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Measuring knowledge management capacities to strengthen health systems: The development and application of the Knowledge Management Index for global health and development

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Programmatic and technical knowledge is crucial to strengthening health systems. Knowledge management (KM) is an evidence-based approach that enables health professionals to have the right knowledge at the right time to positively affect health outcomes. However, there is a gap in measuring and understanding KM capacity strengthening for global health. To address this challenge, the "Knowledge Management Index" was developed. The KM Index aims to examine an organization's or project's use of KM practices, identify opportunities for improvement, and map out an action plan to strengthen the KM capacity. The KM Index measures the capacity in four fundamental KM practice areas: 1) organizational structure (KM vision and strategy), 2) learning opportunities (professional development), 3) internal KM culture (seeking out and sharing knowledge), and 4) KM for global health (effort to advance global health agenda). This paper details the iterative learning and development process of the Index, and results and lessons learned from implementing the Index with a regional health organization in East Africa as well as a United States of America-based global health project. Finally, we will examine the flexibility and adaptability of the KM index and discuss implications for further application of the KM Index.

Keywords: Knowledge Management, organizational learning, capacity strengthening, global health

Introduction

Knowledge generated from research and practice is crucial to strengthening health systems. More specifically, programmatic and technical knowledge can be used not only to increase health system performance, but also to improve health and health equity and transform global health and development (Pang et al. 2003; Sullivan et al. 2015). Knowledge management (KM) is an evidence-based approach that enables health professionals to have the right knowledge at the right time to positively affect intended health outcomes (Ohkubo et al. 2015). Furthermore, evidence from the business sector can be applied to KM interventions in the health sector and

can enhance organizational learning and administration by strengthening staff capacity to create, retain, and exchange knowledge in health organizations (Kothari et al. 2011).

However, strengthening the KM capacity of health organizations, especially those in low- and middle-income countries, is complicated, and the organizations in such countries are more susceptible to managerial and programmatic challenges and resource shortages (Pakenham-Walsh 2012). The critical factors that negatively affect KM efforts often include a lack of performance indicators and measurable benefits; inadequate management support; improper planning, design, coordination, and evaluation; inadequate skills of knowledge managers and workers; problems with organizational culture; and improper organizational structure (Frost 2014). Factors that can potentially lead to failure—such as strategy, culture, systems, structures, and competencies—should be critically and thoroughly examined as soon as an organization decides to invest in KM.

KM interventions should reflect local realities and the ability of an organization to prepare and take appropriate actions to address current gaps, taking into consideration the organization's health information needs—based on their mission and staff make-up (e.g., clinicians, trainers, administrators). The "Knowledge Management Index" was designed to assess the organizational practice of and strengthen capacity in KM and to identify health information needs specific to an organization. This paper details the iterative learning and development process of the KM Index. Using a case-study approach, we will share the results and lessons learned from implementing the KM Index in two different settings: one with an intergovernmental regional health organization in East Africa and the other with a United States of America-based global health project. We will also discuss the implications for further application of the KM Index and the ways in which a thorough understanding of KM capacity strengthening contributes to the sustainability of health systems.

Description of the Knowledge Management Index

Development Processes

The KM Index draws from and builds upon various resources. During the first step of designing the KM Index, we conducted a review of external tools published by the business sector and internal tools developed and used previously by the Johns Hopkins University/USAID Knowledge for Health Project (K4Health) for specific KM or social and behaviour change communication (SBCC) projects.

Examples of External Tools Reviewed

In our initial literature review, we used a combination of KM and capacity strengthening-related search terms in Google to locate published tools relevant to our work. The majority of well-known KM assessment tools and instruments were found in the business sector (Garfield 2017). While we collected and screened many models, tools, and instruments, we extensively reviewed three that used a comprehensive and systematic theoretical framework based on KM Maturity model, a multi-level model to show how an organization improves or becomes competent in various KM capacity elements (see Table 1). While there are variations of the model, some of the dimensions or elements used typically include two broad areas: 1) the knowledge flow/process (accumulation, utilization, sharing, ownership), and 2) the organizational structure (strategy, leadership, resource, technology) (Ohkubo 2015).

Table 1. Examples of external knowledge management assessment tools in literature review

Tool	Author (Year)	Note
Levels of KM Maturity℠	APQC (2017)	APQC's Level of KM Maturity is a five-step model developed to describe the status of an organization's KM programmes. Each level of the framework is associated with the specific characteristics and results one would expect to see in a programme operating at that level of maturity. The levels range from Level 1, where an organization is just starting to recognize the need to improve knowledge flow, to Level 5, where KM processes and behaviours have been fully embedded in enterprise strategy and culture.
KM Mini-Assessment	APQC (n.d.)	This web-based 15-question KM mini-assessment is designed for organizations to determine their current state of KM. The short yes/no quiz format was designed for those who want to quickly assess their organization's level of understanding and implementation of KM. After completing the survey, respondents receive a score that corresponds to one of the three levels of the maturity: beginner, intermediate, and advanced.
KM Self-Assessment Matrix	Collison and Parcell (2007)	The tool asks organizations to evaluate themselves on the following themes: KM strategy; leadership behaviour; networking; learning before, during, and after; and capturing knowledge. Based on their results, organizations are then assigned one of five levels—from Level 1 ("awareness") to Level 5 ("the way we work")—and are asked to use the results to either have internal discussions or share with other related organizations and partners.
Survey on KM	Knoco (2012)	The survey can be used as a subjective assessment of an organization's KM maturity. Ten questions cover topics such as learning before, during, and after; communities and networks; and roles and accountabilities. The survey results assign an organization's maturity to one of five levels: from Level 1 ("we are investigating KM but have not yet started") to Level 5 ("KM is embedded in the way we work").

Examples of Internal Tools Reviewed

Over the past years, members and colleagues of our study team have examined the organizational capacity of global health organizations and projects and have developed various instruments to address KM and related fields. Our aim was to build upon this earlier work and, therefore, included those internal research instruments in our review (see Table 2). In addition to the knowledge flow/process and the organizational structure, we noted that the these internal tools covered relevant health topics—including family planning, maternal and child health, and HIV/AIDs—and identified networking and partnerships as a critical component in KM for global health.

Table 2. Examples of internal knowledge management assessment tools included in the literature review

Tool	Author or Project (Year)	Note
KM Capacity Assessment Tool (Appendix 2)	Johns Hopkins Bloomberg School of Public Health, Center for Communication Programs (2013)	Adapted from Collison and Parcell's work, this tool was published as part of the *Guide to Monitoring and Evaluating Knowledge Management in Global Health Programs* (Ohkubo et al. 2013). It uses four stages or statements of maturity to gauge organizational capacity on the seven KM indicators including strategy, networking, and learning.
Pre-/Post-Capacity Building Research Instrument	Bangladesh Knowledge Management Initiative I eHealth Pilot Project (2011–2013)	The instrument was developed and used for the capacity building pre-/post-assessment of the three Ministry of Health units implementing the project activities. The instrument included a series of questions to assess the skills and structures used to manage both SBCC and KM initiatives. The questions used a four-point scale: 1=poor, 2=fair, 3=good, 4=excellent.

Testing and Refinement

We developed and consolidated an extensive list of indicators and assessment questions relevant to the global-health setting, then prioritized and grouped questions into similar categories. After we developed the initial version, the KM Index was revised and refined several times in response to field-testing results collected between 2015 and 2017. Overall, the KM Index was implemented in 13 focus group discussions and included over 60 participants representing various organizations in East Africa and the United States.

The main goal of the rigorous testing and refinement was to create a simple and streamlined assessment tool that could be easily implemented in different settings. Based on the findings from the literature review and field testing, the final list of questions was grouped into four fundamental KM practice areas: 1) organizational structure (KM vision and strategy), 2) learning opportunities (professional development), 3) internal KM culture (seeking out and sharing knowledge), and 4) KM for global health (effort to advance global health agenda). While the original version proposed the use of a five-stage scoring format accompanied by statements to describe each of the stages, we decided to simplify it and use a binary (yes or no) scoring format. The primary rationale for the change was to help organizations focus their efforts on action planning rather than interpreting data. To that end, we also included a section/spreadsheet to organize key findings, recommendations, and action items.

Main Components of the Knowledge Management Index

Purpose and objectives

The primary purpose of the KM Index is to help organizations identify existing and potential capacity to implement KM, identify potential opportunities for improvement in the implementation of KM, and develop an organizational action plan to strengthen KM capacity. Using both qualitative and quantitative data to measure the KM capacity of an organization, the tool is meant to be implemented by a facilitator through focus group discussions with various levels of staff throughout the organization. The findings can be used as a baseline assessment to inform the creation of project activities to enhance KM capacity, a midpoint assessment to inform potential course corrections, and an endline assessment to show and explain changes in KM capacity and implementation of KM initiatives over time.

Four fundamental knowledge management practice areas: qualitative and quantitative data collection

The KM Index includes four domains, or topic areas, followed by a series of key KM elements, as assessment questions, for each domain (see Table 3). To determine an element's relevance to an organization, the assessment team should discuss the tool with the management to decide which domains are used within the organization and which KM questions are relevant to them (this is further described in the Implementation of the KM Index section later). Each KM element is presented as an open-ended question during a focus group discussion to understand how well a given KM element is being practiced.

Table 3. Components of the Knowledge Management Index

Domain	Domain definition	Key KM elements (assessment questions)	Number of questions
Organizational structure	Refers to the organization's use of strategies and resources to plan and manage KM	1. Does your organization have a definition for KM? 2. Does your organization have a KM strategy for internal KM? 3. Does your organization have a KM strategy for external KM? 4. Does your organization have a staff member(s) assigned to internal KM activities and responsibilities? 5. Does your organization set aside funds for internal KM activities? 6. Does your organization set aside funds for external KM activities? 7. Does your organization conduct periodic surveys of all employees to determine information needs and measure satisfaction with existing KM activities?	7
Learning opportunities	Relates to staff exposure to continuing professional development and training to strengthen existing skills and build new skills/knowledge	1. Do new staff hires receive an orientation, which provides an overview of the organization's mission, work, and available learning opportunities? 2. Do all employees receive ongoing training on common KM concepts, such as tacit and explicit knowledge, and knowledge exchange techniques? 3. Does your organization regularly offer internal training opportunities to its employees? 4. Do employees have the opportunity to attend external training opportunities? 5. Do employees have the opportunity to attend conferences and meetings related to [organization's field]?	5
Internal KM culture	Refers to the environment in which staff members are encouraged to share their knowledge with others and seek out new ideas/approaches	1. Is everyone in the organization encouraged to seek out new ideas/approaches? 2. Are staff members supported (e.g., time, funds) in testing out new ideas/approaches? 3. Do employees receive incentives for sharing new information (e.g., recognizing contributions, offering monetary rewards)? 4. Are best practices collected and shared internally?	10

Table 3. Components of the Knowledge Management Index *(continued)*

Domain	Domain definition	Key KM elements (assessment questions)	Number of questions
		5. Are lessons learned collected and shared internally? 6. Is an internal database for storing best practices/lessons learned available to all employees? 7. Does the organization have a directory that details each employee's competencies—to help staff identify which colleagues can be a resource? 8. Does your organization track the progress of its internal knowledge sharing initiatives? 9. Are employees able to safely report existing or potential problems to management? 10. Do departing staff participate in a hand off process to document their knowledge for use by the organization?	
KM for global health	Relates to the organization's approach to using KM to support health professionals and advance the global health agenda	[Initial question] Which health topics does your organization's work focus on? 1. Does the organization consistently seek out and adopt the latest technical guidelines for [topics mentioned in the initial question]? 2. Do employees receive training on [topics mentioned in the initial question]? 3. Are employees encouraged to join external professional organizations, such as working groups or associations, related to [topics mentioned the initial question]? 4. Does your organization have a database for sharing its knowledge with external audiences? 5. Does your organization track the progress of its external knowledge sharing database?	5
Total number of questions in the KM Index			**27**

Based on a qualitative analysis of the responses, the assessment team will score each KM element as either 0 or 1. A score of a 0 is given to organizations that are not practicing the KM element or are practicing it but not in a systematic way. A score of 1 is given to organizations that are systematically practicing the KM element. Depending on their relevance, not every KM

element needs to be measured. Once each KM element has been scored, it is important to normalize (i.e., adjust values to a common scale of 0 to 1 or 0% to 100%) the KM Index number so that the relationship between multiple datasets can be examined when needed.

In the following example, the organization answered 24 out of 28 KM elements/questions because some of the questions were considered irrelevant to its KM operation. Because the organization was only practicing three KM elements under each domain, their KM Index number for each domain was 3. The KM Index numbers were added under each domain (3+3+3+3) to get the total KM Index number of 12. This number was then divided by the total number of KM elements/questions answered (12/24) to determine the KM Index Score. This last step normalizes the data by converting the score into the range of 0 to 1. In this example, the overall KM Index Score was 0.5 or 50% (12/24=0.5) (see Table 4).

Table 4. Calculation of the Knowledge Management Index Score

KM Element	Number of KM Elements, by Domain	Number of Questions Answered	KM Index Number by Domain	KM Index Score (0 to 1) by Domain
Organizational structure	7	5	3	3/5 = 0.6 (60%)
Learning opportunities	5	5	3	3/5 = 0.6 (60%)
Internal KM culture	10	8	3	3/8 = 0.4 (40%)
KM for global health	6	6	3	3/6 = 0.5 (50%)
Total	28	**24**	**12**	**(See below)**
Overall KM Index Score (normalized range: 0 to 1)	**12/24 = 0.5 (50%)**			

The closer the overall KM Index Score is to one (or 100%), the stronger the organization's KM capacity. However, while the KM Index Score can give organizations a good indication of their KM capacity strength, it is not prescriptive. Each organization should interpret the score along with qualitative data, such as main findings and suggestions for improvement, based on its unique circumstances, as shown in the Case Study section.

Figure 1. A sample form (organizational structure) in the Knowledge Management Index (The Knowledge for Health Project 2018)

The Knowledge Management Index

I. Organizational Structure				
Description	**Key KM Elements**	**Illustrative Probes**	**KM Index Number**	**Notes/Recommendations**
The organization has a common vision for KM, including an accepted definition of KM and a KM strategy related to the organization's mission. Resources are allocated for KM activities, including staff time and funds. The organization has staff members specifically assigned or dedicated to KM activities and responsibilities. Employees are knowledgeable about KM concepts, such as types of knowledge and knowledge exchange techniques, and perform their KM roles consistently as part of their job function.	1. Does your organization have a definition for KM?	What is your organization's definition of KM?	0 / 1	
	2. Does your organization have a KM strategy for internal KM?	What is your organization's internal KM strategy?	0 / 1	
	3. Does your organization have a KM strategy for external KM?	What is your organization's external KM strategy?	0 / 1	
	4. Does your organization have a staff member(s) assigned to internal KM activities and responsibilities?	How many employees are assigned to KM activities?	0 / 1	
	5. Does your organization set aside funds for internal KM activities?	How much money does your organization set aside for KM activities?	0 / 1	
	6. Does your organization set aside funds for external KM activities?		0 / 1	
	7. Does your organization conduct periodic surveys of all employees to determine information needs and measure satisfaction with existing KM activities?	How does management use findings from surveys?	0 / 1	
Calculate KM Index Score (Normalized Range: 0 to 1)	The total of KM Index number divided by the number of questions answered =			
Organizational Structure KM Index Score and Key Notes/Recommendations				

Implementation of the KM Index

In order to implement the KM Index, the facilitator—who has skills in planning and conducting focus group discussions and analysing data—should manage and implement the following steps.

Planning

Before conducting the focus group discussions, meet with the organization's leadership to discuss their health information needs and strategic plan for strengthening KM. As every domain does not need to be measured for every organization, it is important to work with the organization to identify their specific needs and wants. Ask the organization to identify a staff member to serve as a KM Champion—the person who will be responsible for implementing recommendations and advocating for improved KM.

Organizing focus group discussions

Ideally, focus group discussions should include participants from different teams and different managerial levels. However, depending on the cultural context, factors such as age, gender, and position in the organization's hierarchy should be considered when determining focus group composition so that participants feel safe and encouraged to discuss issues candidly and equally. Each focus group discussion should have no more than five participants. Along with the facilitator, there should a note-taker, who is not a participant, to support the facilitator and record key discussion points in each session. Begin the discussion by setting ground rules—such as keeping responses confidential (not discussing them outside of the session)—and then facilitate the session by reading the description of the domain to the group and asking the relevant KM element questions.

Analysing and presenting findings

Analyse the qualitative data from the focus group discussions for common themes, issues, and potential recommendations. Use the qualitative data to score each KM element and calculate the KM Index Score as shown in the previous section. Findings and recommendations should be presented to the organizational leadership and KM Champion. The facilitator should work with the organizational leadership and KM Champion to discuss the implications of the findings, refine the recommendations, and develop a feasible action plan to implement the recommendations that the KM Champion will move forward.

Case Studies

The following two case studies illustrate how the KM Index was administered, how the findings from the KM Index were translated into actionable recommendations to design successful interventions through a systematic and rigorous approach, and why this is a promising model for measuring KM capacity to improve health administration.

Case 1: Use of the Knowledge Management Index by a Regional Health Organization in East Africa

Background

The purpose of the study was to gain a comprehensive understanding of the process and effects of KM interventions implemented by a regional intergovernmental organization in East Africa. The organization was established to foster and strengthen regional cooperation and capacity to address the health needs of their member states and to promote the efficiency and effectiveness of health services in those countries. The study was conducted as part of the organization's implementation of a two-year project to improve the exchange of knowledge concerning health

service delivery among governments and stakeholders in their member countries. Recognizing the importance of having strong assessment tools to examine how KM interventions could influence learning, behaviour, and results within the context of health systems, the KM Index was used as part of a suite of tools to conduct a systematic baseline/endline assessment of the project.

Study Design and Methods

The study team collected the data using the KM Index at two points: at baseline (August 2015) to measure existing KM capacity and at endline (October 2016) to gauge the impact of KM interventions. We employed a mixed-methods approach using three instruments: an early iteration of the KM Index, a structured survey, and key informant interviews. The KM Index specifically looked at two research questions: "What are the KM capacity strengths, weaknesses, and gaps among staff members to manage knowledge management activities?" and "How have the KM capacities changed due to the project activities specifically related to improving the exchange of knowledge?"

We divided the participants into two groups: junior- to mid-level staff members, such as programme specialists, assistants, or officers, and mid- to senior-level staff members, such as programme managers and directors. Altogether, four focus group sessions were conducted with a total of 18 participants (a few of whom participated in both the baseline and endline assessments). Each focus group session lasted approximately two and half hours. In all focus group sessions, the facilitator and note taker noted a binary number (0 or 1) and quotes or observations for each question. We organized both the quantitative data (binary number) and the qualitative data (notes) into spreadsheets using Microsoft Excel to calculate the KM Index scores and examine trends.

Results

The analysis of the KM Index score revealed overall improvements in each domain from baseline to endline (see Table 5).

Table 5. Knowledge Management Index Scores at baseline and endline

Domain	**KM Index Score (0 to 1)**		**Percentage point increase (endline – baseline)**
	Baseline	**Endline**	
Organizational Structure	0 (0%)	0.57 (57%)	0.57 (57%)
Learning Opportunities	0.25 (25%)	0.75 (75%)	0.5 (50%)
Internal KM Culture	0.29 (29%)	0.43 (43%)	0.14 (14%)

KM for Global Health	0 (0%)	0.75 (75%)	0.75 (75%)
Total	**0.14 (14%)**	**0.59 (59%)**	**0.45 (45%)**

The improvement of KM Index scores corresponds to detailed feedback given by participants. We organized main findings on the four KM domains in Table 6 to illustrate how the intergovernmental organization used the baseline data to identify recommendations and create its action plans, and how the implementation of KM activities contributed to the changes in KM culture and capacity.

Table 6. Baseline, action plan development, and endline stages

Domain	Baseline	Recommendation/Action Plan	Endline
Organizational Structure	• KM concepts were new for some and KM values were not well understood • No staff or team had designated KM coordination roles • Staff expertise was not well known or shared across member states	• Identify a team of KM Champions or coordinators at the regional headquarter office and in member states who would take a lead KM role • Create an internal staff skill matrix or directory	• A new position of KM programme officer/manager was created and a KM team was established to provide leadership in all aspects of KM • The senior leadership support KM as an organizational commitment
Learning Opportunities	• KM training had been offered mainly to managers • No funds had been set aside for other KM training or networking opportunities	• Consider organizing virtual forums or meetings to facilitate ongoing interaction and skill building among various staff members	• Training opportunities on KM concepts and techniques were provided in-person or virtually • Staff members were encouraged to participate in professional networking groups, technical meetings, or conferences in-country and in the region
Internal KM Culture	• No specific KM strategy or systematic process was in place • No incentives were given for networking and sharing knowledge	• Create tools and templates to help member states organize their contents and facilitate/foster knowledge flow	• Staff members were encouraged to use new tools to share knowledge in a variety of ways • Incentives or rewards may be given on an ad hoc basis but was not fully practiced yet

Table 6. Baseline, action plan development, and endline stages *(continued)*

KM for Global Health	• The biannual regional conference offered opportunities to share best practices in selected topics across member countries; however, non-participants were not informed of the most current and comprehensive information	• Ensure that the website/online library provides up-to-date materials on relevant topics • Increase the visibility of the regional portfolio of health activities by highlighting best practices, lessons learned, and other programmatic experiences	• The state-of-health report was produced providing a good example of how knowledge was collected from each country, analyzed and synthesized at the central level, and then disseminated to the member states and the public via the website

Implications

The intergovernmental health organization used findings from the baseline assessment to accelerate various KM initiatives that had just been implemented. Because senior leadership had committed to investing in KM, within a short period the organization was able to mobilize both human and financial resources and produce concrete outputs. Findings from the KM Index indicated that the organizational KM capacity was low and showed where and how the organization needed to make strategic investments in its KM action plan. As a result, when used as an endline assessment, the KM index was able to document that the organization was starting to build its KM capacity and where improvement was still needed.

Case 2: Use of the Knowledge Management Index at a USA-based global health project

Background

Our experience testing the KM Index with the regional intergovernmental organization provided us with useful insights to further refine the domains, questions, and format of the KM Index. After revising the KM Index, we retested the tool with staff at a USA-based global health project to ensure the clarity of questions and the usability and validity of the tool.

The project has a mission to improve family planning and reproductive health services in low- and middle-income countries by working to change the way necessary and critical health knowledge is accessed, shared, and used. Because KM had already been an integral part in this project's overall strategy, this study was considered a midterm assessment to gauge progress and inform potential course corrections. To that end, the key objective of this study was to assess the project's internal KM capacity and develop recommendations to strengthen its KM practices.

Study design and methods

Between April and June 2016, the study team conducted five focus groups sessions with a total of 22 participants. Junior- to mid-level programme staff members not on the senior management team were recruited using a purposive sampling approach and then grouped into one of the five

sessions based on their availability and job function. In order to gather a wide range of perspectives, staff members from the same team (e.g., technology, editorial, product management) could not participate in the same session. Each session had four to five participants and lasted for about one and a half hours. All of the sessions were organized and conducted by one facilitator and attended by at least one note taker. Similar to the first case study, we organized both the quantitative data (0 or 1) and the qualitative data (notes) into Microsoft Excel spreadsheets to calculate the KM Index scores and examine trends. Unlike the first case study, endline data was not collected; therefore, we only had one set of KM Index scores and qualitative information. With this assessment, a conscious effort was made to elicit staff feedback on areas for improvement for each of the domains during the focus group discussion sessions. The feedback was then used to create a KM action plan.

Results

Overall, the USA-based global health project achieved a KM Index score of 0.73. The staff members mostly agreed that they were practicing KM, using KM tools and resources, and integrating KM into the project and that professional development opportunities were available, as shown in the scores for two domains: organizational structure (0.71) and learning opportunities (0.75). In contrast, the internal KM culture domain (0.60) received a lower score. Staff members reported inconsistencies in understanding, capturing, and sharing best practices and lessons learned and made suggestions on how to create a supportive environment and culture to facilitate KM. The KM for global health domain achieved the highest score of 1, reflecting the project's commitment to its mission to "support people around the world learn, share, and act on critical health knowledge." Table 7 presents findings and areas for improvement that were captured from focus group sessions.

Implications

The study team shared the findings with senior leadership, which used them to create a plan for improving internal KM efforts. As a result, a small planning team was formed to identify and lead short- and long-term action items, select priority tasks, and assign responsibilities to specific staff members (see Table 7).

Table 7. Knowledge Management Index Scores, findings, and areas for improvement, and examples of action items by domain

Domain	KM Index Score (0 to 1)	Findings	Areas for Improvement	Examples of Action Items
Organizational Structure	0.71 (71%)	• They had a standard definition of KM • Different KM tools were used for internal/within the organization and external/out of the organization • KM responsibilities were shared; there was a budget for external KM	• KM definition could be simplified or made easy to remember • Project's KM tools could be linked the organizational KM strategy • Level of effort/budget to fulfill internal KM responsibilities may not be adequate	KM definition and strategy: Create a handout, short and long definitions, and reorient staff KM roles and responsibilities: Create activity agreements for staff on internal and external KM responsibilities
Learning Opportunities	0.75 (75%)	• Professional development and ongoing training opportunities on KM were available both internally and externally • Staff members were able to attend conferences and meetings	• While learning opportunities existed, budget constraints could pose a barrier because the staff time was covered by the project funds, which do not provide much flexibility	Training and professional development: Implement training plan that provides consistent trainings for staff New staff orientation: Standardized orientation for new project staff
Internal KM Culture	0.60 (60%)	• Sharing and testing of new ideas and approaches were encouraged and regarded as part of the culture • Best practices and lessons learned were captured and shared but not systematically project-	• It would be helpful to streamline the process and platform for documenting and sharing best practices and lessons learned among various project teams • Staff members were unaware of the anonymous feedback form and should	Recognition: Implement activities related to staff appreciation that focus on personal appreciation (not always outward kudos at

		wide • Some staff felt comfortable reporting problems, but others did not	be informed of it	meetings) Best practices documentation: Discuss with the senior management and develop a process and guidance for determining best practices

Table 7. KM Index Scores, findings, and areas for improvement, and examples of action items by domain *(continued)*

KM for Global Health	1 (100%)	• Opportunities to join professional organizations on relevant health topics were available, and many staff members participated in professional organizations • The project's website was kept up-to-date and tracked via usability testing, surveys, interviews, and web analytics	• This domain directly related to the project mission, and therefore there was no particular area for improvement.	Not discussed at this time because this domain corresponded to the project activities already identified and detailed in its annual work plan and budget
Total	**0.73 (73%)**			

Discussion

The two case studies provide evidence of the KM Index's ease of use and wide applicability. While the two organizations differ in their objectives and contexts, the key domains of the KM Index—organizational structure, learning opportunities, internal KM structure, and KM for global health—were highly relevant. These domains are the ones that most, if not all, learning organizations must sustain and foster in order to create a KM culture. The KM Index is a flexible and adaptable tool that can help organizations identify existing and potential capacity to implement KM, identify potential opportunities to improve the implementation of KM, and develop an organizational action plan to strengthen KM capacity. Because the KM Index is

modular, organizations may choose which modules are most applicable and include relevant staff in the administration of the tool. Through our experience, we confirmed that the KM Index can easily be applied to all income settings. This is partly due to the universal language used in the tool and its mechanism for data collection and tool administration.

Considering its overall benefits and strengths, the KM Index is highly applicable to any organization providing KM assistance to their audiences or clients in the social development or business sectors. Inspired by the tools and instruments in the business field, the KM Index was developed primarily for KM researchers and practitioners working in global health and, therefore, it includes an additional domain: "KM for Global Health." The questions in this section are easily customizable: the topic of interest (asked in the initial question) does not need to be health related and the domain can be tailored for organizations to evaluate staff knowledge on any topics or issues.

The KM Index is also a critical planning tool. As capacity building requires milestones to indicate that capacity has been built, the KM Index can provide a baseline measure of capacity, so organizations can assess which KM domain(s) need improvement. Therefore, if an organization implements KM initiatives or interventions, the KM Index can be administered again after the initiative or intervention to ascertain the success and impact of KM programme activities. Indeed, in the first case study, the organization used baseline assessment findings to inform their subsequent KM activities and were then able to gauge the effect of these KM activities through the endline assessment. In the second case study, while the organization did not conduct a follow-up assessment, there was clear evidence that the findings from the KM Index were turned into concrete practical action plans.

Limitations

To use the KM Index to its full potential, KM practitioners should understand possible limitations of the tool. First, the KM Index is not designed to address higher level outcomes or impacts from the KM interventions in the broader development context. Its primary focus is to demonstrate the effect of managing knowledge internally in organizations. While the last domain covers the KM for global health as a topic, the questions in this domain look at the processes and the initial stage of outcomes in the organization's KM performance. Second, we do not know if the KM Index will work well as a self-administered subjective assessment tool yet because we have not tested it for that purpose. The KM Index is intended to be administered as an objective and reliable instrument by an external researcher to capture, analyze, and present findings to the assessed organizations. Similarly, when KM practitioners desire to use the KM Index to compare various organizations and make inferences, for example, as "organization A is doing better than

organization B," without the presence of skilled researchers and rigorous pre-testing, the scores and results may not be objective or comparable due to external factors and possible biases.

Conclusions

The KM Index is a tool to measure the effectiveness, efficiency, and the value of KM capacity strengthening in organizations. The tool is mainly intended for the use by KM practitioners and health professionals working in a global context. Beyond its initial intended purpose, based on our systematic testing and refinement efforts as well as our thorough analysis of two scenarios using the case study approach, we conclude that the KM Index is highly flexible and pertinent to various development contexts other than global health. To further validate its applicability and adaptability, we recommend continued research on the KM Index and the measurement of KM capacity strengthening at large in various development contexts.

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