into other knowledge systems.
The Use of Social Media Technologies to Create, Preserve, and Disseminate Indigenous Knowledge and Skills to Communities in East Africa (SYLVIA A. OWINY, et al 2014).	This article has explored ways in which social media and other electronic technologies can be employed to give the children of Africa both wings to fly and roots to anchor them securely in the rich cultural landscapes of their homelands.	This article proposes the use of social media and mobile technologies (cell phones) in the creation, preservation, and dissemination of indigenous knowledge and discusses the role of libraries in the integration of social media technologies with older media that employ audio and audiovisual equipment to reach a wider audience.
Indigenous Knowledge and the African Way Forward: Challenges and Opportunities (Beyuo Alfred Naamwintome et al 2015)	The study focused on the history of knowledge as science and the evolutionary analysis of science as a body of knowledge.	The study also revealed That colonialization and globalization have negatively influenced the recognition of indigenous Knowledge and hence its utilization.
Indigenous and local knowledge in sustainability transformations research: A literature review (David P. M. Lam, 2020).	What changes indigenous peoples and local communities observe and describe, resulting from their daily experiences and activities.	This paper investigates how indigenous and local knowledge (ILK) is represented in peer-reviewed empirical scientific papers that apply ILK in contexts of transformation, transition, and change.
Knowledge management: Preserving, managing and sharing indigenous knowledge through digital library (Tsetselelane D. Mdhuli, 2021)	Indigenous peoples' ways of preserving, managing and sharing knowledge are argued to have contributed to their knowledge being threatened with extinction.	Article addresses the need for intergenerational transmission of culturally unique knowledge for future generations through digital libraries.
Managing and accessing indigenous Knowledge for national development: The role of academic libraries In Ghana (Paulina Afful-Arthure et al 2021)	Managing Indigenous Knowledge through improved access of the academic libraries.	The purpose of the study is to investigate the role Academic libraries can play to organize and make Indigenous knowledge accessible for national Development.
Traditional knowledge and institutions for sustainable climate change adaptation in Ethiopia Zenebe Mekonnen et al (2021)	Integrating traditional knowledge management into formal planning systems to address climate change adaptation knowledge.	Sustaining traditional knowledge management practices in climate change and adaptation.
Prospects and challenges of using information and communication technology for managing indigenous knowledge in Nigeria (Kikelomo Adeeko et al 2022)	Communication technology and managing IK	This explores Indigenous knowledge as a concept, identifies Intellectual Property law protecting Indigenous knowledge in Nigeria and discusses the role of technology in documentation, dissemination and preservation of Indigenous knowledge as whole.
Social media for Knowledge-Sharing: A Systematic Literature Review (Yunis Ali Ahmed et al, 2018)	Role in Social Media in Knowledge Management	The main objective of this paper is to provide a better understanding, and a detailed review, of the current state of research regarding social media use for knowledge sharing.
Use of Social Media for Knowledge Sharing Among Students (Funmilola O. et al 2018)	Their social influence, and demographic characteristics could have influence on their attitudes towards KS.	This study has contributed to the existing body of knowledge by providing empirical data on the influence of social media on behavior of students.
The Knowledge-Centred Approach to the Somali Cultural Emergency and Heritage Development Assistance in Somaliland (Sada Mire 2011)	Preservation of Somali archeological knowledge.	This paper presents Unique research into local heritage management strategies and unveils indigenous Heritage management methods, which the author refers to as the knowledge-centered Approach.
The Partition of Knowledge in Somali Studies: Reflections on Somalia's Fragmented Intellectual Heritage (Fatha Aden Abdirahman, 2020)	Traditional knowledge of livestock keeping and modern ways of livestock keeping.	Integration of traditional livestock keeping and modern knowledge of livestock keeping practices.
Indigenous knowledge of Rift Valley Fever		
Among Somali nomadic pastoralists and its		
Implications on public health delivery Approaches in Ijara sub-County, North Eastern Kenya (Geoffrey Otieno mugaiet al 2021).	This article has assessed indigenous knowledge base of the Somali pastoralists and its implications on public health delivery approaches.	Enhancing the IK of Somali pastoralist through training on mobile technologies.
Five relevant Knowledge management frameworks		
Author and Title	Focus	Purpose
Knowledge Management and social media: The Challenges and Benefits (Dianne P. Ford et al 2013).	This paper is presenting issue that would cover issues, challenges, ideas, and solutions for two aspects of knowledge management (KM) and social media (SM).	Integrating social media and knowledge management system for improved knowledge management.

<p>Integration Of Knowledge Management and E- learning Technologies in Academic Institutions (Oloruntoyin Sefiu Taiwo 2020).</p>	<p>Enhance knowledge management with integration of E-learning technologies.</p>	<p>This work investigates the integration of e-Learning systems and knowledge management technology to improve, capture, organize and deliver large amounts of knowledge.</p>
<p>A framework for pre-processing of social media feeds based on Integrated local knowledge base (Taiwo Kolajo , 2020)</p>	<p>Integrated social media and mobile technology into knowledge management system,</p>	<p>This Paper proposes an improved framework for pre-processing of social media feeds for better performance.</p>
<p>Collaborative Framework for Supporting Indigenous Knowledge Management (Theodora Mwebesa T Mondo et al 2007)</p>	<p>Importance of collaborative framework in indigenous knowledge management</p>	<p>Integrating traditional medical knowledge into formal medical systems.</p>
<p>The Contradictory Influence of Social Media Affordances on Online Communal Knowledge Sharing (Ann Majchrzak et al, 2024)</p>	<p>Explored four affordances of social media-leveraged engagement in the knowledge Conversation.</p>	<p>The purpose of this article is to examine, develop and establish understanding of the Management of knowledge innovation (KI).</p>
<p>A Digital Indigenous Knowledge Preservation Framework: The 7C Model—Repositioning IK Holders In the Digitization of IK (Donovan Maasz, 2018)</p>	<p>Digitally preserving and maintaining Indigenous Knowledge (IK).</p>	<p>Mainstream digitization Efforts have invested in database and archiving constructs, gathering Information from the IK holders, recording the information, and providing access to Researchers, policymakers and to the public at large, but seldom to the IK holders Themselves</p>
<p>A Truth-Based Epistemological Framework for Supporting Teachers in Integrating Indigenous Knowledge into Science Teaching (Gracious Zinyeka, 2016).</p>	<p>IK practices in science teaching and learning.</p>	<p>This article is about the Application of a truth-based epistemological framework designed to support teachers to make decisions on how specific pieces of indigenous knowledge (local traditional practices and technologies) may be Included in science lessons.</p>

## 2. Social media and knowledge management systems

SM encompasses a set of platforms that enable “people to network, share information, and collaborate” (Hemsley & Mason, 2013). YouTube allows users to upload, share, and view videos. YouTube is multimedia-based and therefore can be employed by illiterate as well as literate users. Recorded videos of indigenous knowledge (music, dance, agricultural practice) can be uploaded on YouTube and viewed by local communities in a library setting (Owiny et al., 2014). SM is a new paradigm that spreads fast in society, organizations, and academia and is used for different purposes. SM is employed in the institutions to support a new communication model by substituting one-way communication into multi-way communication. According to the literature reviews, there have been various perspectives of integrating SM and KM; E-learning with KM functions, KMS with SM functions are the most common architecture. Integrating KMS and SM become heated topic among the scholars in the domain of knowledge management. According to (Chan, Chu, Lee, Chan, & Leung, 2013) KM is an integrated cycle comprising three major stages of KM. The three stages of KM include: 1) knowledge capture and/or creation; 2) knowledge sharing and dissemination and 3) knowledge acquisition and application. The three stages of KM supported by technologies are facilitated by a favorable organizational culture that promotes information and knowledge sharing. The following Figure 1 is presenting how these three cycles interact with one another with how distinctive features of SM that enables participation and social connectivity as an important tool in facilitating KM processes.

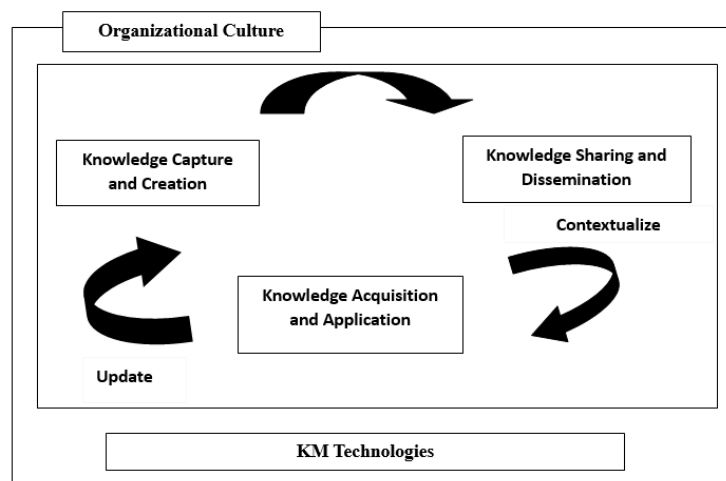


Fig. 1: Note: Taken from Dalkir, 2011.

This above Figure showed that SM has a predominant influence on the social-emotional interaction between the users, which in turn may affect their KM activities. By using appropriate SM technologies, it can enhance the social motivation of the users in pursuing KM. The following diagram represents the architecture of KMS based on SM (Quoc, 2013).

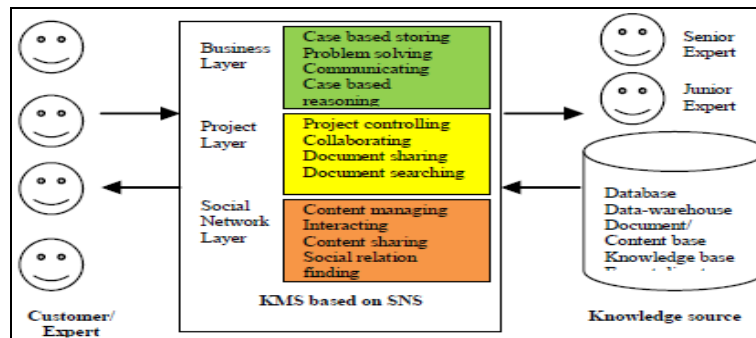


Fig. 2: Architecture of KMS Based on SNS (Quoc, 2013).

Through the demo KMS based on SNS, one of the most significant advantages of KMS based on SNS is to improve knowledge flow (relational capital) and ease its retention and dissemination.

Similarly, KM, LMS, and E-learning are compatible platforms; this is another approach to enhance teaching and learning activities if they are properly integrated.

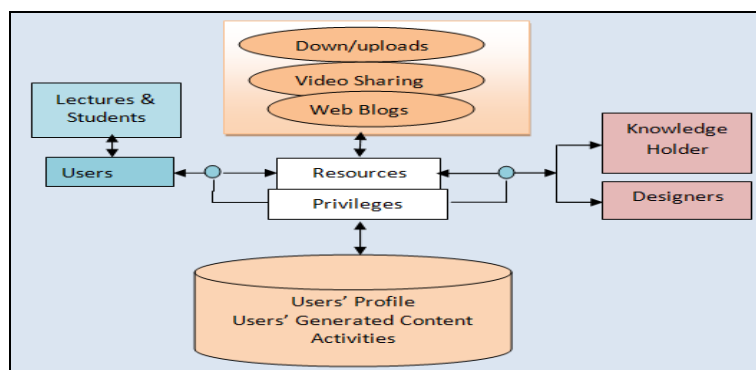


Fig. 3: Hybrid Model of KM and E-Learning (Madar, 2014).

The above figure shows the combination of KM and E-learning functional features to form a hybrid KM framework. This hybrid model supports both knowledge holders, learners, and instructional leaders (Madar, 2014).

SM such as wikis; blogs, Facebook, academia, research gates, and others allow collaborative working. Their integration into KM enriches the teaching and learning process if they are properly planned, configured, and integrated. Furthermore, they offer an effortless method for people to communicate, collaborate and consequently support the creation and dissemination of knowledge (J. Hemsley & R. Mason, 2012). Similarly, SM could also be used as an effective and accessible way of transmitting and sustaining the Somali IK across the loops of the SM. Aforementioned, storytelling is one of the mechanisms that adults transfer wisdom, and traditions to the younger generations, and using SM would allow future generation access to the Somali IK.

Knowledge creation and transfer processes have a strong social underpinning as they are dependent on interpersonal networks (Crevoisier & Jeannerat, 2009). Research on individual interactions has exposed how actors and community-level attributes facilitate knowledge creation and mobilization (Allard & Ferris, 2015). Knowledge is a collective activity embedded in social interactions within both economic and social contexts (Antonelli, 2006). In recent years, there are many organizations that put into practice SM such as blogs, wiki, internal networks, and so on as communication tools to facilitate knowledge sharing between the knowledge holders and users across the society (Panahi, Watson, & Partridge, 2013).

Several studies have indicated a positive impact on the application of SM to knowledge sharing. As such, SM can be handy and would make easy knowledge sharing activities within and across knowledge holders, users, and contributors (Zaffar & Ghazawneh, 2012).

Likewise, SM would be useful for Somalis, they can easily share not only their explicit but also their tacit knowledge through image, symbols, visual and other communication channels, which may be difficult to express in written form. SM can make shared knowledge richer and more abundant, which in turn supports and advances knowledge-sharing activities (Antonelli, 2006).

Building upon the strong social underpinning of knowledge and knowledge transfer processes, this paper illustrates that SM would accelerate knowledge transfer and creation, and most importantly, the proposed hybrid KMS would play a crucial role in sustaining the IK.

On contemporary social networking sites, participation rates are "astounding", since "huge information and data are freely revealed by the user. Similarly, the number and type of knowledge sharing on Web 2.0 platforms including profiling, blogging, posting, tagging, and reviews is incremental and continues to increase (Paroutis & Al Saleh, 2009).

People are liberally contributing to online knowledge communities of all kinds, even when the benefits go directly to different purposes, let it business or education matters (Allen, 2008). This same applies to knowledge holders if they are given to a platform that connects them to knowledge users and contributors, and then both tacit and explicit knowledge holders can freely contribute to knowledge communities.

### 3. Significance of the study

The preservation and management of Somali indigenous knowledge is crucial for the sustainable development of the country and its people. This study is significant as it contributes to the existing knowledge on the potential of integrating social media platforms into KMS for managing and sustaining Indigenous knowledge. The rapid increase in the use of social media and mobile technologies has created opportunities to form knowledge networks that can facilitate the process of creating, preserving, and sharing knowledge and skills unique to communities in the Somali context. The proposed framework can have practical applications in promoting sustainable development

and preserving cultural heritage in the Somali context. The proposed framework helps to capture and disseminate Indigenous knowledge residing in knowledge holders, which is crucial for preserving cultural heritage and promoting sustainable development in the Somali context.

#### 4. Problem statement

Despite the importance of indigenous knowledge, there is a lack of research on how to sustain and manage it in the face of modernization and globalization. Somali society being an oral community with rich IK and other cultural practices lacked a framework in place to organize the existing knowledge in various methods. The advancement of technology disrupted the traditional knowledge management practices that Somalis had been using to pass knowledge and wisdom to the present generations and the future generations to come. Therefore, there is a pressing need to devise a hybrid KMS that compromises SM and KM functions that could be used to sustain and revive the indigenous Somali knowledge. Other challenges facing oral cultures are the disappearance of traditional knowledge and skills due to memory loss or the death of elders and the deliberate or inadvertent destruction of IK.

#### 5. Research question

How can a hybrid framework be developed to sustain and manage Somali indigenous knowledge in the face of modernization and globalization?

#### 6. Methods and materials

The research design used is pragmatism research design that cuts cross review of literature and observations. A thorough literature review was conducted to identify the existing knowledge gaps and to provide a theoretical framework for the study. The search string used for the review comprised two main elements: (1) Integration of knowledge management systems with social media and (2) Indigenous Knowledge Management frameworks designated to manage local or indigenous knowledge. Scopus indexed journals were chosen, and used as the most relevant database for this study due to its high reliability and inclusivity of data, and its extensive collection of methodical tasks across distinct information domains and a dataset for largescale data-intensive studies. Only research papers published from 1990s to 2024 were chosen because indigenous knowledge research about Somalia and similar countries in East Africa were gradually emerging during this period. While this work remains chiefly a product of critical literature review, it is spiced with data from loosely structured interviews with a group of 10 men and three women older than 50 in Somaliland.

Ten highly cited publications from the global and African perspectives were selected and included within the study for a full-text reading to produce a comprehensive contextual review of IK. Search terms employed were indigenous knowledge management framework, local knowledge, traditional knowledge or local ecological knowledge, and sustaining indigenous knowledge.

#### 7. The proposed integrated framework of KM and SM

The proposed framework is novel as it explores the potential of integrating social media platforms into KMS for managing and sustaining Indigenous knowledge in the Somali context. The proposed framework consists of two functional parts; KM and SM. The KM part involves in knowledge capturing, creation, validation, profiling, formatting, storing, and distribution. SM part of the framework involves in knowledge presentation, sharing, and application. Knowledge presentation refers to the ways knowledge is displayed to the organizational members. While other existing KM models illustrate three concentric circles interacting directly to one another; creation and sensing, organizing and capture, sharing, and dissemination. The proposed framework shows a process in which KM and SM are integrated to make KM richer and more accessible. This framework was designed to sustain the IK by establishing interaction among the holders, contributors, and users of IK. This framework has a central repository that stores knowledge. Knowledge profiling and validation are other functional features that verify the authentic sources of different knowledge domains. The validation mechanisms have a role to prevent knowledge manipulation and information distortion, which may infringe intellectual property rights.

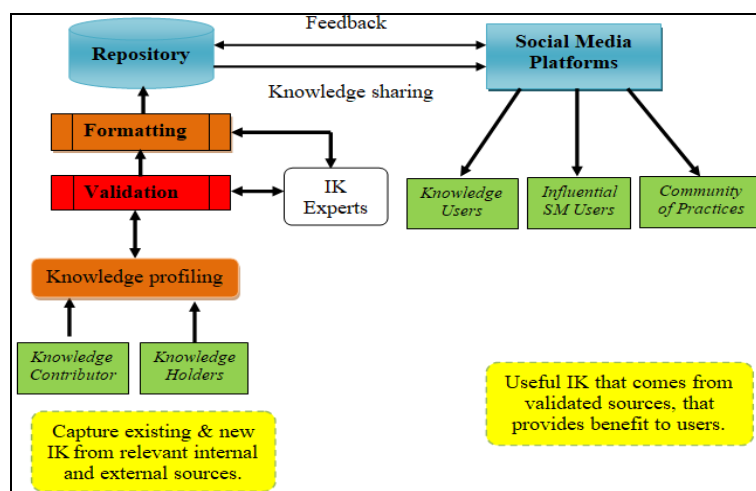


Fig. 4: Madar's Indigenous Knowledge Management Framework.

The major challenges to the management and preservation of IK are issues relating to collection development, intellectual property rights, access and the preservation media. In this regard, this framework is designed to support different forms of knowledge, and disseminate them through different channels of the SM. Most importantly, the proposed framework captures tacit IK from external sources, and converts it into explicit IK. In this framework, the components and functions of the SM and KM system are integrated into two different levels by considering their similarities. This framework illustrates that the function of SM is to ease sharing and utilization. In contrast, KM's role is to capture and transfer both explicit and implicit knowledge. Knowledge profiling and validation are also one of the core functions designated to ensure quality information provided to different levels of users.

Additionally, this framework has IK experts, whose function is to validate and verify content and quality of knowledge domains. Knowledge validation is a painstaking process of continually monitoring, testing, and refining the knowledge base to suit the existing or potential realities. Experts in the validation process review, test, and validate their knowledge base to keep up with the latest knowledge in the discipline and discard the outdated knowledge. The KM design perspective is an alternative that relates to holders, users, contributors of knowledge and sharing it with SMs users.

In this framework, holders are reflective tacit and explicit knowledge holders in this case are said to be IK holders, who struggle to share their knowledge with knowledge users. The SM perspective is a supportive function that complements with functions of the KM; it relates to knowledge users, CoP, and influential SM users for dissemination purposes. This perspective has two essential aspects. According to the perspective, this paper incorporates each element into a new conceptual framework that integrates the significant component of KM and SM frameworks.

Similarly, this framework supports reluctant knowledge contributors who like to share knowledge with their groups through using collaborative SM features including Google community and similar technologies. These technologies would help reluctant knowledge contributors establish their own knowledge networks. Open knowledge contributors could use both layers of the proposed framework in different capacities; they can join to specific CoP, or they could be contributors, and users. Facebook allows individuals to post videos, share interests, make connections, and join groups with similar interests (Liao, Huang, Dennis, & Teng, 2023).

The main components of this hybrid framework are composed of is the KMS and SM as the two sides of the same coin that have complementary functions. The side of the IK components of the framework performs functions of knowledge management systems. There are four key functions embedded in the part of IK of the framework that help effective and efficient management of the IK. These four functions are included the following: Knowledge Capturing, Knowledge Profiling, knowledge Validation, Knowledge Formatting and Knowledge Sharing and Dissemination.

Similarly, the SM being the other side of the coin has set of functions that work as for the knowledge holders, and holders to connect through a various media. These tools enable IK holders collect, edit, verify and disseminate IK. The SM collection tool was developed as the main means of IK collection through capturing various media. The various media forms collected in the application are images, videos, drawings, text input, and audio. These SM tools provide a collaborative and complex mechanisms that enables easier, faster, and more widespread sharing of IK. The IK holders use this application to mainly document daily traditional activities that they feel worthy to preserve.

Functions of SM combines all the media capturing features together such as videos, images, audio, and text. This caters for all possibilities of input, to maximize the efficiency of the application in the collection phase. Integrated functions of KM and SM are also a very important functionality of the application as this allows the IK holder to group (categorize) media relating to certain activities or topics. This allows the IK holders to categorize their captured media into meaningful classifications according to their own context.

## 8. Conclusion

This paper explores effective and efficient approaches to integrating KMS into SM, and how they support knowledge transfer and creation. Basic functions of KM and SM components are discussed and their common features are investigated. The proposed integrated framework has two layers that are interconnected, and interactive, which allows KM layer and SM layer to establish collaborations within the knowledge ecosystem.

The use of social networking tools will help more holders, users, and contributors of IK to connect and form huge knowledge networks. The proposed framework compares the functional similarities between social media, e-learning, and KM systems and their interactions when properly integrated. There may be some contradictions in the existing knowledge regarding the effectiveness of integrating social media platforms into KMS for managing and sustaining Indigenous knowledge.

This framework will also improve the process of knowledge discovery and knowledge sharing across virtual communities and indigenous knowledge holders. Transfer between tacit and explicit knowledge in both directions would enrich the existing IK through profiling and validating potential knowledge sources.

Through analysing the main functions of KM and SM, this paper proposed a hybrid KMS framework that contains the two functions to conserve the IK. This pattern is adaptable to learning society, which can create a flexible environment for the development of IK.

This paper addresses the above gaps and contributes to this literature by offering an IK perspective of how these processes vary across space and whether they follow or challenge established geographies of knowledge.

Using this integrated framework would help Somalis to preserve and sustain IK and overcome difficulties in practicing their traditions.

Future research should focus on other factors or see the impact of virtual communities on IK, especially those related to conflict management and peace building.

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## References

- [1] Adade Williams, P., Sikutshwa, L., & Shackleton, S. (2020). Acknowledging indigenous and local knowledge to facilitate collaboration in landscape approaches—Lessons from a systematic review. *Land*, 9(9), 331. <https://doi.org/10.3390/land9090331>.

- [2] Ahmed, A., Khan, A. R., & Ahmed, S. (2014). Collaboration of knowledge network and e-learning system with social sites for teaching-learning. Paper presented at the 2014 Fourth International Conference on Advances in Computing and Communications. <https://doi.org/10.1109/ICACC.2014.41>.
- [3] Ahmed, Y. A., Ahmad, M. N., Ahmad, N., & Zakaria, N. H. (2019). Social media for knowledge-sharing: A systematic literature review. *Telematics and informatics*, 37, 72-112. <https://doi.org/10.1016/j.tele.2018.01.015>.
- [4] al, A. e. (2019). Social media for knowledge-sharing: A systematic literature review. *Telematics and informatics*, 37, 72-112. <https://doi.org/10.1016/j.tele.2018.01.015>.
- [5] Allard, D., & Ferris, S. (2015). Antiviolence and marginalized communities: Knowledge creation, community mobilization, and social justice through a participatory archiving approach. *Library Trends*, 64(2), 360-383. <https://doi.org/10.1353/lib.2015.0043>.
- [6] Allen, J. P. (2008). How Web 2.0 communities solve the knowledge sharing problem. Paper presented at the 2008 IEEE International Symposium on Technology and Society. <https://doi.org/10.1109/ISTAS.2008.4559754>.
- [7] Alosaimi, M. (2016). The role of knowledge management approaches for enhancing and supporting education. Université Panthéon-Sorbonne-Paris I.
- [8] Antonelli, C. (2006). The business governance of localized knowledge: an information economics approach for the economics of knowledge. *Industry and Innovation*, 13(3), 227-261. <https://doi.org/10.1080/13662710600858118>.
- [9] Ayaa, D. D., & Waswa, F. (2016). Role of indigenous knowledge systems in the conservation of the bio-physical environment among the Teso community in Busia County-Kenya. *African Journal of Environmental Science and Technology*, 10(12), 467-475. <https://doi.org/10.5897/AJEST2016.2182>.
- [10] Barab, S. A., & Duffy, T. (2012). From practice fields to communities of practice. In *Theoretical foundations of learning environments* (pp. 29-65): Routledge.
- [11] Brondizio, E. S., Aumeeruddy-Thomas, Y., Bates, P., Carino, J., Fernández-Llamazares, Á., Ferrari, M. F., Molnár, Z. (2021). Locally based, regionally manifested, and globally relevant: Indigenous and local knowledge, values, and practices for nature. *Annual Review of Environment and Resources*, 46, 481-509. <https://doi.org/10.1146/annurev-environ-012220-012127>.
- [12] Bruchac, M. (2014). Indigenous knowledge and traditional knowledge. *Encyclopedia of global archaeology*, 10, 3814-3824. [https://doi.org/10.1007/978-1-4419-0465-2\\_10](https://doi.org/10.1007/978-1-4419-0465-2_10).
- [13] Chan, R. C. H., Chu, S. K. W., Lee, C. W. Y., Chan, B. K. T., & Leung, C. K. (2013). Knowledge management using social media: A comparative study between blogs and Facebook. *Proceedings of the American Society for Information Science and Technology*, 50(1), 1-9. <https://doi.org/10.1002/meet.14505001069>.
- [14] Chugh, R., & Joshi, M. (2020). Challenges of knowledge management amidst rapidly evolving tools of social media. In *Information diffusion management and knowledge sharing: Breakthroughs in Research and practice* (pp. 745-760): IGI Global. <https://doi.org/10.4018/978-1-7998-0417-8.ch037>.
- [15] Crevoisier, O., & Jeannerat, H. (2009). Territorial knowledge dynamics: from the proximity paradigm to multi-location milieus. *European planning studies*, 17(8), 1223-1241. <https://doi.org/10.1080/09654310902978231>.
- [16] Fullwood, R., Rowley, J., & Delbridge, R. (2013). Knowledge sharing amongst academics in UK universities. *Journal of knowledge management*. <https://doi.org/10.1108/13673271311300831>.
- [17] González-Valiente, C. L., Costas, R., Noyons, E., Steinerová, J., & Šušol, J. (2021). Terminological (di) Similarities between Information Management and Knowledge Management: a Term Co-Occurrence Analysis. *Mobile Networks and Applications*, 26(1), 336-346. <https://doi.org/10.1007/s11036-020-01643-y>.
- [18] Hemsley, J., & Mason, R. (2012). The nature of knowledge in the social media age: Implications for knowledge management models. En 2012 45th Hawaii International Conference on System Sciences. IEEE, 2012. In. <https://doi.org/10.1109/HICSS.2012.580>.
- [19] Hemsley, J., & Mason, R. M. (2012). The nature of knowledge in the social media age: Implications for knowledge management models. Paper presented at the 2012 45th Hawaii International Conference on System Sciences. <https://doi.org/10.1109/HICSS.2012.580>.
- [20] Hemsley, J., & Mason, R. M. (2013). Knowledge and knowledge management in the social media age. *Journal of Organizational Computing and Electronic Commerce*, 23(1-2), 138-167. <https://doi.org/10.1080/10919392.2013.748614>.
- [21] Hunter, J. (2005). The role of information technologies in indigenous knowledge management. *Australian Academic & Research Libraries*, 36(2), 109-124. <https://doi.org/10.1080/00048623.2005.10721252>.
- [22] Ishtiaq, M., Maqbool, M., Ajaib, M., Ahmed, M., Hussain, I., Khanam, H., . . . Hayat Bhatti, K. (2021). Ethnomedicinal and folklore inventory of wild plants used by rural communities of valley Samahni, District Bhimber Azad Jammu and Kashmir, Pakistan. *Plos one*, 16(1), e0243151. <https://doi.org/10.1371/journal.pone.0243151>.
- [23] Jiang, K., & Gao, Z. (2010). Research on the application model of Personal Knowledge Management based on Social Software. Paper presented at the 2010 2nd IEEE International Conference on Information Management and Engineering. <https://doi.org/10.1109/ICIME.2010.5477891>.
- [24] Lam, D. P., Hinz, E., Lang, D. J., Tengö, M., von Wehrden, H., & Martín-López, B. (2020). Indigenous and local knowledge in sustainability transformations research: a literature review. *Ecology & Society*, 25(1). <https://doi.org/10.5751/ES-11305-250103>.
- [25] Liao, G.-Y., Huang, T.-L., Dennis, A. R., & Teng, C.-I. (2023). The influence of media capabilities on knowledge contribution in online communities. *Information Systems Research*.
- [26] Lwoga, E. T., Ngulube, P., & Stilwell, C. (2011). Challenges of managing indigenous knowledge with other knowledge systems for agricultural growth in sub-Saharan Africa. <https://doi.org/10.1515/libr.2011.019>.
- [27] Madar, M. J. (2014). Hybrid Model Of E-Learning with Knowledge Management.
- [28] Mdhului, T. D., Mokgoatšana, S., Kugara, S. L., & Vuma, L. (2021). Knowledge management: Preserving, managing and sharing indigenous knowledge through digital library. *HTS Theologiese Studies/Theological Studies*, 77(2). <https://doi.org/10.4102/hts.v77i2.6795>.
- [29] Mekonnen, Z., Kidemu, M., Abebe, H., Semere, M., Gebreyesus, M., Worku, A., Chernet, A. (2021). Traditional knowledge and institutions for sustainable climate change adaptation in Ethiopia. *Current Research in Environmental Sustainability*, 3, 100080. <https://doi.org/10.1016/j.crsust.2021.100080>.
- [30] Owiny, S. A., Mehta, K., & Maretzki, A. N. (2014). The use of social media technologies to create, preserve, and disseminate indigenous knowledge and skills to communities in East Africa. *International journal of communication*, 8, 14.
- [31] Panahi, S., Watson, J., & Partridge, H. (2013). Towards tacit knowledge sharing over social web tools. *Journal of knowledge management*. <https://doi.org/10.1108/JKM-11-2012-0364>.
- [32] Paroutis, S., & Al Saleh, A. (2009). Determinants of knowledge sharing using Web 2.0 technologies. *Journal of knowledge management*. <https://doi.org/10.1108/13673270910971824>.
- [33] Quoc, T. P. (2013). Apply KM and SNS for Improving Labor Productivity of Vietnamese SMS.
- [34] Schoenherr, T., Griffith, D. A., & Chandra, A. (2014). Knowledge management in supply chains: The role of explicit and tacit knowledge. *Journal of Business Logistics*, 35(2), 121-135. <https://doi.org/10.1111/jbl.12042>.
- [35] Tranos, E. (2020). Social network sites and knowledge transfer: An urban perspective. *Journal of Planning Literature*, 35(4), 408-422. <https://doi.org/10.1177/0885412220921526>.
- [36] Warren, D. M. (1991). Using Indigenous Knowledge. *Agricultural Development World Bank Discussion Papers* (127).
- [37] Zaffar, F. O., & Ghazawneh, A. (2012). Knowledge Sharing and Collaboration through Social Media-the Case of IBM. Paper presented at the MCIS (Short Papers).