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## An empirical study of the use of tools and technologies for knowledge sharing in development organisations in Kenya

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# **An empirical study of the use of tools and technologies for knowledge sharing in development organisations in Kenya**

## **Abstract:**

This paper presents findings from research conducted with development organisations in Kenya, concentrating on using ICT tools and technologies for knowledge sharing. Development organisations of different sizes and operating in various sectors were examined in a large-scale online survey. The study examines the application of a set of technologies, including ICT tools, social media tools, and collaborative tools. The study also considered the strategies employed by the development organisations in enhancing knowledge sharing. The data collected was in quantitative form, and therefore the analysis followed quantitative techniques, including descriptive and inferential statistics.

Findings revealed that technology supports the knowledge processes of extraction, sharing and dissemination. However, technology impacts knowledge processes differently depending on the size of the organisation. The results indicate that different technologies are used to support different phases of the SECI model. Development practitioners use ICTs for various purposes, including preserving, accessing, storing, documenting and gathering knowledge.

This study contributes to the literature on ICT based development knowledge. The study contributes to understanding the barriers and enablers that development practitioners experience while using ICTs for knowledge sharing. The study is significant to the development practitioners in the developing world for understanding how to enhance knowledge sharing through technology.

**Keywords:** Knowledge sharing, knowledge management, development organisations, ICTs

## **1. Introduction**

Development organisations can be described as non-governmental organisations established to serve the interest of the public, such as community assistance, education, science, literary, or religious (Carroll, 2018). Kitonga (2016) pointed out that non-for-profit organisations are self-governing private organisations that make no profit for owners or members. For this study, development organisations are considered as organisations doing non-for-profit work.

Development organisations are founded on the assumption that the market is not adequate, and there are critical parts of the social world, which the profit-making organisations are not designed to support or enhance, like poverty eradication and social well-being (Marchant, 2017). In Kenya, the development sector includes a diverse grouping of institutions including, small welfare and community-based associations to big and secular social-economic institutions (Kanyinga and Mitullah, 2007). In this study, the Directory of Development Organisations was used as the sampling frame. This directory categorises organisations in nine groups: international organisations, civil society organisations, government institutions, finance institutions, training and research centres, private sector support organisations, development consulting firms, information providers and grant makers (Directory of development organisations, 2019).

The number of development organisations in Kenya has significantly grown since independence. Registration records of development organisations show that by 2005 there were about 350,000 non-profit organisations in Kenya (Kanyinga and Mitullah, 2007). Kitonga (2016) noted that not-for-profits have been among the fastest-growing organisations across the world. In terms of financial presence, non-profit organisations have made a significant contribution to the Gross Domestic Product (GDP). In 2000, for instance, the non-profit-making sector in Kenya accounted for approximately US\$270 million in expenditure, which was equal to 2.5% of the GDP (Kanyinga and Mitullah, 2007). Kitonga (2016) also pointed out the financial muscles of development organisations, noting that some of the world's non-profit organisations have huge budgets even more prominent than those of their host nations. In Kenya, non-for-profit organisations contribute immensely to job creation as this sector employs close to half as many workers as the public sector. As Kanyinga and Mitullah (2007), more than half of non-for-profit organisations' mission is to improve the community social and economic well-being and development.

According to Kipkosgei, Kang, & Choi (2020), the changing competitive environment calls for development organisations to remain relevant and become self-sustainable. This can be attained through a number of initiatives key among them utilisation of knowledge-based initiatives and embracing intangible resources such as knowledge sharing. However, sharing knowledge and especially in the development sector, is challenging as development organisations operate in complex environments (DFID, 2014). Knowledge sharing in such settings is complex as sustainable development implies social change, which is inherently complicated (Hearn et al., 2011). Additionally, enhancing knowledge sharing in organisations is quite challenging since employees are hesitant to share their valuable knowledge with colleagues (Berraies et al., 2020).

Although various developed countries have implemented knowledge management programmes, most sub-Saharan African countries are yet to commence knowledge management initiatives (Ondari-Okemwa and Smith, 2009). Research on knowledge sharing is also limited, as most scholars focus on other knowledge management processes (Al-Kurdi, El-Haddadeh and Eldabi, 2018). It is also notable that there is limited research focusing on knowledge sharing among development organisations as the majority of the studies concentrate on knowledge sharing in profit-making organisations.

Previous studies have sought to demonstrate an association between knowledge sharing and organisational performance (Davenport and Prusak, 1998, Massey et al., 2002, Nonaka, 1994). Several studies examined the correlation between knowledge sharing and ICT in the academic arena and by practitioners. However, most existing literature appears to have been derived from business organisations' experiences rather than those of development organisations. Thus, the development sector requires an examination of the application of ICTs in improving knowledge sharing processes to guide the development of appropriate knowledge sharing strategies for this sector. Besides, the majority of knowledge sharing research is based on experiences from developed countries (Tong and Shaikh, 2010). This paper bridges this gap by examining how development organisations operating in low and middle-income countries such as Kenya may apply ICT based knowledge sharing tools in their local context.

Various models have been used to study knowledge sharing in organisations. One of the most common models is the SECI model of knowledge creation that explains how tacit and explicit knowledge is converted into organisational knowledge (Nonaka & Takeuchi,

1995). This model distinguishes four knowledge dimensions: socialisation, externalisation, combination, and internalisation. Although the SECI model was first proposed in business organisations, it has also been applied to assess the role of ICT in knowledge management processes. For example, [Sian Lee and Kelkar \(2013\)](#) used different dimensions of the SECI model to examine the perceptions of knowledge management professionals regarding using ICTs to support knowledge sharing. The SECI model has also been used to investigate knowledge creation in regional networks, study the social networking and knowledge creation capabilities in online forums, assess knowledge sharing in indigenous communities and study motivational aspects in cross-organisational settings (Harmaakorpi and Melkas (2005), Chalkiti and Sigala (2008), Lwoga et al. (2011)). Other knowledge sharing models include the ripple model, which assesses knowledge through activities realised, the capital created, practice changes and performance improvements (Hulsebosch et al., 2009). The causal model is a knowledge management framework that starts with intangible assets and then describes the action affected by that asset and the valuable result (Talisayon, 2009). The study used the SECI model to explore how technology has changed knowledge sharing practices and how technology should be further developed to support knowledge sharing initiatives. The SECI model was adopted because it has been internationally accepted both in the academic and practitioners' world (Von Krogh et al., 2000).

The contribution of research to the body of knowledge is governed by the extent to which the scholarly output adds to existing scholarly research in the field of study, informs policy, informs practice and can drive policy improvements in the area (Creswell, 2016). This research contributes to both theoretical and practical bodies of knowledge. The practical contributions are specific to development organisations, whereas the theoretical contributions apply to organisations that wish to use ICT to improve their knowledge-sharing processes.

Through examining the use of ICTs from the SECI perspective, the study helps to enrich the SECI model by examining how it can be made more effective in the face of technology. The study also contributes to the literature on developing a knowledge triangle, which is an emerging concept that seeks to enhance the use of knowledge in the development sector. The study examined the relationship between different actors through surveying development practitioners (n=331) and interviewing knowledge management practitioners (n=11) from selected development organisations (n=500). The findings contribute to

identifying methods of good practice that other countries can use in sub-Saharan Africa to extract, share and disseminate development knowledge.

## **2. Literature overview**

The literature on knowledge sharing in the development sector is not as rich compared to the business sector and other profit-making organisations. However, various studies have explored a range of knowledge sharing issues in the development sector (Ringel-Bickelmaier and Ringel, 2010, Van Der Meer et al., 2009, Talyarkhan et al., 2004, Cummings et al., 2003). For example, Cummings et al. (2003) examined knowledge sharing in online networks in the development sector and argued that knowledge and learning are essential to development organisations and development practitioners. Ringel-Bickelmaier and Ringel (2010) reviewed approaches taken by international organisations to foster knowledge sharing by examining leading development agencies' knowledge management practices. Talyarkhan et al. (2004) explored the challenges and lessons learnt from knowledge sharing initiatives in developing countries. They used a case study of a UK-based non-government organisation, Intermediate Technology Development Group, to highlight the objectives, channels and contexts that distinguish development knowledge from knowledge sharing in the business sector. Van Der Meer et al. (2009) examined how organisations shared knowledge for sustainable development through conducting a content analysis of 129 sustainable development projects. Ragsdell and Jepson (2014) investigated the knowledge sharing activities of voluntary organisations.

ICTs are considered necessary in the dissemination of development knowledge (World Bank, 1998). ICTs also improve and accelerate the way information is shared (UNCTAD, 2012). Ofori-Dwumfuo and Kommey (2013) investigated the use of ICT tools in knowledge management in a Ghanaian state organisation and found that ICTs play an important role in gathering, documenting and preserving knowledge. As pointed out by Ryan and Prybutok (2001), ICTs help create, store, share and distribute organisational knowledge. ICT tools and technologies are considered to be important in knowledge sharing processes (Lakshman, 2007). However, the majority of ICT enabled knowledge sharing discussions in the literature stem from profit-making organisations, with limited application to development organisations' context. The following overview is on the use

of technologies for knowledge sharing, as discussed in the literature, followed by examples specifically from the development sector.

Although ICT is a major enabler of knowledge sharing, there are different schools of thought regarding its potential in facilitating knowledge sharing. Spingies (2010) examined how knowledge workers used ICTs to gather knowledge in rural communities and found that technology speed knowledge gathering and simplify information dissemination. Elias et al. (2006) assessed impediments to knowledge sharing in Africa and observed that knowledge management processes were hampered by poor infrastructure and inadequate information technology equipment. Dewah (2014) examined the use of ICT tools for promoting knowledge retention by three Southern Africa Development Community Organisations and recommended that to improve ICT use, organisations should enhance access to various technologies. An examination of knowledge sharing in leading development agencies revealed that effective dissemination of knowledge intertwined aid and impacted knowledge-based aid (McGrath and King, 2004).

Although various development actors have invested in knowledge generation, the focus on knowledge sharing and dissemination has been insufficient. Rossel-Cambier et al. (2007) argued that although knowledge generation is important, knowledge dissemination is more important, especially in the context of development organisations. Akude (2014) reviewed the literature on knowledge for development and recommended the establishment of an ICT-supported global network. Nakata et al. (2014) developed mechanisms of capturing, managing and disseminating indigenous knowledge for local communities. They revealed that it is challenging to manage indigenous knowledge in the digital environment.

[Sian Lee and Kelkar \(2013\)](#) examined the effectiveness of knowledge sharing mediums and found that organisations use various technologies, such as instant messaging, email, telephone and audio and video conferencing. [Harvey and Mitchell \(2012\)](#) explored the knowledge sharing mediums of four leading not-for-profit organisations in Africa and reported the key technologies used included email and Web 2.0 tools such as Skype, wikis and Delicious. In their study of knowledge management programmes in the United Nations, [Carlucci et al. \(2010\)](#) identified five knowledge sharing approaches: best practice toolkit, the after action review, the survey of practice, the end of assignment report and the handover note. The findings of that study revealed that the UN used ICT tools to exchange experiences and practices among peers.

[Rao \(2005\)](#) identified practical applications of knowledge management tools and technologies in the industry. Knowledge sharing tools used in various organisations included taxonomies, content management, groupware, portals, online communities of practice, social network analysis, storytelling, e-learning, wireless platforms, innovation management tools and inter-organisational knowledge sharing platforms. [Van Baalen et al. \(2005\)](#) examined factors that led to successful knowledge networks and identified communities of practice as a potentially useful approach. Other techniques identified were knowledge portals, databases, newsletters and information bulletins. [Talyarkhan et al. \(2004\)](#) investigated knowledge sharing channels used by international organisations and identified networks of practice, groupware products, shared systems, and face-to-face contact.

[Staiger-Rivas et al. \(2015\)](#) explored different knowledge sharing strategies used at the Consultative Group for International Agricultural Research (CGIAR) and found that electronic media was popular for social reporting. A study by the Canadian International Development Authority outlined the role of ICTs in knowledge building and identified effective access to knowledge. The recognised knowledge sharing mediums included peer assist, after action review, storytelling, mentoring, coaching, communities of practice, forums and meetings, workshops and knowledge fairs (CIDA, 2003).

Social media tools are also emerging as one of the preferred technologies for knowledge sharing. For example, [Panahi et al. \(2013\)](#) argued that tacit knowledge sharing limitations were likely to be minimised by the advent of web-based social tools. [Zhao and Chen \(2013\)](#) explored the features of knowledge sharing in different enterprises and concluded that Web 2.0 provided opportunities to measure an organisation's knowledge sharing status

Although the literature on knowledge management in Kenya is not as rich, few studies have examined knowledge sharing in the development sector. For example, Mosoti and Masheka (2010) examined knowledge management practices in Kenya and Africa and their contribution to development. Muthamia (2017) examined factors that influenced knowledge management at the UN Women's Regional Office in Nairobi. Gichohi and Wario (2017) discussed elements that affected the implementation of knowledge management practices in health-based non-governmental organisations in Kenya. Sawe and Rotich (2017) investigated knowledge management's influence on service delivery at the



Kenyan Anti-Counterfeit Agency. Nzui (2014) examined the role that ICT plays in enhancing knowledge management at the International Centre for Research in Agroforestry. Githua (2013) investigated knowledge management practices at selected non-profit health sector organisations in Nairobi. Another study evaluated using knowledge management tools in civil society organisations working in Kenya's health sector (Juma et al., 2015).

Overall, the reviewed studies draw attention to the status of knowledge sharing research in development organisations. Although few published studies were available, these studies confirmed the association between ICT and the processes of extracting, sharing and disseminating knowledge. However, the majority of the studies focused on for-profit organisations and mainly in the developed world. This paper fills this gap by documenting ICT tools and technologies used in the development sector for knowledge sharing.

### **3. Research design**

This study assessed the ICT tools and technologies that support knowledge sharing through a survey of development practitioners in Kenya. The survey questionnaire was administered through an online platform, survey monkey, that made it possible to reach out to respondents dispersed across the country. The population for the study comprised 331 development practitioners drawn from 500 development organisations. The Directory of Development Organisations was used as the sampling frame. This directory categorises organisations into nine groups: international organisations, civil society organisations, government institutions, financial institutions, training and research centres, private sector support organisations, development consulting firms, information providers and grantmakers. This study adopted random sampling methods in selecting the study respondents, which presented an equal chance to every individual in the study sample.

The study used the questionnaire method to establish the prevalence of development practitioners in using technology-based knowledge sharing. A self-administrated questionnaire was used, as this format is a low cost, quick and convenient (Bryman and Bell, 2011). Some of the questionnaire items were influenced by the seminal work of Nonaka et al. (1994) who tested an organisational knowledge creation model by collecting data from 105 Japanese managers.

Two expert knowledge management practitioners assessed the validity of the questionnaire by reviewing each question's contents, the flow of the questions, and the completeness of the questionnaires. The aim of the pilot study was to check whether questions were relevant to all members of the sample, whether respondents understand all the questions, whether any questions had a double meaning, and give room for further ideas to develop the survey instrument ([Saunders, 2011](#)). As the actual study involved a sample of 500 development organisations, nine development practitioners were chosen from different categories to participate in the pilot study. The researcher conducted the pilot study through face-to-face, telephone and skype meetings. After piloting, the questionnaire was refined several times. The reliability of the questionnaire was assessed using Cronbach's alpha coefficient. This study used SPSS to analyse the quantitative data, and data analysis followed descriptive and inferential analysis. Descriptive analysis included measures of central tendencies, while inferential statistics included a measure of associations.

## 4. Key findings and discussion

This paper presents an overall landscape of knowledge sharing tools used by development organisations in Kenya. The findings demonstrate the specific use of tools by development organisations, the use of technology in supporting knowledge processes and strategies used to support ICT driven knowledge sharing in the development sector.

The findings are divided into four major subcategories. The first sub-section presents an overview of knowledge sharing mediums, followed by the perceived usefulness of technology in supporting knowledge processes. The third sub-section presents findings based on the importance of the knowledge creation processes of socialisation, externalisation, combination, and internalisation. The final sub-section presents findings of the knowledge sharing strategies.

### 4.1 Overview of knowledge sharing mediums

The questionnaire listed 13 types of ICT tools used for extracting, sharing and disseminating knowledge. As development practitioners use a variety of ICT tools, respondents were allowed to select multiple responses for the ICT tools that they used. These multiple responses were grouped for the frequency analysis. The results are presented in Table 2.

Results demonstrated that email was the most used ICT tool (n=237), followed by websites (n=195), file sharing (n=159), google drive (n=145) and intranets (n=145). Other significant tools were instant messengers and chat (n=133), collaborative workspaces (n=112), discussion forums (n=107), content management systems (n=105), calendars (n=98), blogs (n=96), data visualisation tools (n=72) and frequently asked questions (n=64). These results were consistent with those of [Harvey and Mitchell \(2012\)](#), who explored the knowledge sharing mediums among four leading not-for-profit organisations in Africa and found that the key technologies used included email and web 2.0 tools. The results were also consistent with those of [Rao \(2005\)](#), who identified knowledge sharing tools used in various organisations, including taxonomies, content management, groupware, portals, e-learning, wireless platforms, innovation management tools and inter-organisational knowledge sharing platforms. [Staiger-Rivas et al. \(2015\)](#) also explored

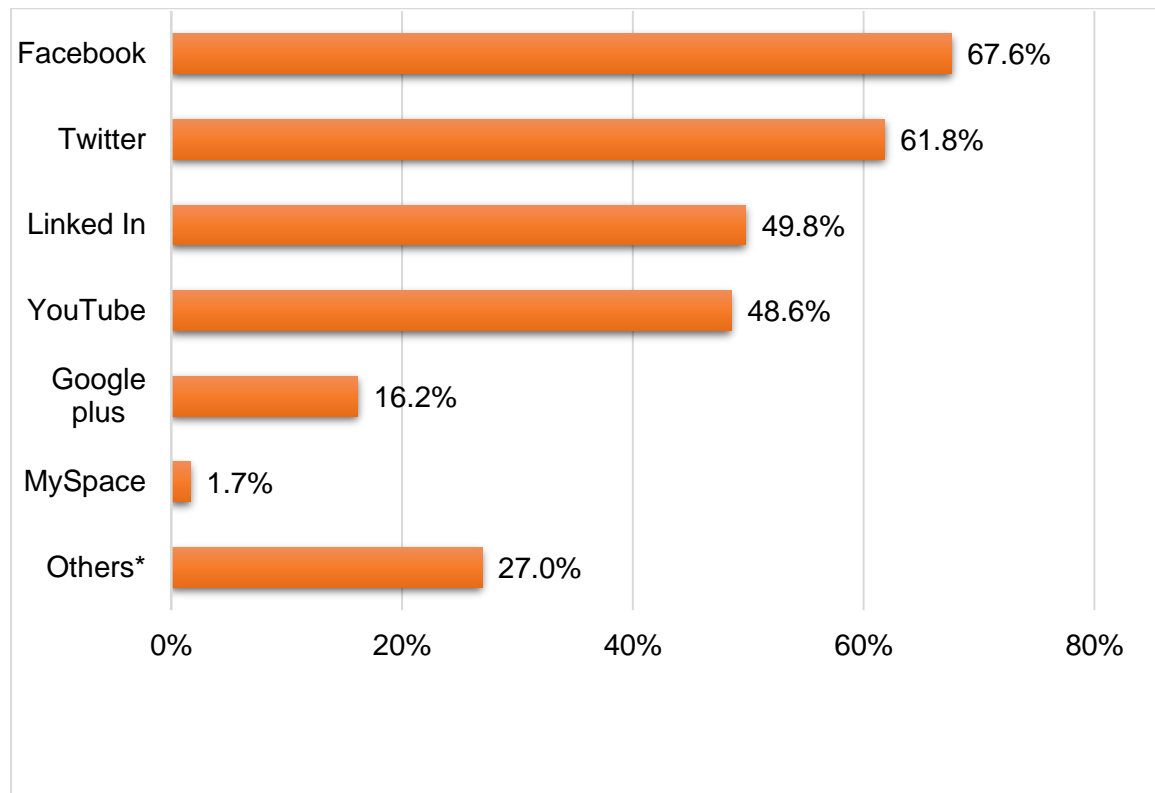
different knowledge sharing strategies used at CGIAR and found that electronic media was popular for social reporting.

**Table 1: ICT tools used for extracting, sharing and disseminating knowledge**

#	ICT Tool	Frequency	Percentage %
1	Email	237	93.7
2	Website	195	77.1
3	File sharing	159	62.9
4	Intranets	145	57.3
5	Google drive	145	57.3
6	Instant messengers and chat	133	52.6
7	Collaborative workspaces	112	44.3
8	Discussion forums	107	42.3
9	Content management systems	105	41.5
10	Calendars	98	38.7
11	Blogs	96	37.9
12	Data visualisation tools	72	28.5
13	Frequently asked questions (FAQs)	64	25.3

Findings on social media tools used for knowledge sharing revealed that Facebook was the most commonly used social media platform (n=163), followed by Twitter (n=149), LinkedIn (n=120 and YouTube (n=117). These findings were compared with [Rathi et al. \(2014\)](#) who explored the value of social media in not-for-profit organisations and reported that Twitter was the most popular social networking tool in the non-profit sector.

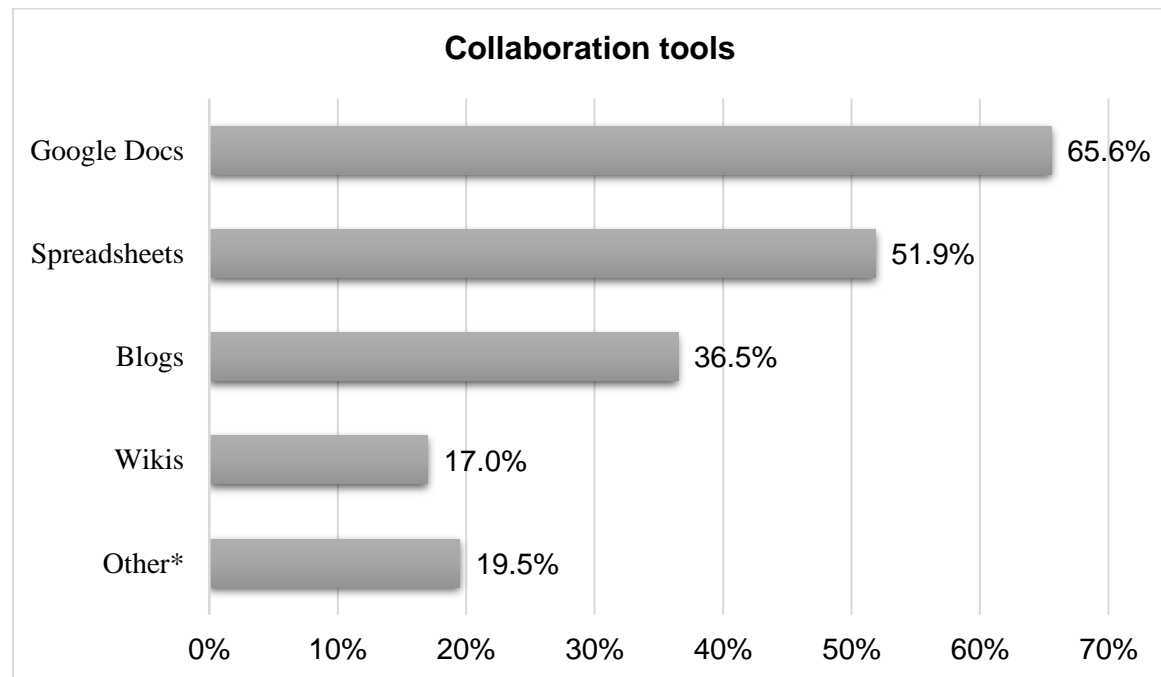
The results of the analysis of social media tools are shown in Figure 1.



**Figure 1: Social media tools used for extracting, sharing and disseminating knowledge**

All but three respondents used collaboration tools for sharing knowledge in their organisation. Results revealed that Google Docs, Spreadsheets, Blogs and Wiki were the most common collaborative tools. A few respondents used the other collaborative tools such as Adobe connect webinars, Dropbox, Exo-platform, Microsoft Office Online, Moodle, Pdf docs, Mendeley, SharePoint, Institutional repositories, Extranets, Confluence, Jira and Asana. Besides, Slack, HeyOrca and Skype were uniquely identified as other collaborative tools used in development organisations. Similarly, previous research also identified a number of ICT tools that were used in knowledge sharing, including blogs, email, e-collaborative systems, e-forums, e-learning/online training, Information repository, instant messaging, NetMeeting, telephone/audio conferencing, Skype, wikis, Delicious, Twitter and YouTube (Harvey and Mitchell, 2012, Sian Lee and Kelkar, 2013).

The results of the analysis of the collaboration tools are shown in Figure 2.



**Figure 2: Collaboration tools used for extracting, sharing and disseminating knowledge**

#### **4.2 Use of technology in knowledge processes**

The use of technology was highly prevalent in supporting knowledge processes of extraction, sharing and dissemination. On average, 183 respondents (73%) perceived technology to be very important in supporting knowledge extraction, sharing and dissemination. Only 12 respondents (5%) perceived technology to be moderately or slightly important in supporting the knowledge processes. This suggests that ICTs are vital to knowledge sharing in the development sector.

The results of the analysis are shown in Table 3.

**Table 2: Perceived usefulness of technology in supporting knowledge processes**

<b>Knowledge processes</b>	<b>Very Important n (%)</b>	<b>Important n (%)</b>	<b>Moderately/ Slightly Important n (%)</b>
<b>Knowledge extraction:</b> creating knowledge from structured and unstructured sources	158 (62.5)	79 (31.2)	16 (6.3)
<b>Knowledge sharing:</b> exchanging knowledge among individuals, teams, and organisations	198 (79.2)	42 (16.8)	10 (4.0)
<b>Knowledge dissemination:</b> transferring knowledge within and across the organisation	192 (77.1)	48 (19.3)	9 (3.6)

The proportion of perceived usefulness of technology by sample characteristics was also interesting. The data showed that 237 of 331 respondents (146 men and 91 women) perceived technology to be either very important or important in knowledge processes. People working in middle management (n=87; 36.7%) and senior management (n=54; 22.8%) perceived technology as very important or important. Table 3 demonstrates the perceived usefulness of technology by sample characteristics.

**Table 3: Perceived usefulness of ICTs by sample characteristics**

Sample Characteristic	Knowledge Extraction			Knowledge Sharing			Knowledge Dissemination		
	VII n (%)	MSI n (%)	P- value <sup>†</sup>	VII n (%)	MSI n (%)	P- value <sup>†</sup>	VII n (%)	MSI n (%)	P- value <sup>†</sup>
<b>Gender</b>									
Male	146 (61.6)	9 (56.3)	0.430	144 (60.0)	9 (90.0)	0.051	146 (60.8)	6 (66.7)	0.897
Female	91 (38.4)	7 (43.8)		96 (40.0)	1 (10.0)		94 (39.2)	3 (33.3)	
<b>Age, years</b>									
18–34	58 (24.5)	3 (18.8)	0.022*	59 (24.6)	2 (20.0)	0.243	60 (25.0)	1 (11.1)	0.029*
35–54	153 (64.6)	7 (43.8)		154 (64.2)	5 (50.0)		154 (64.2)	4 (44.4)	
55+	26 (11.0)	6 (37.5)		27 (11.3)	3 (30.0)		26 (10.8)	4 (4.4)	
<b>Job level</b>									
Consultant	37 (15.6)	6 (37.5)	0.063	40 (16.7)	1 (10.0)	0.745	37 (15.4)	4 (44.4)	0.005*
Owner/executive	8 (3.4)	2 (12.5)		9 (3.8)	1 (10.0)		8 (3.3)	2 (22.2)	
Senior management	54 (22.8)	2 (12.5)		53 (22.1)	2 (20.0)		55 (22.9)	1 (11.1)	
Middle management	87 (36.7)	3 (18.9)		85 (35.4)	5 (50.0)		89 (37.1)	0 (0.0)	
Entry	41 (17.3)	2 (12.5)		42 (17.5)	1 (10.0)		41 (17.1)	2 (22.2)	
Others	10 (4.2)	1 (6.3)		11 (4.6)	0 (0.0)		10 (4.2)		
<b>Organisation size, employees</b>									
1–50	78 (32.9)	9 (56.3)	0.256	85 (35.4)	1 (10.0)	0.264	79 (32.9)	6 (66.7)	0.201
51–100	17 (7.2)	0 (0.0)		16 (6.7)	1 (10.0)		16 (6.7)	1 (11.1)	
101–250	29 (12.2)	2 (12.5)		30 (12.5)	1 (10.0)		30 (12.5)	0 (0.0)	
Over 250	113 (47.7)	5 (31.3)		109 (45.4)	7 (70.0)		115 (47.9)	2 (22.2)	

<sup>†</sup> Chi-square test of association or Fishers exact test of significance \* Significant at p<0.05; VII: Very Important/ Important; MSI: Moderately/ Slightly Important

Respondents were asked to state their perceived importance of using technology for purposes associated with extraction, sharing and dissemination of knowledge. The most important purpose was preserving knowledge (n=181; 73.1%). Other significant purposes were accessing knowledge (n=181; 72.7%), storing knowledge (n= 179; 71.6%), and documenting knowledge (n=178; 70.9%). The analysis of the importance of using technology for extracting, sharing, and disseminating knowledge is shown in Table 4.



**Table 4: Purposes of using technology for extracting, sharing, and disseminating knowledge**

Purposes	Very Important n (%)	Important n (%)	Moderately Important n (%)	Slightly Important n (%)	Not Important n (%)	Total
Gathering	177 (71.1)	57 (22.9)	12 (4.8)	2 (0.8)	1 (0.4)	249
Documenting	178 (70.9)	61 (24.3)	10 (4.0)	2 (0.8)	0 (0.0)	251
Preserving	181 (73.1)	54 (21.8)	11 (4.4)	1 (0.4)	1 (0.4)	248
Generating	132 (53.0)	79 (31.7)	30 (12.1)	6 (2.4)	2 (0.8)	249
Distributing	174 (69.6)	67 (26.8)	5 (2.0)	3 (1.2)	1 (0.4)	250
Exchanging	163 (65.0)	74 (29.5)	11 (4.4)	1 (0.4)	2 (0.8)	251
Storing	179 (71.6)	59 (23.6)	8 (3.2)	2 (0.8)	2 (0.8)	250
Accessing	181 (72.7)	58 (23.3)	7 (2.8)	2 (0.8)	1 (0.4)	249
Acquiring	147 (58.8)	79 (31.6)	19 (7.6)	4 (1.6)	1 (0.4)	250
Capturing	146 (58.4)	85 (34.0)	15 (6.0)	2 (0.8)	2 (0.8)	250
Producing	130 (52.6)	83 (33.6)	24 (9.7)	6 (2.4)	4 (1.6)	247

### 4.3 Importance of the knowledge creation processes

Regarding the perceived importance of the SECI knowledge creation processes, 158 respondents (62.5%) indicated that socialisation was very important, and 16 respondents (6.3%) felt that it was moderately or slightly important. Table 5 shows the perceived importance of SECI in the knowledge creation processes.

**Table 5: Perceived importance of SECI in the knowledge creation processes**

	Very Important n (%)	Important n (%)	Moderately/ Slightly Important n (%)
<b>Socialisation:</b> developing new knowledge through shared personal experiences	158 (62.5)	79 (31.2)	16 (6.3)
<b>Externalisation:</b> codifying tacit knowledge into documents, manuals, articles and similar	123 (48.8)	93 (36.9)	36 (14.3)
<b>Combination:</b> converting and disseminating knowledge among members of the organisation	157 (63.1)	69 (27.7)	23 (9.2)
<b>Internalisation:</b> receiving and integrating knowledge into regular work processes	169 (67.3)	68 (27.1)	14 (5.6)

The findings showed a statistically significant association between the perceived usefulness of technology and the importance of SECI in the knowledge creation processes. Socialisation was reported to be important in knowledge extraction (n=217; 91.6%), knowledge sharing (n=218; 90.8%) and knowledge dissemination (n=220; 91.7%). However, only the association between socialisation and knowledge dissemination was statistically significant (p=0.040). Externalisation was important in knowledge extraction (n=211; 89%), knowledge sharing (n=207; 87%) and knowledge dissemination (n=207; 87%). Externalisation was also statistically associated with knowledge extraction (p<0.001), knowledge sharing (p=0.038) and knowledge dissemination (p=0.025). Combination was important in the knowledge extraction (n=216; 92.7%), knowledge sharing (n=216; 91.5%) and knowledge dissemination (n=215; 91.1%) but only significantly associated with knowledge extraction (p=0.001). Finally, internalisation was important in knowledge extraction (n=225; 95.7%), knowledge sharing (n=225; 94.5%) and knowledge dissemination (n=227; 95%). It was also significantly associated with knowledge extraction (p=0.008). The results of the correlation analysis are shown in Table 6.

**Table 6: Correlation analysis of SECI and knowledge processes**

SECI Knowledge creation processes	Knowledge Extraction			Knowledge Sharing			Knowledge Dissemination		
	VII n (%)	MSI n (%)	P-value <sup>†</sup>	VII n (%)	MSI n (%)	P-value <sup>†</sup>	VII n (%)	MSI n (%)	p-value <sup>†</sup>
<b>Socialisation</b>									
VII	217 (91.6)	13 (81.3)	0.168	218 (90.8)	9 (90.0)	0.626	220 (91.7)	6 (66.7)	0.040*
MSI	20 (8.4)	3 (18.7)		22 (9.2)	1 (10.0)		20 (8.3)	3 (33.3)	
<b>Externalisation</b>									
VII	211 (89.0)	5 (35.7)	<0.001*	207 (87.0)	6 (60.0)	0.038*	207 (87.0)	5 (55.6)	0.025*
MSI	26 (11.0)	9 (64.3)		31 (13.0)	4 (40.0)		31 (13.0)	4 (44.4)	
<b>Combination</b>									
VII	216 (92.7)	10 (62.5)	0.001*	216 (91.5)	7 (70.0)	0.056	215 (91.1)	7 (77.8)	0.202
MSI	17 (7.3)	6 (37.5)		20 (8.5)	3 (30.0)		21 (8.9)	2 (22.2)	
<b>Internalisation</b>									
VII	225 (95.7)	12 (75.0)	0.008*	225 (94.5)	9 (90.0)	0.447	227 (95.0)	8 (88.9)	0.389
MSI	10 (4.3)	4 (25.0)		13 (5.5)	1 (10.0)		12 (5.0)	1 (11.1)	

<sup>†</sup> Chi-square test of association or Fishers exact test of significance \* Significant at p-value <0.05; VII: Very Important/ Important; MSI: Moderately/ Slightly Important

#### 4.4. Knowledge sharing strategies

Respondents were asked to respond to closed-ended questions that sought to determine the strategies used for encouraging knowledge sharing in organisations. Responses were on a five-point Likert scale: very important, important, moderately important, slightly important and not important.

Results indicated that top management's support was the most important strategic initiative (n=184; 73.6%). Besides, developing knowledge sharing policies was reported as being very important (n=158; 63.5%). These findings were comparable with the results of a study conducted in Ghana by [Ofori-Dwumfuo and Kommey \(2013\)](#), which investigated the use of ICT tools in knowledge management in the Ghanaian state organisation, Volta River Authority. The results were also congruent with a previous study by [McNichols \(2010\)](#) that explored strategies, processes and methods for enhancing knowledge transfer. That study reported that support from management enabled the creation of a knowledge sharing culture.

Further findings showed that fostering a knowledge-sharing culture in an organisation enhances knowledge sharing (n=171; 68.4%). Earlier studies suggested that a knowledge-centred culture is an important antecedent to knowledge sharing (Ajmal et al., 2010, Ferreira Peralta and Francisca Saldanha, 2014). Similarly, a study by Cavaliere and Lombardi (2015) revealed a correlation between culture and knowledge sharing.

It has been suggested that linking a reward system to the organisation culture could increase knowledge sharing (Durmusoglu et al., 2014). However, this did not appear to be the case in this study, as almost half of the survey respondents were not in favour of a reward system (n=120; 48.0%). Nevertheless, previous studies showed that intrinsic and extrinsic motivation predicted knowledge sharing behaviours (Tangaraja et al., 2015).

**Table 7: Knowledge sharing strategies**

Strategies (n=253)	Very Important n (%)	Important n (%)	Moderately/ Slightly Important n (%)	Not important n (%)
Getting support from top management	184 (73.6)	55 (22.0)	10 (4.0)	1 (0.4)
Developing knowledge sharing policies	158 (63.5)	64 (25.7)	23 (9.2)	4 (1.6)
Fostering a knowledge sharing culture	171 (68.4)	71 (28.4)	7 (2.8)	1 (0.4)
Establishing a reward system	120 (48.0)	72 (28.8)	50 (20.0)	8 (3.2)
Embracing a learning organisation culture	159 (63.4)	81 (32.3)	9 (3.6)	2 (0.8)
Implementing communities of practice	130 (52.4)	82 (33.1)	32 (12.9)	4 (1.6)
Implementing an online knowledge portal	144 (58.1)	67 (27.0)	31 (12.5)	6 (2.4)

## 5. Conclusion

As demonstrated in this study, ICTs are enablers of knowledge extraction, sharing and dissemination. The findings revealed that ICTs significantly impacted the SECI knowledge creation processes of socialisation, externalisation, combination, and internalisation. There was statistical evidence to support the relationship between extraction, sharing and dissemination of knowledge and the SECI knowledge creation processes. Development practitioners used ICTs for various purposes, including preserving, accessing, storing, documenting, and gathering knowledge.

The findings affirmed significant gaps in using ICT tools, social media tools and collaboration tools to support knowledge sharing. For example, development practitioners did not integrate knowledge sharing initiatives into the organisational goals, and the majority of the organisations lacked knowledge sharing culture. This affected the development practitioners in their efforts to use ICTs for knowledge sharing. Good practice in using technology in extracting, sharing and disseminating development knowledge included simplicity, compatibility and standardisation of the tools.

Besides developing an enabling knowledge sharing culture, other promotion factors included substantial social capital where employees have shared values, motivating

employees to share knowledge and empowering employees to apply knowledge sharing tools.

This study revealed that knowledge sharing in the development sector faces several challenges that undermine its success. The technical challenges include lack of integration of ICT systems and processes, lack of technical support, a mismatch between individuals' needs and integrated ICT systems, reluctance to use ICT systems, lack of training on new ICT systems, lack of communication, resistance to new technology, unreliable Internet and lack of technical know-how. These challenges can be mitigated by creating awareness of the benefits of ICTs, developing a knowledge sharing culture, integrating knowledge sharing with organisational goals, integrating ICT systems and processes, developing knowledge sharing policies and developing a knowledge sharing strategy.

This paper serves as a baseline for researches to further explore technology based knowledge sharing in the development sector in several ways, such as analysing how new media technologies can be amalgamated with traditional ICTs to support knowledge sharing. Further research could also be conducted to establish the cultural, social and human factors that support effective knowledge sharing.

The population of the present study was mainly development practitioners and knowledge management experts. A similar analysis could be conducted to compare the perceptions of professionals in other disciplines with those of development practitioners. Further research could reveal whether using ICTs is similar and therefore generic or whether the purposes differ, raising the need to establish the reasons for similarity or differences in the experiences of development practitioners. Although knowledge is a catalyst for development, the precise mechanism of measuring the impact of ICT-based knowledge sharing remains to be elucidated.

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